

CSR World Leaders Volume 7

A Work of Reference

A selection of International CSR Excellence Award-winning papers, demonstrating corporate social responsibility programmes at their best.

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THE INTERNATIONAL
CSR EXCELLENCE AWARDS

for companies that have a heart

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C

CSR WORLD
LEADERS

CAMBRIDGE PROPERTY INVESTMENTS
- UK

Greener lettings

Page 19

CPI are recognised as a letting agency that handles great properties, ensuring that their EPC levels are at the very best of their potential. As well as supporting local football teams, they also fully back a charity call JOY - supporting children suffering bereavement, and raising awareness of mental health conditions.

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D**DENSO MANUFACTURING UK – UK****Community projects****Page 23**

Nine community projects have been established, aligned to the needs of the local community. These include environmental conservation; providing 2,700 hours of community support so far this year; working with Age Concern; helping Telford Council on road safety for schools; and contributing £50,000 towards projects.

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DUBAI POLICE - UAE**General depart of society happiness****Page 26**

For Dubai Police, corporate social responsibility means going beyond their core business. They have launched 47 CSR initiatives in three years, with 900,000 individuals benefiting. This has included a blood donation initiative; employee care programmes focusing on the quality of working life and stress; plus outstanding initiatives around the victims support programme and the Human Trafficking Centre, which both provide free service to victims.

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G

GORILLA SPIRITS - UK

Page 30

Gorilla Spirits are committed, and contractually obliged, to pay £1 to The Gorilla Organisation for every bottle of spirits sold. Their coffee liqueur uses coffee beans sourced from individual small growers in Rwanda, the price paid exceeds that of Fair Trade. By supporting the rural economy of Rwanda they are helping to prevent encroachment into gorilla territory. They have also worked with a local farmer to help re-purpose redundant farm buildings for the location of their distillery which uses the latest in energy efficient heating and air conditioning systems and they are working hard to eliminate the use of single use plastics.

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H

HORIZON THERAPEUTICS - USA

The Perspectives/IIT MSA

Page 34

The Math and Science Academy serves 600 students from under-resourced communities in Chicago. Students are often deprived of food, live in violent neighbourhoods, or are homeless. Horizon Therapeutics knew that supporting MSA would foster an authentic connection for its employees. Projects were set up to create a safe and conducive learning environment, improving the infrastructure of the school and meeting the basic needs of the students. In the last two years, , Horizon has given more than \$350,000 in financial donations, more than \$300,000 of in-kind donations, and more than 1,000 volunteer hours to MSA.

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IFS - SWEDEN

Zero hunger

Page 39

A good education is the backbone of society and the surest way to a sustainable economic situation. The IFS Education Programme is an attempt to address these challenges by putting IFS's skilled employees and financial resources at the disposal of educational institutions in 50+ countries. As a result, over 90 schools and universities around the world collaborate with IFS to improve education for thousands

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K**KUWAIT OIL COMPANY - KUWAIT****Reduction in gas flaring****Page 44**

Kuwait Oil Company developed a comprehensive strategy to maximise domestic gas use. A key component has been to capture associated gas, instead of wastefully releasing and flaring it during oil production. This had resulted in the reduction in gas flaring from 19.7% in 2008/09 to 0.62% in Q1 2015/16 through the commissioning of various West Kuwait surface facilities. The commissioning and successful utilisation of these facilities have helped the company achieve this important strategic objective.

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LEARNING POOL - UK

Page 46

Learning Pool are committed to behaving ethically and contributing to economic development while improving the quality of life to their workforce, their families and wider society. As well as supporting scholarships, the team is continuously involved in local community initiatives throughout the year. In December alone, they raised £720 and donated another £2000 worth of food and clothes to worthy causes.

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M

MC GEE - UK

Page 50

CSR features high on McGee's list of priorities, which includes supporting the communities they operate in through education, volunteering, sponsorship and donations. McGee also supported the 60th year of the Stroke Association with free advertising on their hoardings and truck livery. They aim to raise £10,000 for the Stroke Association this year and they recently raised £20,000 for Breast Cancer.

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N**NATTA BUILDING COMPANY - UK****The NATTA Family****Page 56**

During 2019, community projects will be undertaken at five Natta sites and they continue to support three nominated charities - increasing the level of giving in line with predicted company growth. Donations of more than £100,000 have been made, including community build projects.

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NORTHERN GAS NETWORKS - UK**Community Promises Fund****Page 60**

Since 2016, Northern Gas Networks have been working in partnership with Leeds Community Foundation to deliver their Community Promises / Partnering Fund. The scheme provides funding for third sector organisations to deliver a free service for customers in vulnerable circumstances. Grants range between £1k and £10k. As well as a short-term funding boost, NGN want to find organisations who can become long-term partners. These partnerships are seen as an opportunity to build ongoing relationships and explore further opportunities to provide support and share learning. £200,000 has been allocated since 2016, with almost 6,000 vulnerable people benefiting directly, and seven recent projects helping many others.

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N**NORTHERN POWERGRID - UK****The comfortable living project****Page 66**

NORTHERN POWER GRID have been working in partnership with Leeds Community Foundation to deliver the comfortable living project. The scheme provides funding for third sector organisations to deliver grass roots initiatives - tackling issues such as fuel poverty, energy efficiency, gas and electricity safety.

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**NORTHUMBRIA HEALTHCARE NHS
FOUNDATION TRUST - UK****Volunteering****Page 70**

The Northumbria Healthcare NHS Foundation Trust works in partnership with Kilimanjaro Christian Medical Centre to improve healthcare services for the people of Tanzania as part of their Global Corporate Social Responsibility programme. Their healthcare professionals volunteer during their annual leave to teach and train Tanzanian healthcare professionals across a wide range of specialities.

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N

**NORTHUMBRIA HEALTHCARE NHS
FOUNDATION TRUST - UK**

Support the arts

Page 74

This programme is now established over a 500 square mile area, capturing a population of almost 500,000 who access healthcare through 11 hospitals and 60 community healthcare facilities. They have forged strong partnerships in their local communities to bring art and artists to the healthcare environment. Arts and wellbeing is now embedded in their CSR programme and continues to find new reach.

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P**PEOPLE OF DETERMINATION COUNCIL
– UNITED ARAB EMIRATES****Initiatives****Page 79**

POD Council was established to set up a clear vision, mission and roll-out of the “People Of Determination Strategy 2021”. This features many innovative programmes aimed at enhancing inclusion and achieving greater safety, by focusing on Health, Rehabilitation, Education, Employment, Social Protection; and promoting public life, culture and sports.

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PGT-RECLAIMED - VIETNAM

**Why cut one down when you can use what's lying
on the ground?**

Page 84

The company uses only reclaimed and FSC-certified wood. Their 500 workers export around 3,300 tonnes of high-class quality furniture each month to almost 20 countries. Last year, PGT-Reclaimed's factory was recognised as the 'model factory' for the furniture industry by auditors who judged the factory's cleanliness, environment for workers and sustainable practices, among other criteria.

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S**SAUDI ARAMCO - SAUDI ARABIA****Self-cleaning wringing separator****Page 89**

Yanbu refinery department piloted a new technology to resolve industry chronic concerns with enhanced safety, efficiency and environmental benefits, the Self-Cleaning Wringing Separator. Black powder is a typical contaminant usually found in sales gas pipelines. Its presence can cause major operational and maintenance issues. The separator vessel delivered a 99% efficiency, eliminating throughput reduction and cartridge waste generation while promoting local industry boosting. The novel solution can be applied at many facilities as most of these industries normally have these systems.

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T**TANAP NATURAL GAS TRANSMISSION
COMPANY - TURKEY****JV of BP, SOCAR, BOTAŞ****Page 92**

The Trans Anatolian Natural Gas Pipeline Project supplies natural gas from Azerbaijan to Turkey and Europe across a distance of 1,850km. TANAP Social and Environmental Investment Programme contributed to the economic and social development along the pipeline in 20 provinces, 67 districts and 600 villages by providing grants to around 1,000 projects. The programme included the installation of solar panels supplying 90% of energy; 601,448 saplings were planted in 12 provinces to enhance biodiversity; and 91 villages were provided with reliable water supplies.

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TICKETAID - UK**Page 98**

From humble beginnings as an idea to provide a philanthropic alternative to the secondary ticket market, TicketAid transformed into the globally accessed proposition that you see today - raising over \$100,000 for charity in the past year, and engaging more than 4,000 workers across the globe through transforming corporate waste into donations that fill seats for good causes.

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VESTEL HOME APPLIANCES - TURKEY

Wastes management

Page 102

Vestel Home Appliances is one of Europe's leading producers, making 45,000 home appliances a day in six different factories within one single campus that expands to 1.3 million square metres. By using components gathered from scrapped appliances, they designed a walker for disabled animals. With this project, they decreased their waste and at the same helped disabled animals free of charge. They hope to help 250 disabled animals this year.

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**WARNER BROS. ENTERTAINMENT - UK****Warner Bros. Creative Talent (WBCT)****Page 104**

Warner Bros. Creative Talent develops and supports young people who wouldn't otherwise be able to pursue a career in creative industries due to financial and social constraints. It creates a pipeline of talent for an industry which is booming in the UK. Creative Talent alumni – over 300 people - have forged successful careers in the industry, and have over 35 nominations and awards, including BAFTA nominations.

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WPP INDIA CSR FOUNDATION - INDIA**WPP India****Page 109**

WPP addressed the key social challenges in India's youth, education and employment with the launch of WPP India Foundation in 2015. They work with almost 20,000 children, who are first-generation learners from the urban and peri-urban slum communities in Mumbai and Delhi. The academic outcomes have improved on average by 35-points among the children and over 70% of the children are employed or pursuing higher education.

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CAMBRIDGE PROPERTY INVESTMENTS LTD

In content we are a green company that lets better quality and more environmentally friendly properties to tenants that don't have to pay the earth to move in whilst supporting our local community and raising necessary funds for a great charity.

All evidence of this can be found on our website
<https://www.cambridge-propertyinvestments.com>

Cambridge Property Investments are at the moment a new and small estate agency here in Cambridge but we are already making fast progress and a great impact in our community.

We are recognised as a letting agency that lets great properties ensuring they are all up to a certain standard, it is important to us to ensure the EPC levels are at the very best of their potential ensuring our lets are greener, We are a family run business having the main focus on family, we run what we call a fair tenant policy meaning that our tenants don't get charged loads of unsightly fees ensuring we make the move run transaction an easy one and as for charity not only do we support local football teams in our community but we also full back a charity called JOY joycharity.org.

We put a percentage of all fees straight into JOY, we promote their events and we help where ever possible. We believe at CPI that we can run sustainable business without charging the earth so we can ensure we look after our tenants best interest and we have chosen a designated charity to work closely with as we believe we can make a big difference too.

In content were a green company that lets better quality and more environmentally friendly properties to tenants that don't have to pay the earth to move in whilst supporting our local community and raising necessary funds for a great charity

Cambridge Property Investments Ltd are a unique Cambridge lettings agency, property investment agency and Cambridge relocation specialist that offer the complete property investment package, A package that offers landlords, tenants and professionals looking to relocate absolute peace of mind - We're here to help.



Cambridge Property Investments Ltd® is owned by the award winning Mathew Maltby who has been awarded the title of the best letting agent in Cambridgeshire 3 consecutive years running by the likes of allAgents, with a wealth of local knowledge from living in Cambridge for over 40 years and working in the property sector for over 25 years now Mathew offers all the information that you will need to make you a success with your property or portfolio.

Mathew believes his success is due to his ability to have a great relationship with all landlords and tenants meaning any issues can be resolved fast and effectively, that combined with the many courses and qualifications gained throughout his career placing him at the top of the property sector. Mathew also

specialises in HMO properties here in Cambridge.

Not only will we help you find great investment properties in Cambridge and modernise them into fantastic rental opportunities obtaining you your maximum yield but Cambridge Property Investments also offer an extensive range of management services meaning that you will be left completely stress free with us letting out your properties for you in and around Cambridge.

At CPI we have a family run team of fully trained agents waiting to fill your properties with thoroughly referenced tenants meaning that we don't just find you any old tenant, we find you the best tenant and all within a great price, so good in fact that we offer our services with a price promise! you provide us with written details of an offer from an alternative letting company and we will either better it or match it without compromising our high standards and award winning service that we are known to provide.

Cambridge Property Investments also offer a complete Cambridge relocation service helping professionals to relocate to Cambridge with ease - we boast professionals that are extensively in the know about the local areas, schools and amenities offering you the best advice whilst showing you properties that suit your specified requirements all within the comfort of a chauffeur driven vehicle, so if you're looking to relocate then why not give us a ring, we'd be happy to hear from you and can help you to find the right property in the right location making sure you get the very best for you and your family.

Finally we also boast an internal team of professional maintenance contractors ensuring that all works are carried out to the highest of standards at all times and with a reasonable price. Using our own team of contractors means that we can save a bit of money which in turn allows us to pass the savings onto our landlords and tenants accordingly, our savings become your savings!

Often we assist our landlords with purchasing

their new rental investments, we will attend your initial viewings of your new property prior to the purchase with you and my head contractor will also accompany you to provide the necessary and valuable information of exactly what your potential investment will need to have done to it to ensure it reaches its maximum yield. More often than not we turn run down properties into high end rentals as at CPI we fully believe that a great property will breed a great tenant!

Our Community



At Cambridge Property Investments Ltd ® we pride ourselves in putting our community first, We advertise through local business, we use local businesses for our boards and stationary etc but most importantly we like to give a little back to our community. We do this in various ways and we would like to share a little insight into what we do with you:

Newmarket Letting Agents

This year we have sponsored a local area making sure it blooms with stunning flowers all year long, The flower bed in Newmarket, Cambridge sits just across the road from the town's main shopping centre meaning that each and every visitor into the shopping centre can enjoy the sights of our flower garden - We keep our flowers in as great condition as our properties, ensuring that our community is kept happy.

Cambridge Constabulary



**Creating a safer
Cambridgeshire**

This year Cambridge Property Investments Ltd ® are proud to be the official sponsor of the Cambridge Constabulary official police hand book, the proceeds from this book go toward keeping the streets of Cambridge crime

free, Cambridge is a great place to live and the crime is relatively low and we believe that this is due to the community spirit and everyone doing their bit to keep Cambridge a great place to live and we are extremely proud to be doing our but too.

C.P.I Charity

Not only do Cambridge Property Investments Ltd ® sponsor our own community but we also recognise the work of some other truly amazing people! CPI Ltd ® are proud to announce that from now on we will be sponsoring J.O.Y as our designated charity. J.O.Y is a charity that support kids suffering bereavement and raise awareness of mental health issues.

We will also be sponsoring @BigBearF1 in his charity fund raising campaigns. Two amazing causes for two totally different reasons but both doing amazing things and were proud to be part of it by helping them along their journeys, you too can be part of these amazing journeys by sponsoring them on their specific sites, links are available below for you, please help us to help them make a difference.

A gift of J.O.Y @JordieOnYou



Cambridge Property Investments Ltd ® are proud to be raising money for the charity! JOY - Jordan Maltby was a loving young man that always put others 1st and always made others smile. Sadly Jordan unexpectedly passed away Christmas morning of 2017 leaving his family and friends distraught, nobody actually new how important Jordan had been to so many people until his funeral where it was in undated with people wanting to pay their respects. For this reason we would like to bestow an act of Jordie On You (JOY). All funds raised by J.O.Y will go towards helping kids suffering bereavement and to raise the necessary awareness of mental illnesses. So many people suffer with mental illness of some description and are often overlooked due to lack of knowledge or funding and often children that are suffering from bereavement are left to suffer a loss in silence but together we can help to change this. You can make donations direct to JOY on their crowd funding page <https://www.justgiving.com/crowdfunding/joy-charity> or perhaps you would like to do some fund raising for JOY yourself? then you can contact them direct via their website here: JordieOnYou

After Jordie had passed away it was discovered that he had recorded a song called Valentine which is now available on itunes, all proceeds of the sale of this song will go directly to charity so why not download it right away, its just 79p and will make a huge difference to someone that really needs it? Go download valentine now on itunes and bestow your own act of JOY on someone and show that you care: <https://itunes.apple.com/us/album/valentine-feat-matt-day-single/1331490741>

Together we can bestow an act of JOY on many and change lives that otherwise would be left devastated.

Cambridge Property Investments Ltd ® are the official sponsors of a few local football clubs this season 2017/18 and will look to do the same again in the 2018/19 season as we believe that community is key, we believe that by creating a better community then we can provide a better class of property letting, we believe that we're Cambridges most prestigious letting agency and strive to stay on top of our game. CPI provide great properties that are situated in great areas and we boast both great landlords and tenants, This enables us to provide a seamless property let in Cambridge as our relationships with both Landlords and Tenants are important to us.

DENSO MANUFACTURING UK LTD

Over recent years DENSO has built a school network to promote and deliver a range of education programmes to engage young people in Road Safety. A strategic partnership with the local council and local media has strengthened this. Aligned to the UK National Road Safety Programme, THINK!, we know that we are adding value to the community and the Next Generation by Actively Improving Safety. The 50th Anniversary of Telford as a (new) town has provided a great launch opportunity for this campaign. To celebrate this milestone DENSO gifted a revitalised road traffic island to the community. A key feature of the island is the unique “living wall” upon which traffic safety messages are placed.



This project was born out of an analysis of our corporate Core Values: “protecting Lives, preserving the planet, building a brighter future for generations to come”. As an automotive company Road Safety is vitally important to DENSO. For this reason DENSO’s CSR Committee embedded the Department of Transport’s THINK! Campaign into our Strategic CSR Framework under one of three pillars, ‘Valuing Associates’. At this point we decided that specialist

insight was needed as to where we could most effectively target our Road Safety Promotion efforts. We contacted our local (Telford & Wrekin) council and agreed to collaborate with the Network and Transport Department. Part of their remit is to promote road safety.

After an initial scoping meeting it was discovered that both DENSO and the Council had a strategy in place to 2021. We decide to focus on those areas of DENSO and Council strategy with the most convergence. Funding challenges had led to a downturn in school participation in Road Safety training schemes and to help mitigate this our shared priorities were identified as: 1. Increase the participation rate of Primary Schools in pedestrian training - ‘Start Stepping Scheme’ (+25% vs. 2017) 2. Increase the participation rate of Primary & Secondary Schools in cycle training - ‘Bikeability Scheme’ (+25% vs. 2017) 3. Promote these actions through a communication campaign leveraging on the combined strengths of DENSO, Telford & Wrekin Council and the local press (Shropshire Star)

DENSO established a bursary £7500 per year to 2021 in order to match-fund the above schemes in any of the local schools. This was set at 50% DENSO : 50% School contribution per course. In addition DENSO designed and provided hi-vis wrist bands 1500 children and hi-vis jackets for 200 children. A member of the DENSO CSR Committee was allocated to manage the campaign (approx. 100 hours). The broad reach of the council was vital to engage the schools en masse and make the offer available.

The council also delivered the training at individual schools through their qualified trainers. Outputs / Actions We know that the majority of our workforce (Associates) live locally to DENSO and, furthermore, that their children attend schools local to our

Focus on OUR CORE Values – Valuing Associates



site. We decided to engage the younger generation because we believe that by promoting road safety messages to develop early stage understanding we can influence the behaviour of the next generation and, by extension, the behaviours of their parents. In order to engage and impact the maximum number of young people we decided to involve local schools at both Primary and Secondary level whilst being mindful that our strategy would need to accommodate appropriate actions for the two different demographics.

Use of the unique Community gift of the 'living wall' and road traffic island as engagement for community Road Safety promotion (KEY INNOVATION POINT) engagement of Primary Schools across the entire community through a design competition for Road Safety

Active education provision for young children to promote early stage understanding of Road Safety (Bikeability, Stepping Out, Junior Road Safety Officers) aligned to the THINK! Campaign. Utilisation of newly-established Monozukuri Skills Promotion Centre at DENSO to facilitate Road Safety education

Provision of an annual bursary and hi-vis equipment to schools

Engagement levels: Promoted to ALL Primary & Secondary Schools in Telford & Wrekin Cycle safety through the 'Bikeability' scheme (to-date) 31 schools / 643 students Pedestrian safety through the 'Be Bright, Be Seen' scheme (to-date) 25 schools / 758 students
Unique Promotion and Engagement for Young Children

To increase engagement still further DENSO launched a unique, annual competition for young children. They are competing to create the next Road Safety messages for the Community Traffic Island in Telford 50 schools

200 teams

4 winning teams

Seen by over 10,000 road users each week this is a great opportunity for DENSO and the schools to create something important together, delivering value to the community by actively improving safety.

Outcomes and impact

Benefits of the campaign:

Over-achieved the stated objectives of a 25% increase in school uptake of Road Safety schemes / training

Actual improvement was 37% compared to same period in 2017

Sustainable impact and commitment to at least 2021

DENSO has strengthened its profile in the local community and promoted its core values Better understanding of key Road Safety messages by young people

Strong and lasting partnership with local council and local press which we will bring to bear on further campaigns

Strong diffusion of communication message both internally and externally

Annual competition established to engage children creatively in promoting Road Safety messages

Internal and external communication - Engagement

The project pivoted on engaging young people of all ages to become involved in actively promoting Road Safety; through their own actions and by informing / encouraging others. Our communications strategy uniquely centred around the 'living wall' on our local community traffic island. The Road Safety messages are placed there for all to see; Associates and all road users locally. Passing traffic is at least 10,000 vehicles per day! For this reason we used the island as both an internal and external communication channel.

In addition, internally we used our "DENSO Connection" platform to diffuse the connected Road Safety activities and to update status and achievement. This is sent to e-mail as a weekly bulletin, shared on internal screens around the site and pushed to all global DENSO social media channels and intranets as benchmark material.

Direct communications to the school network was facilitated through the council. Additional communication to the wider community has been diffused through local media (Shropshire Star) in print and through Social Media Channels.

DENSO
Crafting the Core

Actively Improving Road Safety in the Community

Background
As an automotive company Road Safety is vitally important to DENSO. For this reason we are working in partnership with Telford & Wrekin Council and the Shropshire Star to promote **Junior Road Safety** aligned to the national framework of the latest available statistics show there were 173 reported road casualties in our Community in one year. We want to reduce this by working together!

The Challenge
DENSO and TWC are running a competition for local primary schools to create the most Road Safety messages for the community traffic island at Hintonwood (see image). Can you help us by using your creativity and eye for design?
This is a great opportunity for your school to create something important together. Actively improving safety.

Each school can submit up to four entries selected from the following categories:
1. Bikesafety
2. Be Bright, Be Seen
3. Seatbelt Safety
4. Pedestrian Safety
Your Design must be:
- Creative
- Simple, clear image / message
- A team effort by participants at your school

Winning Schools will:
- Have their designs displayed on the living wall for the community to see
- Join a technology, innovation and safety workshop at DENSO
- Have their design published in the Shropshire Star
- Receive a framed copy of their design to display at school
- Receive a bundle of £200 to promote Road Safety at the school

Eligibility for entry:
- All Primary Schools in T&W - Target Group Key Stage 2
- Team entries only - There will be four overall winners (one per category)

To Enter:
Please keep your original artwork somewhere safe and send an image of it by e-mail to: road@safety@telford.gov.uk

Actively improving safety, Envisioning a better tomorrow

<Closing date for all entries is Friday 29th March 2019>

DUBAI POLICE

Dubai Police social responsibility:

For Dubai police, (DP) corporate social Responsibility means going beyond our core business of maintain security, prevent crime, and deter criminals to carry out initiatives for the society's benefit. DP's commitment to CSR is demonstrated and continuously improved by emphasizing the importance of values, business ethics and good working conditions for sustainable growth. DP develops and operates its networks in accordance with best sustainable practices

As a police force, DP has social responsibility for not only the community of Dubai but persons traveling through or visiting. Therefore, there is considerable overlap between society and our customers. For example, when we conduct survey we not consult persons using our services but also those residing or working in Dubai.

During the last three years the number of social initiatives launched were 2016 (13) 2017 (17) 2018 (17), but one initiative might include many programs. For example, the human rights initiative includes (43) programs

The number of beneficiaries from DP's initiatives were 2016 (106.874) person, 2017 (337.252) person and in 2018 (488.969) person

Mohammed launches initiative to plant one million trees in Dubai



Net money expend for social initiatives in the last three years in UAE Dirhams were 2016 (3.847.744), 2017(5.550.650), 2018(3.576.500)

Exemplary and distinguished societal initiatives

Dubai police provides exemplary and sustainable initiatives and programs. For example, it sponsors the Zayed International Prize Foundation which is the prestigious award, and worth US\$ 1 million.

The foundation aims to honor and recognize the outstanding achievements in environment and sustainable development. Since inception in 1999, the foundation carried out six cycle. The first cycle winner was former president Jimmy Carter and the second cycle won by British Broadcasting Corporation.

Others outstanding initiatives provided by Dubai police are the victims support program and the human trafficking Centre which both provide free service to victims. These kinds of programs are usually provided by NGOs and not by police forces. Therefore, Dubai police is a leading and distinguished organization

Dubai police 's corporate social responsibility

For Dubai police, corporate social Responsibility means going beyond our core business of maintain security, prevent crime, and deter criminals to carry out initiatives for the society's benefit. Besides keeping our country safe and secure .

Dubai police commitment to CSR is demonstrated and continuously improved by emphasizing the importance of values, business ethics and good working conditions for sustainable growth. We develop and operate our networks in accordance with the best sustainable practices

Dubai Police (DP) launched and implemented

corporate social responsibility approach in 2004, which provides opportunities to formalize its social initiatives. The approach provides social framework to understand the society needs and expectations

Dubai police allocates financial resources for community happiness and societal initiatives every fiscal year as follows: in year 2016 was (DH 27.255.881), in year 2017 was (DH 30.275.814), and in 2018 was (DH 22.8246.93) (see annex No 1)

The general department for society happiness in Dubai police developed comprehensive strategy for three years (2015-2018). The strategy form an integral part of DP strategic plan, which was cascaded, down to department and service unit levels and addressed in detail within each operative plan. (See annex No 2)

According to this strategy, DP launched (47) initiatives during the last three years as follows: in 2016 were (13) initiative in 2017 were (17) initiative and in 2018 were (17) initiative

Society Result examples:

Dubai police is committed to being sustainable organization. It believes in improving people's lives, looking for the Happiness of the society, strengthening and protecting environment. Happiness of the society is platform and a motto shared by all members of DP and is the essence of its fundamental values, principles and the way it does business.

Ethical behavior:

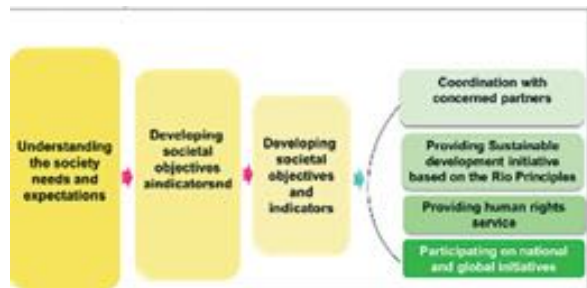
Dubai police Promotes integrity, transparency, and accountability through a set of internal rules and processes.

DP's personnel are acting in ways with what society thinks are good values. They demonstrate respect for key moral principles that include honesty, fairness, equality, dignity, diversity, individual rights and law abiding.

The commitment to behave ethically towards community decreased the misconduct violations during the last three years as shown below: In 2016 were (1810) violation, in 2017 were decreased to (1143) violation and in 2018 were (414) violation and the percentage of misconduct violations decreased by 66%.

On the other hand the number of misconduct committed by the DP's staff were decreased by 77% as follows: in year 2016 were (738) employee , were decreased to (467) employee in 2017 and to (244) employee in 2018 .

Moreover, Dubai police adopt two tenets to ensure that the ethical behaviors of its police officers. First, it have policy spells out their ethical mission and set standards that officers abide to them. Second, ensure that it hire ethical people by screening candidates and hire the most ethical ones. Therefore , the result the percentage of people feel confidence with Dubai police was increased in the last three years as follows: in year 2016 (% 97.8) in 2017 (%97.2) in 2018 (%97.6)



Human rights initiative:

Dubai police adopts comprehensive human rights policy. It protects and maintains the human right standards while conducting investigation, arrest, detention and the use of powers. Dubai police established general department for human rights in 1995. The initiative aims to promote and preserves fairness in relation to race, gender, religions and diversity

The initiative provides human rights programs focusing on protecting mothers, children and workers' rights over the last three-year .

One of the distinguished service provided is the workers complaints service which allows workers in Dubai to submit individual or collective complaints against companies, for whom they work in case of any human rights abuse

Labor complaints, are received round the clock on toll, free 8005005.

The number of workers benefited from this social service in last three years as follows: (28789) workers in year 2016, (20374) workers in year 2017 and (19380) workers in 2018.

The initiative also aims to recover un paid wages for workers and in the last three years the amount recovered in UAE Dirhams as follows : (DH 63619.5910) in 2016 , (DH 33908.721) in 2017 and (DH 69869.445) in 2018

Moreover, Dubai police established human trafficking center aims to provide societal services to the victims of this crime. For example, the center provide long-term services to Trafficking victims. These include victim advocacy, housing, food, medical and mental health treatment, interpretation/translation services and other legal assistance.

The number trafficking victims benefited from this initiative during the last three years were as follows: in 2016 (57) victim, in 2017 (45) victim and in 2018 (29) victim

Victims support program

This service allows victim of crimes to receive assistance and moral support in particular crimes. The number of crime victims supported in the last three years were (105648) in 2016, (113969) in 2017 and (82915) in 2018 (see annex No 6)

Volunteering initiatives:

Dubai police's argues and encourage its employees to volunteering. It launched Electronic Volunteering Platform in 2017, to promote the spirit of volunteering and to create an integrated and sustainable system. Therefore, the number of its staff volunteered in 2016 were (180) person, in 2017 (174) person and in 2018 (180) person, (see annex No 7)

The initiative was praised and appreciated by the Crown Prince of Dubai, Sheikh Hamadan, as he directed the duplication of Dubai Police's Electronic Volunteering Platform initiative across Dubai government departments, to promote the spirit of volunteering (see image No 1)

Blood Donation initiative:

The DP launched (25) blood donation campaigns during the last three years. The initiative makes giving blood easier for employees. The number of blood donors during the last three years were (363) donor in 2016, (359) donor in 2017 and (109) donor in 2018

Employee Care Programs:

Dubai police put in place an approach to enhance the quality of working life. It believe in employees as assets rather than as accosts. For example, it helps in reducing the cost of living for workers by societal services such as providing housing for low-income workers and opening schools without fees for their sons.

Reducing stress and spread positive energy

One of DP's strategic objectives is to make its employees happy, so significant changes have taken place at DP Headquarters to create a more positive work environment that encourages police members to be happy while working

Parts of Dubai Police Headquarters have been given a makeover in a bid to reduce stress and spread positive energy among officers.

Therefore, the result of employee's satisfaction on work environment were stable during the last three years (90.8%) in 2016 (88%) in 2017 and (90.2%) in 2018.

Environmental initiative:



Dubai police has environmental policy aims to reduce the risk of pollution arising through its processes and preserve its environment.

With its environmental management system based on ISO 14001, it makes sure that all its operations, management activities, constructions, maintenance and other initiatives comply with global environmental standards.

For example, it launched program to plant one million tree in Dubai in cooperation with Dubai municipality.

Sheikh Mohammed the ruler of Dubai began the drive by planting the first tree at the main square inside the Dubai Police Academy after unveiling a commemorative plaque for the campaign.

Dubai police in 1999 sponsored Zayed Prize International Foundation, which is the environmental prestigious prize in the world. It is worth one million US dollar. President Jimmy Carter was the winner

of the first cycle in 2000 and the BBC, with its BBC World Service Radio broadcasting was the winner of the second cycle in 2002 and the six-cycle winner was His Serene Highness Prince Albert II OF Monaco in 2016

Communication Approach & Strategy

Dubai police formulates communication policy that stipulates precision and clarity in providing information about its services and procedures to the public. It preserve its image in the community through the dissemination of news about its role in the society. (see annex No 9a-9b the positive and negative news about Dubai police)

Community Satisfaction Surveys

Dubai police conducts an annual survey to measure the community satisfaction on social initiatives and activities that being provided

The survey is classified into different categories such as age, gender, nationalities, race and geographic areas.

The survey examines the society's satisfaction on availability and accessibility of information related to community. It also examines equality in services, education, charitable, health, sports and cultural activities that offered to the public

GORILLA SPIRITS CO. LTD

The Company was founded with CSR principles embedded into the fabric of the business. It is committed, and contractually obliged, to pay £1 to The Gorilla Organization for every bottle of spirits sold.

The Company also seeks out opportunities for product development to further its ethical principles. For example, our coffee Liqueur uses coffee beans sourced from individual small growers in Rwanda. These are sourced by a specialist who ensures that the price paid exceeds that of Fair Trade.

By supporting the rural economy of Rwanda we are helping to prevent encroachment into gorilla territory.

Closer to home, we have worked with a local farmer to help re-purpose redundant farm buildings for the location of our distillery and we are adding to

our local rural economy through tourism and by creating much needed unskilled rural employment opportunities. Our building uses the latest in energy efficient heating and air conditioning systems and we are working hard to eliminate the use of single use plastics.

The below letters from The Gorilla Organization builds on the summary provided.

The Green Organization
International CSR Excellence Awards 1
8 March 2019

Dear Sirs - The International CSR Excellence Awards,

Gorilla Spirits & The Gorilla Organization Everyone at the Gorilla Organization, a small award-winning charity focused on saving the world's last remaining gorillas in the wild is delighted by the support we have enjoyed from our corporate partners, Gorilla Spirits.

We have an excellent working relationship with Gorilla Spirits with whom a no-nonsense agreement operates to donate £1 to our charity for every bottle sold.

Andy and Claire Daniels are visionary entrepreneurs and we have observed the growth of their quality products with awe and admiration.

Claire and Andy are great



listeners and consequently wonderful ambassadors for our charity. It is a pleasure to work with corporate partners who completely get the big picture of community conservation and can consequently speak with conviction about our work at events they organise.

The money generated by Gorilla Spirits supports our work on the front line of conservation, poverty reduction and climate change, helping facilitate the planting two million trees in the Congo basin, creating a green buffer zone around the gorilla habitat and enabling teams of rangers to prevent poaching,

remove traps and combat the militias who run the illegal trade in 'blood minerals'.

Money spent by discerning drinkers also funds conservation education for children and skills transfer for their parents, enabling hugely disadvantaged indigenous people to learn beekeeping and grow crops to feed themselves and to create surplus harvests to sell, with the end result that they no longer need to forage within the gorilla forests.

Unlike CSR at the more usual hi-rate corporate level, this is clear case of entrepreneurs directly

helping smallscale startups and entrepreneurs in Africa. Our experienced African conservation experts, Samson Werikhe and Henry Cirhuza regularly express surprise at the generosity of our UK supporters.

A bottle of Silverback Gin stands in each of their field offices as testimony to the visionary support and tenacity of Andy and Claire and their colleagues. Everyone admires the presentation of the products, which perfectly capture the majesty and quirkiness of gorillas.

We would whole-heartedly endorse Gorilla Spirits' application and hope they will achieve the success they deserve.

Yours sincerely

Jillian Miller
Executive Director
jillian@gorillas.org



Gorilla Spirits Co. was founded by Andy Daniels whose vision was to create a truly ethical business and an exceptional portfolio of spirits and liqueurs.

Based in the north east corner of Hampshire as it borders with Surrey, Gorilla Spirits Co.'s distillery in Upton Grey is where we make our small-batch, award-winning spirits – all while donating £1 to The Gorilla Organization for every bottle we sell.

We're proud of our products and we're proud of the contribution we make to saving the endangered gorilla population.

We're a family-style team, all focused on the mission of distilling, bottling, finishing, distributing and marketing Gorilla Spirits Co.

Supporting Gorilla Conservation

We support The Gorilla Organization with a donation of £1 from every bottle we sell.

Even though the numbers of Mountain Gorillas are on the up they remain an endangered species and still face the serious threat of extinction. Back in 2010 there were only 880 in existence but by 2018 this number had grown to 1004. This small increase in their numbers is to be welcomed and is due to the combined efforts of governments, charities and caring business like us. We can't be complacent though as the growth in gorilla numbers could be reversed at any time because of disease, poaching and encroachment into their habitat. This is why we are proud to donate £1 to The Gorilla Organization for every bottle we sell.

The Gorilla Organization work with communities at the forefront of gorilla conservation with innovative and award-winning projects in Rwanda, Uganda and DR Congo. Its field staff in Africa, supported by fundraising and communications teams in London, oversee a range of grassroots conservation projects, all of them aimed at addressing the key threats facing gorillas today.

My love of food and drink started when I was a young boy being brought up by my single-parent Mum. She was a big influence on me and seemed to have endless knowledge when it came to domestic stuff like sewing, knitting, and cooking. Apart from everything else Mum was a pretty decent baker and I think I spent much of my early years licking spoons in the kitchen! Perhaps it should come as no surprise then that by the time I reached my mid-teens I had a established a pretty good collection of cookery books and magazines of my own.

My passion for all things food and drink has stayed with me all my life and as I approached the twilight years of my corporate life it was finally the right time to indulge my passion and start a business in this exciting sector. In the past I had dabbled with brewing, been a regular cider maker and a hobbyist distiller and having seen from afar a craft distiller movement develop in the USA I knew that I wanted to be part of a similar movement that was beginning to emerge here in the UK. My adventure to create what became the Gorilla Spirits Co. began in early 2011 and it took more than 4 years before our first product, Silverback Mountain Strength Gin, was launched in December 2015.



My vision for Gorilla Spirits Co. is to move with the market by creating a range of the highest quality spirits and liqueurs that people love to drink. But I also want to demonstrate that our business can be successful at the same time as being focused on social responsibility. This means being aware of the impact we have on the world and to find ways to make our impact a positive one.

Our commitment to donate £1 to the Gorilla Organization for every bottle that we sell lies at the heart of what we do but we look beyond this to find many other ways of making a positive contribution too. I was so proud to receive an International CSR Excellence Award in 2019 for our approach and I'm delighted that our story will be written up as an example to be shared with other businesses around the world.

Looking forward you can expect to see some exciting new products coming out of the distillery here in Upton Grey as well as some new and innovative packaging ideas. We love to see people at the distillery so I look forward to sharing more of our story with you when you visit for a tour, masterclass or gin school! Until then, thanks for your support and I hope that you keep enjoying our range of fabulous spirits.

Andy Daniels

Founder and Chief Gorilla

HORIZON THERAPEUTICS

The Perspectives/IT Math and Science Academy (MSA) serves 600 students from under resourced communities in Chicago. Students are often deprived of food, live in violent neighborhoods; others are homeless. Despite MSA's transformative commitment to its students, it lacks the resources to fully accomplish its mission.

Driven by the desire to make giving personal, Horizon Therapeutics knew that supporting MSA would foster an authentic connection for its employees. In December of 2016, Horizon and MSA officially launched a partnership. The impact of what has been accomplished has elevated and inspired both organizations.

The objectives for the partnership include creating a safe and conducive learning environment, creating meaningful exchanges between students and employees through employee engagement, as well as leveraging the support of other impactful organizations in ways that benefit the students

through new programming and curriculum.

Creating a safe and conducive learning environment encompasses improving the infrastructure of the school and meeting the basic needs of the students, such as ensuring students are nourished, comfortable and fully equipped for school. Most recently, Horizon provided employee volunteers and funds to construct a peace and meditation room for students, creating a space to decompress from environmental stressors and practice healthy coping skills.

Working with MSA has provided an opportunity for employees to invest their time and resources, as well as connect directly with future leaders. In the coming years, Horizon will continue to give back and show up, hoping to change the trajectory and pave a new path forward for these courageous children.

Horizon Therapeutics launched its Corporate Social Responsibility function in 2015. As a small to mid-size company, Horizon has emerged as a trailblazer

Our Community: Our Responsibility

At the end of the day, the lives touched, the lives changed, and the lives saved matter most to us.

At Horizon, we are proud to devote our time and resources to initiatives that benefit our community, our patients and our employees.





for giving. In the beginning, Horizon determined that investing in young people would be a powerful way to create a profound, long lasting impact. With that in mind, Horizon began searching for a school that not only reflected its core business values of science and innovation, but also embraced the idea of educating the whole child. After meeting the founder of Perspectives Charter Schools, Horizon knew that it had found the perfect partner.

The mission of Horizon's partnership with MSA is to positively influence students' lives, both in improving their current realities and their future outcomes. Horizon's intention is for students to understand that they are part of a community that extends beyond the confines of their residential communities. Horizon wants to spark hope in the students, to provide a safe space for them to grow their intellectual curiosity, to expose them to new ideas and career paths, and to lighten their load so that they have the emotional bandwidth to process those ideas. In partnering with the school and making it a company-wide initiative, Horizon has the means of generating impact that goes well beyond what Horizon employees could do individually for these students.

Strategy & Execution

Horizon's partnership with MSA is based upon continuous open communication with the school. School administration has the best understanding of what students are bringing into and receiving in

the classroom, and therefore, know what barriers are inhibiting student achievement. Tactics to achieve Horizon's goals fall into three categories: Infrastructure Support, Programming Support, and Employee Engagement.

The need at the school is expansive. Horizon has worked hand in hand with the school's administration to identify the top priorities for the school's facilities, the basic needs of students and areas of development within academics. All the while, Horizon's employees were actively engaged in every project, with financial support and sweat equity, making the giving personal.

To date, Horizon has completed several projects to address the school's infrastructure and student needs. In an effort to restore the dilapidated school building, Horizon financed the installation of a marquis, organized a corporate volunteer project to paint the rod iron fence around the school. Horizon constructed a central front office, reducing entry points into the school and thereby making it safer for students and teachers. Water filtration stations were installed throughout the school to eliminate exposure to drinking water contaminated with lead. Most recently, Horizon provided employee volunteers and funds to construct a peace and meditation room for students, creating a space to decompress from environmental stressors and practice healthy coping skills.

In addition to the infrastructure projects mentioned above, Horizon installed a computer lab equipped with Adobe Creative Cloud, as well as donated an additional 150 laptops and printers that were repurposed from Horizon employees. Horizon has also taken a keen interest in MSA's 50 homeless students, having donated books, school supplies, uniforms, hygiene products, and non-perishable food items, as well as adopting them and their families for the holidays.



Horizon's financial support has also enabled a number of new programs and curriculum to be available for the students at the school, exposing them to new ideas and potential career paths. In addition to guaranteeing the program availability, Horizon employees have generously contributed their time. Employees have mentored students through programming with the Network for Teaching Entrepreneurship, Illinois Science and Technology Coalition STEM Challenge, as well as Horizon's own STEM career speaker series. Students interview the employees participating in the speaker series, not

only developing their public speaking and leadership skills, but also exponentially increasing exposure through a social media mini-series.

Horizon is particularly interested in developing valuable student skills in STEAM, not only because it relates to its core business, but also because it will foster access to high paying jobs in the future. Horizon's various business units (BUs) are also integrating team building volunteer events at MSA.

The BUs have set up equipment, organized college kits for homeless students, presented interactive chemistry workshops to classrooms and conducted mock interviews, among many other activities. Horizon's employees are motivating these students to take their academics seriously, by not only sharing possibilities, but by also demonstrating that others care about their trajectories.

Additionally, Horizon has been fortunate enough to facilitate cross-collaboration between additional resources it has been able to leverage for the students. Due to Horizon's financial support, Kartemquin Films and Louder than a Bomb have provided programming to MSA students on storytelling for college essays and transforming their life experiences into poetry. Horizon

sponsored the robotics team and their participation in robotics competitions, including the Museum of Science and Industry's Robot Block Party.

In just the last two years, , Horizon has given more than \$350,000 in financial donations, more than \$300,000 in in-kind donations, and more than 1,000 volunteer hours to MSA.

Evidence of Results

As MSA reflects Horizon's core business values, Horizon recognizes the potential to draw from the

next generation of STEAM oriented innovators it is currently investing in. In addition to skills development, Horizon has been exposing MSA students to a wide variety of careers through its speaker series, and accordingly, has garnered enough interest to tap into the MSA alumni network for future Horizon interns.

Because our employees go to exceptional lengths to show up for our community partners, such as MSA, Horizon became one of the first bioTherapeutics companies to take the 1% Pledge, joining over 6,000+ companies in over 100 countries. Horizon has pledged, and is already giving, 1 % of company profit, product, and time, and has established an innovative mechanism for employees to participate in giving 1 % of company equity. Horizon understands that although the qualitative impact it has had is compelling for storytelling, it's important to also have a foundational ethos rooted in data and woven into the business. Taking the 1% Pledge has enabled Horizon to do just that.

The engagement of our employees and our commitment to the community is evidenced by the multitude of workplace and CSR recognitions we have been awarded over the years. In 2018, we were named to PEOPLE Magazine's Top 50 Companies that Care, Chicago Tribune's Top Workplaces, Crain's Best Places to Work in Chicago, and #1 in Fortune Magazine's Best Workplaces in BioPharma, among others. Identifying opportunities to give back and serve for employees has fostered a culture critical to attracting and retaining the right talent.

Just as Horizon is committed to effectively enabling positive social change, it is equally committed to capturing and measuring its outcomes. Horizon is working closely with MSA's administration to track the impact of Horizon's giving on the students.

At the start of the 2018-2019 school year, Horizon administered a school-wide survey to inform future programming. Initial analyses of the data suggest students are interested in developing relationships

with mentors in their career fields of interest, as well as building their interviewing skills. In breaking down the data by student interests, Horizon can further align its programming to expose students to relevant mentors and speakers. Additionally, students are seeking to gain time- and stress- management skills. The statistics confirm Horizon's most recent infrastructure investment of a peace and meditation room, and substantiate the need for programming related to emotional wellbeing. Annual data collection moving forward will ensure Horizon is investing in impactful initiatives and best serving the students.

Horizon has recognized the need to do more and responded by investing in a school that Principal Stephen Todd says, "often times feels like there are so many things stacked against [their] students and [their] families." Horizon intends to bolster its support over the coming years, including rolling out a new scholarship program to support students throughout college and cover their tuition expenses in full. In publishing videos annually on the impact of the partnership between Horizon and MSA, Horizon has capitalized upon its social media channels as a platform to reach and encourage other companies to follow our lead and similarly partner with a school. Additionally, the Perspectives Charter Schools network has been able to use our videos in meetings with potential donors and partner companies to exemplify how their support can be impactful.

Most interestingly, what cannot be measured is Horizon's full impact on MSA's students and the students' impact on employees. Anecdotally, Horizon has heard that students feel pride in the way their school looks now, which undeniably spills over into their own confidence. Employees have shared that the engagement with the MSA students has broken down unconscious barriers surrounding the idea that these children are somehow different from their own. The changing of lives on both sides has been both heartfelt and profound.

The future growth of the students and Horizon's support of them and for them is unwavering.



Going to incredible lengths

Horizon is honored to be inducted into the 2020 class of CSR World Leaders.



Horizon is focused on researching, developing and commercializing medicines that address critical needs for people impacted by rare and rheumatic diseases. Our pipeline is purposeful: we apply scientific expertise and courage to bring clinically meaningful therapies to patients. At Horizon, we believe science and compassion must work together to transform lives.

horizontherapeutics.com

IFS – ZERO HUNGER

Climate change is a real challenge for Africa, where it is expected to reduce African food production by as much as 28% if the same agriculture practices continue. At the same time, an increasing population is driving a need for a 70% increase in food production.

IFS has partnered up with Matsei Technologies to integrate smart technology and rural realities through a digital aquaponics farming solution. The working site is a farm near Pretoria where an ecosystem connecting fish farming with growing vegetables use waste in one area to fuel growth in the other. The system is monitored using IoT-technology and

IFS provide the data overview and reports needed and providing the business process before deploying and driving the expansion of the model.

IFS and Matsei believe that this program is a localized African turnkey solution that encourages good nutrition for human development and behavior whilst being a sustainable community aquaponics solution for the future of Africa.

SUSTAINABLE FARMING - A proposal by IFS

BACKGROUND

As a global organization, IFS has the opportunity to affect the world in a myriad of ways. With such power comes the obligation to act responsibly and to target issues that hinder communities to develop in an ecologically sustainable way.

Despite technological advancements the world still struggles with a fundamental problem that has plagued many so called third-world countries for decades: food shortage. Climate change and a population boom in large parts of the world is adding to the problem. The issue of reduction in food production is causing a lack of protein and other nutritious food. Already, Africa is home to 24% of the world's undernourished people. By 2080, Africa will house 50% of the world's undernourished people. In addition, the agricultural industry currently employs 70% of the workforce and contributes 25% of South Africa's GDP.



This food stress issue is contributing to socio-economic problems. It not only causes quality of nutrient to decrease for people, resulting in various social issues such as depression, aggressiveness and assaults, but it will also result in Africa not being able to produce enough food to sustain themselves. This is the problem that IFS, together with partner Matsei, has decided to tackle.

PURPOSE AND GOALS

This collaboration with Matsei Technologies and Consulting targets improvements in rural nutrition, sustainable use of water and the development of more resilient Africa communities. Our goal is to provide the African population with a solution that alleviates food shortage in the long term where each individual can feel a sense of ownership in the farm and pride in using the latest technology.

THE PROJECT

Climate change is a real challenge for Africa, where it is expected to reduce African food production by as much as 28% if the same agriculture practices continue. On the other hand, an increasing population is driving a need for a 70% increase in food production.

IFS has partnered with Matsei to create a solution that integrates smart technology and rural realities - a product of an ecosystem that includes technology, aquaponics and nutritional expertise. The big idea is that a new agri-tech solution could be used to not only improve food production but also drive job creation and support new small businesses. The solution feeds the population today and tomorrow, while laying the foundation for entrepreneurship in the local community.

An aquaponics environment is a closed system where fish are cultivated in tanks, with the ammoniac water from their tanks fed to plants which take nourishment from it and return clean water to the fish. The new solution aims to create protein and vegetables in a

single closed system and it uses about 1% of the land required if traditional farming methods are used.

The system is managed using technology from IFS and Matsei to make sure the ecosystem is stable, that the optimal environment is achieved for both fish farming and vegetable growing and they the local farmers is helped to understand how to maintain the system.

CHALLENGE: USING A HIGH-TECH SOLUTION IN RURAL COMMUNITIES

Technical management: These operations requires a higher level of agricultural knowledge and competent around-the-clock technical oversight as it is susceptible to several technical parameters such as water flow, temperature, chemical quality, and electricity status. All of these challenges have resulted in lower investor confidence in the past. Thus, one of the very important things to make the new solution a success is to instill the mechanisms and instruments that prove to investors that this is under control and sustainable.

OUR SOLUTION: STATE OF THE ART IFS TECHNOLOGY

The proposed solution entails the innovative integration of cost-effective component level technologies into an overall technical and business solution supporting and ensuring the sustained operation of technically sensitive food production operations in rural environments. It entails the following:

- 1) Construction of an Aquaponics Plant: The construction of an Aquaponics plant utilizing simplified designs and materials typically available in rural environments.
- 2) Fitment of the aquaponics plant with IoT Sensors: Production critical parameters on the plant will be fitted with IoT sensors monitoring e.g. electricity status, water levels, pH, flow, temperature, etc.
- 3) Establishment of an Integrated Operations Centre:

The establishment IOC hardware, software and connectivity enabling 24/7 remote monitoring and support of multiple rural operations via the IoT sensors.

- 4) Monitor and control of technical operations: Central technical specialists monitoring rural aquaponics operations on a 24/7 basis providing technical support and oversight in response to alarms and monitors.
- 5) Providing Business Support: Central administrative personnel providing general logistics and financial administrative support services e.g. production planning, input materials planning, budgeting and sourcing.

IFS and Matsei Technologies has collaborated to create this digital aquaponics farming solution. The working site is a farm near Pretoria. The pilot plant uses locally-grown solutions using materials from the local building supplier. A lot of effort has gone into

solutions that can be constructed and maintained in a rural environment.

The system is demonstrated by using a live model of a working farm that uses technologies like Internet of Things (IoT), enterprise operational intelligence (EOI) and advanced analytics to automate and monitor fish aquaponic operations in real time.

LEVERAGING IFS TECHNOLOGY

IFS contributes to the project with manpower and deployment of our business application suite on a central basis to provide coordination on the capacity planning, production planning, MRP, logistic coordination and marketing and sales cycle. As the program extends from the test facility, we will provide centralized management where investors can log into to see what is happening on the ground.

The IFS solution comprises of the following:

- 1) IFS ERP - an enterprise resource planning solution containing administration products and reports such as production plans, materials sourcing plans and budgets, achieved production, maintenance, and market (sales). This can be made available online to stakeholders funding community farmers.
- 2) Integration with IOT based solutions - given IFS internet-based platform and IOT integration capability, continuous access to the technical operation of the plant can be managed and support remotely by multitude of authorized entities.
- 3) Mobility - the increasing rate at which mobile broadband services are becoming available to rural communities means that IFS Mobile Solutions can be used to provide remote access to rural communities.
- 4) Remote Management (IFS EOI) - To ensure efficient management of the business operations, a remote Integrated Operations Centre is established that can be effectively operated with the support of an integrated end-to-end performance management solution such as IFS EOI. All in all,



IFS technology helps with building the plant as well as maintain it.

PROJECT BENEFITS

The agri-tech solution can help communities to further develop as it provides a platform from which e-government, e-health, e-learning, electronic banking, online purchasing and smart security can be built. Potential investors include government, feeding schemes, corporations looking at CSR projects, communities themselves, international agencies and fresh product markets.

IFS and Matsei Technologies believe that this program is a localized African turnkey solution that encourages good nutrition for human development and behavior whilst being a sustainable community aquaponics solution for the future of Africa.

PROJECT COST

IFS's costs for the pilot program has been man hours spent on setting up the system pro bono and giving away free software licenses for the solutions used. The retail value of the time and lost license revenue amounts to roughly \$34 000. On top of this, the cost of constructing the plant, including raw material sourcing amounted to \$110 000.

Extending the solution to more plants is dependent on investor donation as these plants are scaled to feed entire villages.

Small Plant: Cost \$1,5M

- 40 Tons Fish & 5 Ton vegetables per month
- Equates 50,000 x 300 gr. meals per month

Medium Plant: Cost \$3M

- 80 tons of Fish & 10 Tons vegetables per month
- Equates to 153,000 (X300 gr) meals per month

OUR CORPORATE SOCIAL RESPONSIBILITY EFFORTS

OUR GLOBAL CSR COMMITMENT



Large Plant: Cost \$5-6M

- 160 tons Fish & 40 Tons Veg
- Equates to 333 000 meals of 300 grams per month

RESULTS

The pilot installation is working well, but the real impact comes when the concept is rolled out to more African communities on a larger scale. We therefore take every chance to communicate the idea to attract the right partners to increase the impact that we have seen in the pilot project, namely:

- 1) An increase in the food supply through vegetables and fish meat produced
- 2) Nutritious ecological food that in the long run can help to improve the malnutrition situation in Africa
- 3) Drive job creation and support new small businesses in Africa, where the test facility represents a few job opportunities but where a full program could scale this to thousands of high-tech agricultural jobs

KEY LEARNING

The project has been a challenge and a learning experience for IFS and Matsei but has also given us two critical insights.

Firstly, IFS believe that we can accomplish much more by partnering with other companies that we could do ourselves. Having to co-own and agree on a project is always harder than to do things yourself, but the rewards are greater. This is not just a question of scale but of complementary skill sets creating a better solution together, such as in the IFS and Matsei case. Neither company could have accomplished this on their own. Partnering is the future of sustainable farming.

Secondly, building a live test bed rather than presenting a theoretical idea is often the best proof of a concept and build confidence in investors or interested parties. Even though the pilot plant outside Pretoria only supply a limited amount of food, it works as proof that the system is sustainable and that the idea works.

Seeing is believing, which we have experienced first hand in this project.

KUWAIT OIL COMPANY

Reduction in gas flaring from 19.7% in 2008/09 to 0.62% in Q1 2015/16 through the commissioning of various West Kuwait surface facilities. The commissioning and successful utilization of these facilities have helped the Company achieve this important strategic objective.



KOC recently received commendation from the World Bank for its efforts at reducing gas flaring within the Company's scope of operations. KOC officials maintained that this new recognition for its efforts reflects KOC's international standing as a socially responsible company that upholds the valuable contributions of its employees toward environmental responsibility. The recent article released by the

World Bank on its website entitled "Gas Utilization in Kuwait Reaps Economic and Environmental Benefits" praised KOC's success in using nearly 99% of associated gas for production.

The article raised the following question: What happens when one of the world's wealthiest nations with abundant oil reserves lacks enough electricity to power its demand? The answer maintains that it should use an underutilized, readily available resource sitting right under its feet. The article went on to say that since 2008, Kuwait has been a net importer of natural gas, consuming more than it produces and struggling to keep up with growing domestic demand for electricity. It also maintained that KOC recognized there were solutions that could partially solve the growing gas deficit, and that the Company developed a comprehensive strategy to maximize domestic gas utilization. A key component of that strategy has been capturing associated gas, instead of wastefully releasing and flaring it during oil production.

The World Bank article emphasized that KOC, which represents the country in the World Bank-led Global Gas Flaring Reduction Partnership (GGFR), knew





that effective gas management was a key objective for the Company in order to optimize the utilization of a valuable resource and reduce its environmental impact. The mission is to reduce gas flaring to less than 1% of total production by 2017.

To achieve this target, the article added that KOC conducted thorough, periodic reviews of the gas value chain from producing wells to end users in order to identify all sources of waste or potential optimization. Results are monitored at the highest management levels. All of the Company's staff is involved and committed to this objective, which

stands high on their Key Performance Indicators list. KOC's Gas Operations Group Manager, Mohammed Al-Zuabi, was quoted in the article as saying, "We are strongly committed to creating a healthier environment, and we have dramatically reduced gas flaring," adding, "We remain steadfast to further reduce flaring to as low as possible, and I firmly believe this task was only possible because of the complete change in the employees' mindset towards better understanding the environmental consequences of gas flaring and preserving a very valuable resource."

The article then identified KOC's successful gas flaring reduction campaign as a result of several key factors, mainly a solid commitment from all levels of the Company to make flare reduction a priority, significant financial investments in state-of-the-art facilities and operations, close cooperation within KOC departments and with downstream companies and customers in order to adapt to any unforeseen situations and limit the duration of flaring, and a close, productive partnership with GGFR and other organizations to achieve the stated targets.

The World Bank article concluded that KOC is still actively engaged in gas flaring reduction projects, striving to achieve a "Lowest Technical Limit" objective, and working with GGFR on this objective. Top management at the Company constitutes a task force team to continue looking for solutions and develop a roadmap and flare reduction action plan.

LEARNING POOL ONLINE TRAINING

We are a full-service online training provider, offering courses, tools, and content creation to over 650 organisations and two million learners around the world. We're proud that we have a fantastic team with the passion and determination to make things happen.

Building long term relationships, we understand the challenges our client's face. We're obsessive about providing world class customer care and boast a 98% customer recommendation rate. At Learning Pool, we also take our CSR seriously and love to give back. From bake sales and raising money for charities to career enrichment and university scholarships, we consider ourselves an inspirational business. Our efforts have made an impressive impact in our communities and are reflected in our unique culture. We have a dedicated CSR team, who meet monthly to plan and execute a range of community and charity activities that bind the company together.

Corporate social investment helps us build a reputation and brand as a responsible business, which can lead to competitive advantage. We know that most companies favour suppliers who have responsible policies, since this can reflect on how

their customers see them. Being a responsible, sustainable business also makes it easier to help attract high-calibre applicants, recruit new employees and retain our existing ones.

Our guiding principles

We're committed to behaving ethically and contributing to economic development while improving the quality of life of our workforce, their families and wider society.

The company has three core values. These were developed by the team in 2016, they guide the way we operate and help define who we are as an organisation:

1. We've got your back: Learning Pool never short-change anyone and take our responsibility to make the world a better place seriously.
2. Build to grow: our products are great right now and they constantly innovate. Our success is built on our team and creating opportunities for stellar careers is important.
3. Do the right thing: we look after our customers and each other beyond what the contract says or what time of day it is.

As well as these principles, we think of CSR in all brand activities. For example, we donated £1210 to our chosen charities as part of Best Companies survey and raised £2,500 as part of our recent exhibition at Learning Technologies conference.

Here's some more information around our extensive CSR programme which is embedded throughout our company:

Education

We run a scholarship with the University of Ulster to support to support undergraduates for their degree



CSR






VIRTUAL WALK 2019

Lots of activity in March in relation to CSR across the business. We have provided sponsorship for the Walked City Marathon and for the NI Hospice conference.

The team raised money for red nose day in Nottingham with a bake sale and in Derry they're busy raffling tickets to raise money for Age NI.

Various members of the team continue to contribute to both the "time to read" programme and engage with Young Enterprise to support local primary schools in the Derry area.

3 members of the tech team across Nottingham, Belfast and Derry have also offered their support in the shape of mentoring teachers in secondary schools who are introducing a new ICT A level. The idea being that when the teacher is unsure or has questions on a particular topic they will consult with the mentor who will provide guidance.

8 of the team have signed up for the Grant Thornton "Runway Run" to raise money for Simon Communities.

We have launched a virtual walk across the 5 LP sites with teams in each site getting our and contributing to the 2 million step challenge!!

5 of the Derry team took a day out for "be a saint day" and worked in the grounds of the Foyle Hospice.

programmes. This initiative is currently enjoying its fifth year of success. Each student is provided with £4,000 of support, and we also employ them directly (paid placement) for the duration of their one-year work experience.

We also encourage our staff to volunteer and support Young Enterprise, School Employer Connections and other local initiatives with community and educational outreach on a regular basis. This includes school visits, campus lecture-theatre talks and career advice for students.

Community and charity

The company organises a ballot of all staff, which determines the two selected charities that will benefit from their fundraising efforts. In the last year, the team has undertaken charity cycles, charity walks, book sales and various volunteering activities, such as weekend beach cleans. Our team are continuously involved in local community initiatives throughout the year. In December alone, we raised £720 through lots of activity, and donated £2000 worth of food and clothes to worthy causes.

To support topical situations like, homelessness and

modern slavery, we build online training and make it available to the public, free of charge. Approximately 250,000 people having the chance to benefit from the training on Modern Slavery. [learningpool.com/modern-slavery-e-learning-module/] From January this year, to date, we have raised almost £5,000 for our chosen charities, which will almost certainly double before the year of the calendar year.

Environmental initiatives

We also have great success with our 'green campaigns'. These have been put in place to reduce our carbon footprint and make a positive impact on the environment through our day to day work, in addition to cross-site embedded recycling in the business.

We installed a 'Hippo the Water Saver' solution, to help conserve water in toilet cisterns. Our team has achieved a significant reduction in air miles clocked by utilising our online 'Academy' tool, for customer coaching.

Smart diary use within our team is very much BAU, after an extensive staff education programme in 2016. We encourage staff to only visit a customer

if it's necessary. On top of this, we have reduced the number of face-to-face meetings substantially, by approximately 40% since 2016, through the promotion of online meeting technology.

Our people and culture

In the past 13 years, Learning Pool has grown from a modest team of five to a market leader in the e-learning industry. We're two-star accredited with Best Companies for "Outstanding" employee engagement and we're Gold accredited Investors in People.

Our culture is incredibly important to us, and being a responsible business is critical to our ethos. There is at least one representative from each department, in each of our five sites across the UK, at all levels on our CSR committees. On average, 90% of our team participate in office-based CSR activities and 78% of our team voted for their chosen charity to support throughout the year.

We have a business improvement group which is cross-site and has reps from each department. In

this, we discuss a variety of process and people improvement encouraging ideas and active participation from right across the business.

Finally, as an innovative way to encourage collaboration and integration of the team, we introduced a secondment programme last year, which ran for twelve months. We chose five of our staff to help build team relationship and we successfully embedded our culture across our various sites.

Stakeholder buy-in

We know that leadership has an impact way beyond the boardroom and leadership is a prime influence on employee engagement. 100% of our senior team, at director level, are involved with CSR - leading by example.

We'll only work with ethically responsible clients and we have, in certain cases, turned down the opportunity to tender for work or partner with certain organisations. We introduced a conscientious objector policy to our staff handbook, allowing



people raise this in a formal way. Learning Pool has also signed up to Diversity Mark, to recognise their commitment to, and progress on, gender diversity in our workforce.

Reporting and replicability

It's important for us to be transparent about our actions to maximise social impact and team involvement. By measuring the impact of our CSR, we can connect the value of our activities to our company's bottom line.

Our CSR Executive sponsor formalised the process in 2017, so it could be adopted across our five sites, and replicated by any organisation. We have monthly meetings in each site, marketing support for roll-out, a senior sponsor and a budget for any agreed activity;

Here's how we report on our activity:

1. We disclose the importance of our activities to our stakeholders, producing a paper for the board report each month, detailing our CSR initiatives and any impact;
2. We help spread the word and the feel-good factor by sharing images, updating the team with figures on our internal platform, Google Plus;
3. We share our work on our social channels, with details of our activities and how much we raised for charity, or detail how we helped by giving our time and expertise to worthwhile causes.

We know our measurements only shows the immediate impact. We feel the biggest benefit is to long-term reputation and brand as a company who loves its people and is a responsible business.

The future of our CSR

We plan to focus on the following initiatives:

We're already a people first and customer focused company. Our plan is to work our CSR into our

company objectives, aligning our CSR activities with corporate goals.

We're creating a dialogue around CSR and include as part of staff induction, including an overview in training and communicate how employees can get involved; We'll also regularly educate our team on our social responsibility program and why it's important;

Attribute a certain number of days to each team member for contributing to CSR. More can be given, on request;

Part of our ethos is continuous improvement, so this list isn't exhaustive, and we'll add more ideas and improvement to our CSR strategy as we move through our financial year.

Summary

We're committed to behaving ethically and contribute to economic development while improving the quality of life of the workforce and their families as well as that of the local community and society. Our efforts can be attributed to the sustained growth of our company. Annual revenue growth increased more than 40% last year and staff numbers have risen to over 150 colleagues across our five office in the UK.

We are the current Learning Technologies Company of the Year, been awarded Gold Investors in People status, and won two-stars for Outstanding Employee Engagement in Best Companies 2019.

It's not all about the awards though! We think it's crucial to be an ethical business, do our part for the environment and get involved in several important initiatives and CSR activities, encouraging staff to volunteer time across all aspects of the business.

Ambitious plans for CSR in this financial year mean we anticipate this trend will continue and our brand will become synonymous with responsibility, generosity and a company that truly cares.

MC GEE

McGee has a proven track record in delivering a diverse range of prestigious construction projects across London.

As considerate constructors, it is important to us that we are sympathetic to the needs and demands of local communities and we maintain and enhance the prestige and iconic character of the areas in which we work.

Recent projects include new residential developments at 1-3 and 20 Grosvenor Square in highly sought after Mayfair, as well as the construction of a new deep basement for Claridge's Hotel - also in Mayfair - and the construction of the new Londoner Hotel in Leicester Square.

We are committed to working with the local communities every step of the way to ensure we continually improve the image of construction - beyond our hoarding, and create a positive legacy long after we have left site.

Over the years, we have delivered and supported a number of initiatives across the London Boroughs. From providing the Metropolitan Police with vehicles for their award-winning 'Exchanging Places' programme to teaching primary school children about how to stay safe around construction sites - It's all part of our calendar of events that sees McGee actively contributing to the communities within which we work, engaging with local people and businesses.



McGee is a multi-disciplined specialist contractor delivering world-class decontamination, asbestos removal, demolition, piling, civil engineering and construction services, either as standalone disciplines or as an integrated solution. Supported by in-house recycling, transport, plant and equipment we are fully equipped to deliver many of the UK's most high profile and challenging projects, safely, on time and within budget.

We have been in business for 60 years and we are proud of our reputation as a family business which takes its responsibilities to its employees, the environment and the local communities in which we work extremely seriously.



WE ARE CONSIDERATE CONSTRUCTORS

All our sites are registered with the Considerate Constructors Scheme (CCS) and on average receive a CCS score of 44/50 – which is an award-winning performance!

This year's exceptional performance demonstrates our outstanding commitment to improving the image of Construction and achieving exemplary standards in all areas of the Scheme's Code of Considerate Practice across Appearance, Community, Environment, Safety and Workforce.

Our Bayswater Road project was honoured with the highly sought-after Gold Award.

This project – just a stone's throw from Kensington Gardens – required McGee to deliver the soft strip and demolition of the existing buildings for later redevelopment of the site. The nature of the works on a sensitive site in the heart of Westminster and complex interaction with the Local Authority and neighbours and the wider community was recognised by the Scheme. Three other highly sensitive demolition projects received awards on the day – Soho Place received a Silver Award, and 44 Lincoln's Inn Fields and Ludgate House both received Bronze Awards.

The Considerate Constructors Scheme's code of

practice is the barometer within the UK by which the Construction Industry seeks to improve the image of the construction industry and measures itself against Industry best practice and innovation. Therefore, to be recognised with four awards by the Scheme is a major achievement for McGee – and our best result to date. We always strive to go above and beyond on all our projects and that includes our site teams passionately caring about the appearance of their sites and having a positive impact on the local community. All four award-winning sites showed that ethos and it is very much part of our McGee DNA.

Our dedicated Community Liaison team are experts in maintaining close links with all who may be affected by our work.

Our Priorities:

- Establish relationships with site neighbours
- Be sensitive to the needs of local residents and focus on the uninterrupted operation of businesses- Actively contribute to local communities and support local initiatives, employment and work experience opportunities, volunteering and local schools.
- Establish relationships with site neighbours
- Ensure the site team understands the project objectives and approach to engagement- Represent the objectives of our clients

Our demonstration of being a good neighbour includes:

- Design and deliver of in-house Traffic Marshall training
- Watering neighbours' gardens
- Donating items of historical interest from our demolition projects to local museums – for example, the Hand and Racquet pub sign to the Museum of Comedy and windows to the Brooking National Collection.
- Adorning our site entrances with flowers and plants
- Supporting local family days
- Sponsoring a local women's football team
- Donating a life-saving defibrillator to a local school
- Collecting litter beyond our hoarding to maintain a clean and tidy area for all to enjoy. Volunteering to support community clean ups
- Helping the London Fire Brigade to set up a scenario to deliver a training exercise for hundreds of emergency response teams from across the UK and Europe.

CHARITIES

One of the greatest rewards of our success is that we are able to support many worthy causes. Over the years we have shown support for numerous charities – local and national, big and small. The Stroke Association – the UK's leading charity dedicated to conquering stroke – has been chosen as McGee's Charity of the Year 2019 in the year we are celebrating our 60th anniversary. To launch the partnership, McGee has dedicated the advertising space of one of its tipper trucks to the Stroke Association, which was unveiled at our annual Ascot Race Day in August.

The newly-liveried truck features the charity's distinctive purple, yellow and white branding across its entire body and has taken to the roads of London to highlight McGee's support for the charity, whilst raising awareness of the charity's inspiring work.

The Stroke Association is a charity particularly close to the hearts of the McGee brothers, Brian, Michael, and John. Their Father and company Founder, Tom McGee, sadly died as a result of a stroke in 1998. Therefore, in the company's 60th anniversary year since the founding of McGee, the McGee brothers are delighted to name the Stroke Association as their 2019 Charity.

In 2019 we aim to raise £10,000 for the Stroke Association!

Every year, we help our chosen charity partner to raise vital funds through employee initiatives and fundraising events. McGee employees are not afraid to challenge themselves to achieve incredible things which have in the past included Joining Jack, Breast Cancer Now, Brake and The Lighthouse Club. We have risen to the challenge on many occasions by taking part in numerous events, including the British 10k run, the London to Brighton cycle challenge, abseiling the ArcelorMittal Orbit Tower (the UK's tallest sculpture!) at the Queen Elizabeth Olympic Park in London, taking on the London Marathon and getting muddy at Tough Mudder!

Not only do we fundraise for our charities, we help them raise awareness of their vital work through social media and by donating advertising space of one of our tipper lorries each year. The lorries always look resplendent as they go about their work across London promoting a cause that touches the lives of so many.

We're also well known for getting our pink high-vis on, holding cake sales and decorating our site offices with bunting every October to support Breast Cancer Now's annual 'wear it pink' campaign. Over the past five years, we are proud to have supported the campaign which has seen us raise in excess of £20,000 which has gone directly to support vital breast cancer research. It's one of our charity engagement highlights of the year – and an event everyone looks forward to as it is a cause close to the

hearts of many. We will be holding our sixth wear it pink event this October!

Smaller charities benefit from our help too, including the food charity, 'Food for All' to support their ongoing work in providing nourishing, healthy food for the local homeless, disadvantaged and financially challenged.

DALLAGLIO RUGBYWORKS

McGee has had the pleasure of supporting Dallaglio RugbyWorks over the past five years. From organising behind-the-scenes tours of our construction projects, providing information workshops about the exciting career paths that the construction industry has to offer to participating in the charity's fundraising event 'The Dallaglio Cycle Slam' – Winning the Corporate Partner of the Year award cements these efforts and the commitment of all McGee staff who continue to support the charity and its young people.

CONSTRUCTORS' GALLERY

Residents and passers-by on Blackfriars Road can enjoy a new free public art gallery on the hoardings of the Ludgate development site by the southern side of Blackfriars Bridge.

The outdoor gallery, created by Transport for London in partnership with Southwark Council, City of London, Better Bankside, developer Native Land and specialist contractor

McGee is designed to add some colour and interest to the building works.

The gallery features high quality artworks by local artists. Each work of art interprets the theme of 'construction' and was sponsored by a construction company or supplier, with proceeds going directly to a charity of their choice.

The art produced was excellent and it is extremely interesting to see how construction can be perceived by different artists. The gallery not only looks great but it has brought the local community together to help worthy charities.

SCHOOL SAFETY DAYS

In partnership with the City of London Corporation's Road Safety team and the City of London Police, McGee has helped to deliver a number of road safety



Dallaglio Rugby marks Employment Day

REACHING OUT TO THE COMMUNITY

Our dedicated Community Liaison team maintains close links with all who may be affected by our work. We run a monthly Community Newsletter across our sites that informs local communities about ongoing and upcoming works. We also run Community Liaison Meetings to share further details about our works and to answer any questions the local residents may have.

DALLAGLIO RUGBYWORKS

We have had the pleasure of supporting Dallaglio RugbyWorks over the past five years. From organising behind-the-scenes tours of our construction sites, providing information workshops about the exciting career paths that the construction industry has to offer to participating in the 2018 'Dallaglio Cycle Slam' to raise more than £17,000 for the charity – Winning the Corporate Partner of the Year Award 2018 recognises these efforts and the commitment and enthusiasm of all McGee employees who continue to support the charity and its young people.

CHARITIES

One of the greatest rewards of our success is that we are able to support many worthy causes. Over the years we have shown support for numerous charities – local and national, big and small. We help to raise vital funds through employee initiatives and fundraising events. McGee employees are not afraid to challenge themselves to achieve incredible things which have in the past included Joining Jack, Breast Cancer Now, Brake and The Lighthouse Club. Not only do we fundraise for our charities, we help them raise awareness of their vital work through social media and by donating advertising space of one of our topper lorries each year.

WE'VE RAISED OVER £25,000 FOR BREAST CANCER NOW!

days to hundreds of children in Primary Schools across London. The days often involve lessons in safety, both in the classroom as well as in the playground. These events wouldn't be possible without our friends, Ivor and Honor Goodsite, the Considerate Constructors Scheme's mascots.

ROAD SAFETY

We continue to support the Metropolitan Police by providing lorries for their award-winning 'Exchanging Places' programme which is designed to raise awareness of cycle safety. Over the last few years we have supported in excess of 50 events across London, dedicating our time and resources to improving safety on the road of London.

PROMOTING RE-USE

Buildings like everything have a life cycle. Before we begin the demolition of a building to make way for a new development, we soft strip the building beforehand – during this phase, many communities have benefited from the donation of materials that we have salvaged from our projects and ultimately diverted from landfill. From carpet tiles, whiteboards and kitchen equipment to sports equipment and chairs.

CONCLUSION

We always strive to go above and beyond on all our projects, and in all of our endeavours, and that includes our site teams passionately caring about the appearance of their sites and having a positive impact on the local community. Each project we complete, we learn and improve from, and take that learning and those improvements to the next as we continue to cast the net wider to communities and organisations who we can help as we diligently go about our work across the Capital!

Sustainability at our heart



THE INTERNATIONAL
CSR EXCELLENCE AWARDS
WINNER 2019

for companies that have a heart



||| MCGEE

McGee is a multi-disciplined specialist engineering contractor delivering world-class **decontamination, asbestos removal, demolition, piling, civil engineering, construction and recycling services**, either as standalone disciplines or as an integrated solution.

McGee has a proven track record in delivering a diverse range of prestigious construction projects across London.

As a considerate constructor, we are committed to working with the local communities every step of the way to ensure we continually improve the image of construction and create a positive legacy long after we have left site.

We're proud to receive an International Corporate Social Responsibility Excellence Gold Award 2019 in recognition of our ongoing efforts and commitment to Corporate Social Responsibility. We have also been recognised as an International Corporate Social Responsibility World Leader 2019.

NATTA BUILDING COMPANY

The Natta family enhance the lives of many individuals, families and communities locally and nationally through the number of charitable and community projects / challenges they undertake each year either under the Natta brand or through individual employees, with an increase in donations year on year. The Natta Board of Directors made it a company objective for 2019 to be an even bigger corporate socially responsible business by continuing ongoing support to charities but to also enhance more local communities, particularly those that surround Natta's working sites. It was decided that any construction project that impacts the local area, Natta would actively search, find and support any initiatives to involve the community. Where possible, local labour would be employed and local materials sourced. During the 2019 period, community projects will be undertaken at 5 Natta sites.

As well as improving and enhancing local communities through building projects, Natta continue to support three nominated charities; The Rainbow Trust Children's Charity and the local charities, Brightwells Gostrey Centre and The Royal Marsden Cancer Charity increasing the level of giving in line with the predicted company growth. To date donations have been made in the region of just over £100,000 which includes community build projects.

In line with company core values, Natta are keen to give back, add value and have a positive impact on the areas and communities where they work, always on the lookout for projects to undertake to support local communities.

Natta encourage employees to take part in charity events and challenges both with the company and individually, with Natta matching any monies raised individually. Recent charities supported include; The British Heart Foundation, the local Woking & Sam Beare Hospice, NSPCC, DEBRA UK, Save the Children and Comic Relief.

Natta organise and host an annual golf day which supports the three nominated charities. Employees attend several client charity events throughout the year which include race nights and gala dinners, raising money through auction for charities such as the Essex & Herts Air Ambulance.

Closer to Head Office, every Christmas, Natta provide the Tree for the Fleet Christmas Festival along with lights and safety barriers and choose a different local charity to support each year by raising funds through small office events and the Natta Christmas party. Charities supported include; St. Michaels Hospice in North Hampshire and Step by Step based in Aldershot, Hampshire who help young homeless people. Twice a year bucket collections are carried out by employees during work hours at the local Sainsburys for The Rainbow Trust.

Natta's next community project is the installation of a foul water rising main for the scout hut on the recreation ground in Staines Lane, Chertsey for The Scout Group who are in the final stages of completing the building. The Scout Group are a registered charity and their challenge is to complete the building ready for occupation with markedly reducing funds by June 2019.

DRAGON BOAT RACES



CHAMPIONS - The winning team, Natta, Vicount, with their medals and trophy

Natta also approached Basildon University hospital with an interest in developing a neglected area of the hospital grounds as a community project. Natta at the time were working on the main access road for ambulances to the Cardiac centre so already had a working relationship. After further discussions it was decided community garden work would be developed to an overgrown area in the centre of the hospital grounds. The work would improve views out of many patients' windows and give a peaceful area to escape the hospital wards.

Natta undertook works early on a sunny Saturday summers morning, with a team of foreman, engineers and operatives keen to contribute to the garden. Topsoil, seeding, all required tools and mechanical plant were provided by Natta Building along with a generous donation of various plants donated by our soft landscaping contractor.

Helipad for Basildon Hospital; Natta is currently a sub-contractor working on Redrow's Westley Green development in Basildon. Here Natta is providing the infrastructure upgrade of an existing country road, together with, the main first section of spine road for a site that eventually will have 725 houses and a new school.

After an introduction and a number of discussions Natta were keen to further their cause to support

charities, local initiatives and communities which led to the construction of a new helipad free of charge for Essex & Herts Air Ambulance (EHAAT) and Basildon and Thurrock University Hospital. Patients taken to Basildon Hospital by Essex & Herts Air Ambulance now arrive via a specially-constructed helipad at Basildon Golf Club.

Cliff Gale, Operations Director at EHAAT said: "After successful campaigning from the community and a strong proposal submission from Basildon and Thurrock University Hospitals NHS Foundation Trust, we are thrilled to be able to use the new helipad at Basildon Golf Course."

Callum Baines, Project Manager at Natta Building Company commented, "It is part of Natta's philosophy to add value to the communities that we work in. The project involved creating a new landing site and access road for the Air Ambulance in close proximity to the Basildon University Hospital. The team and I enjoyed working on the landing site. When we see the Air Ambulance around the area, we are proud that we aided in giving it a safe place to land."

EHAAT is a Charity that provides a Helicopter Emergency Medical Services (HEMS) for the critically ill and injured of Essex, Hertfordshire and the surrounding areas. The service is provided free of charge but, unlike NHS emergency services the

Charity receives no direct funding from the Government or National Lottery. It costs £500,000 every month to keep the service operational and saving lives, and this would not be possible without the generosity and goodwill of the people and businesses of Essex, Hertfordshire and beyond.

Natta supports Fernie Fields Sports Club 2018; Natta found a worthwhile project



CHARITY & SPONSORSHIP NEWS



NATTA RAISED MONEY FOR STEP BY STEP

£448.57 was raised at Natta's Christmas Party. The money was donated to Natta's chosen Christmas charity Step by Step - a local charity who are dedicated to supporting young people who are going through hard times, including homelessness.

DRAGON BOAT RACES FOR WOKING & SAM BEARE HOSPICES



Team Natta will be competing once again in the Dragon Boat Races this year which will take place on Sunday 19th May to raise money for Woking & Sam Beare Hospices. The event is at Goldsworth Park Lake in Woking. Two teams from Natta will take to the waters against other organisations to compete for the top spot. If you would like to show your support and donate, please follow this link: <https://uk.virginmoneygiving.com/TeamNatta>

near to the Kettering site, and embarked on a charity project at Fernie Fields Sports Club.

At Fernie Fields Natta were undertaking the groundworks for a new pavilion. Primarily, the use of this is for sport for disabled children and community charity groups. As well as this, Natta also undertook the groundworks for a new tractor shed. This houses all their equipment, 50% of which is for the community and 50% for use by the football club.

Situated at Moulton Park, the club is a sports venue, training ground and park. It provides Moulton with a premier location and a base to hold sporting events. Being the home ground of Sileby Rangers, it also

has a first-class clubhouse which is used for special event days.

It was the vision of the club for some time to be able to offer disabled sports activities for all age groups. It includes coaches seeking to work closely with specialist schools and groups to develop quality facilities locally for use by all. The community company run weekend and evening classes throughout the year together with weekly daytime classes for pre-school children. Local schools have been offered the opportunity for activities to be held at their premises during school time.

Natta's latest community project is for the LVD

Church in Copthorne. Natta is currently a principal-contractor working for St. Modwen Properties PLC in Copthorne. Providing a new roundabout and access road to service a major 500-unit housing scheme with associated community amenities and commercial units.

Natta sent the Copthorne team up to LVD Church in Langley Green to embark on a community project where they undertook the construction of new patios and footpaths to improve the access into the church for their community.

The building belongs to the Church of England, but LVD shares it with a Muslim Group. LVD is committed to building and investing into the local community and also to get involved in the wider Crawley community and voluntary sector.

Pastor Roger Ancrasamw commented: "On behalf of the church committee and the congregation, we say to you and your gang a very big thank you. You have done a wonderful job. May the Good Lord bless you all and watch over you."

Project costs vary, with some suppliers / clients making donations of materials which we arrange and manage; however, Natta always supply the labour. Project Managers, site engineers and foremen are always keen to be involved with the community work projects, buildings and groundworks and head office employees love getting involved in the sporting challenges and dress up fundraising days.

Other organisations can easily follow the same innovative as Natta by setting a goal per year of a number of community projects to undertake / charity events to be involved in. Natta have found that many employees enjoy being involved, even if they only sponsor the event rather than physically take part. It creates a great atmosphere in the office of some competitive fun and banter and naturally acts as a team building exercise when out taking part.

Projects are ongoing to make sure the 2019 goal is achieved ahead of setting the next goal for 2020!

NORTHERN GAS NETWORKS

Since 2016, Northern Gas Networks have been working in partnership with Leeds Community Foundation (and recently Northern Powergrid) to deliver their Community Promises / Partnering Fund. The scheme provides funding for third sector organisations to deliver grass roots initiatives, tackling issues such as fuel poverty/energy efficiency, gas and electricity safety, STEM and Priority Services Register, a free service provided to customers in vulnerable circumstances. Grants range between £1k and £10k.

The approach came as a result of feedback from all stakeholders that we should continue to tap into the expertise of community organisations and charities, to broaden our reach and meet our social objectives,

in the most cost-effective ways. As well as a short-term funding boost, we want to find organisations who can become our long-term partners. By working with groups who are embedded in their local communities, we can have a much bigger impact. These partnerships are seen as an opportunity to build ongoing relationships, explore further opportunities to provide support and share learning.

Cost

- £50k in 2016.17 – a NGN only initiative (Community Promises Fund)
- £50k in 2017.18 – as above
- £100k in 2018.19 – joint Community Partnering Fund with NGN / Northern Powergrid (2 x £50k)



Direct beneficiaries

- 2016.17 – 2486 people in vulnerable circumstances supported by NGN
- 2017.18 – 3271 as above
- 2018.19 – 7 projects awarded funding from NGN and NPg...ongoing

Longer term benefits - Economic (job creation, additional funding secured), Educational (people informed), Social (behavioural changes) and financial savings for individuals.

Other partners (Northumbrian Water / Yorkshire Water) attended networking events and are pursuing the same funding model within their organisations.

Extending the partnership working has helped significantly. Community Promises was a NGN and LCF partnership however by extending to another trusted partner NPg, we have doubled the amount of funding and extended the reach.

What did the project involve doing?

Over the past 3 years, Leeds Community Foundation have been working with Northern Gas Networks to deliver their Community Promises Fund. NGN delivers gas to 2.7 million homes and businesses in much of Yorkshire, the North East and Northern Cumbria and initially launched this fund in 2016, as part of their ongoing commitment to local communities.

Building on work over the past three years, the scheme provides funding for third sector organisations to deliver grass roots initiatives which tackle issues such as:-

- Alleviating hardship associated with fuel poverty and promoting innovative energy-related environmental impact, energy efficiency or carbon reduction
- Educating and informing communities about safety in relation to domestic gas and power including the dangers from Carbon Monoxide (CO) poisoning and

how to protect against it

- Encouraging interest in STEM (Science, Technology, Engineering and Maths) subjects and related career opportunities
- Promoting use of the Priority Services Register (PSR), a free service provided by DNOs, GDNs and suppliers to customers in vulnerable circumstances within communities

The funding originally came from Northern Gas Networks however, in September 2018, a joint fund was launched with Northern Powergrid (Electricity Distribution Network Operator – DNO), the Community Partnering Fund - to double the funding pot and enable a greater reach. Leeds Community Foundation continue to be a partner for the purpose of administering the fund.

Northern Gas Networks and Northern Powergrid also offer support to applicants in non-financial ways with training, information materials and networking opportunities related directly to carbon monoxide, energy efficiency, Priority Services Register, STEM subjects or fuel poverty. This means you do not need to be an expert in these areas in order to apply as the two organisations can provide briefings or training if needed.

Once all applications are received, a shortlisting exercise is undertaken and then an independent panel of experts comprising external stakeholders and NGN colleagues reviews the applications. The successful projects are monitored by a Social Strategy Project Manager and in conjunction with LCF, their impact is measured. This is prior to deciding which ones can be scaled up and replicated if they are successful. Any learning feeds into future improvements.

Projects are prioritised as follows:

- Run by local people, for local people – group needs to demonstrate good local links
- Can show a strong understanding of the needs of the community that will benefit

- Will have a direct impact on the community / local needs
- Could become sustainable in the longer term
- Focus on supporting those who are vulnerable and/or face barriers to other services <http://www.leedscf.org.uk/community-partnering-fund>

Why did you do it?

The approach came on the back of feedback from all stakeholders, domestic customers, Ofgem, industry groups and consumer groups, that we should continue to tap into the expertise of community organisations and charities, to broaden our reach and meet our social objectives in the most cost-effective ways.

It also fitted perfectly with our commitment to making a positive impact on the communities we work in, focusing especially on those hardest to reach. As well as providing a short-term funding boost, we want to find organisations who can become our long-term partners. By working with groups who are embedded in their local communities, we can have a much bigger impact.

Northern Gas Networks and Northern Powergrid see this as an opportunity to build ongoing relationships with organisations, explore further opportunities to provide support, gather case studies and share learning.

Siobhan Barton, Head of Stakeholder Relations - Northern Powergrid, said: "We see our role as much more than just keeping the lights on: we're committed to supporting the communities we work and live in. The Community Partnering Fund is a fantastic way for us to support local groups as they help the communities they serve. "We encourage any groups with an outreach activity that develops, strengthens, and educates their local communities around STEM subjects, saving energy or encourages those eligible to sign up to our Priority Services Register, to apply for a grant."

Kate Hainsworth, CEX - Leeds Community Foundation said: "The fact that this funding scheme is now entering its third year, and is even bigger and better than ever, is fantastic news for communities across the North of England. "We're working with Northern Gas Networks and Northern Powergrid to help administer the programme and are looking forward to reviewing many inspiring applications."

What did it cost?

- £150k (total) from NGN's perspective as detailed below
- £50k in 2016.17 – a NGN only initiative (Community Promises Fund) (Round 1)
- £50k in 2017.18 – as above (Round 2)
- £100k in 2018.19 – joint Community Partnering Fund with NGN / Northern Powergrid (2 tranches of £50k from each organisation)
- Funding amounts for each projects ranges between £1k and £10k

Other achievements

- Additional physical and mental wellbeing
- Networking and briefing opportunities for unsuccessful applicants so they are more informed if applying in future. It also allows us to raise awareness within community groups and charities of the Corporate Social Responsibilities placed upon Gas Distribution Networks and Distribution Network Operators
- BPEC accredited CO Awareness training for community groups and individuals
- One of the projects previously funded (Yorkshire Energy Doctor) is now in the process of delivering a network wide project (Community Energy Ambassadors), due to the success of their previous work.

This will be funded as a separate piece of work however, was borne out of the initial work delivered and successful outcomes from Community Promises funding.



 **Leeds Community Foundation**

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Registered charity number: 1096892



Who and what benefited?

Third Sector organisations and community groups (in the geographical areas of NGN and NPg), with innovative approaches to delivering sustainable initiatives that help broaden Northern Gas Networks and Northern Powergrid's reach. The key theme around the fund is to educate and support communities and individuals. Those that have benefitted to date, are some of the hardest to reach and most vulnerable individuals in society. It is through working in these partnerships and with 'trusted intermediaries', that the most vulnerable and those less able to act for themselves, are afforded the appropriate level of support.

- 2016.17 – 2486 people supported by NGN, from 11 successful projects (70 applications)
- 2017.18 – 3271 people supported by NGN, from 9 successful projects (47 applications)

- 2018.19 – 7 projects awarded funding from the joint NGN and Northern Powergrid fund (44 applications.)

These projects are ongoing – successful projects

- o (Carlisle) Botcherby Community – CO awareness
- o (Sheffield) Grace Food Bank – Fuel Poverty
- o (Morpeth, Northumberland) Northumberland Community Enterprise Ltd. – CO awareness, Fuel Poverty, Energy Efficiency, PSR
- o (Leeds) Radio Asian Fever CIC (Fever FM) - CO awareness, Energy Efficiency
- o (Rotherham) Speak Up Self Advocacy Ltd. – CO awareness, Energy Efficiency
- o (Newcastle) Success4All - STEM
- o (Hull) Toranj Tuition – CO awareness, Energy Efficiency, STEM

Longer term benefits?

- Economic (job creation / volunteering opportunities / additional funding secured)
- Educational – people more informed
- More partnerships through networking events... growing an army
- Social – behavioural changes
- Improved health and wellbeing
- Financial savings for individuals

Was there anything innovative about the project?

The Community Promises Fund initiative was in itself innovative, as nothing like this had (or has been) previously undertaken by NGN or any other Gas Distribution Network. Northern Gas Networks is a gas distributor, with some 2000 employees, working in some of the most economically deprived parts of England. We have 2 main regulatory obligations to

help our customers in most need, by providing a free gas connection and raising awareness of CO (Carbon Monoxide). However, a third obligation, gives us free reign to do anything else we deem appropriate, to help customers in vulnerable circumstances, especially in hard to reach communities.

The Community Fund acts as the conduit for us to be able to do that. The second part of innovation was joining up with a DNO (Distribution Network Operator) and doubling the funding amount. By working in partnership with Leeds Community Foundation and now Northern Powergrid, we have created a fund that not only reaches these vulnerable communities, but positively impacts many aspects of their life.

All individual applicants were encouraged to be innovative within reason, for example in the first

Key Outcomes: 2017-18 Grants



3,271

Direct beneficiaries

3

New jobs created

24

New volunteers engaged

60,151

People reached through media campaigns



round, Yeadon Air Cadets were awarded funding which they used to promote STEM by making CO alarms.

Can other organisations/communities benefit from implementing your methods?

Yes. Other partners (Northumbrian Water Ltd. and Yorkshire Water) attended networking sessions and are looking to develop the same model within their own organisations. We have shared the model, outputs and case studies with them.

CO (Carbon Monoxide) Charity Fund – established off the back of NGN's Community Promises framework

The Gas Distribution Networks (GDNs) across the UK launched their Carbon Monoxide (CO) Charity Fund in 2018, inviting UK charities and organisations to apply for funding to support CO related initiatives.

The GDNs consider applications on an annual basis and award one-off grants up to the value of £10,000 from the fund.

Northern Gas Networks, in partnership with Cadent, SGN and Wales & West Utilities, see the fund as encouraging new and innovative ideas around raising awareness of the risks, dangers and symptoms of CO and the prevention of further CO poisoning cases in the UK.

What did you learn from the project and are you planning any further development? Quite a bit of learning was gathered after the initial round 1. One of the main things being that the majority of grants were awarded in Yorkshire and only 1 in the north of the network (Bishop Auckland). For Round 2 we engaged with Tyne & Wear Community Foundation and more applications were received from the north, hence a more even split of funding across the whole network.

We have also learned that extending the partnership working has helped significantly. Initially Community Promises was a NGN and LCF partnership however by extending to another trusted partner NPG, we have doubled the amount of funding and extended the reach. It is an easy route to start developing additional relationships and promoting volunteering opportunities. Other partners are looking to adopt this model as best practice (2 water companies.)

NGN have also engaged with an academic to undertake some vulnerability mapping around areas of multiple deprivation. It is hoped this will help inform the selection of projects in future, so that those hard to reach community groups, can be specifically targeted and benefit from the fund ie worst first. As can be seen from the headline figures above, a number of areas of deprivation are already benefiting from this funding (eg. Bradford and Hull) however, the mapping exercise will help validate this and ensure that for future funding, the most appropriate areas are selected.

The intention is to run this initiative indefinitely however after the funding is awarded, the successful applicants are invited to a networking event where feedback is gathered. This is used to inform further development of the initiative.

NORTHERN POWERGRID

There are many support arrangements to assist vulnerable people with specific advice and guidance in order that they can benefit from services and facilities that they may not be aware of, or are unable to take advantage of from a single supporting organisations perspective.

However what is different and required coordination was the partnering and a willingness to go beyond the norm with the establishment of a service provision that provides benefits across a multiplicity of services.

Based on energy and with a utility focus, this is delivered via an independent well connected and respected delivery partner with the backing and support of NGN and NPG.

The Comfortable Living Project brings together a series of services provided through a single service provision via Green Doctors. This could have been several separate support mechanisms, but bringing them together has enabled a single holistic household

provision across gas, electricity and water, ensuring maximisation of benefits for those that most need support.

We needed to recognise that services provided by referral through partners, supported by both gas and electricity networks could bring maximum benefits, where service users receive support, advice and guidance across a range of areas mostly focused around utilities, but also recognising the wider benefits of income maximisation, and guidance around minimum living standards.

What did the project involve doing?

There are many support arrangements to assist vulnerable people with specific advice and guidance in order that they can benefit from services and facilities that they may not be aware of, or are unable to take advantage of from a single supporting organisations perspective.

However what is different and required coordination



GREEN DOCTOR 

To arrange a Free home visit or to find out more contact:

Tel: 0113 238 0601

Email: greendotorleeds@groundwork.org.uk

www.thegreendotors.org

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Why did you do it?

Fuel poverty is a huge problem within Yorkshire, with 275,000 homes considered fuel poor, accounting for 12.1% of the population.

Often it is difficult for those experiencing hardship to help themselves, The Green Doctor Programme supported by Northern Gas Networks (NGN) and Northern Powergrid (NPG) in part address these challenges with a more holistic people centred approach, recognising that for the most vulnerable members of society, they need individual 1 to 1 support.

Green Doctors offer that support, by working with clients, in their own homes to help them benefit

from services that they may find difficult to manage themselves, such as fuel switching, applications for warm home discount (WHD), installation of simple energy efficiency measures and referral to support agencies for additional help and support.

For NGN and NPG, we are all about energy, and the benefits that it brings to health and wellbeing, but we also recognise that some members of society are disadvantaged and need support to be able to enjoy the benefits of living in a warm home, free of damp, and taking benefits that may be more readily available to those that are less vulnerable, this project helps support balancing some inequalities, "Comfortable Living" helps with this.

What did it cost?

Comfortable Living, over the course of the period reported 1st Sept 2016 to 31 Dec 2018 has been funded jointly by NGN and NPG, with costs circa £50K.

Additionally, a pilot took place before commitment was made to the project at a joint cost of £12k. We have agreed a further £52k to develop a new scheme and continue with the current project for a further 12 months.

Who and what benefited?

The service works on a referral mechanism, whereby the following organisations are able to refer clients for assessment and support; additional to the referral from partner organisations as the programme became better established; self-referrals are accepted, based on need, and levels of income. Those that have benefited from the service are those most vulnerable in society and are often not able to act for themselves, or are in need of additional caring informed and direct support.

Longer term benefits?

Benefits to service recipients - Both in the short and



Comfortable Living Bradford From September 2016



Comfortable Living sponsored by



long term, reduced costs and maximisation of eligible income are clear to see. However, less able to identify but possibly of much greater benefit in the longer term are the health benefits of living in a warmer healthier environment, free of damp. Additionally the reduced stress resulting from financial savings and access to benefits otherwise unknown are real but difficult to quantify.

- Short term benefits in the order of £65,129/year
- Longer term financial benefits circa £550k based on life time savings
- Additional physical/mental health benefits- real, but unable to currently quantify

Benefits to supporting organisations NGN/NPG

- Access to those most difficult to reach, via a trusted intermediary
- Ability to develop partnerships with a more diverse group of stakeholders and communities • Ability to promote wider service offerings, such as Fuel Poor Connections

Was there anything innovative about the project?

Bringing together a diverse partnership into a single support model to be deliver a holistic people centred solution we believe is fairly innovative.

The complexity of aligning organisations, often with a different focus is a challenge, however the end goal of “comfortable Living” has allowed both NGN and NPG work to support vulnerable customers in a simple yet joined up way, allowing greater reach, less interruption and bigger benefits to service users.

Can other organisations/communities benefit from implementing your methods?

We have shared the model and outputs of this partnership with other gas Distribution networks, and local water companies. As a result one of the GDNS has developed a partnership in the south of England to provide the same services, and one of our local water companies has also entered into an agreement to deliver services in Hull via Green Doctors. NPG and NGN are currently looking to support Yorkshire Water and Green Doctors with this project.

Excess Winter Deaths

- An estimated 33,300 excess winter deaths occurred in England and Wales in 2016/17. (ONS, 2017)
- "Cold homes are a bigger killer across the UK than road accidents, drug abuse or alcohol abuse," (NEA, 2017)



The model of delivering core activities via trusted intermediaries is now very clear and brings a range of benefits to service delivery organisations, often charities or community interest companies, and both NGN and NPG are working to promote these methods of working.

What did you learn from the project and are you planning any further development? Learning has been fairly significant;

- Levels of access to hard to reach communities via trusted intermediaries
- Additional relationships that can follow from this type of support model
- Benefits from working in partnership with organisations aligned to similar objectives
- Benefits from colleague engagement via volunteering opportunities
- Learning from working methods of 3rd Sector

Further opportunities to expand scheme

- o Development of a training package to train community champions to deliver Green Doctor messaging. Materials have been developed, an accreditation body are engaged and pilot training sessions are planned prior to larger scale roll-out.
- o Expanding scheme into more rural areas, NGN and NPG are supporting the establishment of a new Green Doctor scheme, based out of York and covering the rural areas of North Yorkshire. Funding is in place and it is expected that the service will be available during 2019.

NORTHUMBRIA HEALTHCARE NHS FOUNDATION TRUST

Since 1999 Northumbria Healthcare NHS Foundation Trust (UK) has worked in partnership with Kilimanjaro Christian Medical Centre to improve healthcare services for the people of Tanzania as part of our Global Corporate Social Responsibility programme.

Our healthcare professionals volunteer during their annual leave to teach and train Tanzanian healthcare professionals across a wide range of specialities. The programme is designed to build capacity within the organisation and is planned to create sustainable change. This ensures that the Tanzanians can take ownership of their services and cascade training to other healthcare professionals nationwide. The programme provides significant personal and professional development opportunities for both Tanzanian and UK health professionals which benefits the patients of both nations. With limited funding (mostly raised by our volunteers) we

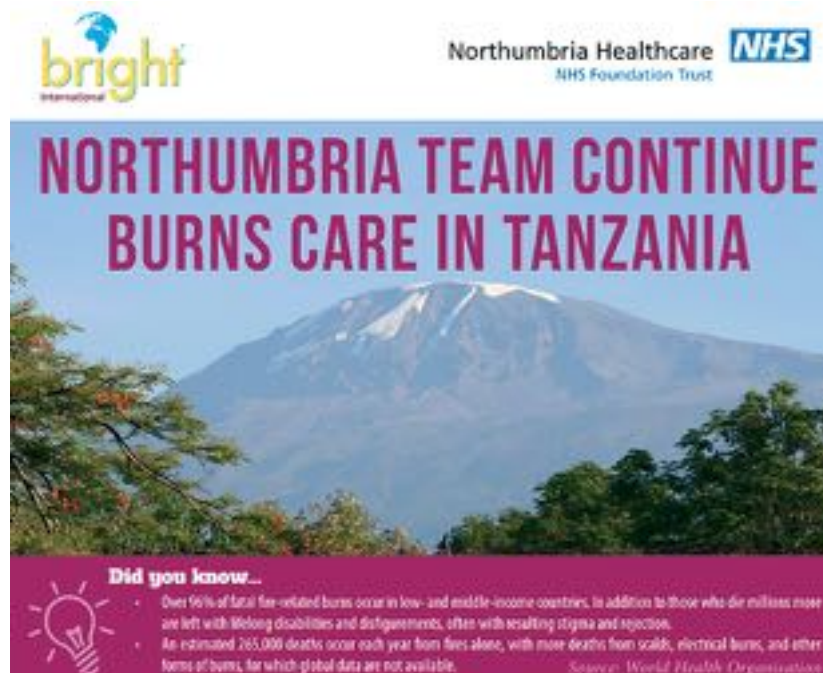
have been able to work together on a number of innovative projects that has brought positive change and significant improvement to healthcare services in Tanzania.

We value our partnership and acknowledge that each partner has learnt a great deal from one another. Our volunteers come back to the UK enlightened about global health, aware of health inequalities and passionate about the difference that international volunteering has made to thousands of ordinary people in Tanzania.

Ours is a strong partnership built on trust and respect and we work together in the true spirit of global collaboration.

For twenty years Northumbria Healthcare NHS Foundation Trust (UK) has delivered a successful international volunteering project that has had far reaching impact on healthcare services in Tanzania. The Northumbria-KCMC Partnership is a recognised part of the trust's Global Corporate Social Responsibility programme and approved by Trust Board.

Since 1999 we have worked closely with the Board of Trustees of the charity- funded Kilimanjaro Christian Medical Centre and focused on areas of need that have been identified by the Directors for development.



In the early years this involved strengthening of core capabilities in key areas. For example, at the time Tanzania did not have a School of Physiotherapy. We agreed to support two physiotherapists to obtain Masters degrees in the UK and worked with the University of Northumbria to develop a BSc Physiotherapy course to launch the profession in Tanzania with the support of the Tanzanian Ministry of Education. Since 2005 more than 150 physiotherapists have graduated from KCM College and are now serving in hospitals up and down the country.

At the beginning of our partnership, Tanzania was unable to report statistics about HIV / AIDS to the World Health Organisation as it was using an out-dated clinical coding system. Over three years we helped to train large cohorts of coding staff to introduce International Classification of Diseases version 10 so that coders could collect this data and report. They went on to train coders from across the country. Now, years later, the first cohort of students are Heads of Clinical Coding departments in all of the main hospitals in Tanzania.

In 2002 we turned our attention to ultrasound training within the Obstetric & Gynaecology Department. Previously all patients requiring an ultrasound had to wait in a very long queue outside the hospital's Radiology Department – even pregnant ladies who had been ushered down on beds from the obstetric ward with life-threatening emergencies! Through donations of equipment and years of training we were able to establish an ultrasound service on the Obstetric Ward so that emergencies could be responded to and treated quickly by healthcare staff training in ultrasound procedures. Northumbria worked with Dr Pendo Mlay (Head of Obstetrics



and Gynaecology) to develop a 5 day short course in foetal ultrasound which was approved by the Tanzanian Senate to be delivered as a higher education course. Since then hundreds of healthcare professionals have travelled from across Tanzania and East Africa to attend this valuable course.

Dr Mlay extended training to three district hospitals, improving antenatal care for thousands of women in the northern region who had previously been unable to access ultrasound to pick up problems early in pregnancy. Our first community patient was a young Masaai lady who found out that she was carrying twins. She was advised to move to stay with relatives near a health facility when she approached the birth date, rather than risk a home birth hundreds of miles from medical care. Ledgers of patients who have attended for ultrasound show that the introduction of an ultrasound service to the community has saved hundreds of lives.

In 2004 we were asked to train surgeons in laparoscopic surgery. The surgical technique is minimally invasive and therefore patients recover quickly and are less likely to develop complications. This is very important in a country where people, regardless of income, have to pay for healthcare and therefore each day in hospital means extra expense and days away from work. In the hospital, the surgical wards were significantly overcrowded as KCMC supports a population of 13 million people and



“The student nurses and I had a lot of discussion on the nursing practices at KCMC and it struck me that these nurses wanted to change it for the better, they agreed that wards were overcrowded and that practice could be improved.”
Catherine Hadell, Burns specialist nurse

there are only 2 consultant surgeons and four surgical registrars to deal with the workload.

For the first few years Tanzanian surgeons came to the UK for training and UK surgeons travelled each year to provide hands on training at KCMC. However progress was slow with the UK training team so far away. Thoughts turned to distance learning possibilities but an internet msn/skype link would not be sufficiently reliable and a dedicated satellite connection proved to be too costly. The team worked with an IT specialist to develop an innovative audio-visual link between Theatre 1 at KCMC and Hexham General Hospital to support training.

UK surgeons could view images from the laparoscopic endoscopy camera beamed from Tanzania and guide the surgeons while the surgery actually took place. Due to infrastructure constraints this required support from the Tanzanian Telecommunications Company to maintain bandwidth throughout the operation and also the Tanzanian energy company so that there were no power cuts in the middle of an operation!

This ground-breaking technological solution made it possible for KCMC to introduce laparoscopic surgery to Tanzania and they have now successfully completed more than 1000 procedures. For the past 10 years KCMC has held laparoscopic training courses for other surgeons across Tanzania and more recently (2016) , launched Day Case Surgery

so that patients can now be treated laparoscopically and go home on the same day. This has benefitted the local community on many levels: provision of affordable surgery, reducing time away from family and work, less congestion on surgical wards and better patient outcomes.

With the increasing range of laparoscopic procedures being undertaken, our surgeons have

worked with KCMC to develop low cost surgical mesh from mosquito netting so that procedures are more affordable for patients who would struggle to pay for treatment. This has been so successful that we are now actively undertaking further research to introduce this product as a cost saving to the NHS.

In 2006 KCMC Directors asked Northumbria to assist with the development of a burns wound service. At the time patients were cared for in a congested area within the general surgical ward. Due to the high cost of burns care to patients and the limited availability of resources it was necessary to develop new treatment protocols to improve the patient experience. At the time all burns were treated with thin gauze soaked in iodine with very little pain relief available.

Over a number of years new treatment protocols were introduced including low cost Vaseline gauze, a volunteer plastic surgeon was recruited from Australia to provide training in reconstructive surgery and a team of specialist burns nurses from the Royal Victoria Infirmary in Newcastle joined the team. Together we supported KCMC to develop Tanzania's first dedicated burns unit which opened in 2016. Now healthcare professionals from across East Africa are applying to KCMC for training opportunities to help improve outcomes for patients across Tanzania and beyond.

In recent years we have joined up with the



Community Health Department at KCMC to extend our work into the community. We have taught thousands of children in local schools about what to do in the event of a burn injury. Local remedies had previously ranged from application of cow dung or rabbit fur – all of which led to infected wounds. The teaching, although delivered simply through play acting and singing, has substantially reduced the number of people presenting late at hospital with infected burns. In fact one of the doctors in the remote Same region told the team that the children were called upon by the villagers to advise when a burn injury happens. Fortunately they know their stuff – lots of cold water and then hospital.

The programme has involved hundreds of healthcare professionals over the years. Many Tanzanians have visited the UK for teaching and training in areas requested by KCMC. Within the UK, the programme is now part of the trust's Leadership Training Course and we are working with Health Education North East

to provide opportunities for doctors in training to gain valuable global health knowledge through being part of our work.

The Tanzania Link, as it is known, has been cited in many publications by the Department for International Development and All Party Parliamentary Group of the U.K as an example of good practice and our work has won a number of national and international awards.

However we volunteer to do this work to demonstrate our global corporate social responsibility, to learn from other cultures, to be more open-minded and to give back to communities in need. Nothing sums it up better than the case of Farajah, a nine year old boy who had serious facial disfigurement after falling into an open fire during an epileptic fit.

When we arrived at KCMC he had received excellent treatment for several weeks but badly needed plastic surgery. The Northumbria surgeon re-built Farajah's face, building new eyelids so that he could close his eyes to protect them at night and releasing a neck contracture so that he could close his mouth and eat normally. That little boy's strength of spirit touched us all and he made us realise that what we do as volunteers really does matter.

A documentary about our work was premiered at the Global Health Film Festival 2018. It is available through this YouTube link <https://www.youtube.com/watch?v=0Jm-wnULlRQ>

NORTHUMBRIA HEALTHCARE NHS FOUNDATION TRUST

Almost 20 years ago, shortly after the formation of Northumbria Healthcare NHS Foundation Trust (UK), the Chairman of the Board imparted a vision for the organisation to work collaboratively across all areas of art practice to develop a healing arts programme that would involve our local communities. This programme is now established over a 500 square mile area, capturing a population of almost 500,000 who access healthcare through our 11 hospitals and 60 community healthcare facilities. We have forged strong partnerships in our local communities to bring art and artists to our healthcare environment and our patients and staff. This has involved development of collaborations with local schools, colleges and universities, as well as connecting with established artists networks in the region. Our work has supported six Arts in Health Ph.Ds and provided many undergraduate students with meaningful art commissions to bolster their portfolios of evidence for their degree course. We have worked with the authorities who provide care for Looked After Children and mental health service providers to

provide a positive art project experience with an end result – an exhibition of work to invite their family and friends to.

We were the first NHS trust to be awarded the prestigious Combined Royal Colleges Medal for the use of photography in a hospital setting.

Arts and wellbeing is now embedded in our corporate social responsibility programme and continues to find new reach through the recent development of social prescribing and realistic medicine initiatives. Our trust is committed to the arts!

Healthcare organisations are becoming increasingly aware of the many areas of research that confirm that the right hospital environment can lower anxiety levels, create a calm ambience and also provide interesting distractions to help patients, staff and visitors step away from the often harsh reality of healthcare – even if it is only for a moment.

Early in 2000, Northumbria Healthcare was





approached by the Department of Fine Art at the University of Northumbria to provide support for some vital research to explore the effect of the arts and art engagement within a healthcare setting. The trust agreed to support 6 doctoral students over a six year period and during that time began to develop its now award-winning healing arts programme. Working with the doctoral students was revelatory for all involved and provided a rich evidence base that engagement in an artistic activity or curatorial development of art exhibitions within a healthcare setting led to many positive benefits for all involved.

The first project was known as Images of Trust, a photography project led by acclaimed photographer Ikuko Tsuchiya. During a period of two years at the turn of the 21st Century, Ikuko documented the breadth and scope of healthcare services provided by the trust. Working closely with staff she was able

to document everything from cutting edge technology to District Nurses visiting farms, in the remote rural communities across Northumberland. A valuable archive of images was produced and exhibited across all trust hospitals. Feedback about the project, which was also documented in a publication, was very positive and even now, 15 years later, our staff talk about Images of Trust and request archived images. The project also reached an international community in Tokyo, Japan and was honoured with the prestigious Miki Jun Award by Nikon. Since then, Ikuko Tsuchiya has set up a healing arts movement in Japan.

To further integrate the arts and healthcare, the trust developed a Medical Humanities module as part of the Student Selected Component for medical undergraduate students. Under the guidance of an Arts in Health doctoral student and Senior Lecturer



from the Medical School at Newcastle University, it was possible for the medical students to use the medium of photography to investigate how they managed interaction with patients, families and friends. This involved exploration of various themes of interest to the students, for example, consideration of the effects of ageing (with a focus on arthritis) or the social complications of Asperger's Syndrome. The final photography was presented as a story by the students to their peers at the end of the course seminar. Their work was also put on display in the hospital that they trained at. The project was highly acclaimed by the medical students as providing a valuable alternative perspective on approaches to patients and medical conditions. Public feedback was also very positive as the images were accompanied by a narrative written by the students which offered important medical information that was of interest to the general public.

Further collaboration with Northumbria University led to the development of a Feng Shui garden in a central courtyard within Wansbeck General Hospital. The garden was developed by the Japanese Ryu Group working closely with the Teardrop Group, who are parents of babies lost through miscarriage or stillbirth. The design of the garden, based on ancient Feng Shui principles, incorporated areas for quiet contemplation. This garden meant a great deal to the bereaved parents and has been a great source of solace. It is lovingly tended by the Teardrop Support

Group. On one occasion a bridal bouquet was found in front of the main statue with a simple note 'you are not forgotten'.

During the planning and commissioning of Hexham General Hospital it was possible to involve local artists, art students and members of staff in the development of a comprehensive arts strategy for the hospital

which involved a number of commissions. The hospital was opened by Tony Blair MP in 2003 and at the time was proud to display more than 400 pieces of art. The local community maintains connections with the hospital and regular rotating exhibitions are provided by local artists and students from the Queen Elizabeth High School.

The well-established partnership with Northumbria University also led to new links with Teesside University School of Interior Design. It was possible to offer exciting projects to work on such as the design of a purpose-built facility for relatives of patients at the end of life. The project, known as the Wansbeck Oasis, was featured by the Kings Fund in the Enhancing the Healing environment publication as an example of good practice. The trust was aware that many family members often have to travel many miles to visit a loved one in hospital. Once inside the hospital there is limited space for them to come together in a place of privacy.

The Oasis offers a private place for families to come together to comfort each other, sleep overnight, or just enjoy a walk in a garden. Hundreds of people have used this facility and the feedback has been very poignant. It is clear that by going the extra mile to support people at such a difficult time, we have struck a chord with the community we serve. This project led to the expansion of the arts programme

to encompass the hospital environment. Since then a number of successful design templates have been developed in partnership with Teesside University to support our patients with dementia and provide comfortable, tranquil spaces for visitors to the wards.

Our support for the arts also extends to the performing arts. We have connections to performing arts academies in our communities and invite young people into our hospitals to engage with our patients. The playing of live music on the wards has had a powerful and positive effect on many of our patients. The medium of dance has been very popular with patients and staff. During the NHS 70 celebrations in 2018 we arranged for 11 local dance schools to provide performances at all of our hospitals. Over 500 young dancers performed brilliantly in front of our patients, staff and visitors.

At present the Northumbria arts team are engaging with our staff and families to develop a major art commission in recognition of Organ Donation. It has been important to involve the families who so generously allowed their loved ones organs to benefit others after their death. We worked with a local blacksmith/ artist to create a sculpture which incorporates the words and ideas of the families. This involved a visit to the forge to see work in progress - it meant a lot to them. The sculpture, which is 4 metres high will be installed in the main restaurant of the Northumbria Specialist Emergency Care Hospital in Cramlington.

We continue to offer opportunities to local community photography groups to exhibit their wonderful photographs in our hospitals. We also work on special community projects and invite the general public to work with us to produce a special embroidery or exhibition. The participation in the activities is led by an artist and supports people, often who are socially isolated or lonely - such as Carers Groups, to share their skills and talents with us. They take great pride in seeing the finished artwork installed in the hospital for their friends and family to see.

The trust also works with Music in Hospitals, a charitable foundation that brings music and entertainment onto our wards. We organise regular performances, especially on our elderly care wards as the patients really enjoy a sing-along. Our staff report that after a performance the patients are more sociable with each other and more receptive to staff in terms of medical routines and medication. At Christmas we pull out all the stops and organise everything from local bands to choirs to entertain our patients, staff and visitors.

For the past five years we have been fortunate to work with the Newcastle Eagles basketball team on their Hoops4 Health programme. This helps us to connect with 150 primary schools in our area. Importantly it also enables us to access over 1000 young people with important health messages such as diabetes care or mental health issues. With each health booklet handed out there is an opportunity to participate in an arts project, whether a drawing or a poem based on a healthcare theme. The resulting artwork is so powerful and it creates a lot of smiles when exhibited in our hospitals.

The Healing Arts programme continues to expand and we are totally committed to opening new and innovative channels to increase our connection with the arts across all of its mediums. Our hospital environments have been transformed – and the general public has even posted on social media that we are the best ‘unofficial’ art gallery in the north of England.

A scenic photograph of a large, historic stone castle with multiple towers and battlements, situated on a grassy hill. In the foreground, there is a body of water reflecting the castle and surrounding greenery. A large, leafy tree is on the left side of the frame.

**Proud to support our communities in
Northumberland and North Tyneside,
in the north of England by:**

Using the arts to improve health and wellbeing

Expanding our volunteering programme to include
school children and corporate volunteers

Enabling our healthcare professionals to develop
important global health knowledge through our
Tanzania Partnership, whilst supporting health
service development in the north of Tanzania

www.northumbria.nhs.uk

Email: Brenda.longstaff@northumbria.nhs.uk

PEOPLE OF DETERMINATION COUNCIL INITIATIVES (FOR COMMUNITIES/CUSTOMERS/EMPLOYEES/ ENVIRONMENT)

AIM

In line with UAE strategy for empowering people with disabilities, called People of Determination, in year 2017, Major General Abdullah Khalifa Al Marri, Commander- in -Chief, Dubai Police established People of Determination (POD) Council and appointed Colonel Dr. Saud Al Remeithi, as its Chairman. POD Council has established clear vision, mission and rolled out “POD Strategy 2021” with many innovative programs aimed at enhancing inclusion, achieve greater safety, development of POD by focusing on Health, Rehabilitation, Education, Employment, Social protection, and Promoting public life, culture and sports.

Some notable achievements are:

1. 54 “Smart Services” on Dubai Police mobile App. are POD friendly. App. won many awards.

2. To enhance safety of POD, creative cartoon based “My Safety Stories” series published.
3. 83000 security staff trained on “How to Deal with POD” covering many industries. In addition, 800 Dubai Police Customer Service staff also trained.
4. Police stations and prisons redesigned to make it POD accessible.
5. Released first diploma of “Sign languages” in the UAE. 674 Dubai Police reception employees trained.
6. Listed in Guinness world record for “Largest Wheel Chair Race”, 2017 in UAE fitness challenge 2017.
7. First winner in “international prestigious “Fatima bint Mubarak” award.
8. PODs’ initiatives contribute to UN Sustainable Development Goals no. 1,4,8,10,11 & 16.
9. Collaborated with 46 organizations locally & globally to provide world-class services to PODs.



IN DETAIL

In April 2017, HH Sheikh Mohammed bin Rashid Al Maktoum, Vice-President and Prime Minister of the UAE announced, “people with disabilities will be called “people of determination”. United Arab Emirates (UAE) is at the forefront in development of adequate care, protection and welfare practices for the POD irrespective of whether they are citizens, residents or visitors. Government issued UAE Disability Act (Federal Law 29/2006) to protect the rights of POD. This law stipulates that UAE’s POD have the same rights to work and occupy public positions. In addition, UAE ratified the United Nations Convention on the Rights of Persons with Disabilities on the March 19, 2010.



In 2014, Ruler of Dubai passed Law No. (2) of 2014 “to protect the rights of POD in the Emirate of Dubai”, thereby reaffirming the commitment of Dubai Government to POD and their leading role in providing high-quality medical care and social services, boost public awareness and ensure inclusiveness of POD into society.

Taking an inspiration from UAE Leaders, commander-in-chief of Dubai police instituted People of Determination Council, in 2017, to make Dubai a POD friendly city by 2021. Some of the innovative,

major and breakthrough initiatives undertaken by POD council, in the last two years were focused on Community, Customers and Employees are listed below.

(A) Management Commitment:

1. Vision, mission, values and policy focused on PODs covering Health, Rehabilitation, Education, Employment, Social protection, and Promoting public life, culture and sports. issued by the Commander in Chief. This is complemented with distinct policies on CSR and Innovation & Creativity. (Annex. 1).

2. POD Council Established: Council, formed in 2017, is led by Colonel Dr. Suad Al-Remeithi as

Chairman and supported by Vice-Chairman, General Secretary and 24 members from Dubai Police. To represent the society, council also has two POD students and two POD expats (UK & India) members and one POD UAE Citizen. This ensure diversity, inclusion and multicultural representation. (Annex.-1)

3. POD Strategy (2016-2021): A five year strategy, aligned with Dubai

Government POD strategy 2020 and Dubai Police strategy was established with strategic focus areas of:

- Inclusion
- Protection
- “Maharati” (My Skills).
- Estedama (Sustainability)
- Smart services
- Collaboration

4. Budget: To execute POD strategy a total of budget of AED 26 million have been approved by Leadership. (Annex – 2)

Notable Initiatives and Programs implemented by POD Council.

1. Inclusion: To promote inclusion, following initiatives have been implemented. Para Taekwondo: To enhance self-esteem, physical and mental capacities of POD, Council organizes Para-Taekwondo courses for PODs with the objectives of increasing cognitive & movement ability, developing muscular, neurological and Visual movement harmony for people suffering from Autism and Dyslexia.

In 2017, POD Council launched this First ever initiative in the Gulf region through three Centers of Ministry of Community Development. About 600 PODs attended Para-Taekwondo Training courses significantly improving their rehabilitation rates of about 40% and parents satisfaction level of 91.7 %.

This initiative got international significance. Sports College, Alexandria University, Egypt has requested Dubai Police to share their expertise and experience. 15 students have benefitted from this program. Due to success of the program, POD Council has decided to extend program to seven centers in UAE. Social activities: To inculcate a culture of inclusiveness, 33 social activities (National Day sports, community events etc.) were organized in 2017 & 2018 and attended by 22000 + people.

2. Protection: Safety and security of PODs is paramount. Based on best practices, POD has introduced following initiatives:

- "My Safety Story": A creative cartoon based "My Safety Stories", (12 no's) , in English & Arabic, have been developed covering safety aspects such as "Crossing Road", "Using Escalators", "Finding Help In Case Of Getting Lost", "Bullying in school", etc. Lectures on safety practices are regularly conducted by POD Council in normal and Autism schools. (Annex 3).

- Safety Box: It includes Brochures, Shoe Tag and a "Tattoo Sticker". Aim is to teach Autism children

parents, who in turn will teach their children, about safety and protection practices. E.g., Tattoo sticker has telephone contact number of child and parent. It makes it easy for parents to trace their kids (POD) in case they get lost in public places like malls, gardens. Dubai Police is first in the region in starting this best practice of launching Safety Box with Tattoo stickers. (Annex. – 3)

Council introduced RUWAD (Pioneer) program for POD employees of Dubai Police. Objective of RUWAD program is to ascertain needs of POD and facilitate their upgrade through augmentation of their Health and rehabilitation, Education, Employment, Accessibility, Social protection and family empowerment and Public life, culture and sports.

Under RUWAD Program, a comprehensive assessment of 46 POD employees of Dubai Police was carried out by a professional agency. Assessment comprised of Training Need analysis, Career development, Performance appraisal, Support to social life (Housing, Health etc.). Some results of RUWAD program:

- 61% of the POD Dubai Police Employees promoted.
- Employee happiness score of POD employees has increased from 93% (2017) to 96 % (2018)
- One POD with visual impairment completed his Bachelor's degree by availing free scholarship
- One POD is now in leadership role in Dubai Police.

4. Smart Police Stations – World's 1st Smart Police Station with No Human Interaction – POD Friendly: In 2017, Dubai achieved the above distinction. In 2018, two Police stations were converted to Smart and POD Compliant offering 27 smart key services like reporting crimes, traffic incidents, and community services in six different languages.

5. POD supported features at Police stations.

- Sensor Guides installed in all police stations to guide blind people in seven different languages.

This feature available through mobile App is connected automatically through sensor once any blind person visits police station.

- Parking signboards with in-built features have been placed in all Police Stations for assisting hearing impaired, who connect directly with Customer Service Helpdesk.
- All the 14 Police stations have been provided with sound and flash type of fire alarm systems, to take care of visual and hearing-impaired PODs.
- Safety Chairs: All police stations are provided with safety chairs for evacuation of PODs while using staircases.
- All police services are free of cost to the POD.

6. Development of staff Skills:

During 2018

- Five training programs on Sign Languages and 20 workshops were conducted for Customer Service staff on "How to Deal with POD".
- During 2017- 2018, 83000 Security staff across various industries trained on "How to deal with POD". These courses are approved by City Guilds

UK

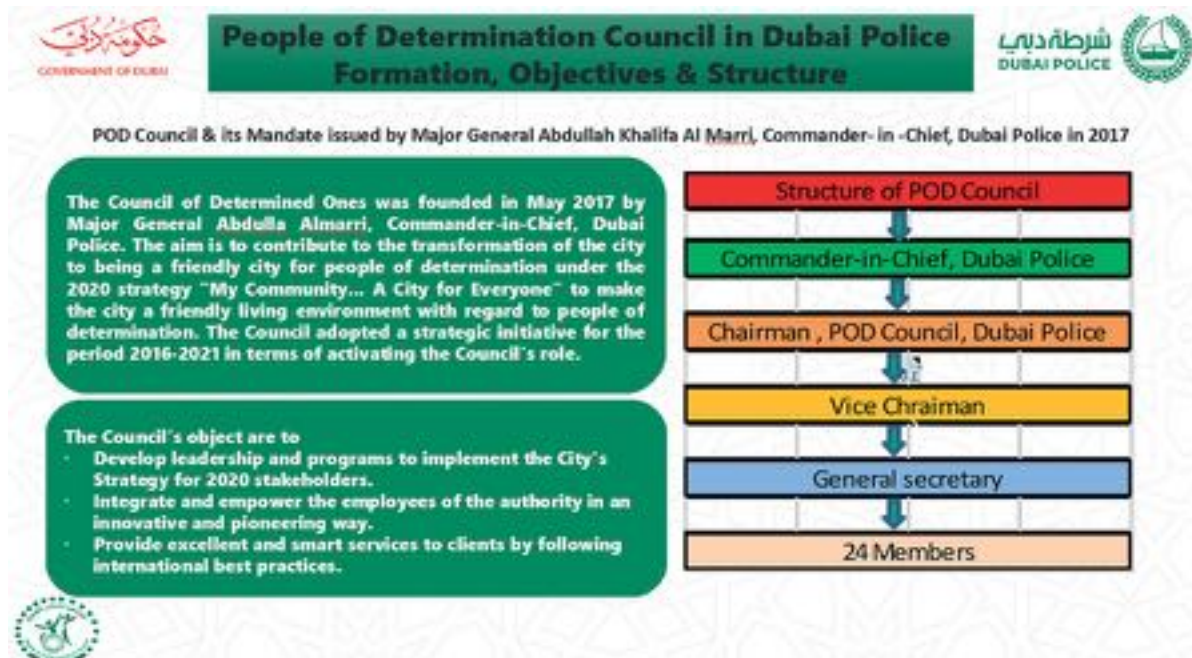
- Mobile App. created on Sign language: with 300 Arabic & 1000 Emariti signs. Plan is to add 1000 English language signs. 18 Police Officers have been trained in it.
- Two special workshops were held for prison staff on "How to Deal with POD".
- 26 training courses were held for POD employees at Dubai Police.

7. Estedama (Sustainability)

- Dubai Code for facility design: With an aim to make all Dubai Police Buildings compliant to POD, nine offices, six police stations and two prisons were redesigned with investment of over AED 2.5 million.

8. Smart Services of Dubai Police:

- Dubai Police App: All 57 Dubai Police smart services are user friendly for PODs. Apps can be managed by voice over and is available free in Google and Apple stores.



App. has won many prestigious awards:

- Best M-Government Service Award 2014 to 2017.
- World Summit Award- M- Government 2014.
- Hamdan Bin Mohammed Award- Smart Government 2013-2016.

9. Making reading easier for PODs – Bookshare, UK:

- Dubai Police has collaborated with Bookshare and published more than one million Arabic words in Braille since 2018. It led to launching the first Arabic library containing smart Braille versions. Bookshare is world's largest online library of eBooks for people with print disabilities with 450,000 members across 70 countries.
- Started converting legal books from Arabic to readable format "DAISY" ((Digital Accessible Information System). Road Transport Authority, Dubai, has emulated this best practice of POD Council.

10. Crisis Management:

- Dubai Police affiliated with National Emergency Crisis and Disasters Management Authority.
- All Dubai police staff have been trained for handling POD under 22 scenarios of Crisis Management program that include Fire, Earthquake, Floods, Thick Fog, Sand storm, Power shutdown, Nuclear disaster etc. 18 fire drills, covering PODs, conducted Police stations.

11. Other Major Achievements of the POD Council

- Dubai Police entered Guinness book of records during the Dubai Fitness Challenge by organizing the largest wheelchair race with the participation of 289 POD.
- Improved POD Employee Satisfaction Scores to 96 % in 2018 from 87 % in 2015.
- Improved Dubai Police satisfaction as Responsible Company in Society from 87 % in 2015 to 93 % in 2018.
- Increase in community initiative for inclusion of POD: from four as of 2015 to 22 nos. in 2018. 12,283 persons benefitted from these initiatives.
- POD council received 35 Appreciated Certificates from local & federal authorities.

PGT-RECLAIMED

Lifestyle furniture creator, PGT-Reclaimed's founder Ian Burden thrives on the philosophy, "why cut one down when you can use what's lying on the ground."

It is this mantra that led the former Sydney man to creating a sustainable world at PGT-Reclaimed in 1998, producing rustic, timeless furniture from recycled wood sourced from discarded pallets and shipping containers, certified by the Forest Stewardship Council.

The company upholds a strong corporate social responsibility program, highlighted by its environmental conservation efforts, and over the past 21 years, the company has saved over 500,000 trees from being felled.

Each of the company's manufacturing steps commits to limited environmental impact, from manufacturing products by-hand, to using non-toxic ingredients in the finishes to biodegradable materials in packaging.

Along with its environmental efforts, PGT-Reclaimed takes pride in creating jobs and providing a positive

work environment for its 611 employees at its Vietnam factory. The company's workforce has an almost even gender balance, with good retention due to high labour standards, a 'compassionate policy' and other key programs.

PGT-Reclaimed's workers are proud to produce furniture that is sustainable and of high quality, with the company advocating an anti-corruption policy enforced by a dedicated Quality Control team.

PGT-Reclaimed continues to grow in popularity, with furniture that can be found in most major cities of the world, gaining momentum particularly in England. A stand-out retail relationship is with 70-year-old business Barker and Stonehouse, and its distribution company Baker Furniture, as PGT-Reclaimed's exclusive distributor in the UK.

PGT-Reclaimed is, "Furniture with Heart".

PGT-Reclaimed, founded by Australian Ian Burden, was the first designer and manufacturer of lifestyle furniture made from 100% reclaimed wood, certified

by the Forest Stewardship Council (FSC). The global company began in 1998, and with its factory in South Vietnam, has grown to employ 611 employees, with sales staff positioned across the world.

When PGT-Reclaimed began 21 years ago, it disrupted the furniture industry with its innovative and environmentally conscientious practices.

The company thrives on respect; for the culture of

PLEDGING TO A MORE SUSTAINABLE WORLD

PGT-Reclaimed has been built upon a business model based on preserving the environment, using recycled timber as the core material, and minimising impact during manufacturing.



the Vietnamese people, the environment and everyone the company comes in contact with, such as distributors and customers, when exporting around 3,300 tonnes of furniture each month, to almost 20 countries. Over the years the company has built long-term relationships with a number of reputable retailers, including the UK's Barker and Stonehouse, Sweden's MIO, USA's West Elm, Pottery Barn, La-Z-Boy, New Zealand's Salamander Enterprises and Australia's Forty Winks.

The company has also received accolades from retail partners, such as in 2011, when it was awarded West Elm's "Supplier of the Year", and in 2018, was recognised as the model factory for the furniture industry by Sweden's MIO auditor. The company was also recognised as La-Z-Boy USA's "Best Gold Level Supplier" in 2018, won 2018 World Grand Champion at the Green World Awards and was awarded Environmental Excellence by the Supply Chain & Logistics Association of Australia.

PGT-Reclaimed's focus is on the 5R philosophy of reusing resources to enhance the furniture industry to be more environmentally sustainable, with a passion for innovation, resource management and wellbeing of employees and consumers.

PLEDGING TO A MORE SUSTAINABLE WORLD

PGT-Reclaimed has been built upon a business model based on preserving the environment, using recycled timber as the core material, and minimising impact during manufacturing.

The mission of conservation is always top of mind, taught to workers during classes, and demonstrated



The Valletta Dining Suite is one of PGT-Reclaimed's latest collections that is made using a tongue in groove technique.

through reclaimed wood incorporated throughout the factory in window frames and hand-towel boxes, along with three tree stumps at the factory's entrance. The largest demonstrates how a large pine takes 30 years to grow and despite its size, only provides .6 cubic metres of timber for furniture. PGT-Reclaimed advocates a pine of this size serves a greater purpose being alive by producing 2,700kg of oxygen for two people to use in a year.

The company's culture is themed upon sustainability. A Company Choir sings The Reclaimed Song at each week's assembly, which was written to tell the company's story and intentions of 'making old new'. The PGT-Reclaimed message unites employees and because of the work they are provided and the value they're shown, retention levels are high. Of 611 workers, 56 percent being male and 44 percent female, 29.7 percent have worked at PGT-Reclaimed for more than five years, with 45 employees in the "10 year club".

A contributor to positive retention might include PGT-Reclaimed's "For a greener future" compassionate policy, which provides workers access to education and assistance for housing, medical, dental and more.

PGT-Reclaimed encourages its workers to be proud

of the products they make, while taking responsible for quality. The company has a policy against corruption with an experienced Quality Control team to ensure product standards are not compromised.

PGT-Reclaimed's steps in ensuring a high quality workplace has been recognised, including being named best employer for looking after the workers and achieving excellent work performance.

COMMITMENT TO SUSTAINABILITY

Ian has built PGT-Reclaimed on using discarded timber, drawn from old pallets, shipping containers, shipwrecks and old buildings, that would usually be taken away and burned.

The idea of using reclaimed wood came to Ian when the Vietnamese Government and World Heritage Council clamped down on logging in 1997. He saw potential in producing high quality furniture using reclaimed wood and worked with the Forest Stewardship Council to develop a Chain of Custody to prove the sourcing of the wood was ethical and authentic.

Ian's theory is "why cut one down when you can use what's lying on the ground?" and through the company's processes, PGT-Reclaimed believes 500,000 trees have been saved from being cut down, generating enough oxygen for millions of people to inhale over a year.

Twenty-one years since PGT-Reclaimed began, the company is still adhering to the same principles of environmental conservation, all the while communicating its effort throughout the company, its customers, and via social media, hoping to inspire others to preserve the environment.

ORIGINAL INNOVATION

From the beginning PGT-Reclaimed has attracted interest internationally for its innovative and unique practices.

In an article published in 2002 in Vietnam's leading daily newspaper, Tuoi Tre Chu Nhat, the journalist Nguyen Huy Cuong recognised Ian's efforts: "PGT provides us with a new insight for the protection of the environment which is different from the old traditional and ineffective way of thinking and working as we do in protecting our forests."

Today, Ian holds a number of design trademarks, with innovative design highlights including the first butterfly extension dining table, the skin wood surface, the unique Sundried Ash finish and the Quick to Assemble Bed system.



Certificate of Merit for taking care of shift meals in 2018



Diploma certificate for achieving excellent work performance in 2018

PGT-Reclaimed takes pride in preserving the integrity of the furniture industry, including through high quality furniture and unique designs.

COMMITMENT TO SOCIAL BENEFIT

Reduce and reuse:

Ian established a plethora of processes to ensure the wood would be treated correctly to withstand any climate throughout the world. This included a minimum 21-day treatment process where the wood is kiln-dried, with off-cuts fuelling the fire. Nothing is wasted.

From the beginning, Ian decided that the furniture would be made using old-English carpentry methods. Compared to factories that use staple and glue methods, PGT-Reclaimed initiated a floating panel method to ensure the furniture would best showcase the wood's personality, charm and character and be durable to last a lifetime. These traditional methods have generated thousands of jobs for the local Vietnamese.

COMMITMENT TO ECONOMIC BENEFIT

Greener and cleaner:

Since PGT-Reclaimed began, its finishes have always been unique, created using a multi-step French polishing method, to produce a stunning patina.

A couple of years ago, the company's finishes became even more unique, when PGT-Reclaimed turned its processes upside down beginning a program to move all finishes to use 100 percent water-based materials, replacing Nitrocellulose (NC).

Although NC isn't considered toxic, using water-based materials instead means there is less of a chemical smell in the air, with minimal residue. This move provided a more comfortable environment for employees and increased consumer satisfaction, with 90 percent of furniture now transitioned to water-based finishes.

As more water was used throughout the factory for these finishes, PGT-Reclaimed installed a Production Waste Water Treatment system costing over \$US100,000 in 2017. This system comprises 13 tanks fitted under the factory to allow water to pass through with solids collected and turned to mud to be discarded in general waste, and the recycled water is used to wash the toilets or water the garden.

Packaging to preserve our world:

Eco-practices extend across the business, including recycled sand paper and brushes used in the factory and recycled paper for printing. A minimum of 80 percent of packaging is made from cardboard and honeycomb, with little styrofoam, spring film or plastic. This allows the packaging to be mostly recyclable, with little excess waste.

Less CO2 released to the environment:

PGT-Reclaimed produces products 100 percent by hand, with no robots. Tracks to move the furniture are wheel-based, rather than electronic conveyor belts.

In addition, the company has moved to reduce electricity through replacing traditional lights to LED, and by allowing natural light to enter the factory via the roof or the side walls. These actions have contributed to energy being reduced, from 1,726,700kWh in 2014 to 1,474,700 kWh in 2018.

REPLICATION

PGT-Reclaimed, while celebrating its successes over the years, has faced its challenges, including generating some "enemy within" meaning some close family and friends have sadly copied some of Ian's original designs. While PGT-Reclaimed has survived because of its originality, businesses that chose to copy did not survive as they were not equipped to generate new designs, new finishes or even adapt to the new way to do business.

PGT-Reclaimed remains proud and protective of its original designs and this was evident when the company fought to achieve a satisfying win in 2017 after an arduous four-year legal battle between PGT-Reclaimed (International) Ltd and ESR (NZ) Ltd (“Early Settler”) in New Zealand regarding copied furniture. It was a pleasing result, while being an exhausting process.

LOOKING TO THE FUTURE

April Fool’s Day 2019 marked PGT-Reclaimed’s 21st birthday. To celebrate, the company launched a 90-second video explaining the importance of preserving forests. This video had attracted thousands of views across PGT-Reclaimed’s social media channels, including on YouTube.

In the coming years, PGT-Reclaimed looks forward to elevating its practices further with a new factory near its current site. In the interim, it is doubling its office area of 3,300 square feet to allow for initial growth.

The last 21 years has been an incredible journey for PGT-Reclaimed. The company continues to lead the recycled furniture industry yet maintains its corporate social responsibility at a high standard to inspire others to contribute significantly to a more sustainable world.

PGT-Reclaimed is, “Furniture with Heart”.

SAUDI ARAMCO

Yanbu refinery department (YRD) piloting a new technology to resolve industry chronic concerns with enhanced safety, efficiency and environmental benefits.

Black powder (BP) is a typical contaminant usually found in sales gas pipelines. Its presence can cause major operational and maintenance issues including blockage of pilots, sensors and filters, erosion of pipeline bends and compromise the sales gas quality with potential interruption of production.

Other Black powder challenges are

- Traditional filtration systems require double-stage filtration
- 70% of black powder

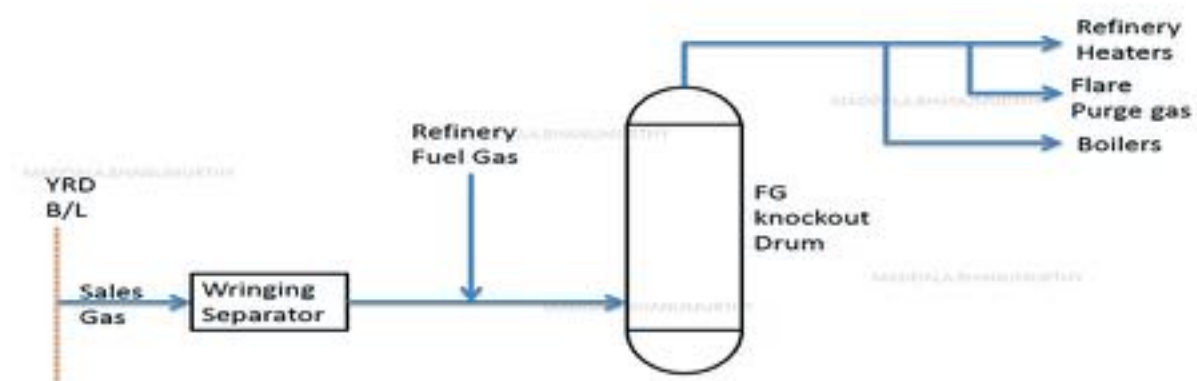
YRD customer base includes major customers such as Luberef, Ibn Rushd, Saline Water Conversion Corporation SWCC. YRD regularly conducts several customer focused meetings to improve engagement with customers and various improvement actions are taken at various divisions to fulfil the stakeholders' expectations in line with YRD Operational Excellence framework that contributes to the achievement of long-term sustainable comprehensive organizational success as well as catalyzes Saudi Kingdom's

development.

It is worth mentioning that "Self-Cleaning Filter for Capturing Liquids and Black Powder In sales Gas" innovative idea was recognized by Saudi Aramco Board of Engineers for successful piloting and was incorporated into Aramco approved technologies. Saudi Aramco is now pursuing to install at other facilities. Moreover, other facilities like SASOL from South Africa, approached YRD to explore this technology and overcome issues with system.

YRD piloted a breakthrough technology to resolve Corporate Sales Gas Black Powder Economically. Yanbu Refinery's piloted "Self-Cleaning Wringing Separator" (WS) Technology offering cost effective environmental friendly Solution to Corporate Sales Gas Black Powder concerns was approved by Saudi Aramco Central Engineering.

The separator Vessel made in Saudi Arabia with 60% less capital investment, 99% efficiency eliminating throughput reduction and cartridge waste generation while promoting local industry boosting "Alignment to National Interest" KPI. The novel solution and executed within YRD, can be applied at many facilities as most of the industries normally have these systems.



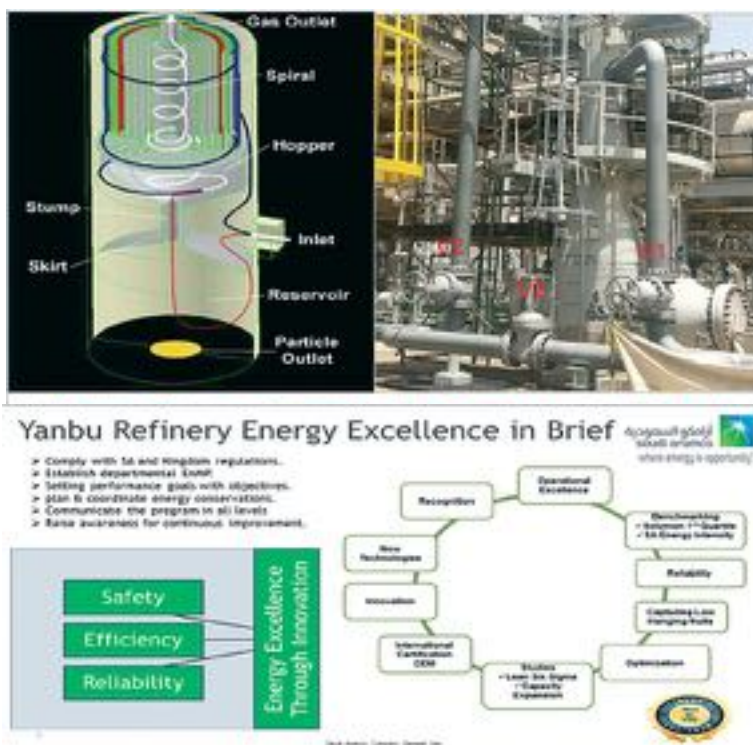
Yanbu refinery implemented ethane to sales gas conversion project for availing Ethane stream to petrochemical industry. However, sales gas had known black powder concerns associated with sales gas. YRD deployed a new filtration technology “wringing separator” instead of traditional cyclone(10 microns) and cartridge filters(up to 1 microns) usually employed in SA, to economically eliminate black powder iron sulfide (Fe + S) and iron oxide (Fe + O), from sales gas network.

The wringing Separator is not a cyclonic, neither a cartridge nor a centrifugal type. The operating principle of the Wringing separator is completely new, based on the use of the boundary layer current generated by the main flow along the walls of a spiral duct. This current is maintained strictly adherent to the walls of the duct lapped by the gas flow.

The Wringing Separator is a system used to capture very small particles (1 micron size) from a gas stream and it is not a cyclonic, neither a cartridge nor a centrifugal type. The operating principle of the Wringing separator is completely new, based on the use of the “boundary layer current” generated by the main flow along the walls of a spiral duct. This current is maintained strictly adherent to the walls of the duct lapped by the gas flow.

Project Impact

The innovative project served the refinery to mitigate negative impact of black powder from escalating to pilots plugging or concerns of pyrophoric material handling.



- In order to prevent potential negative impact of black powder from Sales Gas system cascaded into Fuel gas system and plugging burners, pilots, Yanbu Refinery proactively pursued filtration system as part of ethane to sales gas conversion project. Considering delays in procurement of more than 18 months enhancing potential risk to refinery operation, YRD evaluated alternate technologies and pursued wringing separator installation. Wringing separator performance was tested after 6 months continuous operation. The analysis of black powder @ R&DC and other labs, confirmed that it is able to capture particles as fine as 1Micron without the need for cartridges.

As a result,

- Refinery reduced investment cost by more than \$1MM as compared to traditional cyclone and cartridge filters. This technology had potential to save millions based on industry sales gas filtration requirements

- Reduce the filter element replacement cost which ranges up to \$16M/replacement.
- Reduce pyrophoric material handling risks.
- Since it has no cartridge, solid waste generation is also reduced and frequency of cleaning.
- Yanbu Refinery Energy SME (Subject Matter Expert) and off-sites senior engineer and innovator Mr. Maddala Bhanumurthy's was recognized by Saudi Aramco Board of Engineers for successful piloting and incorporating into Aramco approved technologies.
- Can be used in place of compressor knockout drums at higher constant efficiency.

Saudi Aramco is now pursuing to install at other facilities. Moreover, other facilities like SASOL from South Africa, approached YRD to explore this technology and overcome issues with system.

Advantages;-

1. Minimum solid waste generation by eliminating Cartridge replacement
2. Constant efficiency, no drop in efficiency unlike traditional cyclone and cartridge filters.
3. Self-cleaning filter with low pressure drop
4. Facilitate on line cleaning
5. Allow throughput with low pressure drop
6. Low capital cost (by 50% compared to Cyclone and cartridge filtration system)
7. Low Operating cost due to cost avoidance of cartridge replacements and avoiding purging.
8. Avoid pyrophoric handling risks during Cartridge replacement
9. Reduce Operators frequent isolation, purging and putting in service

Project Sustainability

The innovative project is serving the refinery and helped to promote energy efficiency, enhance safety and environment, with reduced frequency of pilots cleaning along with ~~pyrophoric~~ solid waste generation & handling. Moreover, it is now being explored for potential replacement of KOD with positive impact on compressors reliability with sustained efficiency. The success resulted in YRD Senior Operation Engineer "Bhanumurthy V. Maddala" getting SA BOE recognition. Several upstream departments visited Yanbu refinery to explore this technology for their future investments.



Yanbu Refinery Zero-ethane Flaring Project is featured in Oil & Gas Middle East Magazine

TANAP NATURAL GAS TRANSMISSION COMPANY

TANAP is a JV of BP, SOCAR, BOTAŞ and forms the largest part of Southern Gas Corridor. With 19km running under the Sea of Marmara, the main pipeline in Turkey reaches 1,850km.

TANAP ensures supply security and diversity in Turkish and European Gas Markets, as an alternative corridor from Azerbaijan to Europe.

We are committed to safe, environmentally and socially responsible design and foster environmental, social, economic priorities for the benefit of communities by implementing SEIP along our route.

While TANAP design and construction supports “minimum footprint” principal, SEIP promotes “Maximum Benefit” principal in dealing with our neighbours and environment.

The Trans Anatolian Natural Gas Pipeline (TANAP) Project, a joint-venture of BP, SOCAR and BOTAŞ, aims to supply natural gas from Azerbaijan to Turkey and to Europe as one of the biggest pipeline projects with a length of 1,850km.

Our mission is to build a high-quality, reliable gas pipeline with high safety, social and environmental standards. Our vision is to increase supply security

and diversity in Turkish and European Gas Markets, by opening up a new gas supply corridor.

Being recognised as a successful pipeline company, as a key player in our region, we also want to make a difference by supporting social and environmental development to ensure efforts reach communities in the most efficient way and improve the quality of lives along our pipeline with the spirit of “giving back to our communities”.

With this ultimate aim, TANAP Social and Environmental Investment Programme (SEIP), designed and kicked off in 2015, contributed in maintaining the socio-economic development along the pipeline in 20 provinces, 67 districts and 600 villages by providing grant to around 1,000 projects under two main components.

SEIP, under its social component, supports education, culture, development of rural economy and social capital, productivity, sectoral development, and social and economic capacity increase; under the environmental component, sustainability of natural resources, contributing to the solution of infrastructural problems, supporting local precious plant production, projects targeting ecosystem and biodiversity-based investments. Following site visits on the pipeline route to meet with stakeholders, a Needs Analysis Report was prepared.

Having this report as a baseline, SEIP Strategy and Planning documents, defining the priority areas, were developed. In line with these documents, with support of a professional Joint Venture, contracted for management, evaluation, monitoring and reporting of the projects, all settlers were defined as eligible applicants and grant announcements were conducted accordingly (26 information meetings, 3,070 participants) in order to create sustainable values along the Pipeline.



Project Affected People (PAP) living along the pipeline route as well as the disadvantaged groups such as persons with disabilities, women as the householders or the only one bringing home the bread, children, people in need, isolated elderly people, who are illiterate and have no income, people having income below minimum wage were prioritised. In conclusion, we reached 20,115 children, 6,909 women and 4,310 persons with disabilities.



During pre-qualification process of the awarded projects, sustainability score was one of the crucial evaluation criteria. With this purpose, cooperation with local public authorities were supported to ensure the sustainability of project outcomes after their completions. Projects aiming to increase the quality of services for wider number of people were prioritised. Since, development and implementation of SEIP proved itself with its successful outcomes, TAP benefitted from our strategy as a model for their social and environmental support programme.

SEIP also contributed achieving savings specifically energy saving through numerous projects implemented in cooperation with local authorities. As an example, a project supported under the Programme aims the installation of solar panels for production of electricity at licenced hazelnut facility supplying 90% of its energy from solar panels which will yield 819,655.20 KW/year energy saving leading to around USD 87,000.00/year saving in monetary

terms which in turn ensures a self-reliant and sustainable facility. Giresun Commodity Exchange forecasts that hazelnut storing costs of final beneficiaries will decrease 30% while the revenues of hazelnut producers and exporters will rise around 10%.

SEIP cooperated with regional authorities to improve water supply and storage systems by providing almost USD 4 Million to finance rehabilitation projects including supply and installation of solar panels to obtain water from the source and pump to the reservoirs.

SEIP was structured on a 3-pillar funding mechanism: Programme Contribution, Direct Investment, Direct Grant. Program Contribution was allocated to contribute regional governmental investments on environmental and social areas. Under Direct Investment, partnerships with highly reputable and successful NGOs were established.

Direct Grant was developed as a public invitation (Call for Grant), addressed to clearly identified categories of applicants and for projects to reach out a wide range of beneficiaries. This innovative approach has led to following sustainable outcomes;

601,448 saplings were planted in 12 provinces to enhance the biodiversity through supporting afforestation, and to combat climate change.

91 villages in Central Anatolia were provided drinking water facilities ensuring access to healthy and reliable water supply.

Construction of modern irrigation systems aiming to diversify agricultural products while protecting water resources and soil by consuming less water were attained in more than 23 villages in Eastern Anatolia.

33 hospitals and/or healthcare centres were provided fully-equipped ambulances to improve healthcare services.

TANAP Social and Environmental Investment Programme (SEIP) Core Team

Upon announcement of the awarded projects within the scope of Call for Grants, two signature ceremonies were organized in Ankara to sign grant contracts and to celebrate the successful project applicants. Consisting of young, ambitious members, SEIP Team were proud to complete the signature process of the grant contracts of the 2nd Call on 13th August 2018, anticipating the implementation period of grant projects.



Partnerships with NGOs yielded training of 1,800 teachers and 2,000 families of children with autism, establishing special classrooms for these children at 33 schools, delivering 1,550 teachers Learning Leader Teacher and 240 principals Academic Leadership Training to initiate innovation education methods, installing online training portal for teachers.

Farmers were provided with bovine, ovine and/or agricultural equipment to ensure long-term income raise.

Schools were provided with renovation, computers, laboratories and sports facilities to ensure long-term increase in training quality, cooperatives with modern equipment (beehives, milk cold storage, transportation tanks etc.) to secure sustainable economic growth.

Villages were provided with infrastructure, hygienic

waste disposal equipment, solar energy and modern irrigation to empower common wealth.

Provinces and districts were provided with renovations, asphalt plant, construction material fabrics to ensure self-sustaining public services.

Students, persons with disabilities, children with autism and families were provided capacity building and vocational trainings to achieve adaptability to socio-economic life.

Finally 10,796 Farmers, 189 Schools, 73 Mukhtars, 30 Associations, 19 Unions, 18 Cooperatives, 12 Province/District Municipalities, 11 Unions for Providing Services for Villages, 8 Special Provincial Administrations, and 7 Universities benefited from SEIP.

Ensuring the capacity building of all these institutions



and supporting socio-economic development of farmers, SEIP proved its contribution to sustainable development along the Pipeline. Outcomes of SEIP were evaluated via monitoring visits, feedbacks from the beneficiaries, project documents, and implemented activities. 10 SEIP experts, 30 long-term experts, 60 independent assessors were assigned during evaluation, monitoring and implementation. On-site visits to project locations have monitoring purposes in addition to providing technical assistance to the beneficiaries for project implementation.

SEIP also utilizes an online monitoring, help desk, data collection system, enabling extraction of various type of reports about the Programme.

Grant payments were proceeded in at least two instalments following the approval of Interim and Final Reports as per the contracts signed. These reports include technical and financial reports (demonstrates the realization of indicators against financial figures) and supporting documents (copies of payment receipts, pictures of activities etc.).

SEIP as a Department has also internal monitoring mechanisms and reporting requirements to international creditors, shareholders, stakeholders etc.

SEIP's Communication Strategy was developed to achieve awareness on the objectives among the stakeholders, make the target groups understand the Programme and ensure their participation in the information meetings, successful implementation of grant projects and internal staff engagement with a diverse and inclusive approach.

Visibility materials (notebook, pen, USB memory stick, cap etc.), web-site, brochures, grant application guidelines, introductory presentations were prepared. Governors were informed about both TANAP SEIP leading to ownership and increased awareness. Approximately 8,500 grant applications is the main indicator of the sound dissemination of the Programme.

Following the announcement of the awarded projects, two signature ceremonies (approximately 1,000 participants) were organized in Ankara and a presentation of a short introductory film drew attention of the participants. A Visibility Guideline were provided to the successful applicants.

News bulletins, press releases about ongoing projects were prepared, periodically distributed to TANAP internal staff and external stakeholders as well as local and national media. This systematic information flow led to internal staff engagement and motivation in terms of participating in SEIP events (Signature Ceremony, Afforestation Event, Opening Events etc.). Additionally, being aware of the priority areas of SEIP, several project ideas were suggested by both internal staff and stakeholders. According to annual media exposure report, more than 1,350 news about TANAP SEIP have been published in newspapers, magazines and news portals in 2018. The sound dissemination of project/programme related news will in turn encourage other companies and institutions to initiate such CSR programmes.

Internal portal of TANAP was also utilized and regular posts on social media with specific hashtags were posted. International creditors such as EBRD, IBRD, World Bank etc. were informed periodically. Upon finalization of the projects contracted in 2018, a Closing Event will be held and a compendium will be prepared focusing on dissemination of success stories of our projects.

SEIP was designed for implementation during the Construction Phase of TANAP, however, due to the nature of such CSR theme Programme, it was to be continued. Even though the implementation of the Projects awarded under the Programme is still ongoing, it will be updated and developed annually keeping in mind that “development is within the change”.

Sustainability is the main target of selection and implementation strategy aiming to keep the positive impacts of the Programme in long term. The goals are re-visited regularly through site visits, assessment meetings and update of manuals and documents.



giving
back
to our
communities



**TANAP;
A PROJECT TO ADD STRENGTH TO TURKEY**

Building upon the success of mutual projects between Turkey and Azerbaijan, the two nations are taking a giant step in world energy markets. It is Trans-Anatolian Natural Gas Pipeline Project, TANAP! The brother nations of Turkey and Azerbaijan have worked together to realize this grand project aiming to meet the natural gas demands of Europe and Turkey, as well as to provide an alternative option for the Region.

"Giving Back to Our Communities"

We, as TANAP, do not want to be recognized only as a successful pipeline company, as a key player in our region, we rather like to make a difference by supporting economic development leading to environmental and socio-economic benefits to ensure efforts reach communities in the most efficient way and improve the quality of lives along our pipeline with the spirit of "giving back to our communities".



TICKETAID

Our international CSR story is one of innovation; one of enterprise & employee collaboration – of partnership; one of philanthropy – of trust; and has ultimately been a shining example of social intrapreneurship success.

From humble beginnings as an idea by its founder, Matthew O'Shea to provide a philanthropic alternative to the secondary ticket market, TicketAid transformed, thanks to the support of his employer, Refinitiv, into the globally accessed proposition that you see today, raising over \$100,000 for charity (since 2018) and engaging more than 4,000 workers across the globe through transforming corporate waste into donations that fill seats for good causes.

Filling seats for good causes is our mission, and TicketAid is our attempt to maximise fundraising potential through reducing corporate waste in an entirely new and innovative manner, helping redefine international corporate philanthropy. 2018 was just

the start of TicketAid's journey, and we're always on the lookout for expertise, guidance and volunteers to help us unlock TicketAid's potential.

With this in mind, we've positioned TicketAid as a veritable CSR initiative, alongside others mentioned in our 1,500-word submission, for not only our employees to be a part of but for our clients to share with us, taking inspiration for their ideas and CSR initiatives. We genuinely feel that TicketAid, as an example of our international CSR activity, not only embodies our culture, values and causes of importance to us, but enables us to pass these on to clients and their employees, wherever they are in the world without limitation, and without borders.

We have founded and taken a new proposition to market called TicketAid, which seeks to reduce corporate waste by transforming unused corporate tickets into donations to charity. We identified and sourced over 1,300 tickets to events over the past



TicketAid™ is a corporate ticket allocation website designed to give employees exclusive access to tickets that would otherwise go to waste, whilst raising funds for some fantastic charities.

Donate. Bid. Buy.

There are so many ways to participate in this new program... we can't wait to get you started.

Donate tickets and become part of our Board of Donors listed on our website (we accept employee-donated tickets too). As a donating organisation, you can assign the charity you wish to raise funds for per event, and will also have the option to give your own employees access to TicketAid.

Bid or Buy available tickets. You, as an employee of a participating organisation, gain exclusive access to these tickets to buy at no more than face-value, with the option to donate as much as you wish on top.

Both the face value AND the additional donation will go to the assigned charity. That's 100% of the proceeds!

Results

First 6-months for our Thomson Reuters employees:

Money raised for charity	Tickets sold
£76,588	1307



Reduced Corporate Waste

100% Proceeds to Charity

Our Charity Partners



Do more | See more | Be more





12 months, engaged over 4,000 employees across the world and raised over \$100,000 for six different charities.

We have partnered with six other companies to-date to enable them to do the same, increasing our fundraising potential, allowing our partners to support causes of importance to them while filling seats for good causes. To grow the proposition and maximise our social impact potential we have also founded Refinitiv Charities (1182952) which will allow the funds raised through TicketAid to be given as grants to a growing list of charities by working with an ever-increasing list of corporations.

This proposition is supported and backed by my employer who has made this endeavour my full-time role (since Jan 2018). You can read more about this social intrapreneurship success story here (<https://www.ticketaid.com/about>). I have had sole ownership of the initiative through ideation, software development, global launch, client partnerships and charity grant-making, with a constant focus on reducing corporate waste for the benefit of

supporting causes of importance to our business, our employees, our clients and our clients' employees. I have encouraged both client partners, and charities to detail specifics about the social impact realised through the funds raised and grants given through TicketAid and have been a pioneer in changing the way corporates approach fundraising, and the way charities engage their corporate partners.

The increasing number of charities and not-forprofits that have joined the initiative has led to them positioning TicketAid as an option for their network of corporate partners to use to raise funds for them in an entirely new and innovative manner - seeking to redefine corporate philanthropy.

Our key selection criteria when considering whether to permit a potential client partner to use TicketAid to raise funds for a charity of importance to them and their employees is whether the supported cause is helping address at least one of the SDGs. In addition, when we partner with a successful client applicant, we will work with them throughout the course of the year to ensure Principle compliance, and in



We are also leading the conversation for our organisation to attend the One Young World 2019 Summit. As a penultimate note to demonstrate our constant use of, and introduction of, innovative solutions to enable us to expand our CSR activity, we have recently rolled out corporatwide adoption of the search engine, Ecosia, who use revenue generated from search engine ads to plant trees in locations around the world in most need of reforestation, aiming to fight the increasing levels of CO2 in our atmosphere.

At the time of writing, we are four days into launching this and have already planted over 100 trees. As a final note to demonstrate not only action but consultative status in international CSR, through the TicketAid initiative, we have helped launch several CSR programs for the companies with whom we have partnered. PRS for Music, for example, didn't have a CSR program in place beforehand and have taken our advice and used TicketAid to kickstart their own CSR programs and community.

TicketAid has enabled us to not only embody our CSR values and action but pass them on to clients, their communities and their employees.

the instance where they are not current UN Global Compact signatories, will present our own Refinitiv adherence and operations as a working example for them to consider to adopt.

In addition to the details provided above, we have worked with HR in leading the conversation for integrating CSR-based performance review metrics. We have ensured that the executive leadership team and managers are encouraged to support and recognise the philanthropic efforts by their direct reports. To this end, we are currently building an interactive map that will be accessible by all internally, spotlighting the CSR achievements and efforts of our colleagues across the globe (in an attempt to recognise, but equally raise awareness of, the CSR initiatives).



A philanthropic alternative to
the secondary ticket market.
Filling seats for good causes.

Do more. See more. Be more.

REFINITIV[™]
CHARITIES



VESTEL HOME APPLIANCES

As Vestel Home Appliances, we produce ~9mn products per year with ~8.000 employees and export them to 155 different countries. Our +500 varying customers choose their products from our model range of ~56.000.

Even in such a fast and high volume production, we do not only care for the human comfort, but we also carry a responsibility and show regard to the environment and the domain in which we live together with our lovely friends.

We are the voice of our speechless friends, we are the limbs of our disabled friends.

We, as Vestel Home Appliances family, are one of Europe's leading home appliances producer who makes the productions of refrigerators, washing machines, dish washers, tumble driers, air conditioners, water heaters and cooking appliances in 6 different factories within one single campus that expands to 1.3 million square meters.

While we have a daily production quantity of ~45.000 home appliances, we are not only a production facility but we are also moving in all areas with our environmental responsibility by developing technological products that hold water and energy saving records.



In this context, we as Vestel family, gathered together in order to bring on a social content project towards decreasing the wastes that we leave to the ecosystem. While developing this project, we did not only bear the environment in mind, but we also thought of a plan that gives our cute friends we share the environment with, equal rights to live.

Instead of sending the components gathered from scrapped appliances that fulfilled their economic life to recycling facilities, we designed a walker for the walking disabled animals from these components.

With this project, we aimed to decrease our waste amount and at the same time give equal rights to live for our walking disabled friends for free of charge.

At the first stage, an announcement was made for our employees who wanted to participate in such a project. They voluntarily spent their time off working hours determining the available components and from these appeared the first design of the walker.

Next, the walker was optimized for the animals by getting the opinions of the Manisa Metropolitan Municipality Animal Shelter veterinaries. Different from the other tools that are sold for money, size options for all animals and triple roller structure that

can climb steps-sidewalks were designed. The walker was finalized by making trials on the disabled dogs in the animal shelter.

By making announcements via Manisa Metropolitan Municipality to the entire Turkish municipalities the demands were accumulated. During the first stage we produced walkers for 10



Stray dogs and other animals who suffer debilitating mobility injuries are given their mobility back with the walkers. They will be distributed throughout animal shelters across the country.

animals in 6 different shelters in Manisa and environs for free.

We aim to reach a total of 250 disabled animals in 2019. Also, in different European countries, three different Vestel sales offices were informed. Thanks to this, we were able to reach our disabled friend Vanille, a Spanish Cocker in Lyon, France.

1.450 gr of aluminum, 900 gr of iron, 1.150 gr of rubber and 115 gr of plastic is used in the production of a single walker. By the end of this year, instead of becoming a waste, total of 362 kg aluminum, 225 kg iron, 288 kg rubber and 29 kg of plastics will be revived in walkers during this project of ours that will continue indefinitely.

Although it is not a huge gain in terms of waste recycling, the “joy in their eyes” when our handicapped friends start to run around happily is the most pleasant achievement for us, the Vestel family.



The company uses waste material generated from the manufacture of electronic devices to make the walking devices. Commenting on the project, Manisa Metropolitan Municipality Mayor Cengiz Ergün said the city has an animal rehabilitation center specializing exclusively on paralyzed animals.

WARNER BROS. ENTERTAINMENT

Warner Bros. Creative Talent (WBCT) develops and supports young people who wouldn't otherwise be able to pursue a career in creative industries due to financial and social constraints. It creates a pipeline of talent for an industry which is booming in the UK. WB brings together key partners across film, games, television and theatre: RADA; NFTS; Ravensbourne; University of Hertfordshire; GCU; IADT; BAFTA; Chickenshed; Into Film; AMPAS and the BFI. In partnership with these major industry stakeholders, WBCT provides funding, paid placements, apprenticeships, mentoring and masterclasses. WBCT alumni – over 300 people – have forged successful careers in the industry, and have over 35 nominations and awards, including BAFTA nominations.

Industry Context:

WBCT is a unique, ground-breaking programme bringing together stakeholders from across the entertainment industry. WBCT enables and leverages opportunities for talented people to access Creative Industries, irrespective of economic and social background, ethnicity, capacity or other diversity characteristics that may pose barriers to entry.

In the UK, the entertainment industry has historically been difficult to break into, especially for those without the financial means. Diversity & inclusion has also become one of the most important issues in the media and entertainment industry. People of diverse backgrounds are under-represented on screen and behind the camera.

Warner Bros. Creative Talent Alumni Testimonials:



Rieniye Attah

"Without the support from my mentors and Warner Bros. Creative Talent, I don't think I would be in the position I am now – a job in a field I love, a degree and an amazing video game that I created."



Jon Champion

"Warner Bros. Creative Talent nurtures your professional and personal skills. For me, it has enhanced my speech and dexterity and I am very grateful for that"



Claran Dooley

"Since becoming a part of WBCT, I have been nominated for an IFTA and for two Young Director Awards by the Institute of Creative Advertising and Design. I also received an award from the San Francisco Ocean Film Festival, and had The Great Wide-Open broadcast on RTW, Ireland's national broadcaster"



Rachel Enskine

"I started out as an apprentice and have recently worked as an assistant editor on the film Hell or High Water – I was thrilled when it was nominated for four Oscars!"

- 'More advantaged groups' make up 91.9% of occupations in creative economies.
- Only 16% of UK films released were directed by women.

The dedication, expertise and advice of Warner Bros.' partners are crucial to building and amplifying the success of this multi-partner collaboration.

Warner Bros. Creative Talent (WBCT) is a unique programme within the entertainment industry that develops diverse, emerging talent from all backgrounds. It was established in 2013 to identify and incubate a

Alumni in Action



pipeline of creatives for the UK and Ireland's screen industries, in film, TV, games and theatre. WB Creative Talent participants gain invaluable industry access, experience and insight.

Issue:

Diversity and inclusion is one of the most important issues in the media and entertainment industry. People of diverse backgrounds are under-represented on screen and behind the camera. Warner Bros. Creative Talent is one of the ways that Warner Bros. is committed to supporting a new generation of talent.

WBCT focuses on young people with financial need who might otherwise be prevented from pursuing a screen industries career for economic reasons. It has become a fundamental part of Warner Bros.' commitment to the UK's and Ireland's creative industries. By prioritising socio-economic inclusion,

the make-up of Creative Talent over indexes on various national industry diversity figures.

What is included:

• Scholarships:

Scholarships form a key part of ensuring that talented people are enabled to pursue a career in the creative industries. Changes to the UK government funding for higher education make financial assistance for students more important than ever before – particularly to enable people from poorer socio-economic backgrounds to pursue crucial post graduate training. WBCT offers scholarships and mentoring to students through partnering with six higher education institutions; The Royal Academy of Dramatic Arts (RADA), The National Film & Television School, Glasgow Caledonian University, Ravensbourne, University of Hertfordshire, Dún Laoghaire Institute of Art, Design and Technology

(IADT). In addition to the higher education partnerships, together with BAFTA WBCT also provide three Prince William Scholarships in Films, Games and Television.

- Mentoring:

WB Creative Talent are paired with a senior executive mentor within an area of the WB business. They are there to support the students as they transition from their studies to the workforce and act as a resource for any industry and career-related questions.

- Apprenticeships:

WBCT offers six apprenticeships annually, allowing students to combine on-the-job training with relevant college courses. These apprenticeships are funded by WBCT and have included roles at Warner Bros. Studios Leavesden, Warner Bros. De Lane Lea, and Warner Bros. Television Production UK. After her apprenticeship finished a Grace Reinhold-Gittens from Season 3 received a permanent position at Warner Bros. Studios Leavesden as a Sales and Operations Assistant. She recently won the IDEA (The Duke of York's Inspiring Digital Enterprise Award) and several other WBCT alum apprentices have now got permanent roles at the studios.

- Production Placements:

WBCT scholars are given a paid placement on a WB film or within a WB business unit after they graduate, which directly correlates to their career ambitions. These can vary from script supervisor and production assistant to hair and makeup trainee.

Additionally, in collaboration with ScreenSkills (an industry-led skills charity for the screen industries), Warner Bros. funds at least two trainees on every WB production within the UK. This has allowed 26 of young people to gain on the job experience. Previous trainees have worked on films including Wonder Woman, Fantastic Beasts and Where to Find Them and Ready Player One. Warner Bros. is also the

largest contributor to ScreenSkills' Skills Investment Fund (SIF), investing over £1.5million to date.

- Masterclasses:

All WBCT current participants and alumni are invited to masterclasses throughout the year, which provide them with invaluable insight from WB executives and industry professionals. Sessions are focused on a variety of subjects from film acquisitions and distribution to TV marketing. Tours of post-production sound studio and production lots are also organised to give scholars first-hand experience and behind the scenes access. Masterclasses are an essential aspect of the programme as they ensure that our young people gain invaluable insight into the entertainment business and help to develop skills that will allow them to progress successfully in their careers. A great example of this is the freelancing masterclass which provides guidance for working in a self-employed world.

This is critical for our Alumni, as 50% of those employed in film and video production are freelancers. Our commitment to industry collaboration and outreach means that WB also extends masterclass invitations to other film schools and diversity inclusive organisations outside of WBCT.

- Partners

WBCT works with stakeholders across the entertainment industry - RADA; NFTS; Ravensbourne; University of Hertfordshire; GCU; IADT; BAFTA; AMPAS (The Oscars); ScreenSkills; IntoFilm; Chickenshed. Annually, WBCT supports 14 scholarships; 6 apprenticeships; at least 2 trainee production placements and 25 training course places at Chickenshed.

These partnerships were established when WBCT first began and work together to offer the best support to each recipient.

Each partner contributes significant support:

- AMPAS – WBCT members are invited to film screenings, allowing them to network with award winners.
- BAFTA – WBCT developed the Prince William Scholarships in film, games, and television, which are supported by BAFTA. Recipients benefit from BAFTA and WB mentors.

WB Games is also an industry partner of BAFTA Young Games Designers, inspiring young people to create games.

- BFI / Into Film – WB provides educational material based on WB content to Into Film, makes movies available for nationwide free screenings, distributes DVD's for film clubs and allows access to press junkets for young reporters.
- Higher Education - WBCT provides scholarships at some of the most respected institutions in the UK and Ireland. These provide students with financial assistance as well as mentoring, masterclasses, screenings and a paid production placement.
- Screenskills - WB is the largest contributor to the Skills Investment Fund (SIF), investing over £1.5million to date.

Results:

Since its inception in 2013 WBCT has supported over 300 young people. Many of our Alumni have graduated with first class honours or distinctions; achieved nominations and awards; seen their work garner critical acclaim, festival screenings and theatrical release. They have worked on major film, television and TV productions in the UK. As it enters its 6th year, the programme continues to succeed by developing and promoting underrepresented talent:

- WBCT effectively launches careers; over 80% of our alumni are now working in the industry within film, TV, theatre or games.
- The programme exceeds BFI inclusion targets for representation of women and BAME. • Scholars and alumni have worked on over 150 productions.
- 18 WBCT alumni have been credited on 2019 BAFTA nominated films, with some even working on multiple productions.
- Additionally, alumni have worked on some of the biggest movies of 2018 including Bohemian Rhapsody, Fantastic Beasts: The Crimes of Grindelwald and The Favourite.
- Alumni have been nominated for and won multiple awards across the industry including BFI Vision Awards, BAFTA and Develop's '30 under 30'.
- Scholars have started their own production companies and games businesses, have worked in the National Theatre and the Royal Shakespeare company, have full-time positions within Warner Bros. businesses, have been signed by international production houses and leading talent agencies.

In addition to funding, our charitable and educational partners benefit from working with a major US studio.



- RADA – The Principal Partnership with WB was the catalyst for the development of the Academy’s film and television department. Students now benefit from both stage and screen training, and each year six short films are funded by WB. Students learn about mocap from Rocksteady, one of WB’s games companies. Four scholarships are funded each year.
- BAFTA: WB supports 3 Prince William scholarships annually, and partners with BAFTA young games designers.
- IntoFilm: WB provides educational material, films and access to press junkets for young people.
- Chickenshed – Funding for Young Creators.

Looking forward:

Warner Bros. Creative Talent is a unique programme and is the only one of its kind offered within the UK entertainment industry. Working with a group of forward-thinking partners has enabled WBCT to give ongoing support to scholars and alumni, allowing them to overcome financial and socio-economic barriers to achieve their career goals.

Six years of success stories have only made our resolve to facilitate change stronger, and we will continue to develop the programme in order to reach more young people and help transform negative industry practices.

WPP INDIA CORPORATE SOCIAL RESPONSIBILITY FOUNDATION

WPP, a global creative transformation company, integrates its expertise in communications, technology, experiences and commerce to build better futures for our clients. Our understanding of the audience, helps in driving mass-level behaviour change campaigns. WPP deeply addresses the key social challenges in India's youth, education and employment with the launch of WPP India Foundation in 2015.

With the vision of leading the under-served youth in India from improved educational outcomes to informed livelihood choices, we have initiated our Education to Livelihood (E2L) program, enabling each child for 7 years, to complete their secondary education and make an informed career choice as they turn 18-years old. We work with almost 20,000 children, who are first-generation learners, from the urban and peri-urban slum communities in Mumbai and Delhi.

It takes a community to raise a child, so for our 20,000 children's development we have a 360-degree approach involving the key stakeholder's in their environment including their parents, peers, teachers and community. This enables a holistic development of our children, ensuring a sustainable change in the child's environment through our models of interventions.

In the last two years, our children have made great strides,, where we have increased retention and reduced drop-outs of our children, over the national averages. The academic outcomes have improved on average by 35-points among the children. Over 70% of our children are employed or are pursuing higher education. Our initiatives have made great progress in reducing the equity gaps between the 'have' and 'have-nots' of our society.



Bringing a community together to bring about change:

Education is a key change maker in the field of development when addressing social challenges. India, witnesses high drop-out rates among children studying in secondary and higher education, while the children completing education lack necessary employment skills. While government and industry initiatives have made key efforts towards these challenges, but the needle of improvement has barely shifted.

At WPP, a global creative transformation company, we integrate our expertise in understanding our audiences in bringing about mass-level behaviour change. To address this India challenge, WPP has taken a deep dive and launched WPP India Foundation to lead the underserved youth from improved educational outcomes to informed livelihood choices.

To achieve this vision, we work with 20,000 children from 10 schools based in the urban and peri-urban slum communities in the cities of Mumbai and Delhi. Our children are first-generation learners with a key challenge of understanding the value towards one's education and livelihood. We have introduced our flagship program — Education to Livelihood (E2L) to help create this value towards education and livelihood among our children through over 20 interventions.

Through our Education to Livelihood (E2L) program we want to ensure the following for our children: I. Retention: By reducing drop-outs & bringing back joy to learning

Faraz does not want the programme to ever end. He feels that there are many other children like him who can benefit from the intervention and become confident individuals. The parting words of Faraz were "Miss, please ensure that we have the Magicbus sessions in the coming years as well, so we can learn the good things in a fun way."



II. Learning outcomes: In our culture, where percentage is synonymous to ability, children and parents lose faith due to poor academic results. We help bridge the learning gaps in English and Mathematics through innovative teaching methods. We also introduce children in government schools to coding and 3D modelling.

III. Job readiness: We tackle the issue of youth graduating and not being able to sustain jobs, by helping them:

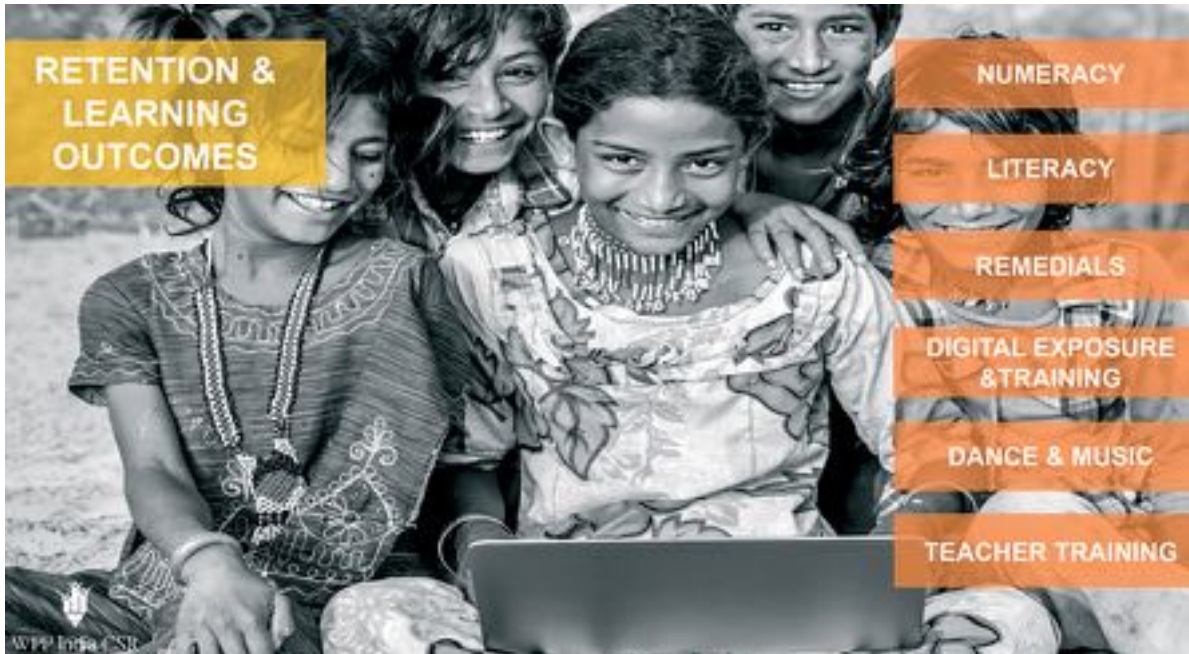
- To build work-readiness, soft skills like time-management, goal setting, teamwork, problem solving, etc.
- To enhance communication skills and personality development

IV. Impacting deep-rooted social norms: Stereotypes of gender and caste hamper a child's success. To eliminate these social barriers, we enable change in adolescent perceptions through play, dance and music.

Building agency within our E2L program through Community Connect:

It takes a community to raise a child. The key stakeholders in their environment—their parents, teachers, peer group and community play a very important role, as they act as their guides.

We consider the school authorities as our co-creators, as they help us identify the key challenges faced by their institutions and the children. They know where it pinches and so help us address these challenges through their cooperation. We provide capacity-building trainings to the school teachers so we can address the technology gaps in teaching and provide leadership skill training, which directly affects our children. Also, we have seen that when you are part of the process of change, you ensure that the change happens.



Parents are made to feel at home through parent-teacher conferences where we want them to engage with the children in their journey from education to livelihood. Through plays, presentations and videos we make them see how their children's lives can change. This directly improved the child's retention and engagement. The parents too become change agents who start encouraging their children. We believe when our children's needs and that of their stakeholders are met, we can achieve mass-level behaviour change which can help us address the key development challenges that we face today.

Measuring our impact in the communities:

We use an evidence-based approach to direct most of our interventions for our children for which we have designed a theory of change with the help of a professor from the Harvard School of Public Health. This helps inform our impact measurement with a third-party neutral organisation, Kantar, which conducts a mixed-methods study with our children and the key stakeholders in their ecosystem.

With everyone's support and a formal framework of

measuring our impact in place, we have started to witness the initial successes of our initiatives through the success of our children.

Academic outcomes of our children:

Our children have over 90% attendance in schools, which is way above the national average of 73% for secondary education. Similarly, we have limited the drop-outs in our schools to less than 5% in comparison to the national average of 17% in 9-10th grades.

Our children who were just passing in English, are now scoring grades that are worth a merit.

Digital literacy among our children:

Our digital interventions have brought our children closer to their imagination by teaching them to code, design 3D models and program robots.

Through KANO computer kit, we have helped children understand the difference between hardware and software. Through scratch coding training, we

have doubled the coding ability of our children. Over 60% of girls in this programme have more interest in pursuing computers as a career option. Through our 3D model designing course, we have tapped into the logical thinking and spatial reasoning of our children. With our Robotics program our children have learnt to use their hands to build and control robots and make them function for simple tasks.

Overall through our digital programs we are witnessing an overall increase in confidence among our children in using digital technologies, which will help our children in their future occupations.

Livelihood outcomes of our children:

We have counselled and assessed over 2000 children across our schools, helping them identify their careers to pursue.

Over 100 children are given vocational training to develop their entrepreneurial skills in various occupations like technicians, food processing, and organic farming.

Through our livelihood programme, over 200 children have been trained in job-readiness skills helping them sustain their employment. 70% of these children have received an industrial placement or will be pursuing further education. The average salary of these children is over INR 10,000 every month. These placements have been at industrial firms like Marks & Spencer, GE Healthcare.

Addressing deep-rooted social norms among our children:

We have witnessed reduced discrimination based on gender and caste by 3% and 5% respectively. We have been successful in making the children more confident in speaking with their peers and teachers. Our children are quick at learning leadership skills including goal setting and confidence building.

Being recognized for our work in the community:

We have been humbled with the support and recognition that has been provided to us by industry and government CSR platforms for our work with the communities.

We have been awarded Best CSR Practices and Innovative CSR practices awards at the ET Now CSR Awards 2019, a special commendation at Golden Peacock Awards for CSR 2019, Company with the Best CSR Impact at India CSR Summit 2018, Best CSR Case Study at NHRDN-BimTech Summit 2018.

We have won the Business and Communications Campaign award for CSR and Best CSR Impact Initiative at National CSR Leadership Awards 2018. Our E2L Project was awarded the Project of the Year Award in Livelihood at the India International Awards 2018.

Bringing our WPP family closer to our community:

In just 2 years, we have been successful in mobilising the support of all WPP employees, whose enthusiasm to support our children is keenly observed during social conversations and company events. Everyone wants to do their part, with some of us managing it daily and some of us bringing in our expertise to achieve our vision together. During one of our employee engagements we introduced toy-donation, which helped us contribute considerably towards the play of our children. Earlier this year we had WPP global employees engaging with children from a school associated with the WPP Foundation to conduct joyful activities including painting a mural on their school walls, doing organic farming and learning robotics.

Conclusion:

WPP Foundation is a young, lean and passionate team that continues to strive towards enhancing the futures of 20,000 children, ensuring the betterment of their communities.

We look to develop a proof of concept around our

Education to Livelihood (E2L) program and build corporate and government partnerships to scale the program across different geographies.

Within a short-period of time, WPP India has shown that the needle can move for the lesser privileged children in India. Made possible through the mobilisation and engagement of key stakeholders in the community of our children, building innovative frameworks and then successfully delivering on an impact which opens doors of opportunities for almost 20,000 children in India.

In true essence WPP has helped these young children believe that a brighter future awaits. That there is someone who will support them every way of the step from studying to taking their first steps towards a career.

We have touched the lives of almost 20,000 children and aim to open the doors of opportunities for many more children in their education and livelihood journeys.

The Green Book

Volume 25

A Work of Reference

Your guide to Environmental Best Practice by
companies, countries, councils and communities

www.thegreenorganisation.info

Including CSR World Leaders

Volume 7

A selection of International CSR Excellence Award-winning
papers, demonstrating corporate social responsibility
programmes at their best.

www.csrawards.co.uk

25 years of helping others to help the environment



Published by The Green Organisation
Helping the environment since 1994

Setting the standard...

The Green Book is the world's only international work of reference on environmental best practice.

It is published by The Green Organisation in tribute to the environmental endeavours and generosity of our Green World Ambassadors.

These are the companies, councils and communities who have won Green Apple Awards for their environmental efforts, and who have taken their commitment to the next level by helping others to help the environment.

They are assisting us in publishing their award-winning papers in The Green Book, and we distribute this valuable educational and informative guide free of charge to environment professionals all over the world.

By helping others to follow their environmental lead and learn from their experiences and successes, they fully deserve the title of Green World Ambassadors.

Not only do they allow us to publish their case histories, but they welcome any followup inquiries. Each Green World Ambassador has a contact name and number shown in the Index, and any of them will do all they can to help others help the environment.



Editor's Note

In the interests of accuracy, these Green Apple Award-winning papers are published here in their original form – basically as provided by the entrants.

As many of the papers are of a technical or specialist nature, it was decided that the experience and expert knowledge of the contenders should not be compromised by the grammatical priorities and

consistency of style that usually dominate the editing process.

Our priority is to communicate the aims, methods and achievements of our winners as they wish them to be presented. To this end, the contents have been only lightly edited and we ask for your tolerance of any grammatical shortcomings that might result.

INDEX

A

AJC TRAILERS/EASYCABIN - UK

Ecosmart Zero

Page 156

AJC are making a lot of noise about their latest carbon-free silent running site welfare cabins, and rightly so. Having developed and launched their concept cabin using solar panels and a fuel cell to maintain its on-board batteries, the order books immediately filled and units are already in use at flagship projects like HS2 and Heathrow.

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ANDREWS & MILLS CONSTRUCTION - UK

Furzy Close

Page 160

The client loved the location of their dormer bungalow, but the building did not meet their needs. A brief to replace the building with a large two storey house with ample guest accommodation as well as a multitude of entertainment facilities was needed. The owners also wanted the new-build to be highly efficient, low impact and to preserve the views of the stunning Cornwall coastline. Andrews and Mills built them their dream home.

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B

BALFOUR BEATTY - UK

Bradford West to Elland overhead line route

Page 163

The refurbishment of a section of railway overhead lines was hampered by the presence of badly maintained dry stone walling in the area where heavy equipment was needed. In conjunction with ecologists and archaeologists, the walls were carefully dismantled and reinstated in their original condition. The measures have provided a haven for wildlife and a much improved aesthetic to the area.

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BALFOUR BEATTY - UK

Springhead Bridge

Page 167

The work on this twin-span bridge will bring much needed relief to the road network around Ebbsfleet International Station. As it spans the river, extra care is needed especially at nesting times, and their efforts have been a total success. Fish and reptiles have been fully protected, and birdlife has actually benefited from the works.

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BEC - UK

North Shore: Fighting climate change in a declining coastal community

Page 171

The ongoing regeneration of Whitehaven has environmental considerations embedded into the design and construction process from the outset. Each phase boasts significant efficiency measures that add up to create a benchmark eco-project featuring renewables, energy storage and carbon capture in developments that are renewing local pride.

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B

BMV JV - UK

M5 Oldbury Viaduct Major Renewal Scheme

Page 175

The team sought methods that would minimise waste and disturbance with great effect. Clever planning achieved a waste diversion rate of 93%, with much of the remainder being asbestos. The tarmac was turned from waste into a product on site, leading to a waste reduction of over 25,000 tonnes.

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BNP PARIBAS REAL ESTATE - UK

Raising Awareness of Plastics in the Ocean

Page 179

This London luxury office complex is the unlikely pioneer of ocean plastic awareness. They have spearheaded many projects in recycling, beach clean-ups and waste minimisation; and by creating a half-ton waste-plastic whale named Plasticus, they gained global press attention and awareness.

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B

BOTAS - TURKEY

TUZ GOLU 3

Page 182

BOTAŞ started the Salt Lake Underground Gas Storage Project to store natural gas in caverns, created in underground salt formations by the injection of water. Turkey's natural gas consumption increased by 52.5% in 10 years and effective storage of gas is crucial for sustainability and to regulate the supply-demand imbalance caused by unpredictable fluctuations. Storage plant, during low consumption periods, withdraws the excess gas from the network and injects into the salt caverns. Conversely, during high consumption/demand period, it withdraws the gas stored in salt caverns and gives back to the network – providing the stability and sustainability required.

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BROADGATE QUARTER - UK

Diverting waste from landfill

Page 188

Working closely with service provider Key Enviro Solutions, Broadgate Quarter has achieved commercial success by respecting the environment and the communities in which they operate. They have seen significant savings in energy and reduced waste. Alongside suppliers and industry experts they have adopted an environmental dashboard which records consumption of resources and measures carbon intensity.

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B

THE BROADWAY - UK

Environmental Best Practice

Page 193

This shopping centre opened in 2015, and already had a great deal of built in sustainability features. While for many this would mean they could sit back and reap the benefits of good design, Broadway challenged themselves to make the best of what they had and still add improvements. They have faced the issues on all fronts, generating savings of almost £100,000 while increasing recycling and using 46% less energy.

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C

CARDINAL - UK

Fernhill House

Page 196

After a serious flood at their manufacturing site, Cardinal took this evidence of the climate crisis seriously and decided to not only mitigate future risk, but optimise their operations and improve their environmental performance. By consolidating all their sites into a single warehouse and production facility they have shown reductions in costs, waste and energy, as well as increases to recycling and training opportunities.

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CBRE:TOWER PLACE - UK

Tower Place - Waste Management

Page 200

When Tower Place were looking for a new waste contractor they took the opportunity to find an organisation more in-line with their own aspirations to bolster their recycling efforts. Despite five of the 10 tenants being restaurants, there was no food-waste recycling and this, along with many other initiatives, has seen them reduce overall waste while massively boosting recycling rates. The restaurants now also use vegware plates, cups and cutlery which goes into the food recycling, helping achieve their 35% reduction.

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C

CENTRE:MK - UK

centre:mk Waste Management

Page 204

While the centre has an effective and motivated maintenance crew that segregate and handle the waste to the best of their abilities, getting the 6000 retail staff on-site to maximise their own efforts has been somewhat more challenging. Undaunted, centre management pressed on with a black bag amnesty and various educational projects that have seen site performance go from around 50% in 2016 to over 80% in 2018 with more to come.

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CONNECTED KERB - UK

**Developing a green, future-proofed and attractive
EV charging solution**

Page 207

One of the major hurdles affecting electric vehicle uptake is access to the charging infrastructure. While this is not a problem for those that have off-road parking, for many it makes the concept redundant. With 80% of charging occurring at home, Connected Kerb have pioneered and trialled an on-street solution that has significantly boosted EV sales in its trial locations.

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C

COSTAIN-SKANSKA JV - UK

Costain-Skanska Joint Venture HS2 Enabling Works Contract (Area South)

Page 210

The scale of the enabling works for the scheme in London is vast, with 85 works packages and about 200 suppliers. As a result, air quality is considered one of the key environmental risks for the programme. The objectives of the project were therefore three-fold; to reduce emissions of Nitrogen Oxides and Particulate Matter from operational machinery, construction related highways, heavy goods vehicles and site operations. The standards adopted on the programme are more stringent than the Greater London Authority's and Transport for London's emission standards. These standards were adopted and implemented three years ahead of time and 99% were compliant with the programme's NRMM emission standards. The scale and transparent reporting is a first for the construction industry.

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CWMBRAN CENTRE CBRE - WALES

Energy Management

Page 214

This centre continues to evolve its industry-leading waste systems and they are now zero to landfill with over 64% of waste segregated on site. On top of this, electricity, water and gas have seen huge reductions of 44%. They have also trained all occupants to "Switch Off", but have still installed occupancy sensors and reduced flushing levels.

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D

DESALINATION TECHNOLOGIES RESEARCH INSTITUTE - SAUDI ARABIA

SWCC enviro initiative

Page 219

The SWCC is an agency of the Government of Saudi Arabia, responsible for producing potable water from seawater. SWCC leads the world in seawater desalination output at 5.6 Mm³/d. SWCC also generates more than 100,000 MWh/d of electricity. With this level of production, the environmental burdens of flue gas emission and brine discharge into coastal water have to be managed. Flue gas desulphurisation was carried out and efficacy-enhancing fuel additives were applied to boilers, reducing emission gases to environmental regulatory levels. Furthermore, new SWRO plants are equipped with waste treatment facilities to solve potential problems related to accumulation of chemical additives in filters and membrane cleaning solutions formerly dumped with brine to coastal waters.

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DPD UK - UK

DPD goes electric

Page 225

DPD have opened the capital's only all-electric parcels depots with electric trunk routes, eliminating 15 diesel vehicles from operation. The Westminster and Shoreditch sites will both reduce CO₂ emissions by 45 tonnes this year; the 'efficient last-mile' operation has slashed the 'miles per parcel' figure by a massive 49.2%; and they are the only UK parcels carrier to use electric vehicles operating from a large out-of-town site as a 'local hub' to feed a city centre micro-depot.

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D

DRAGADOS UK - UK

Bank Station capacity upgrade

Page 230

Their upgrade project had the aim of improving capacity at Bank and Monument underground stations, but Dragados wanted to use it to highlight cutting-edge carbon reduction measures in practice. Results are impressive with sprayed concrete alone saving over 5000 tons of CO₂.

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DUBAI MUNICIPALITY - UAE

Air quality monitoring and forecasting integrated system

Page 235

The growth of Dubai as an urban environment has happened at a speed and scale never seen before, and this has given them problems in regards to transport and infrastructure. Opportunities for proactive environmental mitigation are slim and much remedial work has to be reactive. Mobile air quality monitoring has given them the data to focus their efforts where they are most needed.

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E

THE ECOSMART - UK

Clean Your Car/s With Just One Cup of Water.

Page 238

This novel app-based car washing service brings their industry-leading eco-car wash to your door at the push of a button. Whatever colour the car, it will be a lot greener afterwards, as the system uses just one cup of water and environmentally safe plant-based chemicals to achieve a finish at least as good as the drive-through alternative. Fleet owners benefit even more as they do not need to take cars to the wash.

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**ENVIRONMENTAL CROP
MANAGEMENT - UK**

**Abiotic stress reduction, increasing yields and
improving fertiliser efficiency and reducing
fertiliser pollution in maize crops.**

Page 240

Maize is an important crop in dairy and AD plant operation. Its growth is aided by using manure, which is a great reuse pathway, but can give seedlings abiotic stress and stunt their growth. ECM found that early treatment with low levels of phosphates overcomes the issue and produces abundant early crops; clearing the fields for winter wheat and removing the need for heavy phosphate use later in the growing cycle.

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E

EREN ENERJIELEKTRİK ÜRETİM TÜRKİYE

Eren Enerji thermal power plants

Page 243

The capacity of 2790 MW makes EREN the biggest private sector Energy company in Turkey with almost 7% of total power generation. Due to the best new and effective technology of the power plants, the required electricity demand is also produced with low generation costs. To provide sustainable operation, approximately \$175million has already been spent within the total investment of \$3billion.

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F

THE FLOORBRITE GROUP - UK

**Waste management innovation & increasing
sustainability awareness at DUO UK**

Page 246

Duo and Floorbrite have been working together for 10 years, but in the last five years they have focussed on waste management improvements to great effect. A broader waste recycling system has given reduced costs from 100% landfill avoidance and reduced vehicle movements, as well as closed loop recycling on some products. Reuse avenues have been found for several items and staff across the sites have become proud eco-warriors.

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G

GALLIFORDTRY - UK

Rugby Radio Link Road

Page 252

This huge construction project involves house building, road network improvements and environmental mitigation works. Since inception, there has been a focus on reducing disturbance and pollution with many measures taken to this effect. Vehicle movements have been reduced by 80% and despite moving almost half a billion tonnes of soil and rubble, none has gone to landfill.

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**GALLIFORDTRY INFRASTRUCTURE
& SOUTH TYNESIDE COUNCIL - UK**

Arches Junction Improvements

Page 255

South Tyneside made a wise choice by involving their contractor from the outset of the project to remodel the existing Arches junction where the A194 meets with the A185 in South Shields. This project had great potential in reducing journey times while enhancing safety and the collaboration delivered on all fronts. Pollution is down, safety is up and almost 1000 construction vehicle journeys were avoided.

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G

GATES GREEN SOLUTIONS - UK

Sustainability Ambassador

Page 258

This blue-sky project sought to develop a system meaning a community, island or county could internally manage and benefit from its own waste production. By incorporating methods from Australia, Canada, the USA and other countries they have created a system by which the community is able to process a much wider range of waste ecologically with everything from sewage to high-grade plastics and tyres back into clean renewable energy or fuel.

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GENAIR UK - UK

Emission free, all-weather air compressor

Page 260

As construction site regulations are tightened, so opportunities for improvements become more cost-effective. GENAIR seized on this when they developed an all electric air-compressor that out-performs its diesel-powered equivalents in all respects. Not only is their near-silent and zero emission performance highly desirable, users are also finding them significantly cheaper to hire and operate.

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G

GREEN MOTION INTERNATIONAL

Green Motion's all-encompassing environmental policy

Page 264

This car rental company remains the only eco-focussed organisation in the sector, and as it expands across the world, so does the impact. Clients have the opportunity to offset their reduced footprint further by donating to the Costa Rican rainforests, with over £40,000 donated in the last year.

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**INTERNATIONAL MARINE PURCHASING
ASSOCIATION - UK**

IMPA ACT

Page 269

This organisation promotes ethical and environmental business in the marine industry. They have rolled out several schemes that enable buyers to easily make informed decisions about who they wish to do business with and have created a preferred supplier list from the data. This in turn protects vulnerable people from being exploited and adds protections to environments and communities across the globe.

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INTU TRAFFORD CENTRE - UK

Making a meaningful difference

Page 273

Achievements include: zero waste to landfill; general waste ratio reduction - from 67% of total waste to 61%; increase in cardboard/paper recovery ratio - from 17% of total waste stream to 22%; improved diversion of food waste to digester by 121%; annualised cost saving of £10,876 by recycling food waste; and 3.4 tonnes of coffee grounds recycled to compost in first two months.

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J

JLL - GRETNA GATEWAY - SCOTLAND

Greener Gretna

Page 277

Gretna has achieved a 100% diversion from landfill with only 0.71% of waste going to refuse derived fuel. Waste streams segregated onsite include cardboard, plastics, metals, coffee cups, gum and cigarettes with the last three being very new and innovative initiatives. This has saved £4000 which is being diverted back to green initiatives within the scheme.

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JLL - UK

27 Soho Square – Smart Building Insights

Page 280

While a smart BMS install will provide most businesses with the tools required to reduce energy usage, it is not always the answer. Such was the case at Soho Square where a single HVAC plant serves the whole building. The innovative Smart Building Insights programme was the weapon of choice in this instance and has yielded great results in comfort, costs and equipment reliability.

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J

JLL - UK

Bringing the first RESET™ air-core and shell to Europe and third in the world: 33 Glasshouse Street

Page 284

While air-quality in major cities is grabbing headlines, the same cannot be said for the workplace. However, management at Great George Street still know the benefits of a healthy working environment and have taken great steps to pioneer enhancements to the benefit of their tenants. This groundbreaking system maintains very low levels of CO2 and other pollutants, improving staff health and therefore productivity.

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JLL-CHURCHILL SQUARE SHOPPING CENTRE - UK

Break the bag habit

Page 287

With all the attention focused on single use plastics in general, and plastic bags in particular, hats off to Churchill Square for a multi-channel approach to the issue. They have supported beach cleaning efforts in Brighton, and ran awareness days at the centre. World Environment Day saw them collaborate with 88% of the stores to remove all plastic bags and provide tote bags in their place; giving away 25,000 of these useful long-life products instead of yet more plastic.

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K

KEELHAM FARM SHOP - UK

Veg exchange scheme

Page 291

This independent outlet is known for doing things their way. All produce is sold loose to help reduce food-waste, and even the building is recycled. However, their smartest initiative is the Veg-exchange whereby the public are invited to bring in their own excess garden produce to exchange for farm shop merchandise.

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KELTBRAY RAIL - UK

The Eco Village

Page 293

The Bow to Shenfield section of the Crossrail project was scheduled to take place during quieter rail-times over the Christmas period, but its proximity to local residences meant it had to meet tough noise and nuisance legislation. By creating an Eco Village at the site, Keltbray operated with equipment that makes less than half the noise of traditional options; they saved 15,000kg of CO₂; and made a cost saving from solar storage instead of diesel powered generators.

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K

KELTBRAY STRUCTURES - UK

Borough Yards

Page 297

Concrete waste requires careful management, but the danger comes not only from demolition works. Transport, pumping and pouring can all cause spillage which can put the highly alkaline compound into watercourses. Keltbray have developed a system that treats all potential contaminants, and does it at reduced cost with a significant improvement in safety and mitigation.

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**KOREA AIRPORTS CORPORATION –
KOREA**

Energy Management

Page 301

Korea plans to reduce its greenhouse gas emissions by 37 percent from business-as-usual levels by 2030. The Korea Airports Corporation has been pursuing various greenhouse gas reduction activities to achieve the nation's reduction target and, as a result, in 2018 they reduced emissions by 35%, exceeding the government's recommended reduction target of 26%. They have now achieved results surpassing the government's recommended reduction targets for eight consecutive years. Furthermore, they will contribute to building a sustainable energy system.

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K

**KOREA AIRPORTS CORPORATION -
KOREA**

**Korea Airports Corporation's new Creating
Shared Value activities**

Page 304

KAC have been greening airports for many years. They have created intelligent LED runway lights that operate only when needed; low energy solutions for heating and aircon right to the plane door; and equipment that means aircraft do not need to idle during maintenance and pre-flight. Creating this shared value globally can save over 10 million litres of fuel and 30,000 tonnes of CO2 per year.

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L

L&K PROJEKT - POLAND

Play of light, Gdansk, Poland

Page 308

Leszek Kalandyk's studio created the "play of light" mansion to give an elegant and subdued look. The main structure was based on the letter "L", and the designer says he was inspired by the modernist style. The house features large glazed areas, so the interior is bathed by a play of light. The designers have limited themselves to the use of necessary elements and a minimalist finish. Subdued colours harmonise with an elegant shell, effectively filling it with light.

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LACON LONDON - UK

Diverting waste from landfill

Page 310

Working closely with service provider Key Enviro Solutions, Broadgate Quarter London has achieved commercial success by respecting the environment and the communities in which they operate. They have seen significant savings in energy and reduced waste. Alongside suppliers and industry experts they have adopted an environmental dashboard which records consumption of resources and measures carbon intensity.

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L

LLOYDS BANKING GROUP - UK

Lloyds Banking Group's war on waste campaign

Page 315

For Lloyds, staff engagement has proven to be key to their environmental efforts. With many thousands of employees, Lloyds treated this as a brain pool and have received more than 150 improvement suggestions. Implementation to date has given them more than 35 million fewer items going to waste in the last year.

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M

MAILEN DESIGN

Meadows Day Nursery, Northumberland

Page 319

Architects Mailen Design re-modelled a greenfield agricultural site to create a stunning nursery for 70 children. Meadows Day Nursery School is set in 1.5 acres of beautiful gardens to provide a nurturing and safe environment where children are encouraged to explore the outdoors. A purpose-built adventure playground and children's vegetable garden are just some of the features of this rural education facility.

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**MAJLIS PERBANDARAN PASIR GUDANG
MALAYSIA**

Waste composting programme

Page 323

MPPG has received recognition due to the effectiveness of various recycling operations, not only in food waste composting and 'Reduce, Reuse and Recycle' but also in the recycling of used cooking oil. MPPG manage to collect an average of 3,000 kilograms of used cooking oil every year. The pioneer project of food waste composting started by giving a briefing and demonstration of the food waste composting method. The domestic waste disposal is done by collecting garbage in a waste collection point near the housing areas and MPPG undertakes large-scale composting with excellent cooperation from 24-hour food restaurants and premises.

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M

**MAJLIS PERBANDARAN PASIR GUDANG
- MALAYSIA**

**Multi-stakeholder engagement in neighbourhood
garden initiative**

Page 330

The Chief Minister of Johor created a neighbourhood project in 2016 to coordinate the community through racial diversity participation. Pasir Gudang Foundation became the first local planning authority in Johor to establish a community gardening project focusing on neighbourhood gardens. The location was provided by MPPG at no cost. The main purpose is to assist and strengthen the Urban Agriculture Programme which is monitored by the Pasir Gudang Foundation and the Landscape Department of MPPG. This is being fully managed by the local community committee. This method is able to empower the community through the involvement of residents in easy-to-use fertigation technology activity within the city area.

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**MAJLIS PERBANDARAN PASIR GUDANG
- MALAYSIA**

Rainwater harvesting suystem

Page 333

Rainwater harvesting has been applied in Pasir Gudang for the purpose of building plan approval. A retrofitting process for the installation of this is done on several types of buildings including institutions, commercial, industrial, and government buildings from June 2017 to June 2018. This reduces the need for generating water as lake water is used for landscape watering in MPPG. The target is a 30% reduction in water bills at MPPG nursery, due to the high cost of water consumption in nurseries.

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M

MANOR WALKS SHOPPING & LEISURE
- UK

Project Biosphere

Page 336

While a shopping centre may not seem like an obvious choice for a nature reserve, Manor Walks are steadfastly of the opposite opinion and have demonstrated this with their project, installing 10 bird nests, 10 bee homes, 2 bee hives, 2 bug hotels and 2 natural composting areas as well as a localised nature trail for schools to educate through site visits.

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MARMAX PRODUCTS - UK

Recycling board game

Page 339

Marmax have a long history of finding novel ways to recycle waste plastics, but in turning this resource into a fun board game that highlights the importance of recycling they prove to be leaders in the field. Aspects showing the effects of pollution and ocean-contamination bring the message home to the young players in an entertaining and accessible way.

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M

MCGEE - UK

Initiatives designed to help improve London's air quality

Page 341

As a London based construction firm, McGee are all too aware of the environmental issues facing their city and their industry. They are tackling these problems head-on with a company-wide policy of innovation and mitigation, including investment in the latest green tec, tree planting initiatives and continuously improving their sustainability performance.

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**MERCEDES-BENZ INDIA PRIVATE -
INDIA**

Conservation and strengthening of natural resources

Page 347

This water saving and awareness initiative has brought knowledge and resource to nine villages that previously struggled with seasonal flood and drought conditions. The project has worked with these communities to identify their needs and support the needs of the environment and agriculture downstream. It has resulted in a reliable water supply and boosted tree planting.

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N

NATTA BUILDING COMPANY - UK

REDUCING PLANT EMISSIONS

Page 352

Construction machinery efficiency is a useful but often overlooked approach to carbon and cash savings. Natta have invested heavily in monitoring and GPS equipment with the ambition to save 20% from their carbon footprint in just one year. With an abundance of usage data they have been able to re-task equipment to maximise efficiency and have smashed their 20% target.

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NORTHERN IRELAND WATER - IRELAND

Castle Archdale integrated constructed wetland

Page 357

Waste water treatment plants are typically unsightly, smelly and noisy blots on the rural landscape, but NI Water have gone back to the future with this well proven alternative treatment system. Instead of aeration ponds, settling tanks and pump houses they have created a self contained wetland that naturally, safely and quietly provides ample capacity to treat waste water in the region while providing plenty of reserve capacity in case of floods and peak demand. Not only does it enhance resilience, it also provides a useful and important habitat for many forms of wildlife

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P

PAYBYPHONE - UK

Meters for trees

Page 361

PayByPhone's cashless parking technology not only benefits the user, that does not need a pocket full of change; it also benefits the landowner in reduced overheads and management stress - as well as the environment. It removes the need for enforcement vehicle mileage and comes with the added bonus of a tree-planting programme when councils and landowners transfer to the system.

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PETERBOROUGH CITY COUNCIL - UK

Nene Bridge bearing replacement project

Page 365

This iconic and award winning bridge was failing long before its expiration date, but serviceability was not an original design feature. It carries a dual carriageway across the River Nene and the railway, so any remedial works has the potential for significant environmental and community disruption. Skanska were brought in to help solve these problems and did a fine job. Their solution avoided the need for pilings, made use of fly ash in concrete and used its knowledge to minimise the carbon footprint of the operation.

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P

PGT-RECLAIMED - VIETNAM

Why cut one down?

Page 368

The company recycles wood into furniture and upholds a strong corporate social responsibility programme. This is highlighted by its environmental conservation efforts, and over the past 21 years the company has saved over 500,000 trees from being felled. Further furniture initiatives include innovations in manufacturing, all made by hand; reduced energy use through LED lighting in the factory; and a minimum of 80 percent of packaging is made from cardboard and honeycomb.

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PREMIER FOODS - UK

Improved Waste Management

Page 372

Having managed zero to landfill back in 2013, PREMIER FOODS wanted to reach another level with the new aim to achieve “Zero2”, which is nothing to landfill and net zero cost. With their waste bills running around £150,000 per year this is quite a challenge, but by increasing revenue-generating waste streams and maximising all available opportunities they have already taken almost 70% from the annual bill.

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R

RG GROUP - UK

Brunel House, Bristol

Page 375

This conversion of a former council office suite into 246-room student accommodation not only returns this splendid building to its former glory; it also adds value to the local ecosystem. Soft landscaping around the site was specifically planted with rare and beneficial plants that support insect life, especially rare butterflies and bees. There are also nesting boxes for a variety of bird species, and donations have been made to the Bat Conservation Trust.

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S

SAUDI ARAMCO - SAUDI ARABIA

Flare gas recovery

Page 378

Although gas flaring has negative environmental and economical impacts, it is indispensable in the oil and gas industry for safety reasons. However, Saudi Aramco has developed a revolutionary and innovative system called the Flare Gas Recovery System to recover flared gases from the flare header at gas and oil separation plants through a multi-phase ejector. Not only does it eliminate flaring completely, but it also saves energy by utilising the plants' existing infrastructure instead of new compression units.

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SKANSKA - UK

Bats-sympathetic car park lighting

Page 381

Skanska were commissioned by Peterborough City Council to upgrade a warehouse and facilities. The environmental survey showed a good population of bats in the area and mitigation was deemed appropriate. The lighting in the car park was modified to be below the usual flightpath of the bats with minimal upglow – thus having no impact on their feeding habits and routines.

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S

SOUTH EAST WATER - UK

Woodgarston Markets

Page 383

Having found significant levels of nitrate pollution in the Woodgarston catchment area, it was traced back to local farms and, instead of prosecution, a farmer-led steering group was formed to remedy the issue and find alternative options. The group had many successes from “upstream-thinking”. As well as bringing nitrates down to safe levels, they have closer links and a deeper understanding with the communities in which they operate.

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SOUTH EAST WATER - UK

Pesticide amnesty

Page 388

The temptation to illegally dispose of out-of-date or prohibited agricultural chemicals has led to some of the worst river pollution disasters the UK has seen. By running an amnesty on these items SEW have received over 2 tonnes of potentially catastrophic chemicals from farmers in their region, which have been safely disposed of for a much lower cost than if a spill had to be dealt with.

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S

ST MARKS SHOPPING CENTRE - UK

St Marks waste management project

Page 392

Lighting projects are familiar territory for the Green Apple Awards, and often rather successful. This effort was complicated due to the size and diversification of the site, boasting acres of car parks, a shopping mall and almost 100 residential premises as well as all the back-room areas. Nevertheless, they undertook a 100% switch over to LED lighting and have rapidly seen energy reductions of up to 45%.

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STEELITE INTERNATIONAL - UK

Centrifuge reclamation

Page 396

To be the biggest ceramics manufacturer in the UK you need to be bold, and Steelite's £250k investment in a glaze recovery system demonstrates this admirably. Its use has removed the need for a landfill waste stream and related equipment, saves over 50,000 litres of water and almost £100k of lost materials per year. It is an industry first but they are generously sharing their experience with the industry so it won't be the last.

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S

SWAN CENTRE - UK

**Waste management - team, tenants and
community**

Page 399

This centre firmly believes that it has a role at the heart of the local community. Tying into this philosophy is their revamped waste management strategy, which now boasts 11 waste streams and zero to landfill - but beyond that they also accept waste cardboard from surrounding businesses and individuals. Recycling more than doubled to 63%, and costs reduced by £46,000.

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T

TANAP - TURKEY

Trans Anatolian natural gas pipeline project

Page 402

The Trans Anatolian natural gas pipeline supplies natural gas from Azerbaijan to Turkey and Europe over a distance of 1,850km. TANAP Social and Environmental Investment Programme contributed to the economic and social development along the pipeline in 20 provinces, 67 districts and 600 villages by providing grants to around 1,000 projects. The programme included the installation of solar panels supplying 90% of energy; 601,448 saplings were planted in 12 provinces to enhance biodiversity; and 91 villages were provided with reliable water supplies.

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TCI – TAIWAN

Integrating three elements

Page 409

TCI works to the policy of “three elements of sustainability”. First, agricultural waste bought from local farmers is largely reused by extracting functional ingredients for making health and skin care products. The remaining residues are further fermented into organic compost that fertilises TCI’s own farm. Secondly, the energy consumption of the manufacturing processes is driven from the solar panels installed on the rooftops of TCI’s factories and used to manufacture sustainable products. And finally, all carbon emissions from the manufacturing processes and the factories achieved carbon neutrality by carbon reduction strategies and purchase of carbon credits, which creates TCI’s net zero-carbon status.

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T

TRINITY WALK SHOPPING CENTRE UK

Trinity eco walk

Page 417

Trinity walk the walk when it comes to sustainability. In an ongoing waste and cost reduction exercise over the last few years they have achieved zero waste to landfill; reduced waste going to Material Recovery Facility by at least 10% annually; and reduced electricity consumption by about 10% yearly, all despite tough trading conditions.

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TUSKER - UK

Green car scheme

Page 423

Tusker are a big name in the automotive industry, and when they recently committed to restrict their fleet to ULEV vehicles producing less than 75 grams of carbon per kilometre it was seen by many as a brave move. Incentives such as home-charging and the significant running cost savings have however made this bold move a complete success and there is hope that the industry as a whole will follow suit.

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U

UK WASTE SOLUTIONS - UK

Setting the bar

Page 426

The Marston's brewery and pub chain had environmental ambitions that their waste handler was unable to help with, so in 2016 they contracted UK Waste Solutions and set about updating the systems in place. They have gone from zero provable recycling to zero to landfill; a first in the UK hospitality sector. They have also closed the loop on plastic waste as this now goes to Plastecowood where it is turned into pub garden furniture.

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W

WAITINGS UK

Raby Cote trade effluent sewer

Page 431

The replacement of 11 kilometres of underground sewage pipe across two sites of special scientific importance was never going to lack complications. Waitings and JN Bentley happily took on the project and by applying the principal of prior planning to prevent poor performance they have minimised the potential collateral damage of the works, returning the area to its natural beauty post-construction.

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**WISER WASH TESTIL KONFEKSIYON –
TURKEY**

Development of ozone effecting system

Page 434

Some alternative bleaching methods and conventional bleaching chemicals are being used in industry, but not all are environmentally friendly. Wiser Wash's research has determined that an alternative bleach ozone effect can be applied. Successful results were obtained in comparison with the conventional method in ozone technology and when no chemicals are used in the washing process, water consumption has reduced by 60-90%.

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AJC TRAILERS / EASYCABIN ECOSMART ZERO

AIM

AJC's aim is to take energy emissions down to the ultimate level, i.e. ZERO

AJC Trailers manufacture site welfare units for use on sites. The Health and Safety at Work Act for Welfare instructs contractors to provide statutory welfare facilities on transient sites where three or more people are working. These units operate daily however with the increasing propensity to complete projects overnight, (i.e. highway working), consequently these units consume a considerable amount of power. The power is usually delivered by a diesel powered generator. With emission regulations for NRMM (Non-Road Mobile machinery) becoming increasingly prominent in London and elsewhere, limiting the use of diesel powered machinery is a target for construction contractors.

The aim of this project was to design a range of mobile and static welfare units that produce ZERO local carbon emissions. With these aims in mind, AJC EasyCabin have brought to the market a range of welfare units powered by a combination of a hydrogen gas powered fuel cell and an advanced solar power system. This range of units will emit ZERO local emissions making them totally compliant with current/future NRMM regulations.

ACHIEVEMENTS

AJC have produced a range of site welfare units that emits no local harmful emissions and runs totally silent – the EcoSmart ZERO.

The EcoSmart ZERO range includes static and mobile units. The initial product, a mobile EcoSmart ZERO, was formally launched, to great acclaim, at the hire industry showcase, the Executive Hire Show. There has been significant interest from large hire plant companies to add this product to their hire fleets.



The EcoSmart ZERO range has been designed to have the same user friendly operation as the standard EcoSmart welfare units. The power to run the heating, sockets, kettle and microwave comes instantly from the battery bank. The batteries are fed by the built-in hydrogen fuel cell and solar panels.

The EcoSmart ZERO while on test in March 2019, proved that the large solar panel array could power the unit alone with the Fuel cell only used as a backup power source (ZERO fuel potential). After initial on-site testing, AJC have taken orders and are starting large scale production.

The EcoSmart ZERO is in use on multiple sites across



the UK, notably; Heathrow airport, HS2 & highways. Heathrow's business aim is by 2030 to be carbon free.

IN DETAIL

AJC Trailers Limited has been manufacturing trailers in the UK for nearly 55 years. For the past fifteen years, the company has focused their activities on designing and producing a range of sustainable temporary accommodation units primarily for the rental, construction and associated industries. AJC are proud to confirm that they have never been subject to actions by individuals, governments or organisations.

Their temporary accommodation units are marketed under their EasyCabin brand.

London is set to introduce a Low Emission Zone (LEZ) for non-road mobile machinery (NRMM). Non-road mobile machinery (NRMM) is defined as any mobile machine or vehicle that is not solely intended for carrying passengers or goods on the road. This definition includes power generation machinery. Current estimates of emissions show that NRMM is responsible for 7% of NOx emissions, 14% for PM2.5 and 8% of PM10 emissions across the Capital. In addition, Birmingham and Leeds have advanced plans to introduce their own proposed Clear Air

Zones for traffic and construction in their respective cities.

So there is an on-going drive within the construction sectors throughout London and further afield to increase the environmental awareness in their activities. In part this has resulted in the sharp increase in the demand for energy-efficient, carbon reducing, and low noise temporary site accommodation. Market research by the AJC marketing team soon discovered that both the contractor and their rental partners were seeking environmental innovation in their temporary accommodation requirements.

With this trend in mind, AJC EasyCabin saw an opportunity to build a range of units that will work towards reducing end user costs, save energy and improve the wider environment with cleaner air and less noise.

AJC's research discovered that many units were providing this power by utilising a diesel generator which remained on full power at all times. This is extremely wasteful as, apart from at peak times, the majority the operation was only using a fraction of the power available. AJC's immediate aim was to limit the use of these generators by expanding the power options available. They began the process by implementing three areas of research:

1. Large solar panel array
2. Low consumption: LED lighting / Kettle / Heating / Water heating
3. The use of Proton Exchange Membrane (PEM) fuel cell technology.

The outcome of their research and development was the EasyCabin EcoSmart ZERO welfare unit. The EcoSmart ZERO is powered by a combination of a hydrogen gas powered fuel cell and an advanced solar power system. This means the unit operates almost totally silent and emits only pure water vapour. The EcoSmart ZERO range has been designed to have the same user friendly operation as the

standard EcoSmart welfare units, with power to run the heating, sockets, kettle and microwave coming instantly from the battery bank. The batteries are fed by solar panels and backup hydrogen fuel cell.

AJC EasyCabin can introduce user of the EcoSmart ZERO to hydrogen gas suppliers and a click and collect service is often available. The Ecosmart ZERO fuel cell only needs periodical replacement of air filters; there are no moving parts and ground contamination from fuel spills is totally eliminated.

To produce the EcoSmart ZERO range, AJC EasyCabin engineers worked in close collaboration with Intelligent Energy. Intelligent Energy is a world-leading fuel cell engineering company focused on the development, manufacture and commercialisation of its Proton Exchange Membrane (PEM) fuel cell products, for customers in the automotive, stationary power and Unmanned Aerial Vehicle (UAV) sectors. Fuel cells are used in multiple applications, where clean, lightweight, high efficiency and cost-effective power is required.

AJC EasyCabin have had overwhelming demand from large national hire companies to trial the Ecosmart ZERO with end users eager to see the unit in operation. One such trial was held at Heathrow Airport. One of the purposes of this trial is to dispel myths and misconceptions of hydrogen power. Hydrogen has been a proven power source in industry for decades; to have more hydrogen powered machines will eventually lead to lower hydrogen prices

and most importantly, cleaner air.

Alongside some of the misunderstanding about the use of hydrogen, AJC have also discovered that similar mistakes are being made about the use of solar panels within the welfare industry. Some are of the opinion that solar panels cannot cope with the power draw needed to run a welfare cabin. AJC believes this to be untrue. Solar panels, when

EcoSmart ZERO

- Zero carbon emissions**
Only water vapour.
- Near silent operation**
Very quiet with no vibrations.
- On-demand power & heat**
On any appliance in the cabin.
- Low maintenance**
Only air filters need replacing.
- Safe & easy to re-fuel**
Hydrogen gas bottles. Available from most gas suppliers. Easy to replace.
- Zero fuel with solar panels**
On summer days up to 100% of the power demands can be met from the solar panels.

Multi-award winning site welfare.

AJC EasyCabin

Site welfare is easy.

www.easycabin.co.uk 01582 488663 info@easycabin.co.uk

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Naturally the EcoSmart ZERO range is fitted with all the necessary and mandatory facilities required by legislation. The EcoSmart ZERO utilises AJC's Autosmart system. This system facilitates the seamless power distribution within the unit between the solar panels, battery pack and fuel cell; ensuring that the correct amount of power is available at all times.

used in-conjunction with AJC's patented power management systems, can run a unit without the need of the fuel cell or, indeed, any other power source, resulting in free energy.

The six week long field test will proved that the power of solar, when used with AJC power management systems, adequately provided the necessary resources to keep the unit in constant operation.

The EcoSmart ZERO project has been entirely self-funded, using AJC's budget for research and development.

According to the Carbon Brief website, the amount of carbon dioxide sent into the atmosphere last year totalled 381 million tonnes. For most of the past years AJC have been driven to reduce the carbon emissions from their products and design the most environmentally sustainable temporary site units. Recent awards from within the construction rental industry have confirmed their passions in this regard. Encouraged by AJC's rental and construction partners to push the boundaries of environmental and technological advancement, they believe that in the EcoSmart ZERO range represents the ultimate in carbon emission reduction and the future of site welfare.

ANDREWS AND MILLS CONSTRUCTION FURZY CLOSE

AIM

The client brief was to create a large detached, two or three storey replacement dwelling to accommodate friends and family. The design was to be contemporary in style and fully integrated with the garden to provide areas for inside/outside living. There needed to be a minimum of four superking size bedrooms, all with en-suite accommodation, open plan living/dining/kitchen areas with direct access to

ACHIEVEMENTS

To achieve our client's required levels of accommodation it became clear that at least a full two storey dwelling would be needed on the site to replace the existing 230m² dormer bungalow. A two storey building set in centre of the site would block sea views over the existing single storey, low level pitched roof currently enjoyed by the neighbour behind.



garden or terraces for eating out and entertaining. A separate gym, media room as well as a yoga studio for six users all formed part of the brief as well as dedicated room for our client's dogs. Reverse style living was preferred to maximise potential sea views, with the master bedroom suite located on the upper level alongside the main living accommodation. A separate garage was also required as well as multiple outdoor spaces ranging from a South facing yoga terrace to a hot tub sculpture garden.

Whilst maintaining this view was not a planning, or legal consideration, we felt that with carefully design it should be possible to provide our client with their required two full levels of accommodation whilst still keeping the neighbours happy by retaining their view. By sliding the upper storey across towards the East, the views would be opened up from behind and the main volume of the house would be located in a similar position to the existing house. In addition, a large West facing roof terrace could be created linked directly to the

first floor living spaces. The upper level was then pushed forward towards the street building line and rotated towards the view of Pentire Headland and the sea beyond.

IN DETAIL

Contract Sum: approx. £1,600,000

Cost per m²: £3,551/m² incl. detached garage/surf room, store, landscaping, & external works.

Area: 400m² House, 45m² Detached garage & surf room.

SAP: 84B

Environmental Impact: 86B

Air Pressure Test: 2.37ach

Planning Constraints: Close proximity to AONB, AGSV & SSSI

Furzy close is a large replacement dwelling located in Polzeath, North Cornwall built as a second home for our London based clients and their adult children. The site was bought in early 2015 with the intension of demolishing the existing mid- 20 th Century dormer bungalow, and replacing it with a new contemporary, low energy holiday home, better suited to their needs and lifestyle. ARCO2 were brought on board to help deliver this vision.

The site is situated within the Higher Tristram residential area of Polzeath, overlooking both the beach and the village to the North and North East. At approximately 60m above sea level, the property sits on an elevated corner plot towards the top of the hillside and benefits from fantastic panoramic views out across Polzeath beach.

The design was very conscious to take into account neighbouring properties, and although a significant increase in floor area over the existing building (230m²), the overall footprint and massing of the new house remained broadly the same. Existing ridge heights were respected and maintained, with the bulk of the new building positioned to the East of the site in a similar position to the old house. To gain extra floor area, the client opted to construct a large, 100m² basement under this part of the house to accommodate ancillary uses such as a plant room, owner's store, media room and gym.

Construction

Furzy close was designed to high aspirations in terms of sustainability, aiming to achieve almost Passivhaus standards of building fabric and airtightness and there were a number of different construction systems used in order to construct the relatively complex built form:

- A full reinforced 100m² concrete basement with both type A & C waterproofing.
- An extra wide cavity wall construction at ground floor incorporating 300mm of full fill cavity insulation.
- A steel frame to support the upper level which cantilevers over the masonry ground floor on three sides. The steel frame extends down to the basement slab level, needing to be thermally broken at all points where it touches, or penetrates the external envelope of the building.
- Timber frame first floor walls and cantilevered floors insulated with 300mm of blown warmcel recycled newspaper insulation.
- Flat roof with green sedum matting over has 300mm blown warmcel insulation between i-beams and 60mm PIR insulation over to form a hybrid roof. A risk which was mitigated by procuring a specialist wufi calculation for the construction confirming that condensation would not occur.

Performance & Sustainability

- Close to Passivhaus levels of thermal performance for the building fabric (average U-Values) in excess of current part L requirements:
Walls: 0.12 w/m²k
Roof: 0.13 w/m²k
Ground Floor: 0.13 to 0.16 w/m²k
- Designed out cold bridging through the use of thermal breaks to all steelwork beams and columns, basalt wall ties and the use of 300mm deep structural, thermally insulated cavity closers (Cavalok).





- Full house mvhr system installed with passivhaus accredited mvhr unit installed in the basement plant room.
- Ground source heat pump to provide all space and water heating through low temperature underfloor heating pipework.
- Airtightness; 2.3 air changes per hour achieved through the use of careful interface detailing, high quality airtightness tapes and floor wraps ensuring a continuous airtight line around the external building envelope.
- High performance windows and doors with triple glazing used throughout.
- 100% low energy LED lighting.
- Sedum and wildflower roofs to aid ecology, improve neighbours views and reduce water runoff.
- Fully permeable resin driveway
- As built EPC rated 84 (B Grade due to lack of photovoltaics)

Site & Project Management

- Principle Designer (DHQS) were employed for the pre-construction phase. Designer's risk assessments carried out by each member of the design team, with excess levels of risk designed out of mitigated against, as far as possible. Pre-Construction information issued to main contractor with Tender documents.

- Principle Contractor (Andrews and Mills) appointed during the construction phase. Construction phase health and safety plan put in place, with regular audits carried out by external health and safety consultants to ensure ongoing compliance. The building contract required that a site waste management strategy was put in place, documenting and recording the type and quantity of waste produced along with strategies to minimise, reuse and recycle.

Overall Outcomes

The client's main objective was quality over cost and time. As a result of variations and a very high level of attention to detail/quality the contract period was extended. The client is delighted with the end result and intends to use the property for personal holidays. The building performs very well and creates a healthy, peaceful and bright environment with amazing sea views. The landscaped gardens create privacy and tranquillity to the rear and a rugged, natural coastal feel to the building's approach working in harmony with the house itself and the neighbouring properties.

BALFOUR BEATTY

BRADFORD WEST TO ELLAND OVERHEAD LINE ROUTE

AIM

Dry stone walls have been part of the United Kingdom's landscape for thousands of years. It is estimated that there are over 193,000km of dry stone field walls in the UK, with only 13% of these are in good condition, 17% in an advanced stage of decay and the remaining 70% being derelict. Yorkshire has over 20,000km of dry stone walls.

Balfour Beatty Power Transmission and Distribution (PT&D), working on behalf of National Grid, undertook the refurbishment of the 275kV Overhead Line (OHL) between Bradford West and Elland. The route passes through the heart of West Yorkshire, a largely undulating landscape of undeveloped farm land. In this region fields are intersected with dry stone walls, which are visually in keeping with the surrounding area and hold archaeological significance.



Access for the overhead line refurbishment works required several sections of dry stone walls to be removed to enable the project team to access to the various tower locations. In order to maintain the archaeological and cultural significance of the area, it was essential that all walls were not only reinstated but done so to a high standard following the works.

ACHIEVEMENTS

The key achievements of this project were;

- The successful removal and reinstatement of 185 metres dry stone walls along the Bradford West to Elland OHL route
- Repairs made to 40 metres of poor condition walls
- Maintained aesthetics of the local area and preservation of cultural heritage
- Collaborative working between BB project team, BB procured specialist dry stone wall contractor and the West Yorkshire Archaeological Advisory Service (WYAAS) Archaeologist.

Other achievements included:

- Minimal disturbance to local ecology with all dry stone walls being removed under ecological watching brief
- No disturbance to retained walls during works due to demarcation zones on site
- The re-use of all stone which was initially removed from dry stone walls

- Full agreement and approval from the WYAAS Archaeologists for proposed works
- Comprehensive programme with reinstatement taking into account ecological constraints and potential risk of hibernating reptiles and amphibians during the winter period.

This project was successfully delivered through the combined efforts of Balfour Beatty, National Grid, Wood Group, Peter Isherwood Ltd and the WYAAS Archaeologists.

IN DETAIL

Balfour Beatty PT&D, working on behalf of National Grid, refurbished the 275kV OHL between Bradford West and Elland. This was essential maintenance works to ensure security in the electricity supply



YW041 and 042 Access. 25m of wall removed and reinstated



to the region. As part of the works the project was required to access each overhead line towers in order to successfully deliver plant, equipment and machinery. The OHL was built in 1965, as such no designated accesses were available to the towers and new ones had to be created.

The route transects through the heart of West Yorkshire, where the landscape is undulating with large areas of undeveloped farm land. Most fields are intersected with dry stone walls, all of which are visually in keeping with the surrounding area and are of archaeological significance. Dry stone walls have been part of the landscape of the UK for thousands of years. Dry stone walls are not merely features of agricultural interest; they highlight a legacy of the movement towards enclosure of common farming and grazing land as English society moved away from feudalism.

In addition to their rich history, dry stone walls hold ecological importance as they provide refuge to reptiles and amphibians, particularly over the winter period where they provide suitable hibernacula. To access the overhead line to undertake the refurbishment works approximately 185m of dry stone walls needed to be removed. Working in collaboration with the WYAAS Archaeologist it was agreed to replace the walls to their previous condition or better.

The proposal presented by Balfour Beatty to National Grid involved the reinstatement of the walls by a qualified dry stone waller, as certified by the Dry Stone Walling Association (DSWA). The DSWA is the country's only organisation dedicated to protecting the rich history of dry stone walls. They are committed to raising awareness of the importance of the country's dry stone walls and their heritage to the general public, land owners and the government.

From pre-construction surveys, it was agreed that all walls would be reinstated to the same, if not a higher standard. Through Balfour Beatty's network of sub-contractors, a Lancashire based family-run



YW047 access, 10m of wall removed and reinstated



Master Craftsman certified dry stone waller (Peter Isherwood), was commissioned to carry out the dry stone wall reinstatement.

Works to remove the walls were undertaken by hand to maintain the integrity of the stone. All stone was stockpiled as close to the wall as possible to ensure the same material was reinstated at that location. Any dry stone walls not being removed were demarcated with hazard type to ensure these weren't affected during works. Utilising a specialist contractor ensured that the walls were reinstated to the highest quality. In addition to the 185m of wall being removed and reinstated, 40m of existing walls were found in a poor condition and were subsequently repaired following our works. This ensured that the wall was in a better condition than that removed supporting their long term presence in the local area, ensuring the

character and aesthetics of the area are preserved.

Due to the ecological issues presented by the walls, works were restricted to specific times of year. In order to ensure all ecological risk was fully understood and mitigated, Wood Group was employed to provide a local ecologist for the project. By carrying out an Ecological Clerk of Works (ECoW) role, it ensured that all walls were removed under supervision prior to hibernation season to prevent any delays to the project.

Over a 12 month period the walls were successfully removed, stored and reinstated, with all works were being completed in agreement with the WYAAS Archaeologists and land owners along the route. All removed material was successfully reinstated prior to the wintering period to ensure no stockpiled stone would be used as hibernacula by reptiles and amphibians. Reinstated walls were all photographed and sent to the WYAAS Archaeologists for their records and the character of the local area has been retained for future generations.

The dry stone walling reinstatement was funded by National Grid as part of the overall OHL refurbishment scheme. As a competent contractor and employer, both Balfour Beatty and National Grid were keen that their activities had minimal impact on the communities and environments that they were operating in. The special attention given to this activity and the additional funds provided to carry it out demonstrate that large-scale infrastructure projects can go hand in hand with sustainable development and preservation of the built environment.

The main benefits of the project included:

- A fully reinstated dry stone wall environment thus maintaining the aesthetics of the local area and securing its cultural heritage for future years
- Improved areas of dry stone walling which had previously become damaged and therefore prolonging their life

- The use of qualified Master Craftsmen, as certified by the DSWA, certifying a high standard of work
- Increased awareness of the DSWA across the industry
- Positive recognition for Balfour Beatty through using appropriate specialist contractors This element of the project is an example of industry best practice, the methodology for which can be readily adopted on other infrastructure projects, not only those delivered by Balfour Beatty, but by other similar companies in the same sector and working in similar environments.
- Early engagement with key stakeholders (in this case the WYAAS Archaeologists to agree a scope of work)
- Using experts such as Peter Isherwood to ensure work is carried out to a high specification
- Using local contractors who understand the ground conditions and techniques for successful implementation of the proposals in difficult environments
- Collaboration between all interested parties to ensure ecological and archaeological compliance and to help deliver a successful project for the benefit of the wider environment and community

By working with recognised members from the DSWA, it also promotes the country's only organisation dedicated to promoting this rich history.

The project provides excellent experience and lessons learnt to both Balfour Beatty and National Grid to enable similar initiatives to be implemented on future projects. Lessons learnt include, but are not limited to, the importance and value of the following:

BALFOUR BEATTY SPRINGHEAD BRIDGE

AIM

Balfour Beatty is currently constructing Springhead Bridge on behalf of Ebbsfleet Development Corporation (EDC). It is a two span 87m long structure which provides segregated pedestrian and cycle access to Ebbsfleet international Station from a new large housing development in Ebbsfleet Garden City. The project is being delivered via the Scape National Civil Engineering Framework.

The bridge, well into its second year of construction and due for completion in April 2020, is EDC's flagship piece of infrastructure. Spanning the River Ebbsfleet, it provides an oasis of wildlife, flora and fauna and will provide a key link for the residential developments to Ebbsfleet International Station, allowing safe vehicular, cyclist, pedestrian and Fastrack (bus) movements along with vital utility connectivity. Route orientation, ecological and archaeological considerations required a collaborative approach with the multiple approving authorities and stakeholders. The importance of this new piece of infrastructure is underlined by the strategic and local

ACHIEVEMENTS

Environment and sustainability have been at the forefront of the project from its inception. We ensure the ecology is respected and protected, engaging with the Environment Agency throughout the scheme, and bringing in ecological expertise to ensure protection during bird nesting season. Local ecosystems continue to thrive with a great diversity of wildlife visible on site. Birds have been successfully breeding throughout the nesting season so much so that a family of moorhens have taken a permanent residence around the bridge. Reptile fencing has been installed.

A strong focus of the project is Social Value. We have engaged 3,040 students to date through work experience placements on site, student site visits and supporting curriculum events at local schools, colleges and universities. This includes local schools and further afield institutions such as Universities of Portsmouth and Greenwich and Royal School of Military Engineering.

Over 3,000 tonnes of material has been retained on

Elevation plan



road congestion experienced locally. A number of additional journeys are using the local road network unnecessarily and to this end the project is likely to be very high Value for Money with a high Benefit Cost Ratio.

site, preventing extra lorry movements, with a further 10,753 tonnes being used for land restoration. We have donated top soil and materials to local charities, No Walls Gardens and the Swanscombe Edible Garden project, and have an agreement to provide topsoil to a local school for a gardening project.

IN DETAIL

Springhead Bridge is founded on large diameter bored piles constructed in cofferdams, with reinforced concrete abutments and central pier columns. The bridge deck consists of weathering steel girders and in-situ reinforced concrete deck. A reinforced earth embankment is to be constructed on the north side of the river which will reduce the need for additional concrete retaining structures.

Once complete, new residents of Springhead Park will only have a seven-minute walk to Ebbsfleet International, encouraging more active and sustainable transport, saving 20 minutes on journey times, unnecessary car journeys and reducing traffic volumes on busy local routes. Funded by Ebbsfleet Development Corporation, the budget for the scheme is £13.8 million.

The National Themes, Outcomes and Measures (TOMS) Social Value Calculator uses nationally agreed figures to determine the Social Value generated from the measures taken on projects, such as employing local people, procuring local businesses, reducing carbon, supporting the local community etc. Using this has enabled us to determine that we have generated over £3m in

Social Value so far through this project – a figure which will continue to rise as we near completion. We have diverted approximately 8,000m³ of non-hazardous soft material with a high natural organic content from landfill by sending it to a local land restoration site. The peat material from the site will improve the soil quality on the restoration of an old landfill, further improving the land in the local area. A sewage plant has been set up on the site to manage and treat waste water. This vastly reduces the need for road transport to empty septic tanks, removing approximately 40 tanker visits, preventing disposal of approximately 287.5m² hazardous waste at another location.

Balfour Beatty has utilised local labour, allowing members of the project team to cycle to the site, removing five cars from the local road network on any given day. Public transport to the site is encouraged.

We have an ecologist working on site ensuring biodiversity is protected. Several mallards and coots, butterflies and the Schedule 1 protected Cetti Warbler are adjacent to the works. We maintain a great relationship with the Environment Agency, who is supportive of our approach to managing the river environment.

Wildlife at Springhead Bridge Site



Fish Trap installed at Springhead Bridge



Our employment and skills plan ensures local people have access to work opportunities and local students have the opportunity to take part in work experience on site. Landscaping will be carried out at the end of the construction period to blend in the new embankments into the existing surroundings, including planting trees, shrubs and grass seed to provide a long term planted area available for the

semi- permanent foundations to be constructed and removed.

Excavation works have left us with excess material. For the North Abutment pile cap this was in excess of 1,000m³ and the South Abutment 400m³. This amounts to 3,080 tonnes of material, which would require 154 lorry movements to remove from the

Solar Tower Lights



Works on site at Stone near Dartford to restore an old landfill



local community to enjoy and enhance the available areas for ecology. Reed bed shaping will be carried out at the end of construction. This will be in the form of herringbone channels cut into the existing reed bed areas adjacent to the bridge. This provides further enhancement to the local ecology by leaving exposed water available for nesting birds.

We installed a pontoon access bridge across the river instead of using the highway to travel from each side of the site, eliminating unnecessary traffic on an already congested network and the carbon emissions associated with it. This saved the project from needing two welfare setups either side of the bridge. The pontoon has no environmental impact unlike alternative temporary bridge structures, which require

site. By stock piling we were able to save these road journeys and reduce our carbon footprint by approximately five tonnes.

All under-road construction material for the embankment construction is approved recycled crushed concrete, reducing depletion of natural resources. Our carbon footprint is further reduced with deliveries from the local recycled source.

On site we have used solar tower lights, which deliver powerful lighting without noise or emissions, and have a lower carbon footprint compared to the usual diesel lighting. The lights never need to be refuelled and the digital, in-built, remote control function means we can alter its settings as required to suit the light conditions.

Large Cofferdams have been constructed in the watercourse to enable the construction of the foundations without constricting the natural flow of the river. To enable excavation inside the cofferdams, dewatering of the cofferdams has been required, achieved through the use of pumps and settlement tanks. We have pumped the water through straw bales after the settlement tanks, enabling us to discharge clear water into the water course, protecting the local ecology. We installed a fish trap to stop fish from entering the water pump.

We use 'EnviroPads' on site under all equipment to catch any leakage of oil, diesel and petrol and remove pollutants to non-detectable levels using unique polymer technology. They have no reaction with water - surface water simply drains through, while hydrocarbons are absorbed. Once completely solidified, they can be disposed of in a controlled manner in hazardous waste bins. The Enviropads last longer than traditional plant nappies, reducing the quantum of hazardous waste, are more effective, and are now being deployed across Balfour Beatty projects.

The project is registered with the Considerate Constructors Scheme (CCS). We have scored strongly in the 'Environment' area, with maximum marks and an overall 44 out of 50, well above an industry average of 36 out of 50.

We regularly capture best practice, innovations and good news stories and share them internally and externally via multiple channels, allowing other sites to benefit from our initiatives. This complex project is being delivered with the environment in mind. There are further plans for development along the River Ebbsfleet corridor.

There has been no enforcement action taken against Balfour Beatty. In conclusion, we feel this project delivers exemplary use of recycled materials environmental best practice and community engagement, promoting sustainable urban living.

BEC

BEC'S NORTH SHORE: FIGHTING CLIMATE CHANGE IN A DECLINING COASTAL COMMUNITY

AIM

North Shore will transform Whitehaven's harbour, providing new places to work, rest and play. The town's imposing Georgian architecture and large harbour signal past prosperity. Yet decades of decline and the not-so-coveted accolade of 'Fattest Town in Britain' are the real signs of present-day social deprivation.



North Shore is regenerating neglected places to create a destination quarter. Phase 1 proposes a £55m development: a 4*-hotel, multi-story carpark with carbon capturing living walls and a c.75,000sq-ft office development sited alongside the Buzz Station – a creative and digital hub housing start-up space and artisan food offerings within an abandoned bus station.

The building regeneration will be of great value to the town, but this project aims to be so much more than the reduction of eyesores and new buildings for the community.

BEC intend North Shore to be a flagship sustainable construction project in the North of England. BEC is not a typical property developer, its actions are bound by a golden thread of low carbon activity. With the built environment industry responsible

for up to 45% of total UK emissions North Shore will ensure the practical delivery of Westminster's decarbonisation aims – in the tiny coastal town of Whitehaven.

ACHIEVEMENTS

The project aims to achieve:

- A Zero Net Carbon development spread across multiple buildings.
- A bold and innovative approach to new technologies – incorporating electricity storage, low carbon heat, peer-to-peer energy trading and capacity to load balance intermittent renewable sources – wrapped into the fabric of building design.
- A future proof approach ready to take advantage of evolving practices without risking costly obsolescence or stranded energy assets.
- A proactive way to secure revenue and profit for the business to allow it to invest further in these low carbon areas and increase social impact on local communities over time. – Clear learnings to both help BEC improve its future projects, and to inspire the wider construction and building industry.
- The project will demonstrate that low carbon can be a revenue generator, not a cost burden. The scheme design has already been achieved, together with the assessments of the most appropriate low carbon technologies. In line with the phased approach construction has now started on the North Shore scheme with the first building: The Buzz Station, due to open in Q4 2019.

IN DETAIL

North Shore is regenerating neglected places in a declining town to create a destination quarter. Phase-1 proposes a £55m development: a 4*-hotel, multi-story carpark with carbon-capturing living

walls and a c.75,000sq-ft office development sited alongside the 'Buzz Station' – a creative and digital hub housing start-up space and artisan food offerings within an abandoned bus station.

The scheme is developed by profit-for-purpose development company BEC, a company made up of 24 people with big ambition. BEC has worked hand-in-glove with Copeland Borough Council to ensure the scheme meets the evolving needs of the community and has been supported in the development of its low-carbon-strategy by specialists at SUSTaim and Sonas Energy.

BEC intend North Shore to be a flagship Zero-Net-Carbon (ZNC) construction project in the North-of-England.

North Shore is financed through private commercial funding with the exception of: £2.6m (Sellafield Limited) for the Buzz Station and £1.67m (Department of Transport) for road improvements. Environmental benefit:

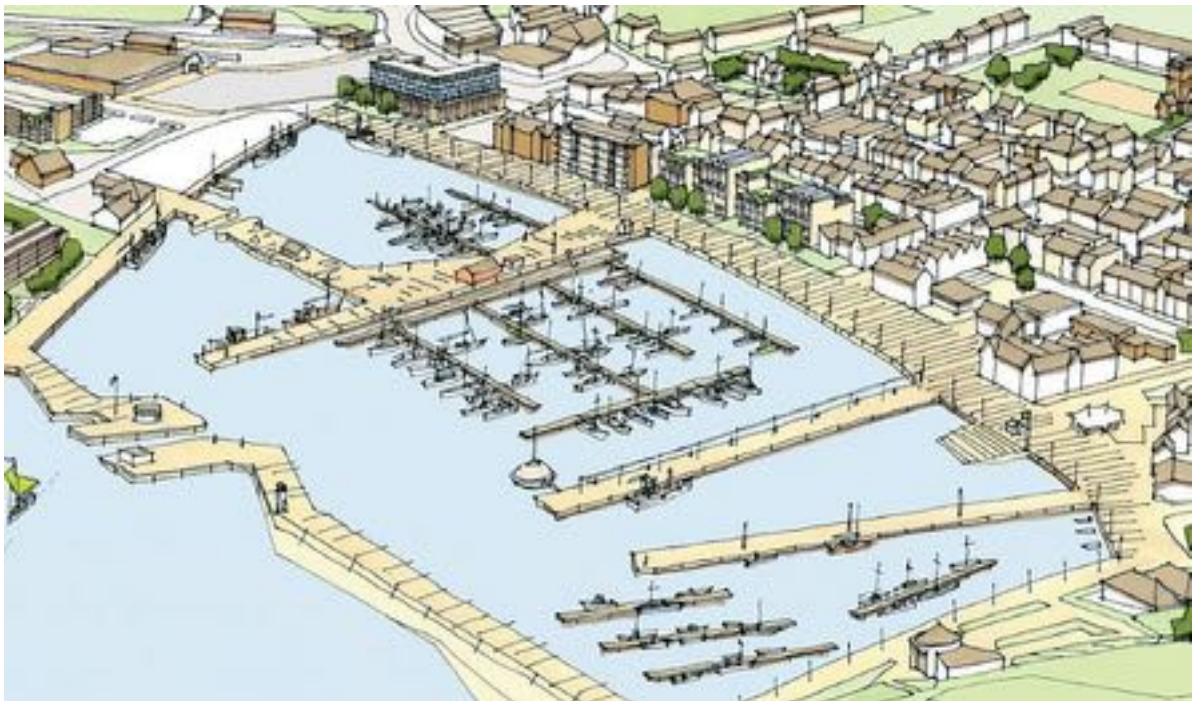
The time has come for not only every person to play their part in the fight against climate change – but every building too.

45% of total UK carbon emissions is an unacceptable reality of the built-environment industry today. Despite significant headway being made with overall UK emissions, the construction industry has giant leaps to make.

Technology is changing the way buildings consume energy.

BEC will install systems that reduce energy loads, optimise passive design and active systems, and recover energy while generating on-site and buying in renewables to fill gaps.

The Buzz Station will be the first North Shore building completed. BEC has designed it with great insulation and sustainably sourced materials. Added to this the development is being assessed for suitability for solar PV, air source heat pumps, and MVHR. The level of detail being explored at the Buzz Station will underpin



its low-carbon success: the building will house a DC-Power-over-Ethernet-circuit fed by PV and utilising battery storage together with low-voltage lighting, PCs, USB charge-points and telephony. Crucially, the Buzz Station has been designed with future-proof ducts to enable later connection to the wider scheme, enabling local energy trading.

Innovation:

Currently rapidly evolving technologies, political turmoil and escalating raw material costs can make it hard to set a course of action without fear of obsolescence. In many cases developers don't know where to start, so make miniscule changes with limited impact or do nothing.

North Shore will showcase how to build future schemes that can be turned into ZNC developments retrospectively should budget or build constraints prohibit these aim immediately. Many innovative approaches are being considered – from all-electric heating to battery storage and cross-site energy sharing – but one of the most innovative things is the approach to financing.

Economic benefit:

This project has been driven by climate ethical aims, but in order to maximise impact commercial considerations are the project's cornerstone.

BEC seeks to make the low-carbon energy system a commercially-investable project that provides power and generates long-term income. By introducing storage to enable the movement of surplus energy between buildings it also allows purchase of cheap-tariff electricity at times of low demand. Furthermore, recognising the investment challenges in geographically-isolated Whitehaven, a modular approach is taken to planning and financing, with each piece representing a snowball of investor confidence. The first step – the Buzz Station – is fully financed, has received planning permission and work is underway.

Social benefit:

With the built-environment industry contributing c45% UK emissions and air pollution deaths at 'crisis point' the importance of North Shore's ZNC aims cannot be overstated. Societal benefit will be realised through the non-emission of greenhouse gasses.

Resident's wellbeing will also benefit from lower ongoing pollution. Parking infrastructure will reduce town-centre pollution from traffic and idling cars while incorporating CO₂-absorbing living-walls. EV charging will encourage greater use of non-polluting vehicles.

BEC is also identify potential commercial opportunities for the sale of affordable surplus power and/or heat to surrounding buildings, public sector organisations and businesses.

However, the community benefits go further than ZNC. Entering Whitehaven's "gateway", for decades visitors and residents have been greeted with rundown buildings, the crumbling walls of a once-beautiful art-deco bus station and its flattened depot remains. North Shore will bring the physical assets the harbour needs to be the hub of lively work and social activity.

Nearby, Sellafield's nuclear site currently provides the bulk of local employment opportunities. However, it represents a ticking-clock of economic decline. Now in decommission, those reliant on Sellafield work must diversify, or the region faces mass-unemployment. Nationally, economic direction is shifting. Regional creative employment grows twice as fast as other sectors (11%). That's why the first site completed at North Shore will be a new creative-hub supporting fledgling firms to compete on the national stage.

Future development plans:

Phase-2 presents a bold vision to expand the footprint of Whitehaven, with land reclamation



offering harbourside housing, a new beach, and a leisure and entertainment venue. All ZNC learnings from Phase-1 will serve improvements in Phase-2.

Possible adoption:

Using the ZNC North Shore as a living case study, BEC hopes to inspire an aspiration shift for property developers across the country.

By approaching ZNC goals as revenue generators and cost savings not burdens, the Cumbrian SME has designed a transformative multi-use scheme to serve as an industry beacon.

Industry leading dissemination events will be developed at a local and national level as the project evolves. The team have already shared learnings with IMECHE and Place North West's development forum.

Commitment by senior personnel:

BEC team members are recruited against core values/behaviours, which include environmental responsibility.

Michael Pemberton, CEO: "Building and construction is one of the most polluting industries. At BEC we believe we have a responsibility to ensure that any buildings we bring forward have a neutral or positive carbon impact."

Joe Martin, Head of Energy: "With the key component parts of the overall scheme now identified, we must turn our attention to ensuring that each building has the best possible environmental impact. We have crucially embedded this into plans from the beginning rather than consider energy as an afterthought."

BMV JV

M5 OLDBURY VIADUCT MAJOR RENEWAL SCHEME

AIM

The Oldbury Viaduct Major Renewal Scheme is a £109 million + project located between junctions 1 and 2 of the M5 in the West Midlands. Some 120,000 vehicles travel over the 3.2km viaduct a day and it forms an important link between the North West and South West England.

Opened in 1970, the viaduct has since deteriorated and now requires major repairs and renewal. The scope of works includes the total refurbishment of the reinforced concrete deck along the entire length of the structure, with associated drainage and communication systems renewal.

The M5 Oldbury Viaduct is a unique project, being delivered within a densely populated urban environment with around 40% of the viaduct above or adjacent to watercourses.

From the outset, the goal was to achieve ZERO environmental incidents throughout the life of the scheme. This is being achieved by implementing exemplar considerate working practices, especially around the management of the hydrodemolition wastewaters. We are also working with local charity Ideal for All, to enhance the local environment to provide a legacy for the future.

ACHIEVEMENTS

The M5 Oldbury Viaduct Scheme has achieved several successes since it started in 2017. The project was awarded a Highways England Blue Star Award for being the first Highways England major project to extensively use Gas to Liquid (GTL) fuel, a cleaner burning alternative to conventional diesel. Our water management system has captured and treated over 13 million litres of hydrodemolition water, which is high pH and sediment laden, without having a detrimental effect on the surrounding watercourses.



Figure 1 Location map of the M5 Oldbury Viaduct

Our waste diversion rate is 93%, a high percentage considering a quantity of our waste is asbestos which can only be landfilled. The tarmac has been removed in a way that it is turned immediately from a waste into a product on site. This has led to a reduction of 25,000+ tonnes of waste.

The project has also received accolades for its health and safety initiatives, winning the excellence in occupational health and wellbeing at the 2019 Highways England awards, as well as improving its performance on issues including diversity, the gender pay gap and mental and occupational health, winning 'Diversity & Inclusion Initiative of the Year' and 'Best Place to Work' at the Construction News awards.

IN DETAIL

BMV is delivering this £109m+ Highways England scheme between junctions 1 and 2 in the West Midlands. M5 Oldbury Viaduct is unique. It is the largest concrete repair project (by value) carried out in the UK, and currently the largest scaffolding project in Europe. It is being delivered within a densely populated urban environment. The 11-metre high elevated section cuts through the mixed industrial

produce dust. In addition, it doesn't compromise the structural integrity of the steel concrete reinforcement. However, hydrodemolition water reacts with broken concrete to produce corrosive, high pH, silt-laden waste water with the potential to damage the water environment if left untreated.

Around 40% of Oldbury Viaduct is above or adjacent to Birmingham Canal navigations, which are sensitive

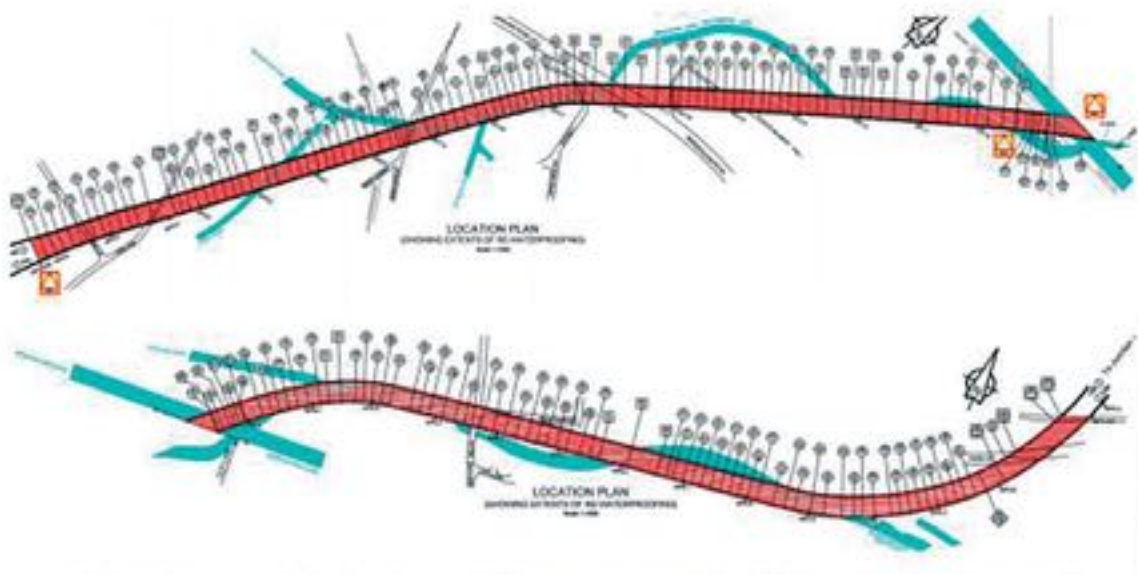


Figure 3 Location plan showing the numerous watercourses (blue) under the viaduct (red)

and residential Sandwell conurbation, with up to 320,000 residents and thousands of businesses, all relying on the M5 for economic success.

The work scope includes the total refurbishment of the reinforced concrete deck along its entire 3.2km length, with associated drainage and communication systems renewal. It is scheduled for completion in Autumn 2019.

One of the major tasks on the project is hydrodemolition, using high-pressure water to remove deteriorated concrete. Hydrodemolition has significant safety benefits over conventional demolition methods as it is vibration-free and doesn't

to high pH waters. Other sensitive receptors line the project, including the Chances Glassworks Scheduled Monument, Smethwick Conservation Area and residential housing. This makes it vital to adequately capture, treat and discharge the 300,000 litres of hydrodemolition wastewater created daily. We established a dedicated water management team, led by Construction Manager, Simon Spink and supported by the Project Director, Matt Atkinson. We researched previous lessons learned and considered the design and the viaduct's location in relation to the hydrodemolition works. We consulted key stakeholders, including Canal and River Trust (C&RT), Environment Agency, Severn



Figure 12 Joint volunteering between bmv and the Canal and River Trust

Trent Water, subcontractors and waste water treatment specialists, Siltbuster. Our practicable and sustainable solution was to capture it underneath, pipe to temporary treatment facilities sited at strategic locations and discharge the treated waters into the canals.

We designed 'bath tub' type structures, constructed from timber, that sit on the concrete beams under the viaduct to capture the hydrodemolition water. The beams have a natural fall, so an outlet with a pipe connected is positioned at the low point. The pipework leads down into a settlement tank, allowing the large sediments to settle. The tank also acts as a holding tank, allowing a steady flow into the Siltbuster unit, containing any pollutants before they enter the environment. The Siltbuster unit treats the fine sediment and reduces the pH.

We believe that hydrodemolition water management on this scale hasn't been undertaken before. In total, the project has 20 settlement tanks and 16 Siltbusters to process the hydrodemolition waste water. We have continually improved the system. Further investigation of the viaduct's condition exposed requirement for more repairs, some at full depth. These repairs, at random locations, meant it was unfeasible to capture water along the whole

viaduct length. We manufactured bespoke 'portable bath tubs' to be placed underneath the extra repair locations, made using a tough geo-membrane and sized to safely fit on scaffold walkways or on the ground below.

Further innovations have improved our water management. We use iPads to record treated hydrodemolition water pH levels, eliminating paper records that can be lost or damaged. They allow instant access to data and reduce error risks associated with double handling of data. Photos of the water being discharged and pH levels recorded on the monitor are taken with the iPads and entries time/date-stamped. This means when the Environment Agency ask for discharge information, the data is robust and readily available.

We monitor the water quality of surrounding watercourses monthly, with the pH of watercourses tested at 15 different points. To date, the pH levels have remained within permitted limits of pH 6-9, aside from 4 recordings that were not related to our works. Detailed water quality testing by an independent UKAS-accredited laboratory was undertaken before work started to establish a baseline and midway during the works. The results at the midway stage showed no deterioration in water



Figure 8 Screenshot of the environmental receptors map. When you click on a receptor it will display control measures and links to further information.

quality. Engaging and maintaining good relationships with key stakeholders is paramount to sustain good water management on the project. This includes the C&RT, as we discharge the majority of our treated hydrodemolition water into the local canals. We engaged with them early to assist developing the water management system, and hold progress meetings and conduct site visits with them. Our water management system featured in an internal C&RT article and the scheme has participated in volunteering days with the C&RT. The volunteering coincided with World Environment Day 2018, where project staff cleaned up the Birmingham Canal as part of a 'plastic patrol'.

We have engaged with the Environment Agency since the start. They've commented on the "excellent control measures" we have for the hydrodemolition waters and no enforcement action has been received to date.

We have achieved efficiencies of £28,480.85 in our water management by:

- engaging early with regulator and only requiring a Duty of Care letter (no charge) as opposed to

- discharge permit (normally required and chargeable)
- discharging to canal (no charge) as opposed to sewer (chargeable).

We have used the Environment Agency's pollution natural capital calculator to estimate the cost of public losses after a scheme pollution incident, and estimated to have saved between £66,000-£77,000 because of our water management efforts (not including costs associated with enforcement fines and clean-up, which would be even higher).

Kier Highways (Area 9 maintainers) consider our project water management as setting the benchmark for future projects. They intend to implement good practice developed here for future schemes. The project liaised with Sandwell College offering carpentry apprenticeships to help construct the bath tubs, a key part of the water management system. Our supply chain partner VolkerLaser employed ex-offenders to conduct Siltbuster duties through a scheme with their own supply chain.

We also did a presentation on our water management and its challenges to Chartered Institute of Highways and Transportation members.

BNP PARIBAS REAL ESTATE RAISING AWARENESS OF PLASTICS IN THE OCEAN

AIM

The management team of Belgrave House has worked tirelessly over the last ten years to create a positive impact upon the environment. Belgrave House is a centrally located prestigious office building in London which houses key tenants including Google and American Express. Whilst energy is deemed the most significant environmental



risk at this site (and has formed part of the focus of their sustainability strategy). The management team of Belgrave House has recognised the opportunity to positively impact upon the environment in terms of conservation, habitat and diversity. While this may seem odd for an office property, the Building Manager, William Ball, is passionate about the environment, especially around the protection of oceans and aquatic wildlife.

The aim of the project (which has various elements to it) is to raise awareness amongst staff, tenants, contractors and the wider population with respect to ocean pollution and encourage individuals to take responsibility for the damage mankind has caused to the aquatic environment.

ACHIEVEMENTS

The main achievement of the project was the original inception of the idea to produce 'Plasticus' which Bywaters (waste contractor for Belgrave House) took forward and produced (see attachment 1). Belgrave House and Bywaters have a strong, ongoing relationship, with the initial relationship aiming to increase segregation and recycling at the asset; the collaboration expanded resulting in the Plasticus initiative - the whale made up of a quarter of a tonne of waste plastic (to represent the amount which enters the ocean every second).

The idea was conceived based upon William's experiences while diving and witnessing the devastating effects he had seen litter cause. Plasticus was picked up by Sky Ocean Rescue and brought National coverage to the issue of plastics in

the ocean through '#PassOnPlastic'. The awareness of the general population of plastics in the ocean has exploded exponentially over the last 18 months, all driven by the original idea conceived at Belgrave House.

Mark Harbard – Bywaters Associate Director stated: "It's been an absolute pleasure to work with you all on the Plasticus and beach clean-up project and in a nutshell our original inspiration came from you so well done for making this a success".

IN DETAIL

William's passion for sustainability is fuelled by being a keen scuba diver. A visit to the Philippines in 2016 (following a visit in 2006) drove home the devastation caused by increased sea temperatures and plastics



in the ocean. This has led to a sustained drive at Belgrave House to promote awareness of pollution of the oceans, encourage people to take responsibility and try to positively impact the natural environment. Since the visit to the Philippines in 2016 Belgrave House has worked even more tirelessly to engage with his workforce, the wider BNP Paribas team and the wider population.

Belgrave House hosts an annual 'Oceans Awareness Day' in conjunction with Bywaters and invites tenants, members from Grosvenor, BNP Paribas and site staff to take part. The awareness day includes sharing knowledge and information, running games and activities with prizes available to promote engagement. In conjunction with the awareness day, a beach clean-up is arranged, this event has snowballed from 11 people involved in 2017 to over 35 people in 2018. The clean-up day was a great success with 7.5 tonnes of plastic waste removed from the beach during the day. The management team of Belgrave House has noted that waste plastics can seem to be a remote impact seen on the news associated with other countries. Seeing the impact first-hand resonates with people.

The wave of change which is beginning to occur from supermarkets changing their approach to packaging to pubs ditching plastic straws, is testament to the original Plasticus idea (attachment 1) which was immensely original and captured the imagination of all. The hope is that the movement away from

plastics will be long term, with the emphasis upon minimising the use of plastics as well as moving away from plastics in their entirety. Although a first baby step, the government has recently communicated a banning on single use plastics including cotton buds, drinks stirrers and straws. Part of the staff room includes a notice board which allows for employees to write important themes / messages of the week on – single use plastics has been the focus of some of these messages.

In addition to the concept of Plasticus, the management team of Belgrave House has focussed attention over the last two years upon the potential positive impact Belgrave House can have upon biodiversity. In terms of sustainability, offices often concentrate upon improvements which will provide cost savings and tangible payback. However, William has embraced biodiversity and has progressed initiatives including the installation of roof top green walls (to further support the bee hives installed two



years ago) and bee hotels, alongside the introduction of a live feed camera from the rooftop bee hives (with access via YouTube) to promote engagement with tenants and staff so they can see exactly what the bees are up to 24/7. The first harvest of honey from the bees has also been obtained which was distributed for free, this has gone down extremely well with the tenants. William has undertaken a qualification in beekeeping demonstrating his total dedication to the initiatives he drives to implement. The beehive initiative implemented at Belgrave House has now been adopted at other BNP Paribas managed assets including the prestigious building of 6 St Pancras Square Kings Cross and other London assets.

Belgrave House has been a key driver in the involvement of the BNP Paribas estate and Grosvenor portfolio in taking part in the annual 'Earth Hour' event whereby all lighting and plant is switched off for one hour in order to highlight the need for urgent action for the environment globally. Belgrave House has over the last three years run an innovative candle lit yoga session open to all staff, tenants and contractors within the reception area of Belgrave House to help celebrate Earth Hour and to promote further engagement to encourage participants to switch off lighting and equipment in their homes (not just focussed on the workplace) - see attachment 5 advertising the event.

Belgrave House is pushing forwards to further expand on its achievement with respect to waste and oceans awareness to an international audience. William has been invited by the Bagacay Elementary & National High School in the Philippines in July 2019 to hold a Waste & Oceans awareness event for its students and local people.

The Philippines is going through a crisis with respect to waste and pollution. The majority of this is not from its own making, but that from the western world, resulting in resorts shutting and a dangerous environment for wildlife forming. William has previously worked with and sponsored various



projects at this high school, building up a strong relationship. The agenda for this visit includes himself, students and teachers completing a beach clean-up and holding a talk on sustainability including technology, waste management, recycling, oceans awareness and holding games to promote and educate people around plastics in the ocean. The project aim is to share William's experiences and knowledge on Oceans Awareness and to donate supplies to the school and community. Supplies collected (and have just touched land in the Philippines following a two-month sea voyage) include a generator, solar panels, LED lights, recyclable bags, litter pickers, gloves, school supplies and clothes. The money for the supplies was raised by William, with contributions from colleagues, contractors and other supporting businesses. Bywaters have also helped to provide some of the waste related supplies.

In 2018 William was awarded the internal National CSR (Corporate Social Responsibility) award from BNP Paribas Real Estate in recognition for his innovations and leading the way within the business. Belgrave House was also nominated and shortlisted for a CSR award at the Premises and Facilities Management (PFM) Awards in 2018. Belgrave House operates to an ISO14001 certified Environmental Management System which helps to drive the sustainability strategy at the building.

BOTAS (PETROLEUM PIPELINE CORPORATION) TUZ GOLU (SALT LAKE) UNDERGROUND GAS STORAGE PROJECT

BOTAŞ has started Salt Lake Underground Gas Storage (UGS) Project to store natural gas in caverns, which are created in underground salt formations by injection of water. The expected results were the reduction of gas curtailments and spot LNG purchases and increasing gas storage capacity.

Salt Lake is in significant migration routes and hosts thousands of flamingos, kestrels, avocets and greater sandpipers. Its surrounding area is a region, where the largest halophilous steps are located. Due to decrease in average annual precipitation amount, construction of dams on the rivers, excessive consumption/wasting of groundwater and high evaporation rates, the area covered by the Salt Lake decreased from 260.000 ha to 130.000 ha in the last 40 years.

UGS Project efficiently uses resources and supports

sustainable development, including social benefits through community by:

- Using Hirfanlı Dam to meet fresh water need in order not to consume groundwater resources. After leaching phase, fresh water pipeline may be used by the communities for agricultural irrigation.
- Contributing to level of water and revival of Salt Lake ecosystem by discharging 69,000,000 m3 of brine into the Salt Lake.
- Contributing to feeding and breeding conditions of Greater Flamingo population by increasing the water amount.
- Planting trees to offset carbon footprint and sharing economic value with the community.
- Producing renewable energy by solar power plant and preventing 878 tonnes/year CO2 release.

Environmental and social aspects will be improved



further by Gas Storage Expansion Project-GSEP, which includes the construction of 40 more caverns, new surface facilities, freshwater and brine pipelines.

During construction phase, 275,000,000 m³ of brine will be discharged into the Salt Lake. Additional 100,000 trees will be planted and an additional solar power plant will be constructed, thus, more than 100% of the electricity consumed by the storage plant will be produced from renewable resources.

1. Introduction

BOTAŞ (Petroleum Pipeline Corporation) is a state-owned enterprise with a joint-stock company status, which has operations in oil/gas sector including crude oil transportation, as well as import/export, transportation, distribution, storage, marketing, and trading of natural gas.

By the end of 2011, BOTAŞ has started Tuz Gölü (Salt Lake) Underground Gas Storage (UGS) Project to store natural gas in caverns, which are created in underground salt formations by injection of water.

2. Project Context

2.1. Objectives

Today, with the increasing population, there has been a significant increase in energy demand. Accordingly, Turkey's natural gas consumption increased by 52.5% compared to 2007 and reached 51.7 billion Sm³/year as of 2017 .

Gas consumption fluctuates seasonally, daily and hourly. Storage of gas, in order to regulate the supply-demand imbalance caused by these fluctuations, is crucial.

As of 2017, Turkey has 2.84 billion Sm³ gas storage capacity, which corresponds to 5.5% of total gas consumption. Gas storage capacity of twenty-eight European Union countries represents 21% of annual gas consumption in Europe . It is obvious that

Turkey's storage capacity is well below the European Union average.

The expected results from the UGS Project are the reduction of gas curtailments and spot LNG purchases and increasing gas storage capacity.

2.2. Description

UGS Project's surface facilities and wells are located approximately 40 km south of Salt Lake. Storage plant, during low consumption period, will withdraw the excess gas from the network and inject into the salt caverns. Similarly, during high consumption/ demand period, it will withdraw the gas stored in salt caverns and give back to the network.

Construction works of UGS Project has started in December 5, 2011. The fresh water, which is used for leaching of salt structure, is brought by 130 km long pipeline starting from Hirfanlı Dam. Salt structure is approximately 1,000 meters below the surface and the brine resulting from leaching is discharged to arid areas of Salt Lake Basin by 44 km long pipeline, which has diffusers at the end.

UGS Project consists of twelve caverns each having 630,000 Nm³ to 780.000 m³ physical capacity. First and second set of three caverns are in operation since February 10, 2017 and May 31, 2019, respectively. By the end of 2021, the remaining set of six caverns will be completed and the storage capacity will increase to 1.2 billion Sm³.

2.3. Cost

Overall cost of the UGS Project is approximately USD 908,000,000, including engineering, construction and capitalization cost.

3. Characteristics of Salt Lake

Salt Lake is in Konya Closed Basin, which is the biggest and the most important basin in Turkey. It was determined as "Specially Protected Environment Area-SPEA" in 2000 due to its natural, ecological

and biological characteristics. In addition, Salt Lake SPEA has First Degree Protected Area, Important Vegetation Area and Important Bird Area status. Being in the significant migration routes, Salt Lake hosts thousands of flamingos, kestrels, avocets and greater sandplovers. Its surrounding area is a region where the largest halophilous steps are located.

Salt Lake is in the most arid part of Turkey. Average annual precipitation amount recorded at nearby stations decrease gradually as seen in Figure 1. Besides, construction of dams on the rivers, excessive consumption/wasting of groundwater by unlicensed wells and high evaporation rates have negative effects on the water level of Salt Lake.

According to a report prepared by WWF-Turkey in 2010, the area covered by Salt Lake decreased from 260.000 ha to 130.000 ha in 40 years, which corresponds to 50%.

4. Environmental Aspects of the Project

This section defines how UGS Project efficiently use resources and support sustainable development, including social benefits through community.

4.1. Selection of Fresh Water Resource

Caverns are created by injection of fresh water. During initial design phase, it was planned to use groundwater as fresh water resource. However, after thorough studies, BOTAŞ decided to bring fresh water from Hirfanlı Dam, which is 130 km away from the project site.

The main reason for this potentially expensive alternative was the fact that the groundwater level decreases consistently due to excessive consumption of groundwater by unlicensed wells. Another reason was the possible use of fresh water pipeline for agricultural irrigation purposes after leaching operations. The majority of the communities living around the pipeline route and surface facilities are farmers and amount of irrigation water supplied to these people is not satisfactory.

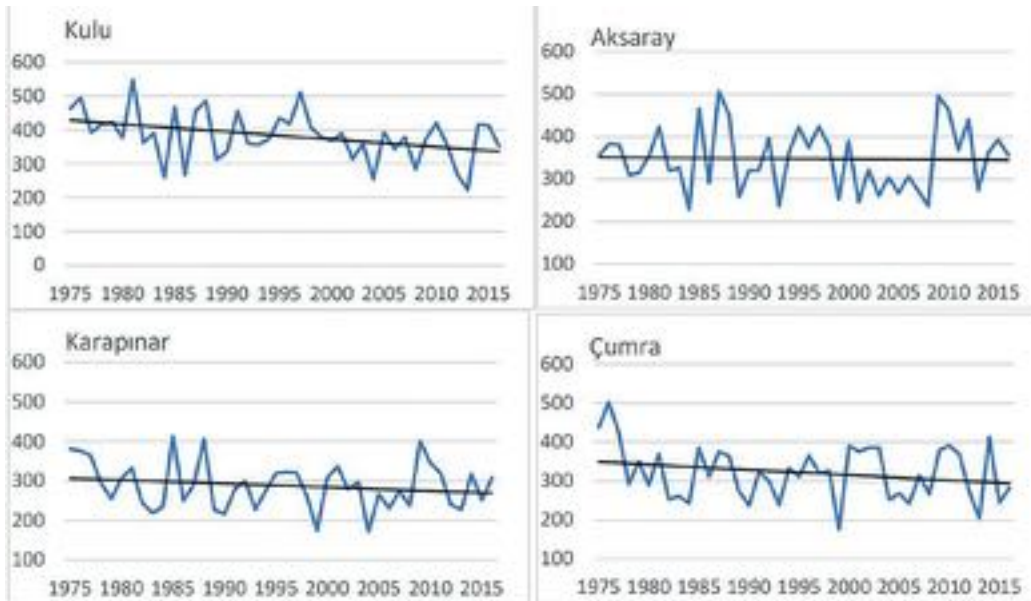


Figure 1. Average annual precipitation amount recorded at nearby stations

4.2. Feeding Salt Lake by Brine

Average water consumption for one cavern is calculated as 5,740,000 m³, based on the real water amount used. Therefore, total water consumption for twelve caverns is 69,000,000 m³. Brine has exactly the same density as of Salt Lake water. Assuming that, brine is transferred to Salt Lake without any loss, 69,000,000 m³ of brine will be discharged to Salt Lake in total, during Project construction phase. Obviously, brine discharge makes a contribution to the increase of water level and recovery of Salt Lake ecosystem.

Environmental monitoring services of UGS Project includes regular analyses of Hirfanlı Dam water, Salt Lake water and brine. According to the results of these analyses, no adverse effect has been discovered so far. These analyses will continue as long as the brine discharge continues.

Interpretation of Satellite Images

One of the methods used for monitoring effects of brine discharge into Salt Lake is the interpretation of satellite images covering the brine discharge point and areas nearby. Satellite images are taken regularly since the pre-construction phase.

The first image taken before project implementation is described in Figure 2. Figure 2 clearly shows that areas close to brine discharge point was arid at that time.

Considering it is obvious that the arid parts of the Salt Lake, which are arid even during the rainy/snowy season, have been covered with water after Project implementation. Furthermore, these areas are still covered with water during dry season. Thus, it can be stated that UGS Project contributes to the Salt Lake ecosystem by increasing the amount of water entrance.

Increase in the Number of Flamingos

As stated above, UGS Project contributes to the revival of the Salt Lake ecosystem.

Phoenicopterus Roseus (Greater Flamingo) is a crucial migratory bird species, which accommodates, feeds and breeds at the Salt Lake during its immigration journey. The most serious threat for Greater Flamingo is the reduction in water level of the Salt Lake. An increase in the water level creates ponds and small islands, which they can use for feeding and breeding more comfortably. In addition, as they spawn on these small islands, they can protect their eggs from reptiles.

Since, Greater Flamingo is an endangered species in Europe, Ministry of Environment and Urbanization-MoEU executes a project called “Study of Population, Protection and Monitoring of Flamingos in Salt Lake Special Environmental Protection Area”. According to the results of this project, the number of young Greater Flamingos in the Salt Lake Basin is increasing gradually. The number of young Greater Flamingos is found to be 9564, 11079 and 12746 in 2016, 2017 and 2018, respectively .

Considering the results of the above study, it can be stated that UGS Project contributes to the feeding and breeding conditions of Greater Flamingo population by increasing the amount of water in the Salt Lake.

4.3. Afforestation of the Land Between Wells

Since all project activities were conducted on non-forest areas, there was no need to cut trees in scope of the Project. In addition, thousands of trees have been planted to offset carbon footprint created by UGS Project.

Afforestation activities have been carried out on the project area in cooperation with the related regional state authority. The location of the surface facilities and wells area lies in the most arid region of the country. Therefore, the selection of tree types to be planted and the soil characteristics of the area were important for the success of the afforestation activities. In order to decide which tree types to plant, soil samples were taken randomly from various locations and depths and the most suitable types were selected according to the results.

For the beginning of the afforestation activities, 7883 trees have been planted on 9.46 ha area including 650 cedrus, 550 calabrian pines, 500 cupressus, 990 almonds, 1.053 elaeagnus, 900 tamarisks, 350 english oaks, 350 sophoras, 740 ash trees, 900 pseudoacacias and 900 atriplexes.

4.4. Electricity Generation by Solar Power Plant

In order to support sustainable development, a solar power plant was also constructed within the boundaries of the Project area with the capacity of 188 kWp / 999 kWe. This plant produces 1,900,000 kWh/year electrical energy, which corresponds to 63% of the electricity consumed by the storage plant.

Renewable energy production by this solar power plant prevents 878 tonnes/year CO₂ release.

4.5. Future Further Development Plans

In order to increase the gas storage capacity further, BOTAŞ has started the Gas Storage Expansion Project-GSEP in September 2016. GSEP includes the construction of 40 more caverns, new surface facilities, freshwater and brine pipelines and is expected to be completed at the end of 2023. When completed, GSEP will increase the total gas storage capacity of UGS Project to 5.4 billion Sm³. During GSEP construction, 275,000,000 m³ of brine will be discharged into the Salt Lake.

Environmental and social studies of GSEP include, but not limited to:

Flora-Fauna Studies: All endemic and other flora and fauna species are determined and habitat maps are prepared. Since the results of the flora study showed that increased brine discharge will have a considerable stress on endemic flora species, a new brine discharge point is selected,

Cultural Heritage Study: The Cultural Heritage Management Plan is prepared, which is applicable to all Project activities that have potential to cause an impact on the cultural heritage. This Plan covers all construction activities and cultural protection

measures, such as the Chance Find Procedure applicable to the Project.

No-Go Areas: Considering the results of flora-fauna studies and cultural heritage study, “No-Go Areas” are determined and project components are located outside these “No-Go Areas”.

Future development plans include:

- Afforestation of all suitable land (more than 150 ha, which corresponds to approximately 100,000 trees) within the boundaries of the Project, based on the results of ongoing afforestation activities. Former owners of the expropriated land will benefit from these trees, e.g. almond trees, which have a remarkable economic value.
- Another solar power plant will be constructed with the capacity of 1500 kWe to 2000 kWe, which is funded by “Instrument for Pre-accession Assistance-IPA” of European Union-EU.

5. Conclusion

UGS Project, aiming to reduce the gas curtailments and spot LNG purchases and increase gas storage capacity, efficiently uses resources and supports sustainable development, including social benefits through community, by:

- Bringing fresh water from Hirfanlı Dam instead of groundwater, after leaching operations resources can be used by communities for agricultural irrigation purposes
- Contributing to level of water and revival of Salt Lake ecosystem
- Contributing to feeding and breeding conditions of Greater Flamingo population
- Planting trees to offset carbon footprint and sharing economic value with the community
- Producing renewable energy by solar power plant

Environmental and social aspects will be improved further by GSEP.



Since 1974, BOTAŞ has been working to meet Turkey's ever-growing energy demand by expanding its activity areas, which now extend from crude oil and natural gas transportation and pipeline operation to LNG terminal operations, marine terminal operations, project design, engineering, land survey, expropriation and construction of crude oil and natural gas pipelines and compressor stations, natural gas and LNG trade, natural gas and LNG storage facilities, international natural gas and oil transportation projects.

While BOTAŞ has extended the natural gas transportation infrastructure in the domestic market so as to reach every single province in Turkey, it has also been striving to realize its vision to make Turkey a regional and international energy hub in terms of oil and gas trade while utilizing national and international cooperation opportunities to become a prestigious company in the world, a leader in the region and a trendsetter in the sector.

With the launching of Trans Anatolian Pipeline Project (TANAP) to carry Azeri natural gas to Turkey and also on to Europe, TurkStream Pipeline Project to bring Russian natural gas to Turkey and to southeast Europe over Turkey, Tuz Gölü Underground Natural Gas Storage Project, the biggest underground storage project under construction in the world, chartering the largest FSRU in the world so as to add another major gas entry point to the national grid, and expanding the capacity of Kuzey Marmara Natural Gas Storage Facility, the very first and the largest natural gas storage facility in Turkey, BOTAŞ not only strengthened the security of supply for Turkey, but also has become a key player for contributing to Europe's natural gas supply security.

Alongside its relentless efforts for supplying energy to national and international markets as a financially and institutionally strong company, BOTAŞ also pays great importance to environmental consciousness and social responsibilities; leaving a positive mark wherever it reaches.

Remarkable rebounding of flamingo population as a result of BOTAŞ' works to revitalize their habitat at Tuz Gölü area, dramatic increase in biodiversity in BOTAŞ facilities at Ceyhan Regional Directorate of Petroleum Operations and afforestation of almost 1,2 million m² of land at various locations near BOTAŞ facilities are all parts of BOTAŞ' efforts to establish itself as a leading green company. As Turkey's most preeminent energy company, BOTAŞ will proudly continue to bring energy to the millions in Turkey and in the world.

BROADGATE QUARTER

DIVERTING WASTE FROM LANDFILL

AIM

Broadgate Quarter and Key Enviro Solutions Limited consulted and then prepared a Waste Management Plan with the overall aim of developing a waste management system that meets the stakeholder's needs and contributes to economic and social development.

Our dedicated approach to waste management practices has mutual benefits, including increased opportunity with respect to meeting obligations, through economies of scale, and sharing of resources and targets.

Our aims are:

1. Securing ecologically sustainable development while promoting justifiable and social development
 - To protection of the environment through effective waste management measures
 - To protect the health and wellbeing of people
2. Avoiding and minimizing the generation of waste
 - Ensure the design and manufacture of products that avoid or minimise waste generation
 - Increase consumer awareness of waste minimisation issues
3. Reducing, re-using, recycling and recovering waste
 - Increase reuse and recycling rates of products
 - Reduce the percentage (%) of recyclable material to landfill
 - Ensure separation at source
 - Encourage the establishments of Material Recovery Facilities (MRFs)
 - Encourage waste to energy options
 - Support the diversion of high calorific waste from landfill to recovery options

4. Promoting and ensuring effective delivery of waste services

- Ensure an efficient and effective solid waste management
- Implement free basic refuse removal policy for indigent stakeholder
- Promote our waste management services

5. Safely disposing of waste as a last resort

- Stabilise quantity of waste disposed to landfill then reduce this volume
- Improve landfill management to comply with legislation
- Increase thermal treatment and conversion of waste to energy

Achievements

Broadgate Quarter London have the freedom to make operational decisions about our business that benefit our stakeholders. Our focus is on the long term vision for our company, which allows us to build strong, resilient relationships with our stakeholders. The benefits are open and transparent relationships, delivering sustainable solutions that support our stakeholders to meet their long term vision and objectives.

Working closely with our service provider Key Enviro Solutions Limited, Broadgate Quarter London has achieved commercial success by respecting our environment and the communities in which we operate.

In recent times we have seen significant savings in the reduction of energy and reduced waste. Alongside our suppliers and industry experts we have adopted an environmental dashboard which records

our consumption of resources and measures our carbon intensity.

Our achievements throughout 2018 - 2019 are:

1. Diverting waste from landfill – Significantly reduced figures
2. Cutting paper use
3. Promoting recycling schemes
4. Our providers use the greenest technologies for their vehicle fleet
5. Saving water and energy.

We've incorporated a number of environmental initiatives in our operations by switching to using green chemical products wherever possible. Our partnerships with some of our stakeholders have led us to achieve near zero to landfill.

IN DETAIL

Broadgate Quarter is a landmark building providing 425,279 sq. ft. of premium office space located on the edge of Broadgate, Liverpool Street.

This internationally desirable business location provides a link between the bustling amenities of the Broadgate district and the vibrant Tech City and Hoxton areas, home to the powerhouse companies of tomorrow.

The building is multi-tenanted with accommodation over 12 floors, surrounding a bright central atrium, with upper floors enjoying spectacular views across the skyline of the City of London and Shoreditch. The ground floor comprises of two spacious receptions, located at 9 Appold Street and 1 Snowden Street, and four premium restaurants.

At Broadgate Quarter we take our environmental responsibilities seriously. We currently hold the ISO 14001 certificate, we have also been awarded the Green Ribbon Award from Hosking Associates for the third year running. This is awarded to businesses who pass a 50-point environmental audit and continue to improve their environmental credentials.



All occupiers of Broadgate Quarter are kept up to date on any environmental achievements and initiatives. We always welcome any suggestions for ways to improve.

Recycling

Broadgate Quarter is committed to minimising the impact we make on the environment. As a multi-tenanted building, we promote recycling to all our occupants. An extensive recycling programme is in place, including: food waste separated for anaerobic digestion, glass separation, cardboard separation and mixed dry recycling. All general waste then goes through a materials

recovery facility and finally for energy generation where recycling is not possible.

Throughout the mobilisation period we have worked closely with our cleaning service provider Key Enviro

Solutions Limited to improve our commitment to the environment. We have established a group to provide our stakeholders with advice and support on energy, water efficiency management and continuous development through concept and innovations.

Our cleaning materials are sourced and manufactured within the UK which, decreases the embodied energy of the products as it has less travel distance when compared to purchases from abroad hence the reduction of used fossil fuels during transportation.

We have a robust recycling and good housekeeping service designed to surpass our previous targets, we intend to achieve this by:

General waste

General waste is inevitably produced as part of any business activity, with a zero-to-landfill service, taking the most environmentally friendly option.

- 100% zero-to-landfill service
- Cheaper than sending waste to landfill
- Reduces your carbon footprint
- Energy generated from incineration put back into the National Grid

How do we collect?

Wheeled bins

- For area that produce higher volumes of general waste
- Wheeled bins for storage in between collections

Portable and static compactors

- Based in the loading bays for large volumes of general waste
- Requires a loading bay or storage area
- Compactors and skips are specific to BQ

Mixed recycling

Mixed recycling are incorporated within commercial businesses in order to limit the number of bins in the commercial space. Our display posters and stickers educate staff and stakeholders on what can go in each bin

How do we collect?

Wheeled bins

- For larger producers of mixed recycling
- Wheeled bins will provide ample storage in between collections

Portable and static compactors

- Based in the loading bays for large volumes of general waste
- Requires a loading bay or storage area
- Compactors and skips are specific to BQ

Food recycling



Once collected, food waste bins are emptied and washed at the waste provider's depot. The food is then taken to Biogen, where they use anaerobic digestion to convert it into biogas and liquid biofertiliser. Biogas generates renewable electricity whilst biofertiliser is spread onto farmland to help grow crops.

Paper recycling

Paper generated make up a large percentage of office waste which is recycled back into new paper, providing savings while reducing your carbon footprint. Paper collected is sorted at our state-of-the-art facility (MRF)

Glass recycling

Glass produced on site is sorted, crushed, melted and made back into a new bottle. The Glass is collected and transported to a specialist facility, crushed and used to manufacture new glass bottles in the UK.

Cardboard recycling

Cardboard makes up a large proportion of waste on the Broadgate Quarter site, we bale all our generated cardboard on site which will then be recycled back into new cardboard. Roll cages are implemented on site as a way of providing convenient storage.

Batteries & toners

Batteries are not disposed of as general waste, they need specialist treatment. Toners and batteries are collected for recycling.

Hazardous waste

Substances or materials are classed as hazardous, or the material or substance that, are harmful to humans or the environment, are classified as hazardous waste, our onsite team separate and store them safely and keep written records of the waste.



Additionally of waste service provider, provide BQ with a hazardous waste consignment note ensuring all materials are dealt with in the most environmentally friendly way.

Secure shredding

Secure Shredding is outsourced to a specialist service provider for disposing of our confidential waste. The provider supply a certificate of destruction when our material has been destroyed. Confidential paper, hard drives and other items for secure disposal, will be taken by a tracked vehicle to our secure shredding facility where they are shredded or wiped, depending on the item and your requirements.

Coffee ground recycling

Our retailers and offices generate and consume large quantities of coffee. The waste coffee grounds are

be collected and taken to bio-bean who produce bio-fuel pellets for powering bio-mass boilers. Collection frequencies are tailored to the needs of our restaurants, café and offices

Coffee cup recycling

Coffee cup recycling reduce our carbon footprint. Coffee cups are made with virgin material, so it's important to transform that waste into a recycled product. By recycling our coffee cup waste we ensure they are recycled in the most environmental way possible. Our coffee cups are separated into especially designed coffee cup recycling sacks.

Our mission

Our mission is to provide an excellent waste and recycling service to our stakeholders, employees and the public which is flexible, reliable and ethical:

- It is our aim to have daily collections on a 7 day-a-week schedule
- We will constantly strive to reduce our impact on the environment and constantly challenge our service partners for innovations and best practice improvements ongoing.
- Our waste scheme is tailored to meet your exact business requirements and those of our stakeholders ensuring we are fully sustainable for now and the future.

THE BROADWAY, BRADFORD ENVIRONMENTAL BEST PRACTICE

AIM

To recognise responsibility to lead by example when it comes to matters surrounding sustainability and the environment.

ACHIEVEMENTS

Implemented various schemes and adopted various energy-saving initiatives, resulting in a saving of £87k on energy versus the same period in 2017, which equates to a reduction of 46%.

IN DETAIL

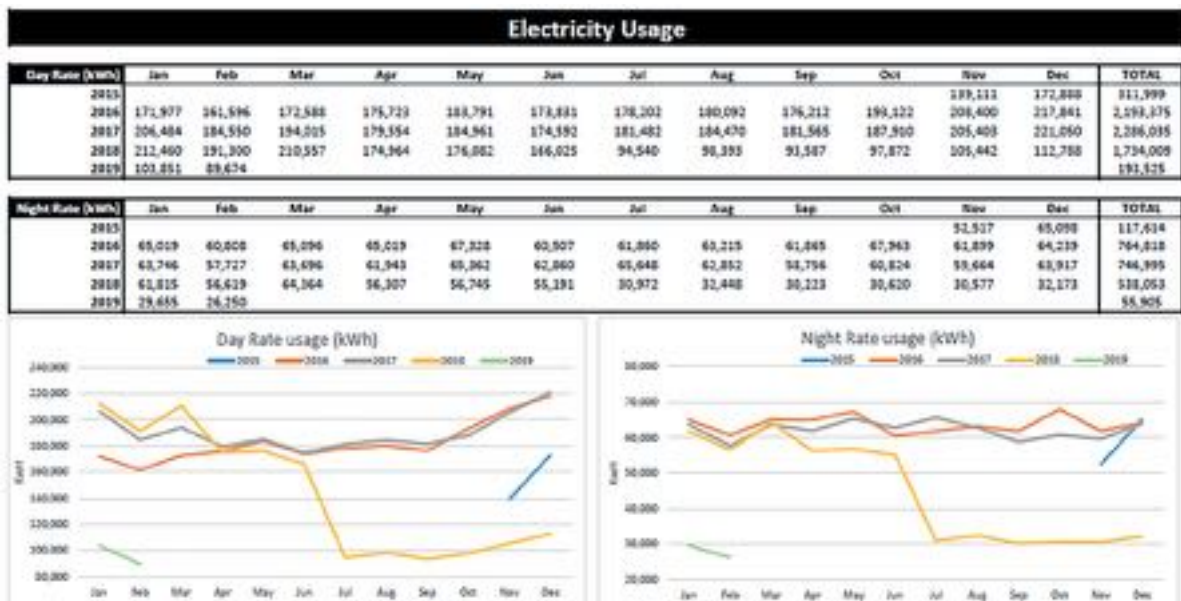
The Broadway, Bradford opened in 2015 and as a contemporary designed mall meant a significant amount of energy efficient equipment was installed during construction.

The management team at The Broadway recognise the huge responsibility to lead by example when it comes to matters surrounding sustainability and the

environment. Not only does the team follow best practice when it comes to waste disposal and use of chemical substances, but there is also an annual agreement with all retailers to ensure there is a zero to landfill approach to waste disposal. Recycling

All retailers adhere to individual company recycling policies; in addition to this retailers are encouraged via memos and the internal Centre 'Retailer Dashboard' to implement further waste segregation at the source. Centre management then review general waste and remove further recyclable products. In 2018, The Broadway's on-site cardboard recycling increased by 10% in comparison to 2017. This was a direct result of encouraging retailers to implement segregation at the source.

In addition to the retailer's own food waste procedures, the management team at The Broadway provide all food retailers in the Centre with a separate



Gas Usage													
Usage (kWh)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	TOTAL
2015													
2016	157,903	240,403	249,246	226,094	74,779	36,010	30,077	29,676	40,841	118,888	399,888	145,620	845,508
2017	309,713	234,706	197,990	89,743	49,824	16,434	16,185	15,749	31,248	66,704	168,460	171,879	1,541,735
2018	274,529	217,066	124,501	88,884	26,659	15,770	11,643	17,813	21,405	70,559	185,911	211,678	1,544,959
2019	276,440	205,023											421,463



bin to collect all by-products for recycling. This is then taken off site by a private waste team and sent for anaerobic digestion. Over the last year, the team have pulled 100 tons of food out of general waste, which would have otherwise not been recycled.

To reduce the Centre's carbon footprint, the team at The Broadway has made a conscious effort to reduce their number of waste collections per month. Rather than implementing a twice weekly waste collection for recyclable and non-recyclable waste, the Centre use an 'on call' system for waste pick up. This has reduced the number of collections from 16 per month to 5 per month, subsequently reducing the Centre's carbon footprint.

Electrical

As part of the ongoing Planned Preventive Maintenance (PPM) a more robust energy monitoring scheme was implemented. By utilising the Building Management System (BMS) all of the time plans were reviewed. These were readjusted so that all the lighting, power and heating were initialised only when required, switching on and off in line with the operational hours of the centre. The team at The Broadway ensured that the visitor experience was only improved by these adjustments and that the malls were maintained at a comfortable temperature, the malls and service areas remained well-lit and the

security provided by the external and car park lighting was not affected.

The shopping centre operates all year round, twenty-four hours a day and has substantial areas, corridors and storage rooms that are back of house with no natural daylight. The areas have been fitted with fluorescent T5 lamps controlled by Passive Infrared Sensors (PIRs) allowing the facility to reduce to 50% lighting. The Centre's engineers adjusted the time settings on the PIRs to minimum. This resulted in the areas reducing to 50% on a far more regular basis despite the high footfall in these areas.

In addition to the T5 lamps, the back of house corridors have been wired so that every other light fitting is an emergency one. The time plans have been adjusted so that once the centre is closed and staff on site are at a minimum, the emergency lights switch off. This means that the corridors are in total darkness until someone triggers the sensors, however this does not compromise the emergency lighting.

Among the power saving advantages, this has also had a positive effect on the security at the Centre. The staff in the Shopping Centre's control room, which is manned 24 hours a day, have commented that monitoring of the CCTV or searching for events is



much easier as the cameras are now in darkness until movement is detected.

The Centre has a vast service area which is lit by four tube, T5 fittings that are illuminated around the clock. In order to improve efficiency, the Centre undertook a full review of these areas, paying attention to peak traffic times. The team were then able to make the decision to close the service area between 2300hrs and 0400hrs without affecting the Centre's operation. This enabled the team to safely turn off the lighting for a full five hours every day. As well as reducing energy consumption, this has released a member of staff; this capacity has been used to provide additional patrols and safety checks around the Centre.

The Broadway management team conduct daily back of house checks to ensure that the lighting systems are working to optimum efficiency. In addition to this, a three-monthly survey of the Centre is conducted to ensure that retailers are turning off all lighting through the night. If this is ever not adhered to, retailers are contacted and reminded of the Centre's energy saving plans.

During 2018, the Centre saved £87k on energy versus the same period in 2017, which equates to a reduction of 46%.

Internally, the staff at the Centre are always working to targets to reduce energy costs including the consumption of water, electricity and gas. Members of staff also encourage ethical paper consumption by implementing 'paper free' office management schemes. The Broadway does not stand alone, the team firmly believes that they are part of a larger system of people, values, other organisations and of course, the environment. The Centre's CSR policy will always be underlined by giving back to the local community and safeguarding the wider environment.

CARDINAL FERNHILL HOUSE

AIM

Following the flooding of existing premises the company needed to reinstate the manufacturing side of the business as quick as possible.

Whilst doing this it was decided to consolidate the multi-site business to a smaller, better planned manufacturing unit with a separate warehouse for logistics, rather than spread across four (4) different sites in Yorkshire & Lancashire.

Several other key factors to the development that the stakeholders wanted to deliver were;

- Reduction in energy usage,
- Reduction in waste production.

ACHIEVEMENT

Through the consolidation project Cardinal has been able to achieve the following main benefits;

- Reduction in fuel costs for operatives working between sites,
- Reduction in energy usage,
- Reduction in waste production,
- Increase in recycled waste,
- Increase in apprenticeship schemes,
- Better colleague engagement.

IN DETAIL

Fernill House, Battye Street, Bradford, BD4 8AG
Refurbishment of 200,000 sq ft warehouse unit to create bespoke offices and manufacturing space.

The building was stripped back to the structure so that it could be fully modernised and fitted out to suit the bespoke needs of the business. A new mezzanine floor to create offices above goods in, full design & installation of a manufacturing operation and the associated welfare facilities that 170 employees

require were all created as part of the works.

Following the flooding of an existing premises it was decided to assess the existing buildings that the business operated out of. Through consolidation of our existing four (4) premises to two (2) local ones there is a massive benefit to the environment which is evidenced through the following;

- Reduced energy usage – 4 sites down to 2, LED lighting, smart systems
- Reduced fuel usage – travel between sites
- New technology purchased as part of move – more effective machinery that reduces waste (CNC), robot welding, newer machines that use less energy
- LEAN processing – layout of manufacturing set out to maximise production
- Future proofing completed – Cat6 data installed, HVAC system for heating specific areas

As part of the relocation Cardinal were also able to create waste segregation areas and separate our waste production more easily for recycling thereby reducing our waste to landfill. LED lighting was installed throughout the premises wired on separate circuits but controlled on PIR sensors to reduce the number of lights being used within the building.

Water saving WCs, urinals and handwashing facilities were installed as part of the refurbishment works to reduce resource usage.

A card reading system to allow different levels of access throughout the facility was put in place. This doubles up not only as a security measure but also as a safety feature with regards tracking people's whereabouts within the facility should there be a fire.

A specialist adviser was drafted in to assist with the design of the layout of the manufacturing side of



business to ensure maximum output with minimum effort. The new machines and technology that have also been adopted as part of this have reduced waste production by maximising each element of raw material.

Extraction systems were installed to the factory which the final section is made of flexible ducting instead of rigid. This allows the extraction to be able to be relocated as workbenches/projects require.

A recycling programme was introduced within the office whereby different coloured bins, to segregate waste, have been installed so that Cardinal can further reduce the amount of waste that is going to landfill.

All printers are set to default greyscale with double sided printing to reduce use of paper and each time something is printed an electronic reminder comes up on the user's PC to check that they definitely need to print it off. An electronic log is kept of colleague's usage so that trends can be monitored and the appropriate actions taken, as required.

The Directors of the business invested not only revenue but also a great deal of time in the planning and implementation of this project. Additional items that were not required have been added to the project to ensure that it was future proofed even though they were not required at the time. The overall project investment was £3.5M with £1.5M of this being M&E related. The funds for this were part insurance, following the flood, and the betterment works were paid for by the company.

As the building was new to us prior to our fit out we do not have existing data of the usage with all the manufacturing equipment in place and set up. There is however a significant amount of evidence available to prove that LED lighting offers a massive reduction in energy usage both in KWs and in cost.

At Cardinal we have an ethos of continual improvement, which is evidenced through our ISO accreditation. As part of this we are always looking into new technologies, methods and techniques to make us more effective, reduce waste production and reduce energy usage. The new open plan layout of the office has increased colleague

engagement, increased morale and helped instil a new collaborative working environment which has led to proactive problem solving & increased customer service throughout the business.

By creating one central facility we have been able to increase our apprenticeship levels from the local community.

As part of this we have recently started the manufacture of 'bathroom pods' as part of our offsite manufacturing drive. This is an extremely effective way of building as the waste levels are vastly reduced but the quality levels increased. There is also a reduction in fuel for travel as the works are completed off site and then shipped as one load.

Cardinal believes that the lean manufacturing process that we invested in can be applied to other manufacturing and warehousing operations, as can the LED lighting & PIR controls, to not only reduce environmental impact but to also make other businesses more efficient.



CARDINAL

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CBRE TOWER PLACE TOWER PLACE - WASTE MANAGEMENT

AIM

Following the building takeover from previous Building Manager in February 2018 new General Manager has looked to implement a number of initiatives to support the building and its occupiers in further advancing environmental best practices. In order to deliver better waste management solutions, I had to re-tender the waste management contract and selected Bywaters as I waste management service partner.

Since October 2018, Tower Place has been working with Bywaters in order to bring about large increases in the site's recycling rate and overall sustainability. Tower Place started making improvements in early 2018, including completely phasing out the use of plastic straws and black bin liners but there were still significant enhancements to be made, Tower Place houses 10 tenants in total, with 5 of these being restaurants. In order to improve the site's waste management, it was, therefore, necessary to focus on correctly streaming all waste.

After initial audits, it was decided to focus on the following areas:

- Increasing the percentage of waste being recycled
- Adding extra waste streams to collect all waste produced by tenants
- Decreasing the overall amount of waste being produced
- Educating tenants about sustainable waste practices
- Reducing carbon emissions from vehicles visiting the site

ACHIEVEMENTS

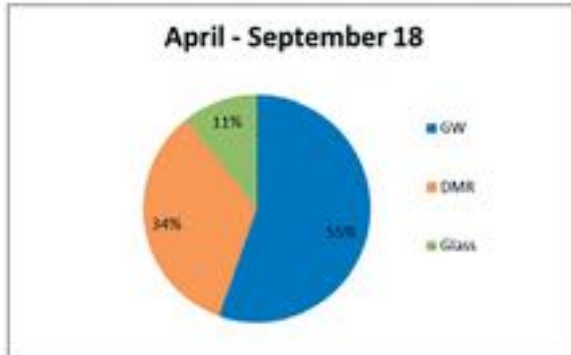
Since implementing the improvement plan, Tower Place has seen significant sustainability

improvements in a short space of time. Since Oct 2018, Tower Place's recycling rate has risen by 8.6% (from 44.6% to 53.2%). Additionally, 4 extra waste streams are now being collected: Food, Card, Coffee, and WEEE. Previously the only waste streams being collected were General Waste, DMR, and Glass.

At the same time as drastically improving the building's recycling rate, the site has also reduced the amount of waste being produced by 35%. The total weight of waste produced in the 6 month period October 2018 – March 2019 was 139 tonnes lower than the figures from the previous 6 months. Waste Awareness Days have been held on site, along with the introduction of new signage and training for



Recycling: 8.6% Increase



Tower Place's cleaning team to ensure that all waste is correctly segregated. All cutlery, disposable plates, and vending machine coffee cups are now made from Vegware, therefore can be disposed of in food waste bins.

Finally, in order to reduce emissions, all contractors servicing the site now use either fully electric or ULEZ compliant vehicles, and executive cars have been upgraded from Range Rovers to electric cars.

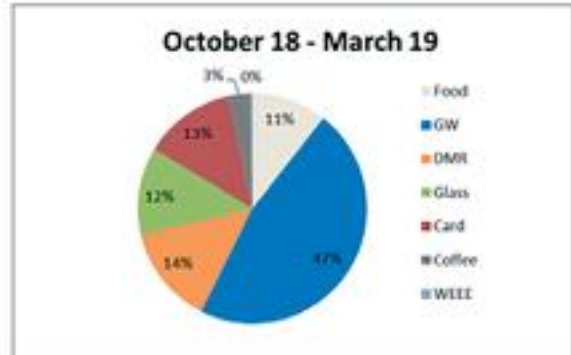
IN DETAIL

Tower Place has carried out a complete overhaul of its onsite sustainability practices. This has yielded impressive results since October 2018 across a variety of key areas.

Recycling: 8.6% Increase

From April – September 2018, Tower Place's waste was being sorted into 3 streams. The percentage of waste being recycled was 44.6% during this period.

From October 2018 the number of waste streams being collected rose to 7, with Food, Cardboard, Coffee, and WEEE being added. The percentage of waste being recycled over the 6 month period from October 2018 – March 2019 also rose to 53.2% - representing an 8.6% recycling rate increase in only 6 months, in addition to streamlining site's waste for more efficient recycling.



To achieve these results, we carried out in-depth audits of Tower Place's tenants in December 2018 to ensure that bins were correctly dispersed throughout the building and signage was clear and easy to understand. Among the recommendations made after this audit was completely removing the use of black bin bags on site, installing mixed recycling bins at all tea points, and implementing the following custom-designed signage:

In addition to this, all cutlery, disposable plates, and vending machine coffee cups are now made from Vegware meaning they are disposed of in food waste bins (which can accommodate up to 20% Vegware) and sent for anaerobic respiration. Coffee cups onsite were previously made from polystyrene, meaning thousands of plastic cups are no longer being unnecessarily used at Tower Place. Recyclable waste is sorted at Bywaters' MRF in Bow and sent to recycling providers across the UK, while food and coffee waste is taken to Bio Collectors' anaerobic respiration facility. Any non-recyclable waste is transported via barge to Energy from Waste facilities, meaning no waste from Tower Place goes to landfill.

Waste Reduction: Cut by 35%

Alongside these improvements in waste streaming and recycling rates, Tower Place has also significantly reduced the amount of waste being produced in line with the waste hierarchy prioritising reduction. From April – September 2018, 399.01 tonnes of waste

was produced. In the six months from October 2018 – March 2019, this figure fell by 35% to just 259.93 tonnes. Included in this drastic reduction was a fall in the amount of non-recyclable waste from Tower Place of almost 100 tonnes:

This reduction in waste was predominantly achieved through implementing a new approach to the waste generated by deliveries. Prior to October 2018, contractors delivering to the site would leave wooden pallets and packaging materials behind, which would then be disposed of largely in general waste bins.

In order to improve sustainability and reduce waste, it was agreed that anyone making deliveries to Tower Place would take these items particularly the heavy wooden pallets away with them. This has not only contributed significantly to the 35% reduction in waste being produced but also prevented many completely serviceable pallets from going to waste, as they can now be used by companies for future deliveries.

Education and Raising Awareness: Staff and Cleaning Teams Trained

In order to ensure all bins for both the existing and newly added waste streams were used and sorted correctly, Tower Place ensured that all staff and cleaning teams were provided with relevant information. In order to educate staff across all Tower Place's tenants, CBRE and Bywaters' Green Gurus held a two-day Waste Awareness event in late 2018. For this event, CBRE made a replica model of Tower Place out of 25,000 coffee cups, alongside which was displayed an online link to a website where staff could guess the total amount of cups in order to win prizes such as attending beach cleans sponsored by Tower Place.

Bywaters' Green Gurus also staged an interactive waste sorting game, with prizes such as a Fairtrade hamper and recycled champagne flutes. Across the two days, hundreds of people participated and were made aware of the positive impact of sustainable waste practices, helping contribute to Tower Place's recent recycling rate improvement.

Separately from this event, Tower Place also took part in 2019's recent Earth Hour for which all non-essential lights were switched off for 24 hours. Energy measurements were taken and showed



that Tower Place saved 35% of its usual electricity usage. A presentation on this was given to all tenants to encourage everyone to conserve energy where possible. Also, Tower Place took part in 2018 Clean City Award scheme and achieved a Gold Award (Special Commendation Winner).

CO2 Reductions: Driving Up Electric Car Use

Taking part in Earth Hour is just one example of the commitment Tower Place has made to reduce its carbon footprint. In line with London's new ULEZ, all contractors serving the building now either use low emissions or electric vehicles and all stationary vehicles now also have to turn their engines off while in the loading bay.

This also extends to tenants executive level management teams, who have now changed their company cars from highly polluting Range Rovers to a fleet of fully electric luxury executive cars, just one example of how everyone at Tower Place has come together in order to increase the site's sustainability.

Conclusion

Tower Place has made significant improvements to all aspects of its sustainability since October 2018. In just over six months:

- The recycling rate has increased by 8.6%
- Four new waste streams have been added
- The total waste being produced has fallen by 35%
- The amount of non-recyclable waste has been cut by almost 100 tonnes over six months
- Signage and bins have been updated in line with thorough audits
- Cleaning teams have been extensively trained
- Major waste awareness initiatives have been staged to educate staff
- All vehicles used by contractors and executive level staff are ultra-low emissions or fully electric

Tower Place and Bywaters are confident of continuing to increase the recycling rate of Tower Place in the coming years after such a strong start to the partnership.

CENTRE:MK

CENTRE:MK WASTE MANAGEMENT

AIM

To reduce the amount of waste created by the shopping centre, divert 100% of waste from landfill, reduce food and general waste and increase recycling both on and off site.

Educate all staff, retailers and stakeholders in waste management to enable the centre to achieve our objectives. Although we have a waste team on site who can segregate waste we rely on the 6,000 retail staff to segregate in the first instance.

Reduce the environmental impact of the centre through waste management, continue the work of the owners in responsible property investment.

Protect our community and encourage local businesses and authorities to do the same.

ACHIEVEMENTS

We have achieved a change in mind set for all on site and the key focus for all is environment and sustainability.

- Increased recycling from 55% - 81% in 2 years
- Education of all staff and retailers in waste management
- Black bag amnesty
- 100% diversion from landfill
- Community engagement
- Reduced cost of waste management
- Shortlisted for the Sceptre Waste Management Award
- Reduced the shopping centres impact on the environment

IN DETAIL

We have increased recycling from 55% in 2016 to a high of 81% in 2019 and an average of 79% and 21% waste to energy. We have continued to reduce general waste, increase recycling and educate our retailers.

Although we have implemented some new equipment this was within the existing budget, the initiatives have been cost neutral as we have saved the retailers money by recycling more and creating less general waste.

We have further plans to develop our site including



Love Where You Live involves city centre businesses hitting the streets to litter pick in the community, centre:mk lead this with McDonalds and provide equipment and vehicles to assist the volunteers.

on site composters for food waste. We have award winning landscaping within the centre, we currently have coffee grounds taken from site by our landscaping team who treat it and return it to site to fertilise our planting. They also use this on farms. In 2015 we achieved 100% diversion from landfill, in this time we have continued to reduce the waste to energy and increase the recycling rates. We continue to work with our partners to consistently improve and innovate to reduce our impact on the environment.

Below is a selection of initiatives we have implemented.

- New waste broker, following the takeover of OCS Wasteline by Reconomy we have worked closely with them to improve the reporting, education and invoicing reconciliations. Reconomy audit the carriers more regularly and strive to find the latest innovation and best carriers to use.
- Online portal – This is a live tracker of all waste taken off site, it is also our online compliance tool with all licenses, waste transfer notes and weights available at any time.

- We redesigned our bin stickers to make the waste streams more obvious for the retailers, the photos below show the designs, this has decreased contamination.
- We have continued to educate our teams and share all detail with them to show their impact on the results.
- New communication posters and flyers have been designed, these are displayed back of house and the flyers distributed to the retailers via email.
- We are working with Reconomy to ensure all waste streams are converted to weight, this includes wooden pallets and composting from coffee grounds. We are currently recycling 75% with 25% going to RDF as waste to energy, 100% of waste is diverted from landfill.
- We have installed a water refill point within the Guest Services Lounge, we have done this to reduce single use plastics, although this reduces the recycling figures it removes the waste completely which is a far better option. We are also registered as a refill point here <https://refill.org.uk/>
- New bins have been installed on the mall, these bins have obvious apertures for recycling and

general waste, the bins have a larger capacity so we are also using less sacks.

- The sacks have been changed to opaque blue sacks for recycling and clear for general, this has reduced the contamination, therefore decreasing general waste and reducing the time spent by our waste operatives in segregating the waste.
- We have banned



New communication posters and flyers, these are displayed back of house and the flyers distributed to the retailers via email

black sacks and swapped them for clear, this makes it easier for the waste operatives to see food waste and card that should be within a different waste stream.

- We have 12 waste streams, food waste is kept separate and we have changed carrier to Refood.
 - Relocation of the 2 x 35yd compactors, general moved to the restaurant end of the centre, DMR moved to those producing more plastic and card. This increased recovery by 10%
- 10 tonnes of coffee grounds a month reused by the landscaping contractor both off site and on the scheme
- Improving everyone's understanding of their impact on the environment
- Pay for parking with plastic bottles, every bottle given to our car park office to recycle receives a 20p discount for parking in our new multi storey car park
- Waste team visit the MRF, following the bins

to see how they can improve segregation further analysing the waste from site

- Bonus incentives for waste team for achieving higher recycling rates
- Waste vehicles have been changed to 100% electric, we have 4 new electric Bradshaw tugs that have been designed specifically for centre:mk and our needs.



CONNECTED KERB LIMITED

DEVELOPING A GREEN, FUTURE-PROOFED AND ATTRACTIVE EV CHARGING SOLUTION

AIM

The UK government has set ambitious targets for the replacement of Internal Combustion Engine (ICE) vehicles with Electric Vehicles (EVs) and there is now growing pressure for these targets to become even more ambitious. Similarly, EV developers have made huge advances in vehicle reliability and range, meaning that the technology is now a viable and attractive option for consumers and fleet operators. Despite these positive steps, barriers to EV adoption still exist. Whilst most attention to date has focused on range anxiety and cost, both issues are falling away as battery capacity increases and economies of scale grow. Rather, now the most critical issue is lack of sufficient or reliable charging infrastructure. With over 80% of EV charging taking place at home (where it's most convenient and cost effective), insufficient public infrastructure disproportionately affects those without access to off-street parking (or the ability to install a home charger) and for these, largely urban-dwelling residents, the attractiveness and convenience of EV ownership is significantly reduced.

We focused on these people (45% of the UK population), aiming to provide conveniently located, reliable, future-proofed, smart and environmentally sensitive charging infrastructure that helps to accelerate EV adoption across all portions of society.

ACHIEVEMENTS

In 2018, Connected Kerb was awarded the Mayor of London's Civic Innovation Award. The judges recognised the differentiation of our EV charging system from others on the market; through our future-proofed solution and incorporation of smart cities technology, and importantly our environmental credentials, as our chargers are made from over 80% recycled materials.

Since then we've continued to evolve our products to increase their versatility, reduce costs and refine our business model. We have live sites in Southwark and Windsor, with further deployments planned for another 16 councils this year.

We have engaged with the housing industry, government and long-stay parking operators and now see the market adopting our aspirations; to provide convenience and confidence to users, minimise impact on the environment and deliver projects in a way that maximises value and minimises disruption. The measure of success for EV technology is the rate of EV adoption and infrastructure utilisation. At a national level, EVs represent less than 2% of new car sales with average infrastructure utilisation less than 4%. Conversely, the way we engage with communities means that our charger utilisation ranges between 18-24% and we've seen a dramatic upswing in EV ownership in the communities where we work.

IN DETAIL

Our initial vision was to develop a reliable, low-impact, smart EV charging system that was best in class for long stay and on-street residential locations. Our solution had to deliver a greener approach to electric vehicle charging and act to positively drive EV uptake by overcoming existing barriers to adoption. It also had to be a solution that delivered both for EV drivers, but was also attractive (or at least palatable) to those who don't yet own an EV - some 98% of the population - but who would see these systems deployed on their streets.

Ambient air pollution is responsible for 4.2 million deaths each year, and 91% of the world's population lives in areas where air quality exceeds the World

Heath Organisation's guideline limits. Combating the onslaught of air pollution is a key driver for us and we are therefore passionate about our role in helping drivers to transition from ICE to EV - thereby improving air quality and establishing and maintaining a healthier environment for all residents.

Through extensive analysis of the EV industry and EV adoption patterns, we identified a gap in the service offering of existing charging infrastructure providers, and consequently, an opportunity to innovate and develop an entirely new proposition - an infrastructure proposition that can help both consumers confidently transition from ICE to EV and the UK government meet its ambitious Road to Zero targets.

A lack of reliability, scale or appropriate location of existing charging infrastructure discourages electric vehicle adoption for UK drivers, particularly those without access to off-street parking and therefore the ability to install a home charger.

These deficiencies in EV infrastructure also risk increasing social divides, as in urban areas a significant portion of the population (particularly

those in poorer, more densely populated areas where air quality is poorest) don't have access to off-street parking and are therefore excluded from EV ownership. In consideration of these factors, we designed an innovative solution for long stay and on-street residential EV charging, with a vision of 'EV access for all' at the forefront of our work. We have made it our mission to improve user convenience of charging and confidence in infrastructure (access and reliability) to encourage and accelerate EV uptake.

Since establishment in November 2017, Connected Kerb has been entirely privately funded. We secured £10,000 as prize money from the Mayor of London's Civic Innovation award that went towards further development of the product and an initial pilot site in Southwark, London.

Recycled Materials – Our chargers are made of 80-85% recycled materials, with the equivalent of 3.5 recycled truck tyres going into every charger. We expect to deploy over 1000 chargers this year, with orders in excess of 3000, meaning that we are having a significant positive environmental impact over and above enablement of EV charging.



Profit Share – We aim to operate a profit share with local authorities where we deploy, with profit from power sales alone (excluding smart cities data potential) proving an attractive investment case.

Acceleration of EV Adoption and High Utilisation – We have seen a direct and sustained increase in EV adoption in the areas where we've installed charging points. This in turn has led to us achieving a typical utilisation of 18-24%, relative to our competition which is typically at closer to 5%.

Local Communities – Smart cities sensor technology and provision of low cost, conveniently located and easy to access EV charging.

Councils – Profit share from system, smart cities data, improvement to air quality and high-quality charging service to residents.

Environment – Accelerated adoption of EVs, diversion of materials from landfill and ability to encourage renewable power.

Supporting CAVs – Connected and Autonomous Vehicles (CAVs) require access to high quality, fast communications networks. Our system currently provides ultra-fast data connections and will soon (by end of 2019) provide access to 5G connectivity.

Future-Proofed Infrastructure – Our system is a long-life asset that supports induction charging and vehicle-to-grid technologies.

Our solution is the first of its kind, integrating both power and data at kerbside (in a single system) to provide a future-proofed solution for electric vehicle charging and smart cities technology deployment. By incorporating both power and data, as well as separating the socket from the below ground charging unit, we have designed a system that is low visual impact, but that is also highly flexible to progress in the development of new charging and smart cities technology.

The long asset life of our system, it's flexibility to be upgraded and integrate new technologies (such

as induction), as well as its high recycled material content, means that our impact on the environment and local people (through disruption) is minimised, whilst the benefits delivered are widespread. By deploying our EV charging and smart cities infrastructure, local authorities and landowners can help drivers to conveniently transition from ICE to EV ownership, and effectively prepare themselves (the local authority) for the inevitable acceleration in electric vehicle ownership towards 2040. This transition will have a direct impact on local air quality (and associated health issues) and where delivered in partnership, will create new revenue streams for the local authority. Finally, where deployed (as intended) alongside smart cities technology (incl. Wi-Fi, environmental and parking sensors), the benefits of the system to the local community (govt., business and residents) will reach far beyond that of pure EV charging.

We are now actively working on the following:

Further Development of Portfolio – We are now developing a wall-mounted charger, which will bring the benefits of our charging solution to multi storey car parks. In addition, we will be deploying our first induction charging mats within the next three months.

Recycled Materials for Subterranean Componentry – We are currently developing recycled material prototypes for the below ground components of our system, thereby increasing our recycled content even further.

Additional Smart Cities Capability – We are adding additional smart cities sensors to our system.

COSTAIN-SKANSKA JOINT VENTURE COSTAIN-SKANSKA JOINT VENTURE HS2 ENABLING WORKS CONTRACT (AREA SOUTH)

AIM

The aim of the project was to reduce the air quality impacts of the construction of the largest infrastructure programme in Europe (part of the new Phase one High Speed Two (HS2) rail scheme between Birmingham and London) in recognition of the detrimental air quality impacts major construction works can have on the local environment and neighbouring communities.

The scale of the enabling works for the scheme in London alone is vast with 85 works packages and circa 200 suppliers. It requires a substantial inventory of site machinery across multiple sites in London, generates a significant number of heavy goods vehicles on the public highway and creates substantial areas of active construction sites. All is happening within busy, populated areas of London, across seven local authority areas.

As a result, air quality is considered one of the key environmental risks for the programme. A robust and comprehensive response is therefore needed, but also unique and industry leading in its approach. The objectives of the project were therefore three-fold;

to reduce emissions of Nitrogen Oxides (NOx) and Particulate Matter (PM) from:

- Operational machinery (Non-road Mobile Machinery – NRMM);
- Construction related highways Heavy Goods Vehicles (HGVs >3.5 tonnes); and
- Site operations.

ACHIEVEMENTS

We have successfully adopted emission standards for site machinery and HGVs that are more stringent and on a larger scale than any other construction project in the UK.

The standards adopted on the programme are also more stringent than the Greater London Authority's (GLA) emission standards for NRMM and Transport for London's (TfL) HGV emission standards. These standards were adopted and implemented three years in advance of the respective authorities implementing similar standards in London's Low Emission Zone - proposed for late 2020. Over the past two years, more than 300 NRMM have been deployed, 99% of which were compliant with the programme's NRMM emission standards. More than 2,500 unique HGVs were deployed, equally 99% of which were compliant with the HGV emissions standard.

CSjv also effectively and consistently implemented a dust management and monitoring strategy across multiple sites along the 27km route from Euston in Camden to



Air Quality Champion

Roles and Responsibilities

- Promote and implement good practice dust management on site
- Raise awareness about Dust and Air Quality
- Complete Daily Dust Visual Inspection Log
- Respond to Trigger Alerts from Dust Monitors



Ickenham in Hillingdon. A network of 37 continuous real-time dust monitors were deployed across more than 20 substantial construction sites. The results of the monitoring have been published monthly on the HS2 government website since 2017. Again, the scale and transparent reporting of the is a first for the construction industry.

IN DETAIL

High Speed Two (HS2) is a new, high speed north-south railway. Phase one will connect London with Birmingham and the West Midlands. The Costain-Skanska Joint Venture (CSjv) HS2 Enabling Works Contract (HS2 EWC) covers 27km of the route within London. The enabling works comprises a wide range of construction activities across seven local authority areas including site clearances, demolitions, ground works, utility diversions and archaeology, including exhumations.

Our many work sites are spread across a wide area. In recognition of the detrimental effects that

construction works can have on air quality, we adopted an innovative and industry leading approach to limiting and reducing the impact on local air quality and local communities.

The project air quality strategy was delivered through three key initiatives:

1. Reducing emissions from Non-road Mobile Machinery
2. Reducing emissions from highway Heavy Goods Vehicles
3. Comprehensive site dust management

Each initiative was underpinned by an air quality focussed communication strategy which ensured stakeholders, both internal (senior project leadership, site teams) and external (local authorities, community groups) were consulted and informed to positively influence the outcomes. To reduce the air quality impacts from the emissions of operational machinery, NRMM emission standards specific to the HS2



Dust Monitoring – Trigger Alert - Email or Text



project were implemented. These were based on the GLA NRMM emission standards but more stringent, requiring the use of 'cleaner' machines – a first for the construction industry.

The relevant standards were based on the geographical location of the relevant site within London, currently:

- Central Activity Zone Euro Stage IV (1,2)
- Rest of Greater London Euro Stage IIIB (2)

Euro Stage IIIB for $37 \leq P < 56\text{kW}$, as there is no corresponding Stage (IV) at EU Level (2) Euro Stage IIIA for constant speed engines of any power, as there is no corresponding Stage IIIB or IV at EU level

The emission standard for all highway Heavy Goods Vehicles (HGVs) used on the project is Euro VI or 'cleaner'. Again, this is the first known infrastructure programme in the UK to adopt such a stringent policy and again goes beyond the requirements of TfL's Low Emission Zone more than three years in advance of the same standard being implemented in late 2020.

To ensure compliance with the project NRMM and HGVs emission standards across multiple sites across London required effective communication throughout the entire project supply chain at each stage of the programme; and dedicated vehicle registration/booking and audit systems. Compliance with the standards formed key qualification criteria during the tendering process. It was essential that tenderers could demonstrate their understanding and commitment to meet the requirements. For all major subcontractors, HGV fleet submissions were required prior to contract award.

Details of all NRMM (including make, model, engine, etc) are preregistered, i.e. prior to deployment on site. Preregistration is supported by photographs of the machine; the specification plate and engine plate, instilling confidence in the quality of the preregistration process. Similarly, all HGVs to be deployed on the project are booked 48 hours in advance. All HGVs are then checked on arrival before being permitted on site. Checks at the gate or vehicle holding area reinforce the programme's commitment to the emission standard with non-compliant vehicles being turned away from site. Likewise, regular NRMM



Dust Monitoring – Evidence (photos recommended at time of trigger)



site audits are undertaken and any non-compliant machinery is immediately removed from site.

Like other construction sites in the UK, CSjv must control and limit dust from site activities in accordance with best practicable means (BPM). An effective dust management and monitoring strategy was therefore needed. The unique challenges for the enabling works contract were the scale of its implementation, the need for consistency in approach across multiple substantial sites across London and the transparency of the monitoring undertaken around the sites.

Like the NRMM and HGV emissions reduction initiatives dust management needed careful consideration during the early planning stages. In line with good industry practice a detailed dust risk assessment (DRA) was undertaken to identify each site's risk profile (i.e. low/medium/high). The risk profile of each work site then determined the range of dust control measures needed to be implemented including the need for dust monitoring.

An air quality champion was appointed at each site to promote and implement good practice dust management; raise awareness about dust and air quality, complete Daily Dust Visual Inspection Logs; and respond to trigger alerts from dust monitors.

Prior to commencement of works each site team is specifically briefed on:

- The programme's air quality requirements.
- The roles and responsibilities of the designated site air quality champion and wider programme team •
- The dust control measures to be implemented
- The completion of daily visual inspections
- Responsibilities and action to be taken following a dust trigger alert

Dust management is therefore consistently implemented in line with good practice and the stipulated control measures for each site.

For medium and high-risk sites, continuous real-time dust monitoring was installed; 37 monitors in total, either at site boundaries, on the public highway or neighbouring third party properties. The monitoring locations were identified and chosen in consultation with the relevant local authority, and local interest groups.

Monitoring reports are published on a dedicated website detailing all monitoring data and details of any triggers alerts, along with reasons and responses in addition to the details of any complaints. This open and consultative approach to the monitoring has set a new standard of transparency for the construction industry.

We consider the air quality strategy implemented on the CSJV HS2 EWC project to be both innovative and industry leading. That said, we also consider it to be readily replicable across most construction projects regardless of scope and scale at relatively limited additional costs to project budgets. There are significant benefits to be achieved on local air quality and importantly on the health and wellbeing of the communities that live or work around construction sites.

From lessons learnt over the past two years, CSjv are now preparing to implement more stringent NRMM emissions standards and adopt Light Duty Vehicles (LDV \leq 3.5 tonnes) emission standards from the beginning of 2020.

CWMBRAN CENTRE CBRE ENERGY MANAGEMENT

AIM

Our aim is to embed sustainable activity into everything. Sustainability does not just involve minimising consumption of utilities, raw materials but how we engender sustainability within working partnerships. Our role has not just been to implement best practice within the Centre but to engage with the wider community by education, informing, demonstrating.

1. Reduction of Gas, Water & Electricity consumption
2. Sustainable procurement
3. Introduce Waste Management Plans, increase recycling, reduce landfill, promote best practice
4. Develop a Green Transport Framework
5. To be at the heart of the community while promoting best practice
6. Changing attitudes with our 'forward thinking maintenance' initiative.

The principle = educated decisions through client / contractor relationships. The ethos is if equipment fails we explore the most cost and environmentally efficient solution of cost vs risk.

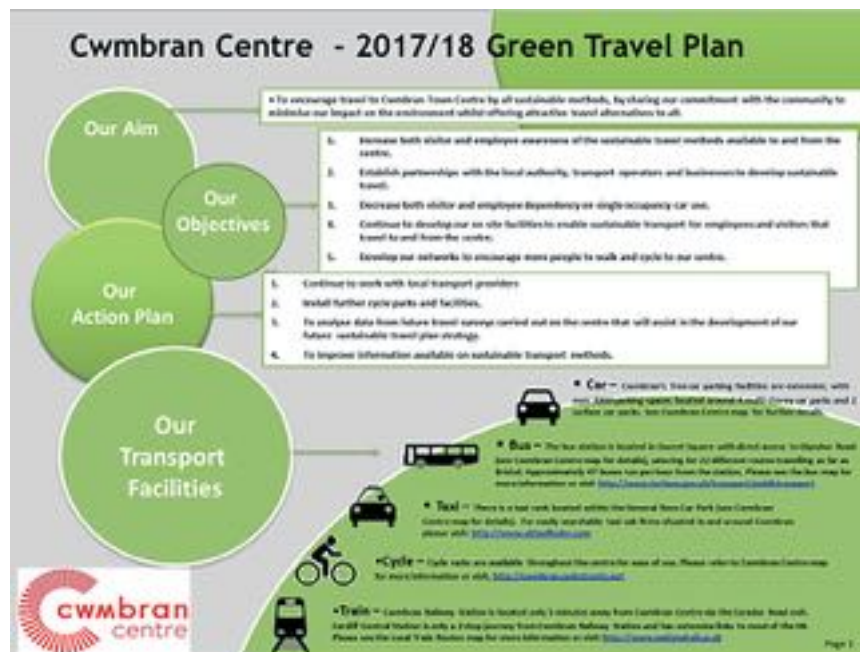
ACHIEVEMENTS

We embarked on a rigorous review of our waste management operations in order to improve facilities. We are now Zero to Landfill. Today over 64% of our waste is segregated on site. • Electricity, Water and Gas have seen huge reductions of 44%.

- The introduction of our Energy Management Plan has enabled us to focus on key savings and considers future 'gain' areas going forward reducing our carbon footprint.
- By introducing LED lighting throughout the Centre and our Car Parks
- Reviewing and upgrading our BMS control system.
- The installation of occupancy sensors and reducing

flushing levels

- Educating staff and tenants in reducing usage
- Introduction of new burners into heating boilers
- We have developed our Green Travel Plan.
- We have organised and hosted sustainability awareness days for all stakeholders.
- Hosting charitable fund-raising events, engaging with local schools and Community delivering best practices. Engagement with Local Council & all Emergency Services is key.



- Implementing our Green Procurement Plan, identifying not just greener alternatives to managing the Centre but also to our contractors.

IN DETAIL

1. An investment of £90k from Landlord / Service Charge into the replacement of LED lighting into several of our car parks. Installing in excess of 2000 lamps increasing burn hours per lamp from 20,000 to 55,000 hours. Reducing wattage from 58w per unit to 22w. Our engagement with 'Earth Hour' has captured further savings and lowered our carbon footprint. During the hour, due to switching several lighting areas off, we achieved a saving of 40KW. The cost of change has been £10k with a payback of 9months Electricity - Since early 2008 we have a live energy database. It includes small project work, improvements and upgrades. We use opportunities with breakdowns to refit/retrofit LED lighting. We are nearing 83,242watts of savings through continual innovation and improvement year on year, with the installation of LED lights into Car Parks. We ensure installations are carried out on 24 hours circuits in the first instance to make the largest gains. Large savings have been made through our Building Management System Review. Around 2520 Minutes have been reduced to the time schedules of various light systems throughout our Centre.

2. Carbon Arc is an Integral supported energy saving initiative that has been implemented at Cwmbran. The whole Condition Report process investigates plant and equipment all the way down to component

5. Llewellyn Car Park LED Lighting Project

Car Park Lighting

Llewellyn Car Park, levels 1, 2&3 has been replaced with LED lighting throughout. Adopting a similar concept as General Rees, the lighting before installation was as follows.

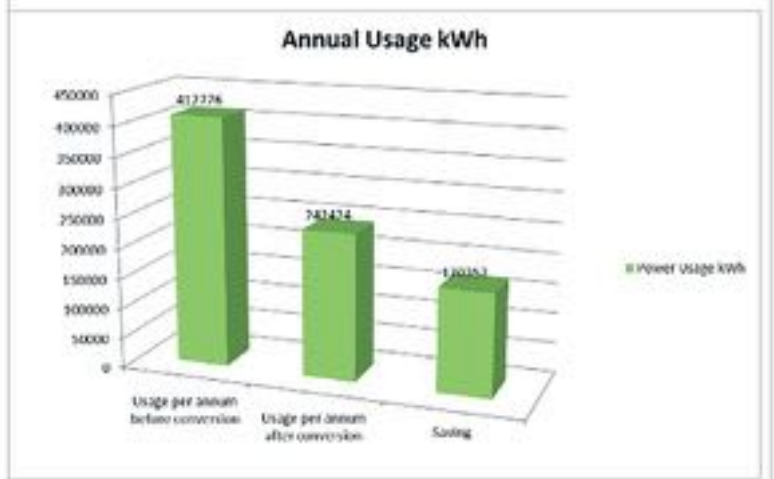
Llewellyn Car Park	Floor 1	Floor 2	Floor 3
TS 49Wx2	0	0	0
TS 58Wx2	67	60	67
LED 24Wx2	0	0	0
TS 48W	0	0	0
TS 58W	190	203	197
LED 24W	0	0	0
			723 fittings TOTAL

Figures included in the table include ramps and entrance to General Rees Car park

The total number of lamps for the car park is 978

Annual Usage (kWh) Before and After LED Conversion

Below is a graph illustrating the energy consumption for the existing 978 TS 58w tubes compared to that of 978 LED tubes.



level, ensuring any weaknesses are potentially found and suitable replacements are readily available. The goal of Carbon Arc is to support the reduction of Energy consumption through staff communications and active participation. Ensuring staff members aware that even the smallest of changes. Carbon Arc provides ideas and resources to motivate everybody to save energy.

3. At Cwmbran, we began our quest to increase our recycling percentage by increasing our recyclable streams on site to 10. On site, we interrogated our general waste to seek further streams of waste that weren't previously considered. This lead us to discover that local charity shop tenants were sending up to 150 bags of textiles to landfill on a weekly

basis. Continuous liaison with the tenants enabled them to revert to recycling their textiles as rags, therefore avoiding almost 2 tonnes of waste going to landfill per month alone.

4. Communication and cooperation with tenants played a large part in the success of the site in achieving their enviable recycling rate. Each tenant was individually introduced to the waste management process of the site and their responsibility to separate waste at source. This was especially important when introducing food waste recycling, where an introductory newsletter was sent to all staff which was followed up by regular individual meetings.



5. All Management and FM provider staff have been trained to understand the new processes, as well as the importance of recycling enabling buy-in.

6. Cwmbran Shopping Centre is an open 24/7 Town Centre and a complex site with an annual footfall of around 18 million per annum which is ever increasing. It consists of over 170 retail tenants which are located over a 52-acre site. The site continues to drive the message of recycling to tenants as well as the wider community with the development of an annual sustainability event. The centre has been given recognition with BSI PAS 99 ISO 9001 14001 18001 accreditation. In addition, 9th Consecutive Gold Medal ROSPA.

7. Water – We have worked closely with WAS (Water Audit Services) an independent water specialist, who are members of the Green Organisation. This has enabled us not only to save on usage but also ensure we are committed to raising awareness of water as a valuable resource. Through our Energy Management Plan we have identified saving on consumption by reducing flushing levels of 85 toilets which equates to a saving on average of 1400 litres per day. The introduction of systemisers, sub-meters and lowering cistern water levels has enabled us to identify further savings. The introduction of a water irrigation system has reduced usage considerably on our planting beds. Our landscaping team are also harvesting rain water.

8. Gas – Our usage of gas for our heating boilers has been minimised to its lowest level by introducing a rigorous maintenance regime that increases the efficiency of our boilers to 95% and lowers our carbon foot print considerably. The daily review and monitoring of weather conditions enables us to adjust our time schedules accordingly in the control of Office blocks and multi tenanted buildings across the Centre. Future investment is planned to install isolation valves to multi-occupied buildings enabling greater thermostatic control of temperatures.

9. Travel plan – The introduction of our travel plan to our staff and tenants on the Centre, has identified many initiatives to all. Incorporating our 'Shared Lift' best practice, 'Purchase a bike' initiative and the introduction of cycle racks on the centre are but a

few of the advantages of our plan. Combining these efforts has been a 're-brand of the Centre at a cost of £250k that has enabled us to supply Information & Awareness' signage

10. Community engagement – This has been a key factor for us in raising sustainability awareness. The sustainability awareness day was devised in order to support environmental objectives and targets and to engage further with our retail business tenants and the wider community. Our annual Sustainability Awareness days captures the following benefits:

- Raised awareness of sustainability
- Enhanced stakeholder relationship
- Encouraged ownership and positive behaviours
- Improved knowledge on sustainability issues
- Improved sustainability performance through the introduction of new initiatives on the day
- Increased moral and team spirit of personnel
- Improved company image

For us to have captured the full potential of delivering our Sustainability days, we:

- Initial formation of an Event Working Committee to formulate ideas and plans
- Engaged with local schools to promote the event and to invite competition for a winning logo
- Liaised fully with all tenants, obtained their buy-in through a 'Special Offers' incentive
- Created wholesale networking opportunities in the wider community through the participation of local charities and organisations
- Created a blueprint to roll out across the business to host similar events at other locations.

CWMBRAN CENTRE COMMITTED TO BEING GREEN



Next to providing a great shopping experience, preserving our Centre and the Environment for future generations is top of our agenda.

As the winner of the Green World Awards 2019 Property Management Global Gold Winner and The Green Apple Awards 2019 for Environmental Best Practice Wales Gold winner, we are officially one of the Greenest Shopping Centres in the UK.

Sustainability and Environmental Best Practice drives everything we do!

We are committed and look for continued improvement in our practices.



www.cwmbrancentre.com



3,000 FREE CAR PARKING SPACES

For more information please visit www.cwmbrancentre.com

DESALINATION TECHNOLOGIES RESEARCH INSTITUTE (DTRI) SWCC ENVIRONMENTAL INITIATIVE AND AWARENESS

AIM

The Saline Water Conversion Corporation (SWCC) is an agency of the Government of Saudi Arabia responsible for producing potable water from seawater. SWCC leads the world in seawater desalination output at 5.6 Mm³/d. SWCC also generates more than 100,000 MWh/d of electricity. With this level of production, the environmental burdens of flue gas emission and brine discharge into coastal water have to be managed. Flue



gas desulfurization was carried out and efficacy-enhancing fuel additives were applied to boilers, reducing emission gases to environmental regulatory levels. In addition, purification of emission gases and commercial production of by-products (e.g. gypsum) are set to begin. Approximately 25 Mm³/d of hypersaline reject is produced by SWCC plants, with associated elevated temperature and salinity as well as possible pollutants such as disinfectants and their by-products, chemical additives, contaminants due

to corrosion (heavy metals), and cleaning chemicals. The effects of the two major physical attributes of temperature and salinity were moderated by co-location of thermal and seawater reverse osmosis (SWRO) plants. The brine from SWRO plants helps reduce the temperature increase from thermal plants and the cooling water of the thermal plants dilutes the high salinity effluent from SWRO plants. In addition, the design of brine discharge structures enhances dissipation of temperature and replenishment of oxygen. Overuse of chemical additives was identified and vast reduction of chemical additives was achieved without negative effects on operation. The result is less chemical load in the brine reject. Furthermore, new SWRO plants are equipped with waste treatment facilities. This should solve potential problems related to accumulation of chemical additives in filters and membrane cleaning solution formerly dumped with brine to coastal waters. With the aforementioned practices in place, brine discharge has been found to have nil or at worst minimal toxicological or environmental impact on receiving coastal waters. Any reports indicating otherwise should be interpreted with caution.

ABSTRACT

The Saline Water Conversion Corporation (SWCC) is an agency of the Government of Saudi Arabia responsible for producing potable water from seawater. SWCC leads the world in seawater desalination output at 5.6 Mm³/d. SWCC also generates more than 100,000 MWh/d of electricity. With this level of production, the environmental burdens of flue gas emission and brine discharge into coastal water have to be managed. Flue gas desulfurization was carried out and efficacy-enhancing fuel additives were applied to boilers,

reducing emission gases to environmental regulatory levels. In addition, purification of emission gases and commercial production of by-products (e.g. gypsum) are set to begin. Approximately 25 Mm³/d of hypersaline reject is produced by SWCC plants, with associated elevated temperature and salinity as well as possible pollutants such as disinfectants and their by-products, chemical additives, contaminants due to corrosion (heavy metals), and cleaning chemicals. The effects of the two major physical attributes of temperature and salinity were moderated by co-location of thermal and seawater reverse osmosis (SWRO) plants. The brine from SWRO plants helps reduce the temperature increase from thermal plants and the cooling water of the thermal plants dilutes the high salinity effluent from SWRO plants. In addition, the design of brine discharge structures enhances dissipation of temperature and replenishment of oxygen. Overuse of chemical additives was identified and vast reduction of chemical additives was achieved without negative effects on operation. The result is less chemical load in the brine reject. Furthermore, new SWRO plants are equipped with waste treatment facilities. This should solve potential problems related to accumulation of chemical additives in filters and membrane cleaning solution formerly dumped with brine to coastal waters. With the aforementioned practices in place, brine discharge has been found to have nil or at worst minimal toxicological or environmental impact on receiving coastal waters. Any reports indicating otherwise should be interpreted with caution.

SUMMARY

The Kingdom of Saudi Arabia operates huge desalination and desalination/electric cogeneration plants for production of potable water and generation of electricity. Potentially harmful by-products resulting from these plants include flue gases that can affect the air environment and hypersaline brine reject that can affect the coastal environment. The Kingdom is a signatory of regional and global environmental agreements, has its own environmental regulations and is keen on maintaining clean air and water

environments. The SWCC has tasked its Desalination Technologies Research Institute (DTRI) to assess the environmental impacts of SWCC desalination and cogeneration plants and suggest remedial action to alleviate any environmental impacts.

The DTRI efforts can be divided into air and water environments:

1. Air Environment

Desalination requires a large energy input from fossil fuel and it generates carbon, sulfur and nitrogen emissions. Desalination plants use both gas and heavy fuel oil to generate power and produce desalinated water. Combustion at these plants is a source of emissions in the form of acidic air pollutants, which are released into the environment and are potentially harmful to human health.

Fuel oil is a mixture of hydrocarbons containing a variety of organic compounds. Oxides of sulfur, carbon and nitrogen, as well as particulate matter, are the chief pollutants produced by fuel oil combustion. Sulfur is the third most abundant element after carbon and hydrogen in fuel oil and forms toxic sulfur dioxide during fuel oil combustion. Part of the sulfur dioxide is converted to sulfur trioxide in the boiler superheater and reheater and this causes severe corrosion and fouling. Corrosion results in the deterioration of metals and a decline in the structural integrity of air heaters, ducts and stacks.



Sulfur could be removed/decreased (desulfurization) from fuel oil before use by treatment with additives. Alternatively, flue gas could be desulfurized. The Flue Gas Desulfurization (FGD) process was found feasible in decreasing sulfur and dust emissions when seawater, wet limestone/gypsum or dry lime are used as absorbents. The process was tested in a SWCC MSF co-generation plant with reduction of sulfur and particulate emissions. A new research project involving FGD is underway in one of the SWCC cogeneration plants. The project aims at reducing gas emissions coupled with commercial production of pure gases and gypsum.

Chemical additives are used in boilers to enhance fuel combustion and consequently lower harmful oxides in stack emission. Magnesium-based chemical additives were tested in the SWCC boilers. They resulted in improved flue gas characteristics. Significant reductions in both SO₃ content and acid dew points were observed during additive dosing. Chemical additives such as MgO react with combustion products, giving them higher melting points so that they leave the combustion chamber as dry particles. In addition, MgO reacts with sulfur trioxide and this decreases the formation of sulfuric acid and consequently decreasing corrosion in air heaters and chimneys.

The Saudi Arabian Presidency of Meteorology and Environment (PME) Standard for Power Plant Emission Gases is:

NO_x as NO₂ 400mg/Nm³, CO 400mg/Nm³, SO_x as SO₂ 440mg/Nm³, Particulates 50mg/Nm³; (Nm³ = Normal m³, i. e., the amount of gas having a volume of one m³ at 0 °C and 101.325 kPa). Measured values following application of FGD and chemical additives from power plant emissions are well below the standard limit.

2. Water Environment

SWCC rejects approximately 25 Mm³/d of brine to coastal waters of the Red Sea and Arabian Gulf. The brine contains chemicals and is at elevated

temperature and salinity relative to seawater. The types of chemicals released include biofouling-control additives and by-products, coagulant/coagulant aids, scale-control additives, foam-control additives, contaminants due to corrosion (heavy metals), and cleaning chemicals.

Optimization tests previously carried out by SWCC have led to successful operation at low antiscalant dose rates. Dose rates recommended to SWCC in 1981 were 12.5 ppm and 4.5 ppm for top brine temperatures (TBT) of 110 and 90 °C, respectively, which are currently reduced to only 2.0 and 0.8 ppm for the respective temperatures. Antifoam dosing rates were reduced drastically as well. As a consequence huge quantities of chemical additives no longer reach coastal waters. SWCC has also abandoned the use of certain chemical additives (e.g., sodium hexametaphosphate) based on their questionable efficacy and environmental effects. Nevertheless, chemical additives will ultimately reach coastal waters albeit in much reduced concentrations.

It is very difficult to trace the fate of most chemicals present in discharged brine on the marine environment, due to their low concentrations. The assessment of their impact could only be carried out by changes in the biotic community in the vicinity of brine discharge sites or by the toxic effects of brine on representative marine organisms.

Experiments in the coastal waters of the SWCC plants on the Red Sea and Arabian Gulf showed phytoplankton densities and chlorophyll a concentrations to be greater at the brine discharge sites than at the intake site or at least similar between the two locations. Therefore, brine discharge did not negatively impact primary production. A study of the intake and brine discharge sites of the largest SWCC plants showed Arthropoda, (with copepods and larvae being their main representatives) forming the largest zooplankton community in the outfall bay, with Protozoa forming the second largest zooplankton group. Copepod and protozoa abundance was

similar at the discharge site and at a distant recovery zone in open sea.

Concentrations of trace metals normally associated with corrosion (iron, copper, molybdenum, and nickel) were determined in tissues of fish held for five days in cages at the effluent outfall and in the intake water site at two of the large SWCC plants the brine effluent is a mix of cogeneration and seawater reverse osmosis plants. Metal concentrations in fish tissue did not differ between intake and discharge areas. Moreover, moribund fish collected following a fish mortality event at the Jubail plants did not have higher concentrations of metals than fish held in cages. Desalination plants do not appear to be a source of metal contamination in fish tissue. All fish survived in the cages for five days suggesting that the discharge water is not toxic. Static, acute toxicity tests were carried out with brine shrimp *artemia* (*Artemia franciscana*) and the rotifer *Brachionus plicatilis*. Hatching rate of cysts and larval survival were compared in brine discharge and normal

seawater. Hatching rates of rotifer cysts were $\geq 98\%$ in all water samples. No measurable larval mortality occurred 72 h after hatching in either brine discharge or normal sea water samples. Toxic effects were also measured by immersing biofilm development slides in the brine discharge channel of the largest SWCC plants comprising reject from both cogeneration (water and electricity) and seawater reverse osmosis (SWRO) plants. The brine discharge supported the growth of assorted biofilm components comprising algae and bacteria. Considering the presence of the zooplankton community mentioned above and assuming a food chain of bacteria/unicellular algae, protozoa, copepods, larger crustaceans and fish or variations of this chain, it is likely that the food chains in the discharge area would be stable and able to sustain a stable standing crop. Therefore, acute toxicity at the ecosystem level would occur only when sudden discharges of concentrate with exceptional levels of temperature, salinity, metal ions etc., are made into the sea.



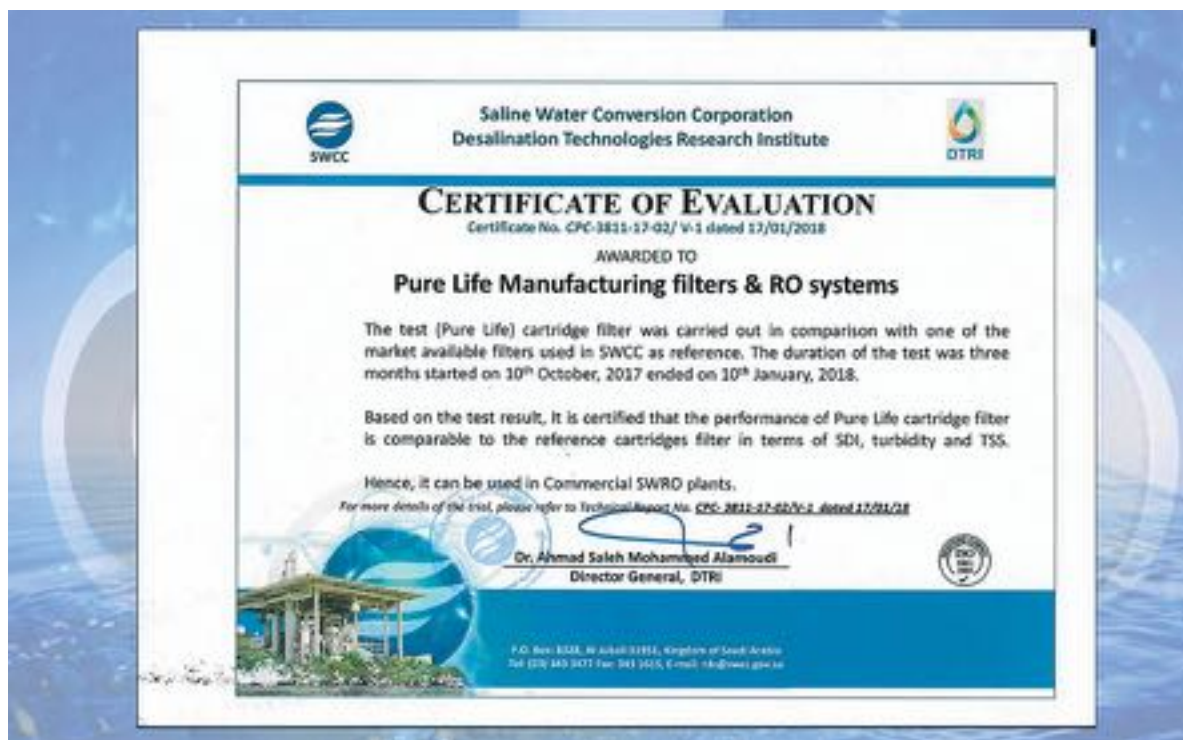
The above-mentioned experimental results indicate a benign effect of brine discharge on coastal ecosystem. This effect is largely due to favorable practices by SWCC, chief of which are well designed discharge systems that allowed for dissipation of temperature, dilution of salinity and replenishment of oxygen. The dual purpose operation and co-location of thermal and membrane plants also brought favorable effects: a) Most plants are dual purpose, producing drinking water and generating electricity, and the huge quantity of cooling water from electricity production dilutes salinity and minimizes the temperature increase of the brine from cogeneration plants; b) The majority of large thermal plants are co-located with SWRO plants and the brine from SWRO plants helps in further minimization of temperature increase from thermal plants; c) The cooling water of the distillation plants dilutes the high salinity effluent from SWRO plants. In addition, the SWCC is abandoning some of its thermal desalination plants in favor of membrane desalination plants. The new membrane plants will be

equipped with waste treatment facilities. This should solve potential problems related to temperature rise and accumulation of chemical additives in filters and membrane cleaning solution which used to be dumped with brine to coastal waters.

3. Health-induced practices

SWCC uses chlorine for the disinfection of product water with potential formation of chlorination by-products and associated health concerns. These health concerns have led SWCC to gradually replace chlorine disinfection with chlorine dioxide disinfection, with the consequent alleviation of any health hazard from chlorination by-products.

Another health concern is the presence of bromate in SWRO product water. SWCC applied a novel nanofiltration technique (SWCC Patent No. 2281 – Malta, 2006 and SWCC Patent No. GC 0001053 – Gulf Cooperation Council States, 2004) coupled with a novel membrane arrangement (SWCC Patent No. 9090491-82 – USA, 2015). Consequently, bromate



concentration in product water was brought below WHO guideline levels.

4. Energy Saving

A patented design integrating a tri-hybrid configuration of nanofiltration-reverse osmosis-multiple effect distillation/thermal vapor compression (MED-TVC) was introduced by SWCC for the first time in the desalination industry (SWCC Patent # 5089236 – Japan, 2012). The design facilitates operation of a MED-TVC distiller at a TBT of 125 oC without scale formation. Increasing the TBT allowed the use of a large number of effects with a significantly enhanced gain output ratio. The MED -TVC distiller, operating within the context of the trihybrid configuration, can thus double the water production of a MED -TVC distiller with the same thermal energy consumption. The tri-hybrid system leads to significantly lower specific thermal energy consumption, thus representing a historical breakthrough for the desalination industry. The fuel oil consumption was reduced by 50% with the associated reduction of flue gas emission. Similarly, SWCC has also introduced a hybrid nanofiltration-SWRO operation allowing for 40% more water production without incurring more energy use.

In SWRO desalination, the cost of energy usually represents between about 30% and 50% of the total production cost of water, but it can be as much as 75 % of the operating cost, depending on the price of electricity. The high pressure pump (HPP), which drives water over the membranes, consumes more than 80% of the energy requirement. Only a small fraction of the applied pressure ($\approx 2.5\%$) is used for driving water across the desalting membrane. The remaining portion is expelled with the brine reject which constitutes a huge energy loss. By introducing energy recovery devices (ERD), it is possible to reduce the specific energy consumption. Experiments at SWCC have shown that by using recently developed high efficiency ERDs, the electric energy consumption of SWRO plants can be reduced by approximately 50%.

DPD UK DPD GOES ELECTRIC

AIM

As the UK's number 1 and fastest-growing parcel carrier with a nationwide fleet of 8,000 vehicles, DPD UK has a responsibility to reduce its carbon footprint and make its operations as sustainable as possible. That's why we launched a Smart Urban Delivery Strategy (SUDS) in 2017 in a bid to become the UK's most responsible city centre delivery company and to become an influential opinion former in the ongoing debate around emissions.

Of the 250 million parcels we deliver every year, 46.05% are delivered to city centres and with online shopping growing at 20% a year in urban areas, it is crucial that we continue to plan for a sustainable future.



London Assembly Transport Committee members Caroline Russell and Caroline Pidgeon MBE (Chair) at our Westminster micro-depot with DPD's Rob Fowler

Our specific aim was to prepare for the introduction of London's Ultra Low Emission Zone (ULEZ) in April this year and for similar future legislation in other city centres. That's why we opened the capital's first and only all-electric parcel depot in Westminster on 17 October 2018, going well above and beyond ULEZ clean diesel requirements. We chose Westminster as the location because it is right in the heart of the SW1 postcode where we have a very high drop density and can achieve optimum productivity on delivery routes.

ACHIEVEMENTS

Our achievements are described in detail in the 1,000-word upload. To summarise the main points of our entry:

1. We've opened the capital's first and only all-electric parcel depots with electric trunk routes, eliminating 15 diesel vehicles from our operation;
2. Our Westminster and Shoreditch sites will both reduce CO2 emissions by 45 tonnes in 2019,
3. Our efficient last-mile operation has slashed unproductive stem mileage, reducing our 'miles per parcel' figure by a massive 49.2%;
4. We are the first and only UK parcels carrier to use EVs operating from a large out of town site as a 'local hub' to feed a city centre micro-depot;
5. We are the only parcel carrier to import electric Paxster micro-vehicles;
6. The impressive performance of our electric depots and our unique micro-

distribution model are receiving enthusiastic support from customers and from influential stakeholders such as TfL, the DfT, Shirley Rodrigues and the GLA;

7. We are seen as an expert in shaping the urban logistics debate in the press and on influential conference platforms.

IN DETAIL

DPD's new micro-depot in Westminster represents the first step of a mission launched by our CEO Dwain McDonald at the site's official opening: "We are fully supporting the Mayor of London and TfL's ambition for a cleaner and less congested capital and have started building London's first all-electric urban delivery network, with another seven sites already in the pipeline."

The new 'micro-depot' – in an upmarket residential and retail area – was officially opened by London's Deputy Mayor for Environment and Energy, Shirley Rodrigues who said: "London's toxic air contributes to thousands of early deaths each year... so it's good to see businesses like DPD preparing for the ULEZ and helping protect Londoners' health by transforming their delivery fleet. I hope DPD's site will be the first of many all-electric delivery depots in London."

We invested £500,000 to refurbish a TfL-owned site and more recently have also opened a second site

in converted railway arches in Shoreditch. A new operation to meet the city centre challenge DPD currently has 11 depots serving London but as this map shows, most of them are on the outskirts or in the suburbs (where B8 space is more readily available), resulting in long daily stem mileages for our vehicles before they can start making deliveries.

A unique differentiator of DPD's new electric operation is that the trunking legs – not just the final mile deliveries – are also carried out by electric rather than diesel vehicles. Our new 5,000ft² Westminster site acts as a 'satellite site' for our 63,000ft² London City depot (in Southwark) which, until the new site opened, was sending 15 3.5t diesel vehicles into central London every day, clocking up 614 miles to deliver 3,024 parcels. Of these 614 miles, 180 were unproductive 'stem mileage' and the whole operation produced 3.75 tonnes of CO₂ per month (113.94 grams of CO₂ per parcel).

DPD opens all-electric delivery facility to cut carbon footprint

By PRESS ASSOCIATION

PUBLISHED: 10:32 GMT, 17 October 2018 | UPDATED: 10:32 GMT, 17 October 2018



Delivery firm DPD has opened an all-electric parcel depot as part of wider plans to reduce its carbon footprint.

The company said the facility in Westminster in central London now used only electric vehicles for bringing parcels in and delivering them to customers to save an initial 45 tonnes of CO₂ a year.

The site handles 2,000 parcels a day, and DPD said it was the first of a planned seven more all-electric depots in the capital.



© Press Association
Electric vehicles outside DPD Westminster. (Mark Williamson)

Therefore our 'miles per parcel' figure using 3.5t diesel vehicles before Westminster opened was 0.203. Thanks to the electric vehicles at our new micro-depot, this has been reduced by a massive 49.2% to 0.103 miles per parcel and zero CO2 per parcel. This more efficient operation now produces zero tonnes of CO2 per month versus 3.75 tonnes of CO2 per month before the site opened. The 15 3.5t diesel vehicles have been replaced by two electric 7.5t Mitsubishi Fuso eCanters running daily trunk routes between Southwark and Westminster – there are just ten of these vehicles in the whole of the UK and DPD is the only parcel carrier to have them on fleet.



We modelled various scenarios in our quest to find the safest, cleanest, quietest and most economical final-mile fleet. This included running thorough trials of 20 different alternative fuel vehicles – including CNG and LNG as well as electric – and ranging from micro-vehicles to HGVs.

Following this evaluation we opted for a mixture of two vehicle types:

- ten Nissan eNV-200 all-electric vans;
- eight micro-vehicles from specialist Norwegian manufacturer Paxster.

We are the first and only company in the UK to import Paxsters and each of these highly nimble vehicles

travels just 7 to 8 miles a day in the area immediately surrounding Westminster depot, to deliver up to 137 parcels per charge.

Helping to shape the wider debate DPD is not just reacting to ULEZ and other legislation, we are also proactively engaging with key influencers and stakeholders such as the DfT, TfL and the GLA to ensure compliance with all future regulations.

Rob Fowler, our Head of CSR, has written editorial for Motor Transport magazine and recently spoke at the Freight in the City conference.

On each of these influential platforms he has lobbied vocally for the changes that need to happen so that companies such as DPD can open more allelectric sites: “Local authorities, property owners and infrastructure providers need to work together to make sure more B8 buildings can be made available. And manufacturers need to work faster to develop electric vehicles.” So far our electric urban logistics

strategy has produced 81 items of positive press coverage, worth an Equivalent Advertising Value of £234,000 – titles include The Daily Mail, the iPaper, Metro and The Times.

We have also started a dialogue with the GLA’s Caroline Pidgeon MBE AM, Chair of the London Assembly Transport Committee who recently visited our Westminster micro-depot to discover more about our approach to clean urban deliveries. Rob Fowler was subsequently invited to speak at a London Assembly Transport Committee where he gave expert evidence on how DPD’s technology improves right first-time deliveries for consumers, thus minimising our carbon emissions.

Following his evidence, Jesse Norman MP, Minister for Transport, spent an hour visiting our Westminster site to find out more about 'green deliveries'. Various prestigious London estate holders (names withheld due to ongoing confidential negotiations) are also now approaching DPD, asking us to put micro-depots in their properties, in a bid to make their sites more attractive, especially to business investors who value access to a leading nationwide delivery network.

We also instigate regular dialogues with supply chain professionals at our major customers, including ASOS, Next and Apple, so that we can help them meet their own environmental goals. Our forthcoming white paper – see extracts from confidential draft in appendix – calls on government, influencers and industry leaders to make 8 urgent and wide-ranging changes to speed up the deployment of electric vehicles in the delivery sector, given that 10% of all vans on UK roads operate for parcel carriers (source: RAC Foundation).

Rolling out an 8-site London micro-depot strategy
DPD is implementing a long-term micro-distribution strategy, with DPD Westminster providing the template in terms of operating model, environmental benefits, service standards and commercial viability for all future sites – see further planned locations in map below. We are also very keen to extend our successful model beyond London into other major UK cities.



dpd

The UK's most sustainable delivery company



DPD UK has a clear goal when it comes to sustainability, and that's to be the UK's cleanest, greenest delivery company.

We will have the UK's largest all-electric delivery fleet, with 10% of our vehicles electric by the end of this year.

There's so much more to our green story - visit our website to see the way DPD is becoming the UK's most sustainable delivery company.

green.dpd.co.uk

DRAGADOS SA UK NOISE AND VIBRATION MONITORING

AIM

The project involves a major upgrade of the Bank / Monument Station that will provide greatly improved passenger access, circulation and a new interchange; along with improved emergency fire and evacuation measures and increased capacity. The project comprises the construction of:

- A new Northern Line southbound running and platform tunnel west of the existing Northern Line platform and the conversion of the existing southbound platform into a new passenger concourse;
- Four new cross-passages from the new southbound platform to the new concourse;
- New walkways and escalators to improve passenger access between the Northern and Central lines and the Docklands Light railway (DLR);
- Three new cross-passages at the DLR level, increasing the number of cross-passages from seven to ten; installation of two new passenger lifts to link the new station entrance on Cannon Street directly with the Northern Line; one of which will also continue down to the DLR, providing step-free access to, from and between these lines and the

street; and

- A new station entrance which will open on to Cannon Street at the junction with Nicholas Lane together with a bank of escalators down to the new Northern Line passenger concourse.

ACHIEVEMENTS:

The project has also nominated and awarded numerous supplier awards for environmental good practice; by Transport for London, City of London and NCE Tunnelling Awards.

Dragados has worked with passion to reduce the carbon footprint of the project through design innovations.

This includes altering a piled lift shaft, to a sprayed concrete design (disability access), saved a total over 5,600 tonnes of CO₂ (30.24%), equivalent to taking 1,112 cars off the road for one year. Other achievements include:

- Multiple management systems aligned to go beyond compliance;
- Sustainability professionals integrated with tender, design, procurement, and construction teams;
- All concrete and steel reinforcement procured to BES 6001 (Excellent);
- Environmental visual standards – posters and booklet;
- 800 tonnes of carbon saved through the use of PFA (28%) and GGBS (50%) in concrete mixes;
- Use of BIM to calculate carbon savings;
- All timber is certified to FSC;

BSCU Carbon Footprint (With design changes)

Category	Value
Concrete	1,234,567
Steel	987,654
Timber	12,345
Other	5,678
Total	2,239,544

Category	Value
Concrete	1,234,567
Steel	987,654
Timber	12,345
Other	5,678
Total	2,239,544



-  Increase Capacity
-  Minimise Journey Time



-  Provide Step Free Access
-  Compliant Emergency Fire & Evacuation

Fig 1: BIM model of Bank Station Capacity Upgrade

- All task lighting is LED with light sensors to turn-off automatically, saving 7 tonnes of carbon;
- Whole Life cycled costs used on plant and machines purchased for the project;
- Waste timber (over 100 tonnes) went to National Community Wood Recycling for reuse and recycling;
- 99.9 % of waste recycled; and
- All PPE is recycled minimising unnecessary waste to landfill.

IN DETAIL

The BSCU project will provide a new passenger entrance on Cannon Street with lift and escalator connections; a new Northern line passenger concourse; new Northern line southbound train and platform tunnels; and new step-free internal passenger connections between underground lines.

For the beginning client and principle contractor have worked collaboratively, with early contractor

engagement. The biggest achievement of is the integration of sustainable approaches from the project outset.

At verification stage on the Interim Design and Client Stage of CEEQUAL, we have achieved a score of 88.6%, exceeding our target of 75% (Excellent).

Sustainable Design

Opportunities in design have been interrogated with our tunnel and structural designers (Dr Sauer).

- Reduced concrete through combined lining approach for SCL tunnels;
- Change from piled box to Sprayed Concrete Lining (SCL); and
- Reduced thickness of key slabs and lining walls.

Impressively, this has saved over 2,000 tonnes of concrete and 500 tonnes of steel, while removing vehicles from the City of London. Because this is specialist concrete – with metal fibres – 4,400 tonnes of carbon has been saved. The equivalent of taking 878 cars off the road. Savings in materials were accurately and rapidly calculated through the use of BIM.

Sustainable Procurement

Procurement teams were able to align sustainability and environmental requirements by integrating environmental performance into supply chain performance KPIs, contractors were selected on their environmental credentials.

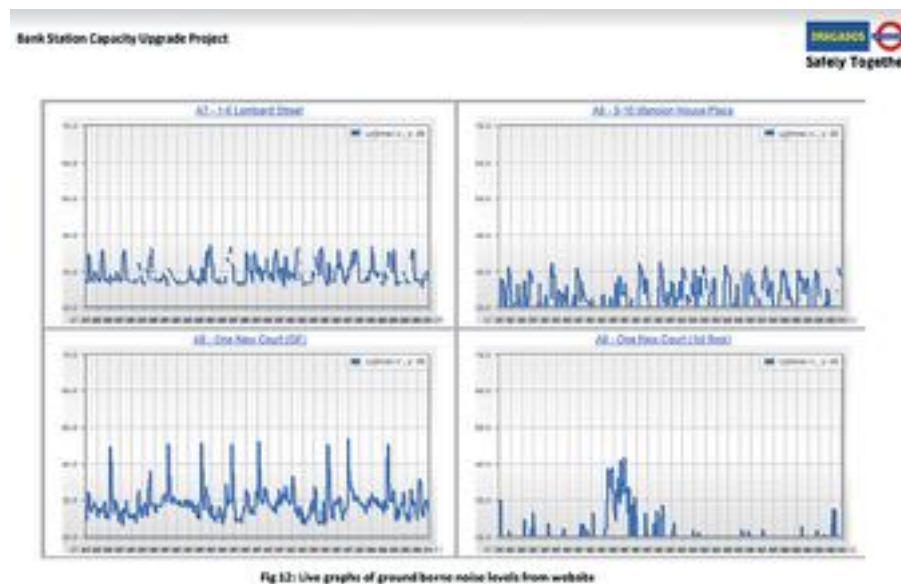
All plant purchased by the project undergoes life cycle costing to assess running costs, maintenance, rather than 'what is the cheapest'.

Education

Extensive education and training has been provided to all working on the project. Details site briefing to all site workers, including events on world environment day (plastic awareness), and National Clean Air Day. A four hour sustainability training course has been developed and delivered to 70% of all Dragados staff. The environment team have actively taken 15 work experience pupils so they can gain real life civil engineering experience.

Initiatives and Innovations

BSCU is relentlessly challenging, requiring 24/7 working close to the operational railway at the fourth busiest interchange in London. Tunnelling under highly sensitive and listed buildings posed significant risk of noise and vibration; our clients made legal commitments to restrict PPV, VDV and Ground borne Noise (GBN) levels.



BSCU is utilising PVA (Pulverised Fuel Ash) as a replacement for cement. Through consultation with the designers and materials manager, the maximum level of cement replacement of 28% was achieved. For our site piles and concrete slabs 50% GGBS (Ground Granulated Blastfurnace Slag) was attained.

All concrete and reinforcement is procured to BES 6001 (Excellent), this helps ensure responsible sourcing is demonstrated through an ethos of supply chain management and product stewardship and encompasses social, economic and environmental dimensions.

BSCU worked with 01dB and Acoustic1 to develop equipment software to allow live instantaneous monitoring data on for PPV, VDV and GBN – the only equipment to achieve all these requirements. Further actions included:

- Close liaison with building owners, their consultants and London Underground (the Client) to ensure suitable location for the equipment was available;
- established ambient baseline readings of each individual building, which demonstrated some levels were above commitment limits;
- developed a way to present complex information

to give confidence all stakeholders on the management and methodology used to limit impacts; and

- Enabled the system and software to offer instantaneous alerting of triggers exceeded during specific construction activities that notified the team to ensure best practicable means were always adhered to.

The 01dB system, for the first time, has made it possible to:

- Live monitoring – web-based system developed;
- Listen to the vibrations for a better understanding of the effects and cause of re-radiated noise, so control measures can be implemented;
- Set up and monitor triggers to ensure immediate compliance on level breaches; and
- Profile GBN to help to model future noise expectations accurately.

As well as reducing disturbance events, the collection of data has allowed Dragados to optimise our works, for example; we have assessed the noise profile of different sizes of breaking machines and the effect of the rotary header to remove tunnel concrete. This has allowed us to generate accurate predictions in advance of tunnelling works, and so better inform affected parties.

The client and project teams can now better programme and manage works in advance, including:

- Planning specific work timings; and
- Matching methodologies to outcomes e.g. planning certain works for night, day or weekends due to the impact on our stakeholders and workforce.

Adapting construction methods has also enabled us to reduce the likelihood of dust pollution and ultimately reduce the health and safety risk to the workforce. Providing advanced warning of elevated noise levels has also allowed the stakeholders to offer their preferred working times, thus creating a more harmonious relationship between all parties.

As well as limiting noise and vibration disturbance for stakeholders and sensitive receptors, the project has other long-term benefits that can be adopted across the industry.

Time and Cost Savings

This innovative system has allowed us both to keep the project on schedule and to make cost savings:

- We have achieved a saving of c£1,000,000 through self-delivery.
- We have saved c£550,000 by using the data collected to mitigate potential delays.

To date, this type of and level of monitoring has never been conducted on a major infrastructure project. And as with all firsts, we both took a risk yet also aimed for uncompromising quality in technology designed entirely for this project.

Summary

BSCU has provided a combination of local environmental improvements compared to the original design, a legacy to the community through the wood recycling scheme, a contribution to society through reduced carbon footprint, and innovative (award winning – NCE) monitoring solution to mitigate against noise and vibrations. This was all achieved by engaging in the design process from the outset, and working closely with procurement to select a supply chain that will work with us proactively to provide solutions to sustainability and environmental problems. Each innovation and measure has been recorded and best practice and case study documents developed to ensure that other projects are capable of implementing the same measures. All learning is shared amongst partners to have the biggest impact on the industry.



BANK STATION CAPACITY UPGRADE

ROADS & HIGHWAYS



BRIDGES



BUILDINGS



MARINE



DAMS & HYDROPOWER



TUNNELS



PUBLIC PRIVATE PARTNERSHIPS

DRAGADOS

MAJOR CIVIL ENGINEERING & BUILDING

Regina House, 2nd Floor 1-5 Queen Street, London EC4N 1SW (UK). T: + 44 (0) 207 651 0900

DUBAI MUNICIPALITY AIR QUALITY MONITORING AND FORECASTING INTEGRATED SYSTEM

AIM

The air quality integrated system consist of 15 fixed monitoring stations, 1 mobile monitoring station and a smart air quality forecasting system. The network was built with an aims of establishing a comprehensive air quality database that is utilized primarily for; assessing ambient air quality status and emission sources to ensure compliance with the air quality standards; studying the air dispersion of pollutants; input to the environmental studies; forecasting of ambient air quality, informing and engaging public and developing air management strategies, policies and action plans.

ACHIEVEMENTS

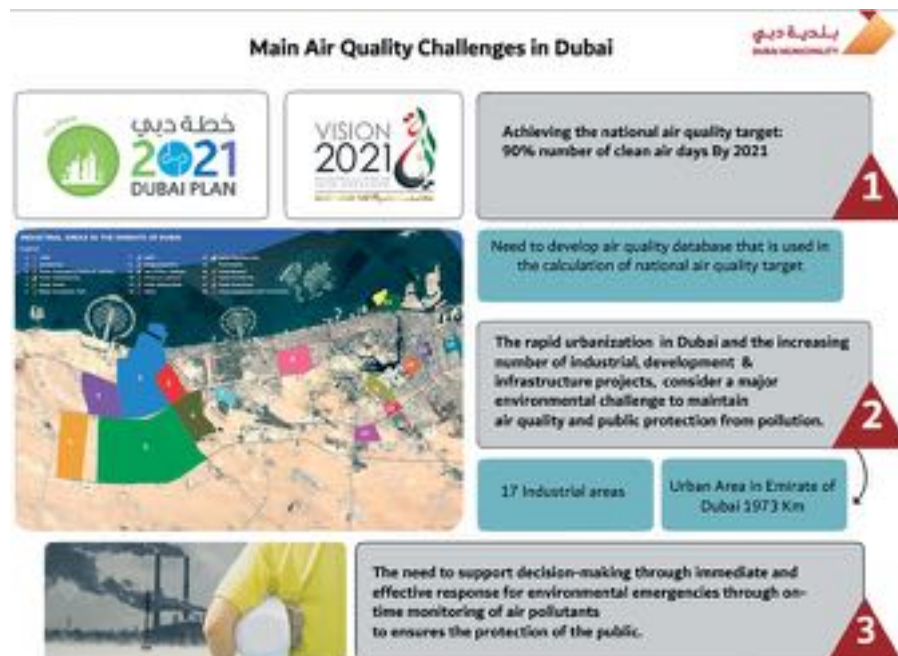
The air quality integrated system is fully compliant and certified against the latest American and European Standards. The network has contributed

successfully to the development of a range of strategic projects such as Dubai Air Quality Strategy 2017-2021. As a result, the Air Quality Strategy has recently received conferment by King's College of London UK for following the best international air quality management practices. The network is, additionally, supported by air quality mobile station which is recognized as the first of its kind in the Middle East. The mobile station has contributed majorly in surveying air pollutants concentration within different locations and identifying hotspot areas in the emirate of Dubai. The network also supports the 1st regional air quality forecasting system, and real time air quality public portal in Dubai.

IN DETAIL

Rapid urbanization has been taking place at an

unprecedented scale across Dubai, and the Emirates Government has been progressively engaged in managing and controlling the environmental challenges that come with such rapid growth - one of which is the quality of urban air. Continuous monitoring of air quality is a primary step towards achieving effective air quality management. The collected data enables the assessment against environmental



policies and the outcomes of protective or mitigatory actions. Dubai Municipality has been leading the way in the control and monitoring of air quality which was reinforced with the expansion of the air quality integrated system. The air quality integrated system was specifically designed to track key criteria air pollutants. Meteorological parameters are monitored in order to aid identification of the origin of these air pollutants within areas of high traffic, industrial, commercial and densely populated areas. The stations are supplied with full telemetric capability, meaning they can be accessed remotely by the engineers anywhere in the world. The instrument technology has been specifically designed to withstand extreme temperatures and frequent dust storms which are common in the region. Real-time data is transmitted to a centralized database where hourly, daily, weekly, monthly and annual trends are reviewed for compliance with the federal air quality standards.

To protect human health and the environment from air pollution it is necessary to manage the anthropogenic contribution to ambient air quality and be able to nowcast and forecast air quality conditions. Dubai Municipality has established an integrated forecasting system that will combine:

- Management of real-time ambient air quality monitoring and meteorological data;
- An online emissions inventory documenting the release of pollutants into the air from mobile, stationary and area sources across different

economic sectors and activities;

- An air quality forecasting system that facilitates short-term (3 day) forecasting of ambient air quality and concentrations of pollutants.

The air quality integrated system incorporates air dispersion simulation models, designed to facilitate interactive analysis. Nowcasting and forecasting interfaces is available online to report the air quality conditions and alert/advise the Dubai population in the event of unfavorable air quality conditions. The availability of reliable air pollution forecasts allows regulators to enforce the emission reductions over a specified time.

To support the air quality integrated system, Dubai Municipality has, additionally, launched the first air quality mobile station in the Middle East, designed to monitor over 100 air pollutants. The vehicle is the first of its kind in the region and will serve as a mobile environmental operation room, designed to monitor the ambient air pollution in Dubai from the manufacturing and operational processes across a range of different sectors including the industrial, transportation, energy sectors and a range of service





facilities such as sewage treatment plants and cooling stations. It can be immediately deployed into an emergency situation where the station facilitates immediate examination of the captured data, which can support the decision-making processes and allow taking appropriate measures to protect the environment from pollution. The station also contains devices for monitoring radiation, noise pollution and weather conditions to relate pollutant dispersion to the meteorological conditions. The captured data is used as input to the air quality integrated system to create an accurate digital map identifying the sites and areas that exceed the limits of environmental air pollutants. The air quality mobile station has, furthermore, built-in communication devices and advanced computer softwares to

process and analyze the data which is displayed with high accuracy on the internal screens in a graphical and digital manner supported by the 3D and 2D dispersion maps. This is considered as a quantum leap in the field of the environmental monitoring. To ensure quality of the captured data, the mobile station is equipped to undertake on-site calibration for each of the monitoring devices on board. All sampling and measurement equipment is following either USEPA

reference or equivalent method in accordance with the US Codes of Federal Regulation.

The smart air quality integrated system is owned by Dubai Municipality. The air quality system provide invaluable air quality information to a range of government and private stakeholders, and support sustainable development and environmental health of Dubai Emirate. Dubai Municipality has, therefore, committed towards the expansion of air quality monitoring system and smart technologies.

THE ECOSMART LTD

CLEAN YOUR CAR/S WITH JUST ONE CUP OF WATER

AIM

To introduce the Acceptance of Waterless car Washing - the way to do that is to demonstrate the same if not better finish of a traditional wash and not lack on quality. It is why we have presented an 'uber' like "modern daily car wash" A system which is truly environmentally friendly, Professional and at one click of a button on TheEcoSmart App, an Eco-washer could be outside your door ready clean up your car. Our cleaning procedures eliminate the usage of water, soap and other hazardous chemicals which allow us to protect the environment in our own way. Saving our planet's resources for better uses. being on demand, eco-friendly, efficient, reliable and most important the best customer service.

We believe in perfection through profession, happiness through service. We as a team can change the way your CAR look. You can rely on our team and we will make sure your car gets the best. Environmentally Friendly Fully self contained, Mobile and equipped - all Fit in a Smart Car. Professional And Reliable

ACHIEVEMENTS

We successfully introduced an 'uber' like "modern daily car wash" A system which is truly

environmentally friendly, Professional and at one click of a button on TheEcoSmart App, an Eco-washer could be outside your door ready clean up your car. Our cleaning procedures eliminate the usage of water, soap and other hazardous chemicals which allow us to protect the environment in our own way. Saving our planet's resources for better uses. being on demand, eco-friendly, efficient, reliable and most important the best customer service.

Our cleaning procedures eliminate the use of extensive water, hazardous chemicals and high-pressured equipment while maintaining a high quality clean and results.

IN DETAIL

1. introduced an 'uber' like "modern daily car wash" A system which is truly environmentally friendly, Professional and at one click of a button on TheEcoSmart App, an Eco-washer could be outside your door ready clean up your car. Our cleaning procedures eliminate the usage of water, soap and other hazardous chemicals which allow us to protect the environment in our own way. Saving our planet's resources for better uses. being on demand, eco-friendly, efficient, reliable and most important the best customer service.





2. our cleaning procedures eliminate the use of extensive water, hazardous chemicals and high-pressured equipment while maintaining a high quality clean and results.
3. cost of a Fully functioning User App and its partner App and a website. Self Funded
4. Our cleaning products are eco-friendly, biodegradable and plant based. Hence eliminates the usage of water, soap and other hazardous chemicals which allow us to protect the environment in our own way. Waste Water from Traditional Carwashes in the UK go down our drinking water drains instead of the waste water drains and that is alarming and something we would like to prevent. Saving our planet's resources for better uses.
5. In Our Eyes, Saving Clean Drinking water from being used extensively on cars is beneficial in saving the costs of the procedure to cleaning the water again. We are Preventing the use of hazardous chemicals that are used on the cars which go down the same drain to our oceans and contaminating in that term.
6. the delivery of our service via an 'uber' like system and application of our service; we have a Uk manufactured Eco-solution which is dispensed via a unique machine built in house and fitted in our smart cars; - includes a pump, hose rail, tank, black box and batteries. the use of smartcars, this tiny vehicle allow us to fit in any small area to cater for our customers.
7. Other companies can benefit, they do not have to drive to a car wash, we have a team of trained individuals who will arrive to the location and clean the cars. local businesses and commercials are the target as they are whom have large fleet of cars.
8. We learnt that Users were keen on the concept of a waterless wash but are uncomfortable that it could result in scratching the paint work. this is not however the concerns of our customers as they have been given a demonstration of how we clean the cars and most if not all were relieved of that discomfort.
9. as for now keeping mobile and being EcoFriendly car cleaning, however we definitely would like to introduce this system to local car washing businesses.

ENVIRONMENTAL CROP MANAGEMENT ABIOTIC STRESS REDUCTION, INCREASING YIELDS AND IMPROVING FERTILISER EFFICIENCY AND REDUCING FERTILISER POLLUTION IN MAIZE CROPS

AIM

Maize is a vital crop for livestock farmers and for anaerobic digesters. It is a crop that is often fertilised using animal manures which allows farmers to use this waste product as a fertiliser. One of the main problems that maize growers face is the period when the maize seed starts to produce roots and the plant comes under stress and stops growing. During this period ECM has pioneered techniques to overcome this abiotic stress. This is stress caused by environmental conditions such as drought, cold

or in this case by the plants inability to produce a root system quickly enough. This lag results in lower yields and leaching of manures into the local groundwater as the crop is unable to capture it

Aim of the project.

Our aim is to keep the maize plant growing in the transition from seed to full root system. This will be achieved by tissue testing the soil and manure before planting to predict what deficiencies the crop will encounter. Very often high levels of soil phosphate





are indicated (this is a problem as eutrophication by phosphate is a major threat to streams and pond adjacent to maize fields) which causes a Zinc deficiency in the maize and stops growth. Also, fields are often limed prior to maize planting inducing a manganese deficiency.

Dry stressful climatic conditions- abiotic stress often occurs in May and early June that inhibit plant growth which ECM has alleviated using amino acid products.

ACHIEVEMENTS

Achievements of the project.

Using a combination of very low rates of foliar applications of phosphate (and sometimes manganese) combined with amino acids that cause signalling within the plant to overcome abiotic stress we have increased maize yields by over 20% without any additional fertiliser applications. This saves the farmer money and ensures the maize crop extracts all the phosphate from the soil and prevents ant

potential pollution issues. Farmers have been able to use less fertiliser once they see the benefits of the technique and many are seeing a reduction in the very high levels of soil phosphate seen in the North west of England.

By getting the crop to establish faster, maize yields are increased and the crop harvested sooner, reducing damage to soil structure seen in harvesting in wet conditions in October and November. In fact, winter wheat crops can be drilled in the Autumn following the maize and earlier harvesting again preventing vital crop nutrients being lost to leaching over the winter.

This technique has been adopted by 80% of our maize growers who farm 8000 acres of maize in Cheshire and Lancashire. A cost saving of £240000 to our farmers who have not applied £30/acre of phosphate to their maize crops!

IN DETAIL

Background

Maize is a vital crop for livestock farmers and for anaerobic digesters. It is a crop that is often fertilised using animal manures which allows farmers to use this waste product as a fertiliser. One of the main problems that maize growers face is the period when the maize seed starts to produce roots and the plant comes under stress and stops growing. During this period ECM has pioneered techniques to overcome this abiotic stress. This is stress caused by environmental conditions such as drought, cold or in this case by the plants inability to produce a root system quickly enough. This lag results in lower yields and leaching of manures into the local

groundwater as the crop s unable to capture it.

BENEFITS OF THE SCHEME

Crucial to the farmer, yields have increased by 20% worth £100/acre, costs have been reduced by £30/acre. Excessive soil phosphate levels are reducing, manure (a high-volume waste product of livestock farms) is more efficiently used and pollution to water courses reduced.

Abiotic stress, the biggest threat to crops is being minimised to improve yields and quality and farmers convinced to use amino acid products (a new innovative method of crop management) on their crops to help them become more efficient in a sustainable way.

PROMOTION OF THE SCHEME.

ECM has trained the Crest groups 90 agronomists in this new technique. We have also shared our findings with Lancaster University and Manchester Metropolitan University colleagues to see what further discoveries can be made.

FUTURE DEVELOPMENTS.

ECM is involved in further research on other amino acid materials and other materials involved in managing gene signalling to reduce abiotic stress in other arable crops .

EREN ENERJİ ELEKTRİK ÜRETİM A.Ş. EREN ENERJİ THERMAL POWER PLANTS - 2790 MW

In this application letter, Eren Enerji Elektrik Üretim A.Ş. (hereinafter “EREN”) has explained its approach on the environmental and social aspects by providing best practice solutions technically and financially for its coal fired thermal power plants in order to provide the sustainability while cooperating with other private companies, governmental organizations, universities, civil society organizations and residents. With the objective of sustainability, EREN aims to construct and operate the most environmental coal fired power plant in Turkey which is leading social awareness against the possibility to operate green coal fired power plant and driving motivation on other power plants to improve their own facilities in the same target. The main solutions that EREN carried out are the technological improvements to keep low level of emission levels, establishment of sale and marketing mechanism for byproducts like fly ash, bottom ash and gypsum, support on purchase of local coal

although its unsuitable low level of calorific value, and willingness to cooperate with all stakeholders of the country. The positive result of these applications of EREN is pushing itself to continue the investments and retrofit projects for better social and environmental outcomes.

Eren Enerji Elektrik Üretim A.Ş. (hereinafter “EREN”) has been operating Coal Fired Thermal Power Plants since 2010 up to 2790 MW installed capacity in Zonguldak City, Turkey including five units, 160 MW, 2x615 MW and 2x700 MW respectively. The capacity of 2790 MW leads EREN to be the biggest Energy company of the private sector in Turkey with almost 7% of Turkish total power generation. Due to the increasing growth rate and population of the country, these power generation investments helped Turkish economy to deal with the upward trend of the energy demand. Due to the best, new,

ENVIRONMENTAL INVESTMENTS			
		AMOUNT	TOTAL
ZETES III	2x700 MW		
	FGD	47,415,702.00 USD	85,074,155.00 USD
	ESP	15,021,147.00 USD	
	SCR DENOX	18,964,369.00 USD	
	FLY ASH	3,672,937.00 USD	
ZETES II	1x615 MW		
	FGD	20,790,000.00 USD	37,286,000.00 USD
	ESP	4,844,000.00 USD	
	SCR DENOX	10,040,000.00 USD	
	CATALYST	1,612,000.00 USD	
	1x615 MW		
	FGD	20,748,000.00 USD	37,851,000.00 USD
	ESP	4,834,000.00 USD	
	SCR DENOX	10,020,000.00 USD	
	CATALYST	1,810,000.00 USD	
	FGD DEVELOPMENT	439,000.00 USD	
BLACK SMOKE ELIMINATION	PLASMA IGNITION SİSTEM İYİLEŞTİRMESİ	2,000,000.00 USD	2,000,000.00 USD
WATER INTAKE SYSTEM	PIPE	1,252,835.45 USD	1,430,582.90 USD
	CONCRETE WORKS	164,142.01 USD	
	CONCRETE TETRAPOD	13,605.44 USD	
CEMENT - ASH BLENDING SYSTEM	ÇİMTEK	1,043,466.69 USD	1,043,466.69 USD
ASH BLENDING SYSTEM	EREĞLİGAZ	55,802.55 USD	5,672,571.27 USD
	ASF	652,787.30 USD	
	OPTİMA	3,227,079.96 USD	
	WEIR MINERALS	1,017,089.06 USD	
	GENKON	11,904.76 USD	
	İZOTERM	707,907.64 USD	
	BERA	539,036.64 USD	539,036.64 USD
	ASH STORAGE	EXCAVATION, PIPE	1,332,578.49 USD
SOUND ISOLATION	ISOLATION WORK	123,800.40 USD	123,800.40 USD
		172,353,191.38 USD	172,353,191.38 USD

and effective technology of the power plants, the required electricity demand is also satisfied with low generation costs which is also benefited by the whole Turkish citizens and industrial corporations. Additionally, in order to provide sustainable operation of the power plants, approximately 175 million USD has already been spent in the scope of environmental equipment within the total investment amount of 3 billion USD for whole units.

The environmental scope in the total investment is mainly composed of FGD, SCR, EFIP and ESP systems with almost 85% portion which are related about the SO_x, NO_x, and dust emissions subjected to limitations regulated by the Turkish government in the same line with European Union. Although the emission limitations in the regulation are based on 200 mg/Nm³ for SO_x and NO_x and 30 mg/Nm³ for dust, EREN constructed the supercritical power plants providing lower emission levels with the contractors and realized the actual emissions during operation as 21 mg/Nm³ for SO_x, 83 mg/Nm³ for NO_x, 2 mg/Nm³ for dust and 1 mg/Nm³ for CO which are listed in Attachment – 2. These low level of actual emission levels mean that EREN power plants are the most environmental power plants in the country despite its high capacity and high coal consumption. The reason of choosing to be the most environmental power plant by pushing lower emission levels is to consider the longer sustainable operation of the power plant and provide security of supply for the citizens and corporations of the country. In case European Union and Turkish government push lower emission levels in the future, EREN aims to prepare the power plants in advance for this circumstance and provide electricity in any condition without any interruption which is very crucial and important for whole country prosperity and steady political and economical conditions.

One of the other issue needed to be dealt with is byproducts which are fly ash, bottom ash and gypsum. They are produced after coal burn in the amount of thousand tonnes per each day. If any plan is not organized and considered, it may have a very big negative impact on the sustainability of the power plant operation. The applicable regulation does not allow any power plant to continue its operation without dealing with this problem and pushes the power generation companies to find a permanent solution. In order to handle with this problem, we organized a company with dedicated team members for sale of these byproducts both in domestic and foreign market especially for cement industry.

These byproducts are usually used in the production of concrete together with cement and also decreasing the cost of production of the concrete. Due to the importance of the quality of the byproducts to be used in cement industry, EREN made new investments and retrofit projects to focus on increasing the technical parameters of the byproducts leading better results on sale and marketing aspects. EREN now is able to sell 100% of the all byproducts to the foreign market from United States to Africa in addition to the Turkish domestic market. Due to the reliable and suitable technical parameters of the byproducts that EREN provides, the demand on them is increasing without any problem to find customer.

Although the EREN power plants are designed according to the import coal technical specifications, EREN is the biggest company in Turkey who uses the local coal by blending with import coal. The amount of local is equal to more than 240.000 tonnes per year which is very high amount compared to Turkish coal production. EREN basically purchases the local coal from the Zonguldak mines which is the same region with the location of the EREN power plants. Although

Year	Gypsum (tonnes)	Flyash (tonnes)	Bottomash (tonnes)
2018	181,875.15	505,128.15	75,189.10
2019 until the end of July	100,528.28	419,484.26	10,293.06

the local coal technical specifications are not suitable and low level of calorific value, EREN decides to maximize its local coal usage in blending mechanism with total consumption. The total purchased local coal list is on the Attachment – 5. In addition to the usage of local coal, totally 1141 people are employed by EREN on these power plants whereas 1031 of them are the local residents of the Zonguldak region. This is very important for local economical development and provides domestic welfare in the region by preventing any kind of objections about the power plants.

As summarized, due to its technological and environmental superiority among the other power plants in Turkey, EREN power plants are selected as the best practice and usually benchmarked by the other power plants in order to improve their own specifications. EREN always welcomes the visitors of the other power plants, governmental organizations, universities, civil society organizations who wants to inspect and get information about EREN power plants. It is also beneficial to improve overall effectiveness of Turkish power generation and awareness of the society about the thermal power plants. Besides the technological and environmental aspects, EREN power plants are also honored in terms of financial aspects as “Europe Power Deal of the Year” by Euromoney – Project Finance Magazine in 2009 for 2x615 MW EREN power plant and “Best Project Finance in Europe, Middle East and Africa” by EMEA Finance Magazine in 2013 for 2x700 MW EREN power plant. The certificates are listed in Attachment – 6.

In conclusion, after nine years of the operation, it is clearly realized that these investments are having a very critical role in the development plan of the country and also giving many opportunities to improve technical, social, environmental and financial situation of the companies in the energy industry. Similarly, people living in Turkey are getting benefit by reaching more environmental and less costly electricity. Unemployment rate of the country is also pushed downward due to the high amount of employees in these investments. Our successful implementation of these projects encouraged us and other investors in Turkey to enter as same or improve the existing facilities. EREN never hesitates and stops its investments and projects in order to improve social and environmental issues to provide sustainability by sharing same objectives together with the whole stakeholders of the country.

THE FLOORBRITE GROUP LTD

WASTE MANAGEMENT INNOVATION & INCREASING SUSTAINABILITY AWARENESS AT DUO UK

AIM

The Floorbrite Group Ltd have been providing cleaning services at Duo UK since 2009. Duo UK are a manufacturer and supplier of high quality polythene packaging products. Our bespoke Waste & Environmental Management Service was introduced at the end of 2014. We contacted Duo UK to offer a tailored alternative to waste removal services.

In early 2015 our Waste & Environmental Consultant, Trudie Williams, who is an ISO 14,001 Lead Auditor and WAMITAB accredited, met with Duo and discussed our waste solutions. Our ideas fitted perfectly with the company objectives at Duo, following the launch of their new “Duo Green” range, a green PE alternative material made from sugar cane, for mailing bags, which is 100% recyclable, renewable and sustainable and CO2 negative.

In becoming a responsible supplier and manufacturer by producing a green alternative, Duo’s focus switched to waste produced on site in Manchester. Trudie was able to help the management team outline their aims to reduce Duo UK’s carbon footprint helping Duo’s customers and supply chain to achieve their sustainability goals, reduce costs, increase recycling and reduce landfill.

Floorbrite aims were to reduce waste removal costs, encourage 100% recycling, achieve zero landfill, introduce full segregation of waste streams, recover energy from waste. Get buy in from management and staff to increase recycling, fully train staff, reduce overflowing containers and handle waste in the correct way. Finally, by working closely with Duo we created a powerful case study to target other manufacturers to reduce their waste to landfill. In 2018 we set up a closed loop recycling scheme, with

Floorbrite installing Equipment on Three of Duo UK customers sites. The sites in turn bail the returned plastic mail bags and the bailed waste is returned to Duo UK to be made into raw material to reuse within the production process.

ACHIEVEMENTS

Our achievements have certainly helped the environment by reducing Co2 and transport (road mileage) to and around Duo’s Manchester site and neighbourhood in the form of waste vehicles. The reduction in waste pickups has in turn reduced Duo’s costs. Movement of waste on site has reduced due to the reorganisation of waste disposal and recycling points and the reduction in the total amount of waste produced. We have introduced the separate removal of food waste, increased the amount of paper waste removed, increased the reuse of cardboard cores and reduced the number of cardboard cores going into the waste stream, also decreasing the amount of waste on Three customer site and highlighting recycling opportunities.

By educating the management team and staff they have become passionate about recycling. There is a real “Feel good factor” proved by Trudie’s reports and this has also inspired staff to take what they’ve learned home and become greener individuals. There is a definite change in staff culture with all looking at ways to make other waste reductions. Internal recycling containers were installed, and this has increased the recycling carried out on site considerably.

With Floorbrite recommendations, Duo UK have invested more in their recycling process and promoted their achievements to their supply chain, inspiring their customers to carry out more recycling and introduced closed loop recycling options.

By breaking down the waste into individual waste streams, Trudie's waste data and environmental reports give a clearer picture of the waste data that is recorded. There is greater control over disposal costs and control of the waste on site.

Duo UK are very proud that the introduction of Floorbrite new systems with the co-operation of the whole of the Duo Manchester team have achieved zero to landfill.



IN DETAIL

What did the project involve doing?

Site Audit/Installation and training on site visits

Visit to site 2 x per week during implementation process

Ongoing quartley visits with the Operations Manager

Order and installation of compactor

Order and installation of three bailers, off site

Change of containers (External)

Decrease in collection frequencies

Provision and installation of signage

Provision of internal recycling containers

Managing the removal of existing containers

On Going Training and education

Negotiating new waste contractors and contracts

Why did you do it

In becoming a responsible supplier and manufacturer by producing a green alternative, Duo wanted to also focus on their own waste production at their manufacturing site in Manchester.

What did it cost and where did the money come from?

The money for the project came from the existing annual Budget for waste management, but by reducing waste disposal costs by 38% and also purchasing a compactor the cost became cost neutral. Equipment costs are eliminated due to increase of raw material.

If quantifiable what did the project achieve in terms of sustainability, development, economy, environment and equity.

All Duo UK's staff, management and customers have been educated about the benefits of recycling with a change in culture by seeing the achievements unfold. Duo UK are enthusiastic about promoting their success and their green products with the ability to become attractive to PLC Companies and their own KPIs.

The local community have benefitted from a reduction in traffic. Duo have benefited from cost saving and will benefit from further investment and savings.

Floorbrite have reduced skip collections per annum from 650 to 34 and reduced cardboard cores from 32% of their total waste to 2% and still reducing.

In achieving zero to landfill, since August 2015 to the 29th of April 2019, so far Duo have diverted 728 tonnes of waste from landfill, saved 12,376 trees from destruction and the equivalent to 601.71 kg of Co2.

Longer term benefits

As Duo UK are leading the way in the plastic packaging industry for green products and their own waste management achievements their credibility in this area will increase. As Duo's own customers become more aware of Duo's achievement and of their own responsibility to achieve sustainability goals, Duo's trusted track record will be able to encourage and inspire customers to follow suit. The story does not stop with what Floorbrite have achieved so far. We have inspired Duo to look at additional recycling innovations and make further investment in machinery to increase recycling in other areas. E.g. Floorbrite are currently looking at further installations of bailers to support the closed loop recycling scheme and use a compactor to compress all the mixed recycling.

Duo also offers closed loop recycling to its customers and are in the forefront to increase this type of service into all the customer base.

Was there anything innovative about the project?

Introduction of compactor to reduce collections on site

Introduction of a cardboard core cutter, reducing costs to purchase cores each year Introduction of Bailer for returned plastic mailing bags offer a closed loop recycling scheme.

Can other organisations benefit from implementing your methods?

Yes

Manufacturing companies could benefit from this method.

Packaging companies could benefit

Companies that have multiple skips or bin collections weekly would benefit from the introduction of a compactor on site.

Introduction of bailing equipment on site.

What did you learn from the project and are you planning any further development? Further development for the reduction of metal waste on site.

Further development for the compaction of mixed recycling on site.

Carry out regular review meetings to help achieve consistent reduction on site. Increase the closed loop recycling scheme into every customer site

Awards Gained

2015 Bronze Green Apple Improving Environmental Awareness Award

2016 Gold Green Apple Environmental Best Practice Award

2017 Gold Green Apple Environmental Best Practice Award

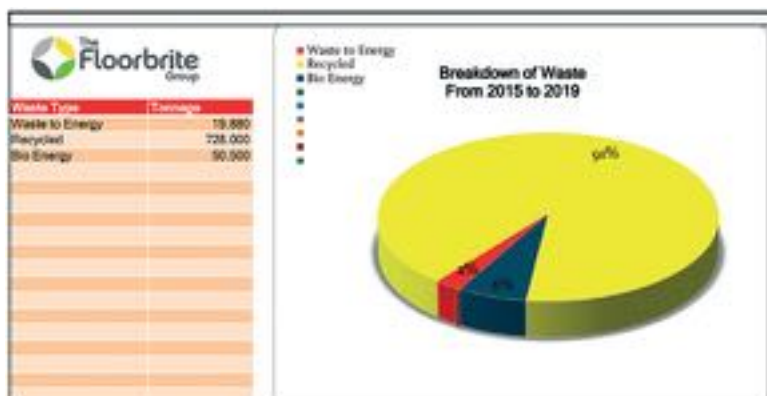
2018 Silver Green Apple Environmental Best Practice Award

2016 Green World Ambassador Award

2017 Green World Ambassador Award

2018 Green World Ambassador Award

2017 International Green World



Award

ROSPA Gold 2015 - 2018

2015 Golden Service Awards x 2 Manufacturing & Hospitality

2018 Golden Service Awards Finalist for Environmental Awareness Award

Case Study

Duo UK based in Manchester employs over 100 staff and turns over £25Mil. Established in 1988, the company secured its position in the packaging market as a trusted manufacturer/ supplier of high quality packaging to the e-retail, retail and industrial brand markets and are proud to name JD Williams, Tesco, JD Sports and Keep Britain Tidy as longstanding clients. Duo UK has a substantial track record of investing in environmentally responsible technology and practices reducing its reliance on unsustainable resources. Recent measures include major investment in closed loop recycling, educational outreach programmes and the development of odour-free 100% recycled packaging. Duo UK was also selected to be the first UK manufacturer to produce mailing bags using Green PE, a polythene that uses sugarcane, rather than oil, as its base substance the product is 100% recyclable. Continuing its commitment to a greener future, in 2015 Duo UK launched Duo Green a platform to help companies create sustainable, environmentally low impact packaging solutions and shine the spot light on new sustainable innovations.

Upon launching Duo Green, Duo UK made a commitment to achieve zero waste to landfill at their site in Manchester and review their manufacturing processes and supply chain to make further changes to minimise their impact on the environment.

Floorbrite have implemented a number of measures to help Duo UK achieve its ambition of zero waste to landfill and continue to work in partnership to make further changes to minimise impact on the environment.

Aiming for zero waste to landfill

Duo UK invested in a closed loop recycling system to recycle polythene scrap created during the manufacturing process and post-consumer waste. This system recycles polythene scrap and produces recycled polythene pellets for the re-use in the manufacture of new polythene packaging products. The company also encourages its clients to segregate its polythene waste and offers to pay a rebate for scrap and use their own scrap when manufacturing products. Duo UK also offers its clients free packaging audits to review a client's operation and recommend environmental and cost effective solutions.



Floorbrite have introduced recycling facilities for the separate collection of confidential paper waste, paper, cardboard cores, card, metals, plastics and organic waste. The prevention, re-use and recycling measures introduced by Duo UK and Floorbrite have reduced the amount of residual waste it produces by 70%. With the introduction by Floorbrite of a Compactor, we have been able to reduce the

collection of waste from three skips twice per week to One Skip Monthly. This helps reduce movement on site, cut down on road traffic in the surrounding housing estate and reduce road mileage.

Diverting Recycling and food waste.

The introduction by Floorbrite of Internal Recycling Containers and Food Caddies in canteens and kitchen areas, has diverted all food waste in to the external food bins.

Recovering other value

Since September 2015, food waste has been collected weekly and sent to an anaerobic digestion plant to produce biogas and bio fertiliser.

Enabling re-use

As part of Floorbrite objective to decrease the amount of waste produced on site, desk top recycling boxes have been introduced and has increased paper re-use, confidential paper waste is sent for off-site shredding and 100% recycled. All cardboard waste is now separated and sent for recycling. The Cardboard Cores are now re-used on site, which has reduced the amount of cardboard previously sent off site by 53%. By the introduction of segregation of all mixed recyclable waste Floorbrite have used the Compactor on site. This has reduced collection of the waste considerably. All this waste is removed and sent to a recycling facility which recovers 97% of the waste and the balance of 3% is used in waste to energy. This has achieved Zero Landfill for Duo UK and has also seen a reduction in waste by 27%

Maximising opportunities for recycling

Duo UK has set targets to increase the amount of waste it recycles. Cardboard is a major waste item and Duo UK aims to reduce the amount it needs to dispose of by encouraging suppliers to: Optimise packaging to prevent excess; and use re-usable containers. Any cardboard that cannot be re-used

is recycled. Duo UK has been recycling polythene and cardboard since it was established and now has an on-site compactor. Using the compactor means fewer visits from recycling contractors to collect the waste and less space is taken up by waste awaiting collection (three days' worth of compacted waste has the same volume as one day's worth of uncompacted waste) also improving site health and safety.

Continued opportunities

Floorbrite are now looking into increasing the amount of customers that use the closed loop recycling scheme which will increase the raw material recovered.

Communicating with Staff and Management

Following initial discussions with Floorbrite, Duo UK had aspirations' of achieving Zero Landfill. Floorbrite have been able to reduce waste disposal costs, which has inspired the Management and Staff into looking at how the saving can be reinvested in ways of recycling more within the business. Working together with staff at Duo UK, the Floorbrite team have visited site to carry out training with staff and fully audit the areas of concern to ensure initial targets are being met. Floorbrite trained Staff on the safe use of the compactor and placed signage to help staff understand where items go to be recycled. Train cleaning operatives on the movement of waste, type of waste, container and bags required. Waste Data reports are provided enabling the Management to see the improvement and the weight of each collection and share this with staff to motivate and keep the momentum. Only by measuring the waste can consistent improvement be made. Duo UK have been able to inspire their supply chain with the good news waste story so far challenging them to make changes.



As one of the UK's top 100 and largest family run cleaning and facilities service providers, the next generation of Floorbrite are ensuring that we still treat our customers with the same care and attention as when we first began in 1972.

We provide commercial cleaning and facilities services across the UK. Providing daily, industrial and window cleaning services to all sectors of industry. Washroom, hygiene and consumable supplies, waste management, pest control, plants and grounds maintenance, security, building maintenance and MEWP hire ensure we deliver a complete solution to our clients.



0161 972 3000 info@floorbrite.co.uk www.floorbrite.co.uk



GALLIFORDTRY RUGBY RADIO LINK ROAD

AIM

The project is located at the site of the old Rugby Radio Station, a large radio transmission facility at Hillmorton near the town of Rugby Warwickshire in England, situated just west of the A5 trunk road and in later years junction 18 of the M1 motorway. Part of the site was on the other side of the A5, across the border in Northamptonshire. First opened in 1926, at its height in the 1950s it was the largest radio transmitting station in the world, with a total of 57 radio transmitters, covering an area of 1600 acres. Traffic slowly dwindled from the 1980s onwards, and the site was closed between 2003 and 2007. The project comprised of the design and construction of a new link road 2.5km long to provide access from Rugby Town centre to the Radio Mast site where the developer Urban and Civic would be constructing the new Houlton village development. The project

was awarded to us by client Urban and Civic and Warwickshire County Council.

There are three significant structures on the road and a large cut \ fill earthwork programme to create the road platform. The road design incorporates a large environmental bund to screen from the picturesque Oxford Canal and existing housing south of the west coast mainline railway.

ACHIEVEMENTS

The new link road and junctions will allow residents to travel to Rugby Train Station and the town centre amenities within 10 minutes and will forge a strong link with the new Houlton development. This will ensure the wider town benefits from the economic growth brought about through the expansion at Houlton. It will also provide congestion relief in the surrounding areas of Hillmorton and Clifton Upon

Dunsmore. The public amenity works alongside the road will provide increased leisure and wildlife diversity for future generations.

The project has been undertaken with no environmental incidents and having two visits by the Environment Agency under the Environmental permit works and regular visits by the Canals and Rivers Trust, none of which have raised concerns over





environmental protections being implemented on site. The site has supported several external organisations with Volunteer Work including construction of new building foundations at a local school, STEM Careers Days and the construction of a new remembrance garden at the Mary Ann Evans Hospice. The project, as part of the Houlton development, helped host an Ecology Day with celebrity, Mike Dilger, and local residents and children.

IN DETAIL

Initial environmental surveys revealed the presence of several active badger setts located outside the site and therefore attention needed to be paid to the potential presence of this faunal group. These setts within the site boundaries were closed under licence and were not a constraint. Great Crested Newts were also identified on adjoining land within the main development site and were successfully translocated to new habitat before our earthworks began.

In accordance with Site Environmental Risk Register, we carried out noise monitoring, risk assessments and constantly reviewed working methods. We carefully selected plant and equipment to minimise noise disturbance including silent and vibrationless hydraulic pile press to install new canal bank pile walls, innovative dual view dumper which travels forwards and so eliminates reversing alarms, and 110v power supply points for small tools to remove

the need for small petrol generators. Existing hedgerows within road footprint have been removed but all remaining hedges were retained and buffered from construction with the use of protective fenced as required. We take great care to protect the existing ecology, the landscape and watercourse, by the principle following measures.

- Environmental sensitive areas and control measures are identified to all workers at Induction
- Hazardous substances are kept in a designated secure, COSHH non-flammable storage container located on the site compound.
- Spill kits are held on site in several locations for emergency use with spillage clean-up equipment clearly signed. Spill Response teams are trained and practice regularly on site.
- Drip trays and nappies are supplied for all static plant to prevent the risk of contaminating the ground /water courses.
- Ecology surveys carried out pre-start and during works.
- Measures are taken to prevent silt laden water from entering watercourses with specialist 'Siltbuster' settlement tanks, straw bales and lagoons created to trap silt.
- Weekly Environmental Inspections

We have used a fully electric vehicle for use on site by our team of Engineers for moving between work areas by the public highway. This emits zero emissions at point of use and little noise. We have an electric car charging point on site for use by visitors during the day.

All of our site cabin are ECO friendly units, being fitted with sensor lights, push taps, double glazed windows and timed heaters. We harvest rainwater from the roof, to use for cleaning small tools and traffic cones.

Most of our concrete structures were manufactured off site such as head walls, culverts and bridge beams. The greatly reduced the number of HGV movements required by up to 80% per structure, as well as reducing noise and dust pollution, than if they had been manufactured on site. The project is registered with the Considerate Constructors scheme and we received a monitor's visit in 2018 where we received a score of 43 points out of 50. Subsequently we were represented with their bronze award at their ceremony in Manchester early in 2019.

We actively promote recycling. All site waste is placed in covered segregated skips. The site compound waste is removed under contract with the local council with mixed dry recyclables and mixed general waste streams collected weekly. This reduces pollution and detritus on site.



We make extensive use of solar powered mobile welfare units on site, these dramatically reduce noise and pollution by operating from battery power most of the day.

In order to minimise dust pollution, we carry out regular dust suppression measures by use of our water bowser. A road sweeper also cleans the main perimeter / entrances / car parks and local highways (daily in the winter months and once or twice a week or when needed in the summer months). Good tidy housekeeping is enforced on site and is relayed on initial site inductions and reinforced with monthly Toolbox Talks. A litter picking task is carried out

every week to ensure no litter is around the perimeter of the site as well as on the site itself.

One of the canal towpaths had to be diverted for the duration of the works, and the general public were able to view one of the main key areas of the site i.e. the canal bridge construction as they walk through it. The towpath was formed of clean gravel and used to display information and progress posters about the project.

GallifordTry are members of FORS and we aim to have subcontractors that are accredited to FORS to promote responsible driving and deliveries.

Zero to landfill (from a total cut volume of over 460,000T) with all surplus material retained on site under a Material Management plan for future re-use across the Houlton development. We have undertaken a programme of soils testing and classification to ensure the materials used in the road and retained are inert and have suitable properties. These testing works have comprised insitu and lab-based procedures and have been completed by specialist laboratory based 10 miles from site, reducing vehicle mileage. In addition, we have used WRAP recycled aggregates as backfill to all structures.

The design of the link road includes various environmental enhancements. These include new ponds, new woodland landscaping with informal woodland walks \ paths, wild flower verges.

The Link road design also incorporates various flood mitigation measures. Constructed under 3 Environmental permits, an 86,000m³ flood compensation / storage area has been constructed upstream of the road on the Clifton Brook, a tributary to the River Avon. The new triple box culvert is designed to convey the flood waters under the road to maintain existing water levels. All highway run off discharge is via retention ponds and flow control devices (hydrobrakes) to limit flow into watercourses during flood conditions.

GALLIFORDTRY INFRASTRUCTURE LTD ARCHES JUNCTION IMPROVEMENTS

AIM

This Early Contractor Involvement (ECI) scheme involved the remodeling of the existing 'Arches' junction where the A194 meets with the A185 in South Shields.

Our works included changing two existing roundabouts at the 'Arches' and Hobson Way into new signalised junctions, construction of a new

through a former railway embankment, along with the construction of a steel sheet piled retaining wall with a weathering steel capping beam and the installation of a storm water retention tank. The economic appraisal of the scheme demonstrated very high value for money and benefit cost ratio. The funding was secured by both contributions from STC (South Tyneside Council) and the LGF (Local Growth Fund) the overall value of the scheme was £8m



ACHIEVEMENTS

As part of a wider programme of strategic transport investment projects. The Arches Junction project has helped reduce congestion, reinforced local economic potential and established a strategic gateway into South Tyneside. The scheme Improves traffic flow, reducing journey times especially at peak times and improving safety throughout the road network This will not only benefit commuters but people who live in the surrounding residential areas.

Long Term Benefits

one-way link road extension from Hobson Way to Jarrow Road, widening of the A194 towards the Hobson Way/Elswick Way junction for the creation of two right turning lanes, conversion of Jarrow Road between the extended Hobson Way and the A194 to one-way, and the construction of dedicated pedestrian and cycle routes.

The creation of the new link road extension at Hobson Way required major excavation works

- Contributing to the access to over 100Ha of future employment development land, including the International Advanced Manufacturing Park (IAMP), forecast to generate over 5000 jobs by 2024•
- Improving safety - better facilities for pedestrians and cyclists
- Improving local air quality in the Lindisfarne corridor by reducing congestion
- A 36% reduction in collisions on route.
- Journey times, reliability and queue lengths through the corridor have all been improved. This has been



achieved through increased vehicle flow.

- An appraisal has shown that the A194 carriageway is now in compliance for Nitrogen Dioxide (NO₂) emissions.
- The amended earthworks strategy brought additional environmental benefits by reducing construction activities carbon footprint. A total of 778 wagon movements required to take contaminated material to landfill were not required and saved 15.6 Tonnes of Co₂ emissions.

IN DETAIL

Incorporation of contaminated material within the permanent works through a detailed earthworks strategy.

Following the initial ground investigation, we identified a large quantity of non-hazardous material which was initially bound for disposal at a waste facility, however it was suitable for use in public open spaces.

Initial estimates of the volume of material indicated around 7,000m³. As this is non-hazardous it would require disposal at a special landfill facility, the nearest approximately 45 miles from site (90 miles round trip). This would give a carbon footprint for this operation alone of 15.6 Tonnes of CO₂ along with the high cost of using the waste facility it was decided to undertake further investigation into other

options to reuse the site won material, reduce the carbon footprint, reduce projects costs and the requirement of the landfill waste facility.

During ECI stage it was agreed to enlist the help of our specialist consultants RSK to review the conditions of the material, assist with the development of the material management plan and support the project delivery team to help investigate what possible options we had to reuse this site won material.

Collaborative workshops with GallifordTry, South Tyneside Council, AECOM and RSK were implemented and working in partnership the final materials management plan was developed. This ensured the works were carried out under the CL:alre Protocol, and the plan was approved and signed off by the Environment Agency. In conjunction with the Material management plan approval we began a further review of the scheme plans. A landscape redesign was developed to allow use of the land purchased for the scheme and utilise the excess site won material generated. The revised design included additional tree and shrub planting and again supported our reduction of the carbon footprint of the scheme.



A very detailed procedure was implemented to ensure the material designated to be retained was carefully excavated and placed on site with daily records of movements and positions recorded, in conjunction with further testing we ensured all the designated material was excavated and placed in the landscaped area on site.

All this information had EA approval and a full report has been issued to the Environment Agency for their records.

Incorporation of contaminated material within the permanent works through a detailed earthworks strategy.



£2m cost saving

1. We undertook a thorough review of contamination levels with support from specialist geo-environmental consultants (RSK), and our earthworks balance specialist (OPSIS) having re-analysed all available data, and carried out additional contaminant testing we developed a detailed earthworks strategy which allowed all material to be accommodated on site within the permanent works. Avoiding programme delays and assuring project viability
2. Carbon Footprint. (Waste to Landfill) The amended earthworks strategy brought

additional environmental benefits by reducing our construction activities carbon footprint. A total of 778 wagon movements required to take contaminated material to landfill were not required and saved 15.6 Tonnes of Co2 emissions.

- 3 Amended the original drainage design on Jarrow Road to avoid utilities diversions and reuse an existing corridor. £50k cost saving. The original design showed the new drainage going into a footpath filled with services. We undertook a GPR survey which highlighted an existing underground service corridor in close proximity to the works. We amended the drainage design to use that corridor. The amended design removed the requirement for additional service diversion/protection works, in addition to the cost saving, the health and safety risk was also removed as such utility works would have required hand digging.

Environmental Awareness Education:

Raising environmental and ecological awareness, we presented an overview of the environmental challenges we encountered on the scheme and our commitment to reducing our impacts on the environment and the local wildlife to the 'Eco Warriors Group' at Lord Blyton School. Our apprentice engineers built a 'Bug Hotel' from recycled site materials to encourage and support the students with their interest in local ecology. They also attended the presentation day and assisted the children with populating the hotel with the finishing materials including hay, cardboard tubes and small twigs from the garden.

GATES GREEN SOLUTIONS LTD SUSTAINABILITY AMBASSADOR

AIM

To see if it is possible for a land mass (island or County) could become sustainable within its boundary. By using the waste and resources of the population and skill and resources to encouraging generations to stay local and develop careers on the island, (or county) regenerating communities, furthering education, training, work experience and the local economy, over and above the seasonal tourism and agriculture sectors.

I am working on a project to write a proposal for The Responsible (Sustainable) Island Project Report. The core principle: To use the waste of the population of the island to generate electricity from a 'non-incineration', hydrogen-rich process, to produce consistent chemical quality gas to drive a gas turbine and/or produce quality liquid fuel.

A single managed waste stream would produce extremely high levels of recycling of better-quality raw materials with a 'reuse' facility on site for construction materials. Target: 4% byproduct of Black silicon crystals to be used in tyre/road construction and sea defence from erosion.

Working to inspire Companies and Organisations to engage with the Sustainable Development Goals, inspire staff, improve their efficiency, reduce their use of natural resources and utilities and develop a low carbon circular local economy.

ACHIEVEMENTS

Years of research, networking and International collaboration, means that we now have the technologies, knowledge and Framework from the Sustainable Development Goals to be able to achieve this.



With waste management processes from Australia and Canada, to be able to process a much wider range of waste, ecologically with everything from Sewage sludge to high-grade plastics (inc Ocean plastics) and Tyres, back into clean renewable energy or fuel.

Methods to desalinate water and generate utility-scale energy from the USA

IN DETAIL

WHAT DID THE PROJECT INVOLVE DOING?

Six years of research in international innovation and technology processes. Relationship building.

WHY DID YOU DO IT?

I have a heart for sustainability and reducing our impact on the planet by improving how we do things.

WHAT DID IT COST AND WHERE DID THE MONEY COME FROM?

This was a self-funded project, that I couldn't put an exact figure to, but in the region of £40k.

IF QUANTIFIABLE, WHAT DID THE PROJECT ACHIEVE IN TERMS OF SUSTAINABLE DEVELOPMENT, ECONOMY, ENVIRONMENT AND/OR EQUITY?

Using the SDG framework 'the Responsible Island Report' is a working document that any European Island or County could implement, by using the equation of the population's waste with the three specific technologies, (Gas Phase reduction - Non-incineration, Air-Heat Streamenergy and Advanced recycling) will transform the economy of the land area, to produce more locally and import less. Increasing employment, equality and equity within the community. Improving the basic human rights of SDGs 1-6 (reduction in Poverty and Hunger and increasing Health & well-being, Quality education, Gender equality and Clean water.

WHO AND WHAT BENEFITED?

All members of the community. The County council reduce the volume of waste and the cost of processing per ton. Giving them more to spend on

the social requirements of the community and future generations.

LONGER TERM BENEFITS?

Carbon reduction, reduction in climate impact, reclaiming mineral resources, reclaiming landfill land for regeneration, clearing and processing ocean plastics, affordable clean renewable energy, economic growth, sustainable cities and responsible consumption, local, national and international consideration of global citizenship and growth in biodiversity

WAS THERE ANYTHING INNOVATIVE ABOUT THE PROJECT?

Yes, the three main core technologies are innovative. All the technologies used with the regional companies and organisations for decarbonising of building stock are low carbon, low voltage, conservation technologies across all of the utility resources to improve energy assessment. Local, regional energy generation reduces the demand pressure and losses on the grid. Regional waste treatment reduces the transport of waste.

CAN OTHER ORGANISATIONS/COMMUNITIES BENEFIT FROM IMPLEMENTING YOUR METHODS?

Yes, all counties, Island or states could implement these methods and benefit greatly from them.

WHAT DID YOU LEARN FROM THE PROJECT AND ARE YOU PLANNING ANY FURTHER DEVELOPMENT?

Yes, the three core technologies are very versatile and have a number of very effective applications from Soil remediation (the treatment of contaminated land, landfill processing, treating Ocean plastics, treating medical, chemical and military waste and effective desalination for water-poor areas.



GENAIR UK LIMITED

EMISSION FREE, ALL WEATHER AIR COMPRESSOR

AIM

Air compressors are used extensively on construction sites for a variety of projects. These include; powering air tools (scabblers, needle guns, impact wrenches etc.), shot blasting, cleaning and similar tasks. These site compressors are normally powered by a diesel engine, which will be constantly in operation. This brings to the forefront all of the associated issues of carbon emissions, noise and other pollutants linked with the use of diesel. Also it is a fact that the cost of fossil fuels are continuing to rise, adding additional expenditure for an operator.

With NRMM (Non-Road Mobile Machinery) regulations soon to be enforced in London and elsewhere, the use of diesel machinery, such as air compressors, will be strictly monitored. London already has a NRMM registration system, which adds to a site manager's administrative duties.

GenAir's aim is to negate all of these issues by designing and building a range of air compressors that has all the same attributes and facilities of a comparable diesel powered set; however the GenAir units would be entirely emission free, operate almost silently and be NRMM compliant.

As most air compressors are used outdoors in all weathers, GenAir housed their emission-free compressor in an 'all-weather' canopy.

ACHIEVEMENTS

Working in close liaison with experts in the manufacture of electrical and air compressor pumps,

**THE ALL ELECTRIC AIR COMPRESSOR
FROM GENAIR**

Summary –
the all electric compressor from GenAir has:

- No diesel fuel required
- Saves on fuel costs
- Emits ZERO Carbon Emissions
- Eliminates possible ground contamination
- Works in extreme conditions
- Powerful output
- LEZ and ULEZ compliant
- Low maintenance requirements
- Less noise pollution

Thank you for reading this – call +44 (0)844 775 0590 for more information

[WWW.GENAIR.CO.UK](http://www.genair.co.uk)

GenAir have brought to the market an 'All Weather Emission-Free Air Compressor'.

The unit delivers a powerful working pressure between 10 –190psin with a maximum free air delivery of up to 400cfm. This is easily equivalent to a diesel powered compressor, delivering sufficient power to complete most tasks.

The set has been designed to operate in temperatures from minus 25° to plus 50C° and its' built-in after cooler and water separator eliminates up to 70% of moisture. This is important as it helps to with deliver superior air quality and improved performance.

The GenAir 'All Weather-Emission Free Compressor' emits zero carbon emissions as it is powered by an electric motor. Therefore this compressor requires no diesel fuel. This eliminates all fuel costs and rules out any possible ground contamination. It also runs at a whisper quiet sound level (67 dBA) meaning that noise pollution will always be at a minimum.

GenAir have achieved their initial aim in bringing to

market an on-site air compressor that has serious environmental attributes that will help a contractor comply with all the regulations and bring about a cleaner atmosphere.

IN DETAIL

“GenAir has been a supplier to our company for over 7 years. For our shot blasting and painting we have normally hired in an 825cfm diesel mobile compressor. GenAir convinced me to try their new weather proof electric compressor. Our working week varies from 40 hrs up to 70hrs depending on work load, we hired the compressor for 11 weeks and in the overall cost we have saved over £8000.00, also we were saving the planet (which I like)” - Lee Quince – Director - Millenium Site Services

Incorporated in April 2007, GenAir UK is an independently owned company and currently operates from three strategically placed depots; Motherwell, Slough and in the West Midlands. Their safety and quality is reinforced by their registration to ISO 9001 standards. The GenAir management team has a collective 140 years’ experience in the compressed air markets. The company is pleased to report that it has never been subject to any enforcement actions by individuals or otherwise.

As outlined in the both the project aims and achievements, GenAir’s drive to bring to market noise and carbon free air compressors were partially initiated by the forthcoming stricter regulations in London. However, GenAir are also keen to assert their own environmental aspirations, recognising the need to supply more fuel efficient machinery.

GenAir have invested over £1m from its own development funds to design a fleet of electric mobile compressors, each ideally suited to deliver clean, sound reduced compressed air in a range between 7 to 13 Bar. The project was initialed by GenAir’s managing director and fully supported by his technical director and project manager.

These individually designed compressors have a working pressure of 190psi with a maximum free air delivery of up to 393cfm. With a whisper quiet noise level of just 67dB (A) and protected in a fully weatherproof canopy, these brand new units are perfect for use in all situations and particularly in areas governed by emission and noise rules.

The compressors boast compact dimensions of 2400 (Length) x 1330 (Width) x 1660mm (Height) and weigh just 1600kg. They will continue to operate in

extreme temperatures from minus 25° to plus 50C° and their built-in after cooler and water separator will eliminate up to 70% of moisture. This will help with delivering superior air quality for improved performance, which helps to lower CO2 emissions. For effective operation, the GenAir sets require electricity power at 125 amps to work at 7–10 Bar and a slight increase to 150 amps for 10–13 Bar. The controls have been designed to be completely user friendly.

EMISSION FREE
COMPRESSED AIR FROM

GenAir

Electric mobile compressors, each ideally suited to delivery clean, sound reduced compressed air up to 13bar.

These individually designed compressors have a working pressure of 10 - 190psi with a maximum free air delivery of up to 4000cfm. With a whisper quiet noise level of just 67dB (A) and protected in a fully weatherproof canopy, these brand new units are perfect for use in all situations and particularly in areas governed by emission and noise rules.

STOCKABLE, COMPACT AND MOBILE:
• 2400 (L) x 1330 (W) x 1660mm (H)
• Weight 1600kg

The compressors will continue to operate in extreme temperatures from -25° to +50° centigrade. A built-in after cooler and water separator will eliminate up to 70% of moisture, delivering superior air quality for improved performance. GenAir's electric compressors run entirely free from fuel therefore environmental damage from diesel spillage is completely eliminated.

• London Low Emission Zone (LEZ) compliant.

GenAir UK Ltd
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There are many advantages for using an electric compressor as opposed to a diesel powered set. Because most diesel sets can only run for about 12 hours before they need refuelling, their fuel levels will require constant monitoring, which distracts an operator away from more important tasks. As GenAir's electric compressors run entirely free from fuel, the environmental damage from diesel spillage is completely eliminated. Furthermore, a diesel engine's filters must be replaced every 500 hours – that's every three weeks for a project that runs for 24 hours. GenAir's electric compressors can be left alone for up to 4,000 hours before maintenance is needed, giving them a significant advantage on all major programmes. In addition using a GenAir electric compressor avoids having to register the compressor with the NRMM authority and negates any subsequent inspections and potential fines for non-compliance. Operators working in close vicinity of a working GenAir electric compressor will benefit from having no emissions and little noise as will the wider environment.

To highlight the economical use of an electric compressor, a contractor working in London had a requirement for 197 cfm at 10 Bar, for a period of 5 weeks. Traditionally they would use a 260 cfm diesel powered mobile compressor. However, in consultation with GenAir, the client was supplied with one of these new electric sets. The contractor calculated that over the five week hire period they saved in excess of 3250 litres of red diesel. Add in the fact that there was no chance of any spillage, plus

low noise and zero emissions, without any lowering of output, the advantages of using a GenAir electric compressor was obvious.

The GenAir 'All Weather-Emission Free Compressor' was a finalist in the Hire Association Europe (the leading equipment hire trade association) Hire Awards of Excellence 2019.

GenAir have pledged to continue to develop their NRMM compliant compressors and build a complete range of electric sets for their rental fleet and to sell to contractors who wish to have their own line of compressors.

GenAir believes that their new all electric compressors are worthy of winning a top award. They have actively engaged with their clients and wider industry and produced an air compressor that still delivers the same qualities of a traditional diesel machine, yet has environmental attributes that will help a contractor comply with all the regulations and bring about a cleaner atmosphere.

Home » In the Spotlight » Process Controls & Plant

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Emission free air compressor

Published: 07 March, 2019

GENAIR UK, a leading hire company specialising in the supply of air compressors, desiccant dryers and associated equipment is celebrating having one of its new products selected as a finalist in this year's prestigious Hire Association Europe, Hire Awards of Excellence.

Representing GenAir in the 'Hire Industry Product of the Year' category will be its 'All Weather, Emission Free' electric air compressor. In a strong line up, GenAir's compressor will be competing against a range of site lighting equipment, access machinery, welfare products and demolition tools.

The winner will be announced at a glittering gala dinner due to be held at London's Grosvenor House Hotel on Saturday 13th April. The event will be hosted by the Strictly Come Dancing star and TV presenter Anton du Beke.

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LOW EMISSION ZONE AIR COMPRESSORS



GenAir has a complete range of 'Low Emission Zone' (LEZ) diesel and electric powered sets, which meet with the stringent emission regulations now being enforced in London and elsewhere.

AIR COMPRESSORS FITTED WITH CHALWYN VALVES AND SPARK ARRESTORS

For contractors requiring compressed air in sensitive environments, such as an oil refinery, GenAir have sets fitted with Chalwyn Valves and Spark Arrestors making them completely acceptable in these situations.

AFTER COOLER AND WATER SEPARATORS

After coolers and water separators will eliminate up to 70% of moisture. This will help with delivering superior air quality for improved performance.

DESICCANT DRYERS

GenAir also has a fleet of desiccant dryers. Desiccant air dryers adsorb moisture from the compressed air flow and through desiccant material in a reversible process, which makes them just right for use in subfreezing conditions or where processes require extremely dry air.



CONTACT

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[Depots in Slough and Motherwell]



ISO 9001
Certified

GREEN MOTION INTERNATIONAL GREEN MOTION'S ALL-EMBRACING ENVIRONMENTAL POLICY

Green Motion is the only car rental franchise system built entirely on an environmentally friendly ethos.

We focus on lowering our CO2 emissions and are also concerned with our overall impact on the environment. All of the materials we employ throughout our business platform are sustainable and / or recyclable.

As mentioned in our submission last year, the lowering of our CO2 emissions and our use of sustainable materials / products isn't merely a project for Green Motion; it is the core of our brand's principles, behaviour and values.

Presently, Green Motion is the only international vehicle hire company which is 100% focused on an

ecological structure and offers its services to both leisure and business customers.

As the pioneers of the vision of low carbon vehicles for daily rental, Green Motion has continued to go from strength to strength since the company was formed over 10 years ago. With carbon reduction and sustainability at the very core of the company, Green Motion has remained focused on evolving and procuring the newest and most advanced technologies, ensuring that we retain our position as number one in the provision of low CO2 car and van rental across the world.

Established in 2007 by British entrepreneur Richard Lowden, Green Motion has since grown into an

international business, currently operating in approaching 400 locations within 31 countries – making it one of the fastest growing franchised car rental businesses. Green Motion are the pioneers of the vision of low carbon vehicles for daily rental.

Green Motion's objective is simple; to offer customers the choice to rent vehicles from a company who is genuinely concerned about their impact on the environment. The Green Motion model is unique as it does not charge a premium to

The screenshot displays the Green Motion website interface. At the top, the logo 'greenmotion car and van rental' is visible alongside navigation links: Home, Register, My Account, Loyalty, Book Now, and a 'Make a booking' button. The main section is titled 'Make a booking' and contains a form with fields for 'PICK UP LOCATION', 'PICK UP' (date and time), 'DROP OFF' (date and time), 'PROMO CODE', and 'DRIVER'S AGE'. To the right of the form, there are two promotional banners: one for '15% OFF' in Eindhoven, Netherlands, and another for '10% OFF' in San Diego. Below the booking form, a green banner titled 'Going greener with Green Motion' features icons for a car, fuel consumption (3.9 L/100 km), a fuel pump, a wallet, and two glasses, with the text 'Going greener with Green Motion Car Hire means more miles for each and every tank of fuel which is better for your pocket and better for the environment. And don't forget, you'll have more money to spend on your holiday.' and 'Book a green car now'.

go green, educating customers that they do not have to compromise on cost or comfort to go green. We also look to concentrate on overall environmental and sustainable efforts such as reducing our energy use, minimising water consumption, effective recycling and the employment of sustainable / ecological materials throughout our business platform.

Green Motion's mission is to remain at the forefront as the "greenest" vehicle rental company. We abide by an all-encompassing and evolving environmental strategy, embracing new automotive technologies and the latest eco ideas.

Minimising our impact on the environment and in turn contributing / protecting the world we live in isn't just good for business, it is our business.

All of Green Motion's vehicles abide by a strict CO2 emission guide, enabling us to boast the greenest and cleanest vehicle rental fleet in the world; our collective vehicle emissions stand at sub 93g/km which is more than 35g/km lower than our nearest competitors.

Green Motion is continuing its global expansion;

currently present in 31 countries – with several more opening this year – giving even more customers an opportunity to rent vehicles from a company which genuinely cares for the environment.

We also offset our carbon usage by our Green Heart Fee initiative which gives customers the choice to donate a small fee to the Costa Rican rain forest.

CO2 EMISSIONS

Green Motion works with the world's leading motor manufacturers in order to source and operate the latest developments in eco automotive technologies.

Green Motion is considered to be the only legitimate offering in the environmental car rental sector with us now having the lowest CO2 fleet with a large selection of environmentally focused vehicles including hybrid, plug-in hybrid, range extender and full electric. Our objective is to ensure that we operate and promote the lowest CO2 emitting fleet within a given region / country. From a global perspective, around 35% of our fleet is made up of hybrid or electric models and our ultimate mission is to deliver the world's first and only zero emission fleet.



With a fleet size of approximately 35,000 internationally and 4,600 in the UK, each franchised location must adhere to strict guidelines for the rental vehicles they contain on their fleet.

Green Motion is proud to have the greenest vehicle rental fleet in the world with our collective vehicle emissions standing at sub 93g/km (beating our 2016 emissions which stood

at 105g/km) which is more than 35g/km lower than our nearest competitors.

ENERGY USE

Power generation – where appropriate, our locations have installed power generators supported by either micro wind-turbines or solar cell technologies.

Power supply – where appropriate, each location purchases their electricity supply from an accredited green energy supplier. Our head offices employ 100% green energy (via Green Energy UK who harnesses their energy through plants, animals, water and wind) which further reduces our carbon emissions.

Lighting – each location features low energy LED light fittings, dramatically reducing our power consumption. Where appropriate, locations have also installed passive sensors to automatically turn lights on / off, reducing energy use when areas are not occupied.

WATER CONSUMPTION

Each of our locations are focused on reducing their water consumption by the use of innovative valeting technologies including steam cleaning, water capture & recycling and waterless cleaning processes (which is used by our UK locations as well as our Finnish franchisee).

Our franchisees in the Netherlands and Florida invested in a machine which enables them to clean their vehicles purely with steam. This has allowed them to save up to 90% on their regular water usage, saving more than 5 million litres per year!

RECYCLING / SUSTAINABLE MATERIALS

Valeting chemicals – each Green Motion location features environmentally friendly / bio-degradable chemicals – from washing the dishes to washing our cars, all of the products we use are safe for our planet.

Recycle zones - all of our locations feature a recycle zone, promoting recycling best practice not only with our staff but also with our customers.

Stationery – each Green Motion location utilises business / marketing stationery which is made from either recycled or sustainable materials. In addition, Green Motion's rental software and new app enables customers to have a paper-free rental experience as the rental agreement is captured electronically.

Flooring – all of the flooring material employed at our locations is recycled from used tyres or reclaimed timber. Our head office has also installed recycled flooring.

Shop-fitting materials - where appropriate, each Green Motion location utilises materials for shop-fitting and signage which are sourced from environmental suppliers, utilising sustainable materials and products.

SOCIAL IMPACT



Green Heart Fee - our franchised locations are all true ambassadors for the green environmental movement and they regularly inspire us to make changes in our business.

The master country franchisee for Green Motion Costa Rica launched the Green Heart Fee initiative in 2013 which has now been adopted across the entire network. The Green Heart fee is charged to customers when they make a booking with Green Motion (they do have the option to opt out if they wish) which is then donated directly to the Costa Rican government via FONAFIFO. This initiative allows Green Motion customers to reduce their CO2 footprint by offsetting the emissions produced while driving one of our vehicles.

In the past 12 months circa £40,000 has been donated through the Green Heart initiative; resulting in the planting of thousands of trees along with other ecological initiatives. The combined efforts of Green Motion and its customers have achieved a position of carbon neutrality which has been further accredited by Investors in the Environment who have awarded Green Motion International their top award of 'green' accreditation.

Awards - our brand is proud to be an award winning car hire company, winning several environmental contribution awards such as GreenFleet's 'Rental Car Company of the Year' 7 years in a row (2009 – 2016), Energy Saving Trust's 'Fleet Hero Award' in 2011, the 'Environmental Rental Company of the Year' for the Institute of Transport Management in 2011, and Green Apple Awards in 2015, 2016 and 2017 as well as becoming Green World Ambassadors in 2016 and 2017.

Behavioural Changes - the image that our rental branches advertise to customers must also embrace our sustainable ethos. Customers are encouraged to share our brand values during their rental as our staff provide eco-friendly driving tips and involve customers in the Green Heart Fee.

Green Motion is now in its 11th year of operation and has achieved phenomenal success in creating a completely new brand sector within the daily rental industry with many of our industry partners and competitors starting to introduce their own greener fleet. Green Motion was genuinely the market disrupter that started the total change towards greener vehicle rental.

We are redefining car & van rental...

Low cost and lower CO₂ car & van rental

Hiring a car from Green Motion gives each and every customer, including leisure travellers and business users, the opportunity to play their part in reducing CO₂ emissions relating to vehicle rental while enjoying the highest levels of car hire service at industry leading rates.

For more information, please visit
greenmotion.com



Green Motion International Car and Van Rental is proud to be named a Green World Ambassador by the Green Organisation for 2016, 2017, 2018 & 2019.



Have you got our app? [Download now](#)

INTERNATIONAL MARINE PURCHASING ASSOCIATION IMPA ACT

AIM

By developing a comprehensive programme of engagement in the art and science of responsible supply chain management, IMPA ACT aims to improve the economic, social and environmental compliance of its ship purchaser and supplier members.

ACHIEVEMENTS

IMPA ACT has been building the capacity and profile of CSR and sustainability within the shipping industry and the wider community. Some of IMPA ACT's 'CSR' achievements include:

- 1) the creation of the IMPA ACT Supplier Code of Conduct, an all-encompassing ethical code that is fully aligned with the UN Guiding Principles on Business and Human Rights and the ten principles of the UN Global Compact.
- 2) streamlining of companies' CSR practice through the creation of resources and step-by-step guidance to help companies engage with suppliers and ensure that international human rights, environmental and anti-corruption principles are not violated across the supply chain.
- 3) 18 major suppliers achieved 'preferred' status so far, meaning that they have successfully proven to their customers that they have implemented the necessary procedures and systems to identify,

mitigate and remediate their adverse impacts on human rights, environment and anti-corruption principles.

- 4) IMPA ACT is a winner of the International CSR Excellence Award in 2015 for our innovative IMPA ACT programme.

The IMPA ACT six-step process



IN DETAIL

Ships not only carry 90% of world trade, but they are also the 'greenest' form of transport when compared to land and air alternatives. The scale of impact and international reach of shipping means that the industry has the potential to become frontrunner in the international sustainability and 'green' agenda. One factor that

has prevented shipping companies from further promoting their sustainability and environmental compliance has been a lack of awareness and uniformity on sustainability, responsible supply chain management (RSCM) and corporate social responsibility (CSR). Without this knowledge and capacity, many shipping companies miss the valuable opportunity to engage with clients, shareholders and the community on the risk management of negative impacts, as well as positive impacts on the environment, society and the economy. This is why in 2013, the International Marine Purchasing Association (IMPA) collaborated with top industry actors, shipping companies and CSR experts, and created IMPA ACT (Action Changes Things), the first RSCM initiative in the global shipping industry to be fully aligned with the UN Guiding Principles on Business and Human Rights (UNGPs) and the ten principles of the UN Global Compact.

With the rise of the UNGPs and the UN Global Compact's principles, companies now have a responsibility to identify, mitigate and remediate their adverse impacts on human rights, environment and anti-corruption principles, including those impacts that arise through their purchasing practices. IMPA ACT is a management system that is tailored for the shipping industry and that helps companies adopt responsible supply chain management practices easier and at a much lower cost. IMPA ACT is based on standardised tools, such as the IMPA ACT Supplier Code of Conduct, which add uniformity to the marine procurement industry and streamline work practices.

IMPA ACT promotes the adoption of RSCM, CSR and sustainability within shipping and industry through public advocacy and tailored RSCM and CSR solutions for IMPA ACT Members. Central to both activities is publicly promoting the adoption of

IMPA ACT Supplier Code of Conduct

The IMPA ACT Supplier Code of Conduct has been designed to lay out the expectations that a company must have from itself and its suppliers in order to ensure a responsible management of its supply chain. It details the kind of responsible supply chain management system that each company must develop in order to comply with internationally-endorsed human rights, environment and anti-corruption principles. To get the full version, please sign up as an IMPA ACT member or supporter at www.impa-act.org.



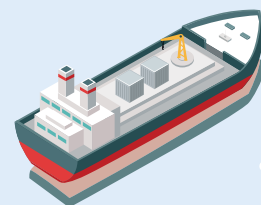
an industry-wide code of conduct, the IMPA ACT Supplier Code of Conduct, comprising a set of environmental, social and anti-corruption principles that is fully aligned with the ten principles of the UN Global Compact and the UNGPs. Since its launch, IMPA ACT has been building the capacity and profile of CSR and sustainability within the shipping industry and the wider community.

Firstly, IMPA ACT has been mainstreaming environmental principles through the IMPA ACT Supplier Code of Conduct. At the core of the IMPA ACT Initiative is the IMPA ACT Supplier Code of Conduct, a set of social, environmental and economic principles that are based on internationally-endorsed UN minimum expectations for businesses and represent current best practice. Promoting the adoption of the code and its principles is also part of IMPA ACT's advocacy role. By moving from a mass of individual, company-created codes and systems into an industry-wide initiative, shipping companies, ship operators and ship suppliers will save costs and time and can be part of a constantly-evolving and developing programme that represents best practice and is in line with international expectations on CSR.

Secondly, IMPA ACT has been building a network of ship owners, ship managers and marine suppliers committed to CSR internally and within their supply chains. IMPA ACT Members commit to working towards alignment with the Supplier Code of Conduct over time, both internally and within their supply chains. IMPA ACT members are able to do this by accessing the IMPA ACT RSCM Platform. This system has been set up to help IMPA ACT members to access relevant resources and share best practices on CSR within a shipping context. There are currently 10 IMPA ACT members and almost 90 suppliers implementing the human rights, environmental and anti-corruption principles within the IMPA ACT Supplier Code of Conduct and building capacity.

Thirdly, IMPA ACT advocates for and promotes environmental sustainability through social and traditional media. For example, this is done through the IMPA ACT website (www.impa-act.org), the IMPA Magazine, Marine Trader (www.impa.net/marine-trader), social media, and the quarterly newsletter, which provides the latest maritime specific news coverage on the initiative and CSR.

Through the initiative, IMPA's aim has always been to progress excellence in the marine procurement sector and help ship owners and suppliers incorporate sustainability into their business strategies. With close to 100 companies directly involved with IMPA ACT, we believe we are on the right track.



IMPROVING RESPONSIBLE SUPPLY CHAIN MANAGEMENT IN THE GLOBAL MARITIME INDUSTRY

IMPA ACT IS AN INITIATIVE OF THE INTERNATIONAL MARINE PURCHASING ASSOCIATION (IMPA) THAT HELPS SHIP OWNERS, OPERATORS AND MARINE SUPPLIERS BUILD SOCIALLY-RESPONSIBLE BUSINESS PRACTICES ALIGNED WITH INTERNATIONAL CSR PRINCIPLES

In practice, IMPA ACT is a management system for supply chain sustainability that offers buyers and suppliers:

ONE. A model Code of Conduct that outlines internationally-endorsed UN demands on responsible conduct that both they and their suppliers are expected to meet.

TWO. An implementation plan for using the Code that inspires companies on how to align the Code's requirements with their supply chain's practice.

THREE. An issue-management plan which has been drafted to enable adequate reactions from the shipping industry whenever operational adverse impacts on social issues are identified.

IMPA ACT Purchaser and Supplier members all receive the following benefits:

- ✓ The full IMPA ACT Supplier Code of Conduct;
- ✓ Promotion on the IMPA ACT website, print and online media;
- ✓ Personalised branding material and certificates of achievement;
- ✓ Regular updates from the IMPA ACT community;
- ✓ A private members' area with advice, templates and guides;
- ✓ The opportunity to look for partners through the initiative;
- ✓ Discounted consultancy and training sessions on CSR;
- ✓ VIP invitations and discounted fees at IMPA ACT events.

By engaging in the IMPA ACT process, buyers and suppliers can collaborate on their journey to compliance with the model Code, benefitting not only from an exchange of best practice and experience, but also from a strengthening of their business relationships.

For more information, visit our website below

impa-act.org

INTU TRAFFORD CENTRE MAKING A MEANINGFUL DIFFERENCE

AIM

intu Trafford Centre's aim was to improve our waste management processes and our environmental footprint whilst ensuring the most cost effective and efficient solutions were implemented today and in the future.

The centre's priorities were;

1. To use a data tracking platform to provide transparent information for the teams involved in waste management, enabling them to manage compliance and identify cost, efficiency and environmental savings.
2. To recycle more cardboard and paper waste and improve recycling ratios whilst reducing the costs of disposal by diverting these types of waste from general waste and energy recovery treatment.
3. To divert more food waste to the on-site food digester, saving on disposal costs and CO2 emissions as well as improving recycling ratios.
4. To divert coffee grounds from disposal and convert it into compost
5. To divert coffee cups to recycling.
6. To continuously improve recycling rates in line with realistic medium- and long-term targets and maintain zero waste to landfill.
7. To introduce creative tenant engagement programmes to support the above initiatives.

ACHIEVEMENTS

1. Implementation of the Don't Waste system to provide accurate and transparent data, track every load leaving site from a compliance perspective and improve reporting to the site and intu.
2. Zero waste to landfill - since project commencement, procurement of good quality service providers, monitoring compliance and of treatment destinations has ensured that no waste

has been sent to landfill.

3. General Waste ratio reduction - from 67.16% of total waste to 61.14% of total waste – a 9% reduction (comparative period Jan – April 18 vs Jan – April 19). Our aim was to reduce general waste as much as possible.
4. Increase in cardboard/paper recovery ratio - from 17.91% of total waste stream to 22.72% of total waste – a 26.83% improvement (comparative period Jan – April 18 vs Jan – April 19). As this is the highest volume recyclable waste stream at shopping centres and the most valuable waste commodity from a rebate perspective, our aim is always to recover as much cardboard and paper as possible from the general waste.
5. Improved diversion of food waste to digester by 121% - 19.2 tonnes over 2018 period (comparative period Jan – April 18 vs Jan – April 19).
6. Annualised cost saving of £10,876 by recycling food waste.
7. Launched the “Cof Free Grounds to Compost” initiative for coffee grounds – 3.4 tonnes converted to compost (recycling) in first two months.
8. Launched paper coffee cup recycling – 2.6 tonnes diverted for recycling in first two months.
9. Waste hierarchy improvements – 11.8% improvement in recycling ratio.
Our Aim was to divert as much waste from recovery to recycling by separating at source and choice of treatment destinations.
10. Implementation of a tenant engagement campaign including newsletters, signage and house rules to drive improvements in recycling and reduce costs

IN DETAIL

WHAT DID THE PROJECT INVOLVE DOING?

The project involved implementing waste management practices, systems and initiatives

WASTE HIERACHY OUTPUTS Jan-Apr 18		
RECYCLING	RECOVERY	DISPOSAL
800.42	928.51	0
46.30%	53.70%	0.00%

that would make substantial improvements to the centres environmental footprint in a cost effective and sustainable manner.

We did this by:

Appointing a Waste Champion to drive the initiative.

The manager would be responsible for project implementation and for ensuring continuous improvements for the future.

Analysing current waste streams to establish for improvement.

We analysed our data looking at waste types segregated within the centre and their performance ratios and determined where improvements could be made.

This analysis revealed that improvements to five areas would lead to major environmental and cost improvements:

1. General waste – the largest category in terms of waste volume, and ratio going mainly to energy recovery rather than recycling, could be reduced by encouraging tenants to separate their waste.
2. Cardboard - this type of waste was targeted for improvement in the amount recycled.
3. Food waste – this was separated with most volume going to food wheelie bins. There was a cost for these collections. Some food was not separated at all by retailers and was still going into general waste. It was agreed to target increasing the amount of food going into to digester. This would reduce the cost of collections for general

WASTE HIERACHY OUTPUTS Jan - Apr 19		
RECYCLING	RECOVERY	DISPOSAL
818.61	771.8	0
51.47%	48.53%	0.00%

waste and food bins and in addition improving recycling figures by reducing the amount of waste going to energy recovery.

4. Coffee grounds were not separated and going mainly into general waste. A decision was made to launch the “CofFree Grounds” to compost project.
5. Paper coffee cups - were not separated in the centre and going mainly to general waste and waste to energy. A decision was made to launch a coffee cup recycling project.

Proactively working with waste management partners to facilitate the strategy

The centre took a more proactive approach in working management, staff, tenants and supplier partners to implement this totally new waste management strategy on site.

Best practice required ongoing communication, education and relationship development with staff and tenants to ensure they were and continue to be engaged, encouraged and thanked for their hard work throughout the process. Retailers were engaged and ongoing communications regarding projects were implemented

Implementing a new waste management system.

We implemented the Don't Waste System as part of our sustainability campaign. The system provides independent, integrated and optimized waste management control systems and services.

This system is designed and established to check, record, regulate, supervise, authenticate, report and (if necessary) restrict on-site waste activities.

The results

All waste transactions are now generated and confirmed via the system so that all control requirements can be met.



All waste duty of care aspects are now controlled via the system for every load leaving site.

Alert functionality warns for any imminent document expiry and audit screens prompt for all paperwork outstanding to close of data on all transactions.

Every load leaving site is confirmed on the mobile app providing us with the ability to reduce the number of empty bins being tipped and charged for.

This provides cost and environmental savings as well as accurate recycling rates. Data is tracked and recorded to actual treatment destinations.

They classified by the way they are treated. Dashboards allow for monitoring of real data and facilitate the management of and focus on areas targeted for improvement.

Environmental benefits of the data (type of waste and treatment options) are quantified and displayed as an incentive and to align efforts to maximum environmental benefits.

The environmental and cost savings to date have been significant. Contamination of bins on site and other breaches of house rules are recorded using the mobile app giving operatives the ability to report issues to management for tenant engagement.

WHY DID YOU DO IT?

The centre felt that whilst major improvements had been made historically, additional improvements could still be made.

inu Trafford took a proactive decision to empower the waste management team and invest in a system, toolkit and infrastructure to fulfil our vision of continual and sustainable improvement.



WHAT DID IT COST AND WHERE DID THE MONEY COME FROM?

No additional funds were spent on these projects. Existing staff were used, and savings on waste costs have been realised. The Don't Waste system costs have been offset by the Green Apple Awards submission savings that have been realised.

The Compost Café has been at nil cost, the staffing has been utilised by increasing productivity. We initially spent £250 on stand and branding

IF QUANTIFIABLE, WHAT DID THE PROJECT ACHIEVE IN TERMS OF SUSTAINABLE DEVELOPMENT, ECONOMY, ENVIRONMENT AND/OR EQUITY?

- Cost savings and environmental improvements have been the outcome of the project.
- 11.8% improvement in recycling ratios.
- £31,710 from improving Cardboard recycling and diverting this from General Waste.
- £10,876 from improving food waste recycling by increased utilisation of the digester.
- £4,122.44 from recycling coffee grounds and paper cups as well as removing this from General Waste.
- Shoppers and public have benefited from free compost and education regarding recycling.

WHO AND WHAT BENEFITED?

Centre, retailers, the general public and environment in equal parts.

LONGER TERM BENEFITS?

Savings will continue to accrue into the future and as collection and or treatment costs increase with inflation, the positive impact of the savings will compound.

WAS THERE ANYTHING INNOVATIVE ABOUT THE PROJECT?

Use of unique systems, and data intelligence. The Compost café initiative is unique to intu,



CAN OTHER ORGANISATIONS/COMMUNITIES BENEFIT FROM IMPLEMENTING YOUR METHODS?

Yes.

WHAT DID YOU LEARN FROM THE PROJECT AND ARE YOU PLANNING ANY FURTHER DEVELOPMENT?

Positive feedback from the staff and tenants shopping centre has been received as the centre is not only achieving its own environmental goals, but also helping the individual organisations to adhere to and achieve their own environmental objectives and policies.

Additional initiatives are continually being addressed, the culture developed is one of continuous improvement.

The Don't Waste system and service provides continuous information and reports to keep goals on track and to highlight additional areas for improvement.

Current ongoing additional improvement projects All treatment outputs off site are monitored to ensure we are aware where all our waste is going. We are also striving to generate a new culture for positive environmental impact and are excited and dedicated to make this a reality and becoming a case study for other shopping centres in the intu portfolio.

JLL GREटना GATEWAY OUTLET VILLAGE GREENER GREटना

AIM

Greटना Gateway is nestled within miles of woodland, horticulture, arable and livestock businesses. It's also close to the Solway Firth marshlands, famous for its diverse wild life. Therefore, the overall aim of the project was to make our footprint as light as possible on our local environment and be the Railpen centre of excellence for sustainability. Railpen at present do not have sustainability targets for its centres so everything we do is above and beyond the client's expectations. Our initial objectives were:

- Reduction of transportation costs and vehicle emissions

- Reduction of waste being sent to EfW
- Reduction of waste being produced onsite.
- To create an income from waste streams that were previously charged by our waste suppliers to remove from site.

I have intentionally not put target percentages on the project for year one as the low hanging fruit will allow large achievements. Percentages have been added for year 2 as we are now working on marginal gains.

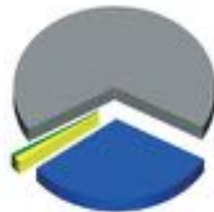
ACHIEVEMENTS

Higher recycling rates and an improvement in the waste hierarchy. (see attached environmental summary).

B&M Waste Services Environmental Report

By Customer/Account

- Non-Site Segregated Recyclate 36,967kg
- Organic Waste 1,350kg
- Refuse Derived Fuel 720kg
- Site Segregated Recyclables 79,713kg



GREटना GATEWAY OUTLET VILLAGE GP LTD ACT

Account Number:

JLL070

Customer Site:

UNIT 1 GREटना GATEWAY

Date Period:

01/07/2017 to 30/09/2017

Below is the environmental report for the waste collected from your site for the above period. This information is calculated from the recording/heavy performance figures provided by the relevant recovery centre/treatment facility that received your waste during this period.

Please note that recycling rates may vary due to alternative tipping sites being utilized at discretion because of operational issues.

Site Segregated Onsite (kg)	Site Segregated Organic Waste (kg)	Site Segregated Recyclables (kg)	Site Non-Segregated Recyclate (kg)	Refused Derived Fuel Process (kg)	Residual Waste (kg)	Total Collection Weight (kg)	Total Percentage Recycled/Recovered
0	1350	79713	36967	720	0	118815	100%

Carbon Footprint Limited Endorsement

Carbon Footprint Limited have endorsed the service provided by B&M Waste and agents, which has reduced your indirect carbon emissions through landfill diversion. These carbon savings equate to:

Carbon saved (kg):

44219.89

Equivalent no. of trees saved:

57.50

Equivalent car miles saved*:

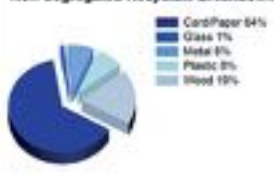
13579.14

*Car miles based on a standard 2.0 litre diesel

Refuse Derived Fuel (RDF) Process Breakdown



Non-Segregated Recyclate Breakdown



This pie chart represents the typical composition of the RDF process. Recyclable materials are recovered prior to fuel preparation.

This pie chart represents the typical composition of the recovered materials processed through a Materials Recovery Facility.

B&M Waste Services, Iris House, Dock Road South, Bramborough, Wimal, CH62 4SD
Telephone: 0151 346 2900 Fax: 0151 346 1329 Email: info@bagnallandsons.com
Registered in England: 3479390 VAT No: 793 8746 37



Initial cost savings of 10% with further savings expected in year 2.

Reduced transportation equalling lower omissions. Previously 48 x 1100 litre bins, 33 x 8 cubic meter bins and 4 x 240 litre bins were collected weekly from site. This has been reduced to just the collection of the new compactor on an average of once every two weeks and a weekly collection of food waste (four bins).

New income streams for cardboard and plastics estimated at £4,000 for year one. Reduction in waste sent to energy recovery with the introduction of segregated waste streams including, Wood, metal, plastics, cardboard, chewing gum, coffee cups and cigarette ends. These are all separated and sent to be recycled.

Wood, plastic, metal and cardboard is collected from the retailer by our team in an electric vehicle. Coffee cups are removed from general waste and sent back through Costa coffee for recycling. Chewing gum and cigarettes are emptied from collection points and sent via mail to be recycled. Prevention/minimisation

of waste has also been accomplished with a water bottle refill scheme running with the centres F&B retailers.

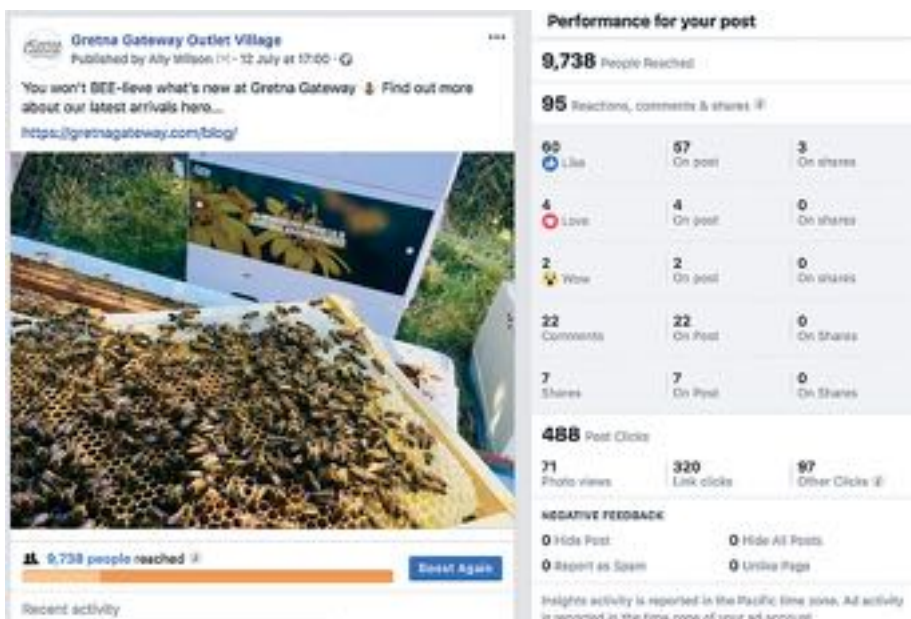
IN DETAIL

Prior to this project the centre utilised 85 separate bins for general waste and mixed recycling. These required weekly collection and took up a lot of space around the service yards. Most of the volume transported to our waste plant was air.

To counter this, we brought in a static waste compactor and two mill sized balers for cardboard and plastic film. New smaller bins were provided for each retailer and each waste stream is collected when required by our onsite team who use a clean electric vehicle. All equipment and labour were purchased for 10% less per annum than the original contract price with the addition of being far more environmentally friendly.

General waste is emptied into the compactor which obviously reduces the volume and the need for collections and this is again reduced by the removal of cardboard, plastic film, wood, metal, coffee cups, glass, Cigarette stubs and bubble gum are also

removed from the bins and sent away for recycling into various products such as new collection containers, wellington boots and stationary. The added benefit is the saving in clean up fees for malls and pavements. Site segregated recycling is high. Out of the 81,216 kgs of waste produced in Q1 only 0.71% was used as refuse derived fuel. All other streams are recycled.



Not only has this resulted in revenue streams coming back to the service charge estimated at £4000 for year one but it has also greatly reduced our indirect carbon omissions. Revenue for recycling is being pushed into other sustainability projects. This year it has been used to buy 4 bee hives.

In January 2018 alone, the centre diverted 30 tonnes of waste from landfill. This meant 33,000kg of carbon emissions were avoided which is the equivalent of more than 28 tree and 8,500 car miles. Our waste is now zero to landfill and less reliant on sending waste to EfW plants improving our waste hierarchy strategy.

Working closely with B&M and Andron this process has been efficiently managed and after some

training, our retailers have all supported this venture by segregating waste prior to collection. B&M have used the centre as a case study to promote their business and our aim is to be recognised as Railpens environmental centre of excellence. Going forward we are looking at expanding our recycled waste streams including cans and plastic bottles and the dehydration of food waste.

The project has been well received by our retailers and we are about to start taking these projects out to schools and the community, but we wanted to get them operationally established first. I think it is important to show that even smaller centres (125,000 square feet) can fit recycling areas into their properties if well planned and managed.



**Gretna
Gateway**
Outlet Village



JLL 8-10 GREAT GEORGE STREET 27 SOHO SQUARE – SMART BUILDING INSIGHTS

AIM

Carbon Credentials developed the innovative Smart Building Insights programme which was employed by JLL on behalf of Hermes, in order to strategically evaluate opportunities at minimal risk. Notable for its small central HVAC plant which limits the impact of standard BMS optimisation programmes, 27 Soho Square was recognised by JLL and Carbon Credentials to be an ideal Proof of Concept (POC) site to trial the Smart Building Insights programme when it was initially launched.

The project aim was to improve visibility on energy performance and intelligently control and reduce energy and maintenance costs, as well as reducing carbon emissions and improving occupant comfort conditions.

The comfort conditions at 27 Soho Square required analysis to be carried out to indicate the potential for improvement. A preliminary site POC analysis

identified that this could be achieved through analysis of site data, leading to operational efficiency and occupant comfort.

Comfort conditions through air quality and thermal control, were to be monitored in several different areas of a participating occupier floor (Dawn Capital) to understand how the workspace is used and perceived by occupants, monitoring temperature, humidity, motion, brightness and CO2 levels.

ACHIEVEMENTS

The smart building trial at 27 Soho Square added value to JLL on three fronts; productivity, comfort, and energy performance.

- Productivity has been improved through a greater understanding of how air quality affects JLL's occupant productivity and the actions that can be taken to improve productivity.
- Occupant comfort was enhanced by understanding the root cause of building comfort issues and how



The Process Overview



to increase occupant satisfaction, with the aim to boost employee retention.

- By thoroughly understanding the building's performance using analytics previously unavailable from the old BMS the energy performance could be assessed and any issues identified and solved.

Improvements at 27 Soho Square were implemented as of May 2018. By April 2019, the programme had generated valuable data, allowing opportunities to create a more productive and comfortable workplace and better performing building energy performance. This success is based upon a combination of innovative technology, robust processes and proactive collaboration.

In addition to the reduction in energy use and consequent spend and carbon emissions, better control and smart use of the HVAC plant at 27 Soho Square has reduced the occurrence of faults and increased the lifetime of the equipment. This, in turn, has reduced maintenance costs/expenditure when replacing broken equipment.

IN DETAIL

Background

JLL is an international commercial real estate advisory firm. Acting as a managing agent for real

estate in excess of 2 billion square feet across 68 countries. The firm conducts the management of buildings in accordance with their mission to 'maximize the potential of property to accelerate success of our clients and our people'. Carbon Credentials has worked closely with JLL and Hermes Investment Management for many years to optimise their buildings and create spaces that people love to work and stay in. There have been several successfully implemented Collaborative Asset Performance Projects (CAPP) – a programme which looks to optimise building performance – across the JLL portfolio. Carbon Credentials and JLL sought to improve the visibility on energy as well as intelligently control and reduce maintenance costs, energy use and costs, and carbon emissions for JLL which will then result in improved occupant comfort conditions at 27 Soho Square.

The objective of the project was to evaluate the following:

- Current impacts of air quality and thermal controls
- To explore how Carbon Credentials' approach created a positive branding story for JLL
- To improve office conditions and productivity for JLL's valuable assets: its people, whilst saving costs and carbon emissions.

The trial involved the installation of wireless sensors across the POC site and the analysis of collected data over a continuous 30-day period, 24 hours per day. Key plant activity and output were measured, along with comfort conditions (air quality temperature, humidity, occupancy) in office areas and meetings rooms. Sensors were connected wirelessly to a secure Smart Building Insight gateway for secure data storage and external analysis.

Comfort conditions were to be monitored in several different areas of trial tenants, Dawn Capital, to understand how workspace is used and perceived by occupants, monitoring temperature, humidity, motion, brightness, CO2 levels.



Carbon Credentials achieved these objectives alongside JLL by utilising analytics, data monitoring and alerts and a dashboard and microsite. Powerful analytics with a simple, clean visual assisted in understanding the comfort patterns and anomalies of JLL's building workspace. Live data monitoring and alerts, which are accessible 24/7 online, provides the ability to keep track of key metrics. A summary dashboard and customisable microsite were shared across teams and departments for the purpose of real-time awareness and engagement (see example below).

The Process Overview

Improving Productivity, Comfort & Energy Performance Management at Soho Square

By monitoring the comfort conditions (temperature, humidity, motion, brightness and CO2 levels) of five different workspaces of the occupant, Carbon Credentials was able to understand how these spaces are used and perceived by occupants. For instance, during a site review, it was recognised that temperatures drop on cold nights, particularly in meeting rooms on the east side of the building, whereas the open work area and kitchen maintain

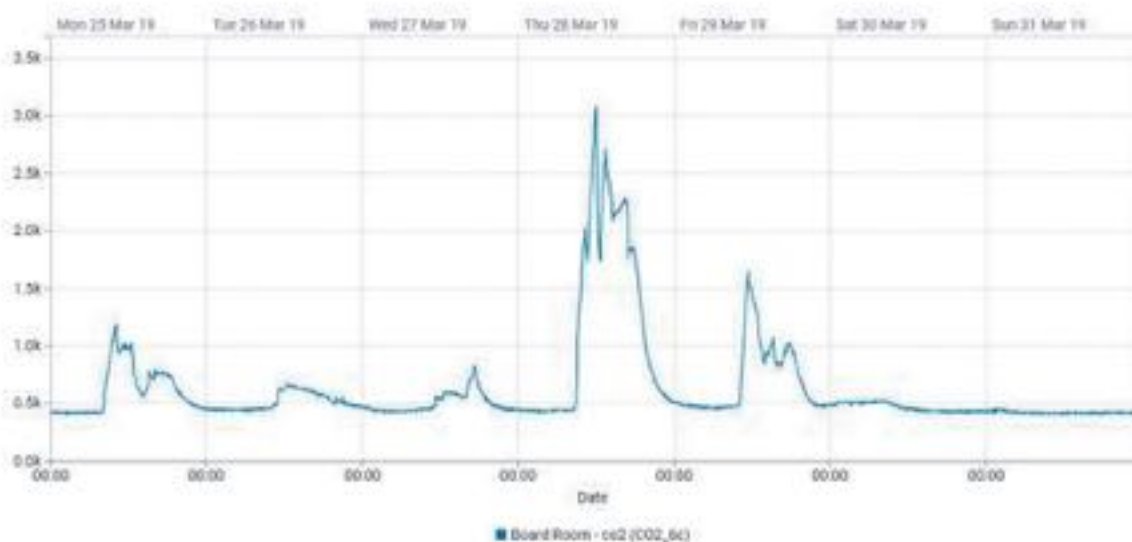
heat better. This was identified by the site review team to be due to better mechanical ventilation in open areas, or certain VRF units being in operation 24/7.

The following floor map and highlighted occupant rooms were then analysed to identify Smart Building Insight opportunities.

The real-time analysis provided details insights into the 5 workspaces utilised by Dawn Capital. By observing the boardroom (1) and meeting room (2), insights reveal that these rooms contain plenty of natural light, where artificial lighting would (due to motion sensors or good practice) frequently turn off when the rooms became unoccupied. In addition, CO2 levels would peak at over 3000ppm during times of frequent occupancy.

By observing the casual meeting room (3) insights revealed that artificial lighting would switch on and off each day and night, including weekends, despite infrequent use.

Equally, observing the Open Work Area (4), insights revealed its constant usage during the day, with partial lighting switching off when not in use,



but continued lighting overnight. This room also showed generally low CO2 levels (400 to 650 ppm), making the Open Work Area an optimal space for productivity.

In addition to these room-specific insights, three further key smart insights were communicated to JLL in order to optimise Dawn Capital's overall workspace. The first was that night heating setback provided an opportunity to save energy cost, this was achieved by reviewing the VRF schedule and revising schedules or set points at night. Lighting controls were identified to be a further opportunity to save energy costs. By investigating control improvements in the casual meeting room and open work area, lighting controls continue to be addressed. Finally, it was found that busy meetings cause high CO2 levels and that the occupants should consider opening a window or door in order to maintain fresh air and clear minds.

Financial Benefits

The financial value of Smart Buildings was realised at three levels for JLL. Each level is at least an order of magnitude larger than the one below it. Traditionally, smart building projects have focused on the 'Facility' level, particularly measuring energy and cost savings arising from reduced consumption. However, this Smart Building trial provides substantially more value to JLL than the measurable energy savings metric.

Outcomes

This dynamic, real-time analysis of Dawn Capital's workspace represents a leading new approach to cost control and management of worker wellbeing.

Its sustainable output is clearly measured through financial benefits, reduced electricity and heating costs for 27 Soho Square and follow on reduction in plant maintenance costs.

JLL 8-10 GREAT GEORGE STREET BRINGING THE FIRST RESET™ AIR – CORE AND SHELL TO EUROPE AND THIRD IN THE WORLD: 33 GLASSHOUSE STREET

AIM

Building on a successful collaborative BMS optimisation programme at 33 Glasshouse St (CAPP) which had unlocked some of the potential for maximising tenant comfort by way of temperature control, JLL, the managing agent, wanted to take this further and implement the RESET™ Air – Core & Shell, as a mark of best practice for ensuring tenant comfort and increasing occupier engagement.

The project was a collaborative project between all stakeholders to implement and achieve a RESET Core and Shell certification at 33 Glasshouse Street. The strong, communicative and open collaboration from the CAPP programme provided an excellent foundation from the outset. Communication was key to achieving the certification as the air quality RESET™ readings are extremely sensitive and any changes would need to be addressed quickly to achieve and maintain certification.

The aim of achieving a RESET™ certification is twofold in that it aims to certify and maintain air quality to an international standard but also as a tool to engage occupiers and enhance their experience of working in the space. Improving tenant wellbeing is linked to better tenant retention and productivity which in turn drives business value.

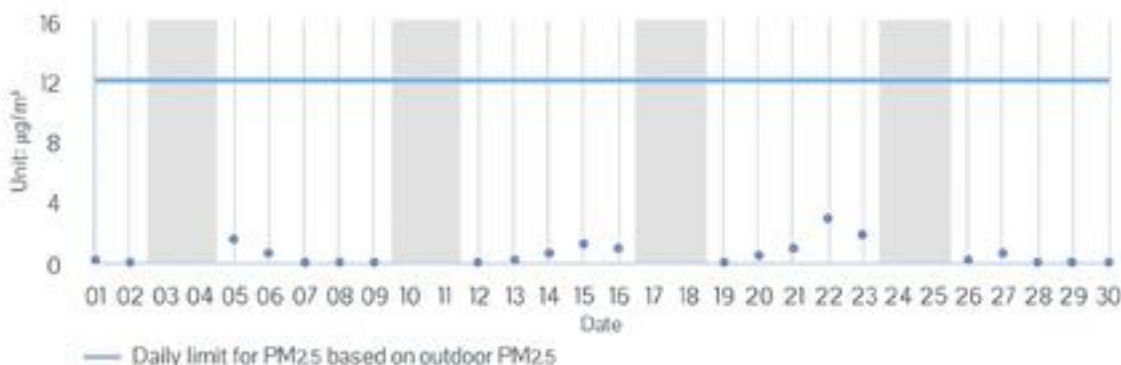
ACHIEVEMENTS

As of December 2018, 33 Glasshouse St was awarded its certification having met the requirements of the standard. This meant it became the first RESET™ Core and Shell Project in Europe and third in the world. Multiple stakeholders worked and continue to work collaboratively to deliver the RESET™ and Wellbeing programme to a high standard for the benefit of the managing agent and the tenants. The requirements of the standard are to maintain certain pollutants below specific thresholds. These are; CO₂, (below 800ppm), Particulates (below

PM_{2.5} Indoor Daily Average

For a Core & Shell project, PM_{2.5} readings must be $\leq 12 \mu\text{g}/\text{m}^3$ or if the average outdoor PM_{2.5} is $>48 \mu\text{g}/\text{m}^3$, $\leq 25\%$ outdoor PM_{2.5}. Indoor monitors are paired with outdoor monitors. The graphs below show an outdoor monitor's daily limits in the form of a line and the daily average of the paired monitors in the form of dots.

* Each dot represents a daily average from a monitor



12µg/m³) and VOC's (below 400µg/m³). There is also a requirement to monitor temperature and humidity.

Recognition within the industry and credibility for all stakeholders to cement their purpose to lead innovation and optimisation in their businesses, reduce their environmental impact and improve the occupier experience.

IN DETAIL

Background

Air quality is increasingly being put in the spotlight when we talk about health and wellbeing. The Mayor of London's campaign to improve the outdoor air quality of London's streets has rightfully received a lot of public support and attention. But what about when you come in off the street and into your office building? What then is being done to monitor air quality and why does it matter?

There is increasing awareness that the design and operation of buildings affects the health and wellbeing of occupiers. Staff typically account for 90% of business operating costs, so small improvements in productivity deliver significant benefits and there is increasing tenant demand for office space that promotes staff health and wellbeing. Improving and maintaining the air quality in this workspace would provide the opportunity to improve tenant productivity and comfort.

Carbon Credentials has previously worked closely with JLL, managing agent of 33 Glasshouse Street, to achieve a successful CAPP programme that has reduced energy and maintenance costs, increased asset value, and improved occupier productivity and wellbeing.

Following the success of this project, JLL signed off a programme that would improve the air quality at Glasshouse St, maximise tenant wellbeing and productivity, and ensure that the building provides a healthy environment in the long term, continuing on its journey to becoming a Smart Building. 33

Glasshouse Street consists of office space above 100 Regent Street, on the north side of John Nash's iconic curve, just north of Piccadilly Circus. The building underwent a major refurbishment in 2015/16, redeveloping the entire office core, including new and efficient central plant.

The offices notably sit above an area of continuous high traffic density, in a zone which is often perceived as having an elevated level of local air pollution. This made the site an ideal, if not challenging, location to pilot RESET™ as an engagement tool with building occupiers.

About RESET

RESET™ Air - Core & Shell tracks and communicates the health performance of buildings using real-time data monitoring. This helps owners attract occupiers, maintain asset value, and reduce the potential liability associated with underperforming buildings.

RESET ensures that the air provided by the central plant to building occupiers meets high performance standards. It does this by monitoring and reporting levels of recognised pollutants, specifically; particulate matter (PM2.5), carbon dioxide (CO₂), and Volatile Organic Compounds (VOCs) in the outside air supply. This ensures that these pollutants are maintained below the strict standards within the programme; below levels considered to adversely affect human health, wellbeing and productivity.

RESET Core and Shell at 33 Glasshouse Street: Smart Buildings in Action

Carbon Credentials is a RESET™ Cloud Certified data partner and will install RESET™ Class B accredited sensors for the project. In Stage One we configure and calibrate the sensors for a secure and encrypted direct data feed to ADAPt, our data management platform. There is extensive off-site testing before provision to the installation team.

To maintain RESET™ Air - Core & Shell, the air is actively monitored, with samples taken every 15

minutes. This data is analysed by Carbon Credentials' ADAPt data platform, with alarms sent to facilities managers if any issues are detected so that they can respond quickly. There are two multi-sensors at 33 Glasshouse Street, monitoring the required outdoor and indoor air quality indicators. They are located close to the intake, and downstream of, the main Air Handling Unit, to meet the RESET™ standard for sensor arrangement.



RESET™ Air - Core & Shell works in conjunction with the CAPP that JLL has already put in place, where settings and controls in the Building Management System (BMS) are actively monitored. JLL's decision to further optimise the opportunities for data at Glasshouse Street such as linking the latest sensor technology to the BMS and ADAPt data platform makes this landmark office space a positive example of smart buildings in action. For instance, the team improved CO2 levels by optimising air recirculation for heat recovery based on actual data rather than standardised calculations.

As a result of this collaborative effort we are proud to say that as of the November 2018 33 Glasshouse Street was awarded its RESET™ Core and Shell certification, ensuring the air quality at the site to an international standard.

Key benefits: Using robust data to drive engagement

A key benefit of the RESET™ programme is the

engagement that can be leveraged with tenants through live data displayed on dashboards. To show live data at 15-minute intervals, the data flow needs to be very robust, with no gaps in data handling. Hardware and data transfer systems must also be detailed and have resilience, which requires a lot of testing, not just of the sensors but of data transfer and calculation.

At 33 Glasshouse Street, real-time air quality data will soon be available to occupiers via a screen in the reception area. This is a positive way of engaging with occupiers on air quality and demonstrating quality management in their building. The communication of the health performance of buildings using real-time data monitoring will help JLL attract better tenants, maintain asset value, reduce the potential liability associated

with underperforming buildings and demonstrated quality management from JLL in their buildings on an ongoing basis.

Sitting above Regent Street, particulates were an area of interest at 33 Glasshouse Street. Data from November, shown in the chart below, evidences that indoor air quality significantly outperforms standard industry benchmarks, used by both RESET™ and the WELL Building Standard.

What achieving RESET™ Core and Shell means to JLL:

Tim Hutchen, Director - Property & Asset Management, JLL: "RESET™ offers us the ability not just to demonstrate that we are undertaking air quality monitoring, but to benchmark the quality level it is sustained at. While much of the market may audit air quality, far fewer will be able to show compliance with benchmarks. This is a really exciting initiative and we are delighted to have achieved this."

JLL CHURCHILL SQUARE SHOPPING CENTRE BREAK THE BAG HABIT

AIM

With many landlords in the industry focusing on social value and sustainability initiatives, Aberdeen Standard Investments is no different. As one of their leading shopping centres, Churchill Square in Brighton had an opportunity to lead the way and take charge around the conversation of plastic.

'Break the Bag Habit' was one overall campaign that encompassed three different initiatives that tied together to educate, engage, and ultimately change the habits of shoppers.

The aim of 'Break the Bag Habit' was to bring customers, Centre Management and store staff together to make a change through a community driven initiative such as local beach cleans on Brighton beach. Then utilising the waste collected to install a bespoke art installation that would serve as a further reminder about the damage our waste

is doing to our oceans. The art installation formed a talking point, and information boards surrounding the site provided further education and stats.

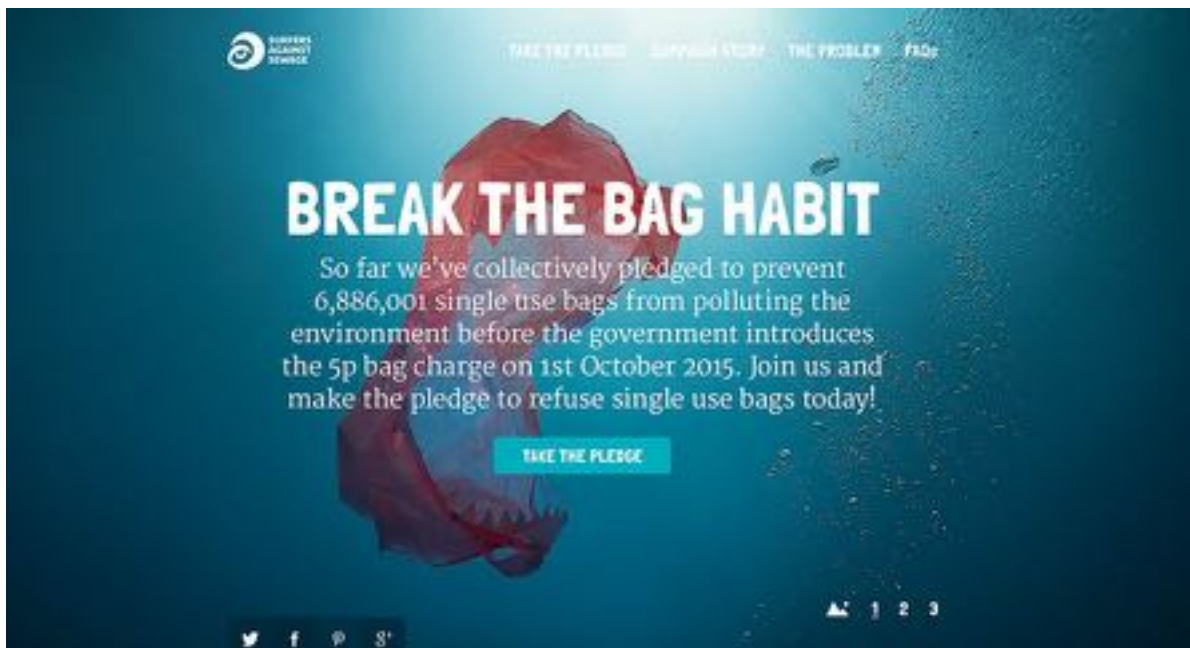
The final aim of the campaign was to take a stand on World Environment Day – Wednesday 5th June, as the first UK shopping centre to remove plastic bags from its retailers and replace them with reusable tote bags for shoppers to use time and time again.

ACHIEVEMENTS

Our Brighton Beach Cleans saw us partner with Sea Life Centre in Brighton over 4 days during the first May bank holiday.

Over 170 people helped us collect over 75kg in waste.

100 members of public joined and 70 members of staff from Shopping Centre took part.



Our bespoke installation was installed on Saturday 1st June until Sunday 9th June and promoted across social media alongside our removal of plastic bags from retailers on World Environment Day, Wednesday 5th June.

Total figures for engagement across our social media platforms during the week saw

Engagements: 2,001

Impressions 182,889

Reach 291,456

Total PR reach for the campaign was 128,412

88% of retailers took part (please note we discounted our food retailers)

25,000 re-useable tote bags were handed out as part of the campaign.

Brighton based bloggers Zoella and Alfie Deyes with a combined audience of 8.6million featured one of the bags on their vlog. This was purely organic and not a paid for promotion

100% positive feedback from retailers taking part in the campaign

IN DETAIL

- Planning for Break the Bag Habit started in early 2019, with initial meetings with Sea Life Brighton in early March. Our meeting served as an education for the team around beach cleans, tide times, equipment required, and Sea Life waste management.
- The May bank holiday weekend was chosen to take advantage of the long weekend, totalling four days of collection.
- Beach clean places were bookable online via Eventbrite, this allowed us to keep control of numbers to ensure we would have enough supervision for safe collection and equipment. Days were capped at 60 – 70 participants only
- The final day Beach clean tickets sold out
- Waste collected was sorted via Sea Life's internal team as they have to make note of everything collected for conservation.
- Local teenagers which a keen interest in sustainability initiatives who took part in the beach clean volunteered to help the team with the art installation.
- Our bespoke installation was on display from Saturday 1st June to Sunday 9th June alongside 6 notice boards which detailed the beach cleans and how the installation had been formed. Alongside this was information about plastic waste found in oceans, and how to live more sustainably.
- The cost of the Beach cleans, bespoke art installation, and information panels was £8,000 which came from the Marketing Budget as part of our campaign
- ASI invested a further £18,000 as they believed and supported our project to be the first shopping Centre in the UK to remove plastic bags from the scheme for World Environment Day. With the money provided we were able to purchase 25,000 re-useable tote bags.
- The Churchill Square brand prides itself of being positive, cheeky and inclusive so to ensure our brand TOV and presence translated across to this campaign, our tote bags were designed with the text 'I'm totes judging your plastic bag' on them with the Churchill Square logo.
- 88% of retailers took part, our focus was on all fashion retailers and accessories. Our food outlets were discounted due to their nature. Those who didn't take part – Urban Outfitters had their own tote bags. Zara and H&M used their paper bags, however we engaged heavily with their HO to go through a number of approval levels.
- The Head of Sustainability from H&M called centre directly to say they thought the initiative was great, but that it needed sign off from Sweden to remove their branded bags, and they didn't have enough time.
- Goldsmiths HO replaced the Brighton stores plastic jewellery repair bags with branded cloth bags and pledged to never return to plastic. They are seeing how the Brighton store fares before looking at running out company wide.



- Watch brand Oris contacted Goldsmiths directly to ask if they would be taking part in our campaign, and if so, they would provide them with the Oris Clean Ocean limited edition and their Great Barrier Reef III limited edition watches exclusively instore.
- Brighton based blogger and vlogger Zoella and her boyfriend Alfie Deyes featured the Churchill Square bag on a vlog. They have a combined audience of 8.6 million subscribers and the video has been watched 358,186 times
- For the week (1st June to 9th June) all content across our social platforms and targeted HTMLs covered only sustainable and eco initiatives which are retailers offers. Shining a light on a number of products customers might not have realised. Such as;
- Children's shoes from Clarks made entirely of recycled ocean plastic.
- Lakeland held workshops through the day on how to live more sustainable with their reusable products
- LEGO brought in their plant-based bricks for workshops
- SoleTrader promoted their vegan leather range
- A video was created to capture the full campaign and final outputs, this was then used to further promote the campaign on social media and with local press.
- Break the Bag Habit resonated with the local community, the engagement was both inspiring and has opened the conversation of what we can do next, or whether we can remove plastic longer term.
- Retailer feedback has been incredibly positive;
- **Yankee Candle**
'We had the bags hung on the entrance to the store and we had so many people come in and ask if they could buy one! We told them they could have one for free if they bought anything in store, so it definitely helped drive customers in store.'
- **H Samuel**
'I'm pleased we took part and were united as a centre! If we hadn't of taken part, we would have really stood out. Well done, great idea!'

- **Lakeland**

'What a lovely campaign! We actually going to reduce the amount of sizes of the plastic bags we order in store, as your bags proved we don't have to have lots of sizes. We were up 5% during the campaign.'

- **Footasylum**

'The beach cleans are a no brainer when the beach is on our doorstep, it's great for us to drive this being that we have such a prominent presence in the city. We should do these more often! Customers loved the bags too; we saw them all round Brighton and we were up 2% WoW.'

- **Footlocker**

'Customers loved the bags and the message as to why we were giving them out. It also opened up conversation with customers when we told them about it was for World Environment Day and all stores were giving them to customers, we were being asked about what Vegan or environmentally friendly shoes do we sell etc and people were taking a huge interest in what we sell that were sustainable. Our sales were up 9.2% YoY

- **Hollister**

"The whole campaign was so good! Our customers loved the bags and also the quote on the bag was so cheeky - many people commented how they loved this. Would love to see more amazing initiatives like this"

KEELHAM FARM SHOP VEG EXCHANGE SCHEME



AIM

- Combat food waste
- For Keelham to be a successful business model that contributes to community and produces profits with purpose, supporting the local economy and the environment
- Help customers to be more eco-friendly

ACHIEVEMENTS

- 634 Veg Exchange transactions in the Skipton shop since it opened in 2015
- Two awards national awards won in 2018, with commitment to environmental causes a significant factor

IN DETAIL

Keelham Farm Shop's Veg Exchange programme has revolutionised the way that local people in Craven produce and purchase their fresh veg.

The Veg Exchange scheme lets customers bring home-grown surplus fruit and veg to Keelham where it is sold on their behalf, in return for credit. Now in its tenth year since it started at Keelham's Thornton shop, the Craven community has taken the scheme into their hearts, and there has been 634 Veg Exchange transactions at the Skipton shop since it opened in 2015.

Roger Baert was the first Keelham customer to sign-up for the scheme. Roger's three redcurrant bushes were producing up to 20,000 currants per season, and despite him using the crops to brew his own homemade wine, thousands of the berries were going unused. Roger saw an advert for the Veg Exchange in his local paper and decided to take down his glut of redcurrants.

He has since provided Keelham with raspberries, gooseberries, blackcurrants, strawberries and a variety of herbs, all fresh from his garden.

It's not just through the Veg Exchange scheme that Keelham is combating food waste. All waste is recycled; even bones go to customers for dogs and greens go to the Keelham sheep.



Unlike the supermarkets, there are no best before dates on fruit and veg. Keelham is passionate about helping its customers be more environmentally friendly and educating them on how they can better reuse and recycle.

Customers are encouraged to buy just what they need rather than throw away any excess; this means Keelham never put multi buy deals on fresh food, and the majority of fruit and veg in the shop is sold loose so that customers can buy as much or as little produce as they need. It's the same with baked goods, biscuits, grains, herbs, nuts and pulses; all are sold loosely to avoid waste.

As well as reducing food waste, Keelham is also committed to reducing its impact on the

environment. When the Skipton shop was built in 2015, Keelham chose to renovate and

repurpose the former Nicholas Smith garage rather than erecting a brand-new building. The shop has sedum walls and roofs and the heat that is reclaimed from the refrigeration system is used to heat the water and team areas.

On site, photovoltaic solar panels support the production of electricity and composting reduces food going to landfill sites. The shop also provides bottle banks, recycling areas and charitable collection points for clothes.

Keelham is also giving its own team a hand with becoming more environmentally conscious. The team are encouraged to cycle to work with the national Cyclescheme - an employee benefit that saves staff up to 39% off the cost of a bike and accessories - and there are recycling bins in every office.

Keelham's commitment to sustainability, to protect the environment on which farming and food production in Yorkshire is built, was a key factor in the shop winning two national awards in 2018: 'Best Farm Shop' at the Guild of Fine Food Shop of the Year and 'Independent Retailer of the Year' at the Fresh Awards, helping to put Skipton and Yorkshire on the map for great tasting fresh food.



KELTBRAY RAIL THE ECO VILLAGE

AIM

Keltbray Rail works on the design and installation of railway infrastructure and is currently working as the Principal Contractor for P2R-GE-ATF Crossrail project, Bow to Shenfield.

The project scope includes working on overhead line equipment and relies on the availability of track possession when no trains are running to do essential works, with the Christmas period an important opportunity for delivering work. To optimise work output during this crucial time, a welfare compound was required proximal to the work site. No access to electrical mains was available so site operation was reliant on a diesel generator for energy supply. Due to the sites longevity and requirements to operate 24 hours a day, local stakeholders would inevitably be

subjected to nuisance outside normal working hours and during the sensitive Christmas holiday season.

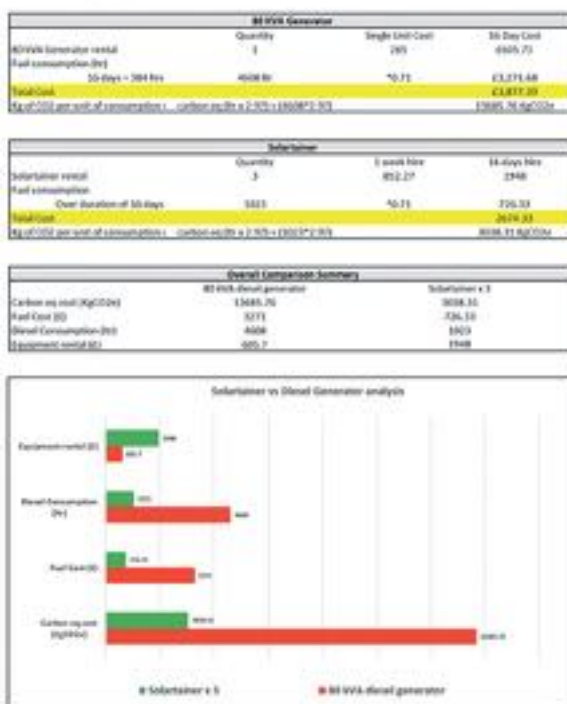
To maximise sustainability and minimise potential nuisance, the Project Manager (Lee Poole), with the HSQE Lead (James Brown) and Environmental Advisor (Helen O’Keeffe) were inspired to design ‘The Eco Village’. The aim of The Eco Village was to trial and showcase sustainable alternatives for a typical site compound, aiming to run with minimal noise and fuel use and therefore benefiting the local community both environmentally and socially.

ACHIEVEMENTS

The Eco Village was successful in:

- Increasing the sense of environmental conscience within the organisations culture. This was demonstrated by the shift reports and testimonials received. Positive comments and suggestions highlighted staff members enthusiasm in conserving energy.
- Providing adequate and continuous facilities to the project team.
- Minimising diesel consumption and carbon cost; choosing to use Solartainers and TCP lights instead of a 80kVA generator and diesel powered tower lights reduced consumption by 5285 litres. This is a carbon saving of 77.8% and equivalent to 15696.45 kg CO₂e.
- Increasing the number of ‘silent hours’ at the site compound was achieved. The TCP lights operating silently 100% of the time. The built in batteries and solar within the Solartainers reduced noise pollution by 63% per unit.
- No complaints were received from any stakeholders.
- Running the compound at a lower cost was achieved. Considering rent and fuel costs, the Solartainer worked out to save the project £1202,

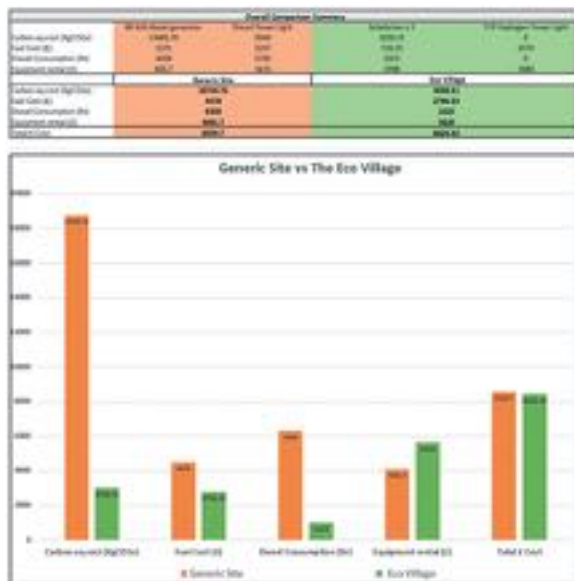
80 kVA diesel generator vs Solartainer



although, the TCP lighting was more expensive when compared to generic tower lighting, costing the project £1066 more to operate. However, when both products are considered together, the project saved a total of £135.

IN DETAIL

This project involved the setup of an Eco Village (EV) as opposed to the usual site compound. This was done with the aim to reduce the negative environmental impact associated with a site compound and increase sustainability.



The key objectives to achieve the aim were as follows:

- Interview the project team on an 'off the shelf' generic compound set-up
- Summarise and analyse the generic compound in terms of its financial cost and its potential environmental and social impacts
- Identify alternative, more sustainable options capable of delivering on the requirements of the site, but with a reduced negative impact compared to the generic site
- Implement alternative solutions to create an EV

and raise the environmental awareness of staff. The deliverables to achieve this aim were:

1. Increase the sense of environmental conscience within the organisations culture
2. Provide adequate and continuous facilities to the team for a 16-day period
3. Minimise fuel consumption and carbon cost
4. Reduce noise pollution
5. Receive zero complaints from stakeholders
6. Run the compound at an equal or lower cost when compared to a generic site compound

All listed deliverables were aligned to improve the sustainability of the project; however, in order for the EV to be economically sustainable and repeatable in the future, the cost of the EV needed to work out equal or cheaper than a generic site compound. This was important as the funds for the EV were constrained by the original budget.

The first task was to interview the project manager who outlined the requirements, comprising a gatehouse, canteen, drying room, toilet facilities and offices. The compound was to facilitate up to 40 people at any one time, operating 24 hours a day for 16 days.

A meeting with the site manager helped summarise what would need to be hired to deliver the project manager's needs. Normally, one 80 kVA generator would have been hired along with ten diesel generated tower lights.

The HSQE team then worked to identify alternative technologies to maximise the sustainability performance.

When identifying new products, the focus was on:

- Would this product ensure less diesel consumption?
- Would this product operate at a lower noise level?
- Would choosing this product support local and innovative industry?



- Would this product increase the level of 'environmental pride' within the team, thus empowering the team to become more environmentally conscious?

After research and comparative analysis, the HSQE team chose to implement two innovative alternative technologies to optimise the sustainability of the project.

The first technology was Solartainer as an alternative to a 80 kVA generator. A Solartainer is a hybrid unit comprising solar panels, storage batteries and a diesel generator. Ideally, the unit powers the site during daylight hours by capturing solar energy. When solar is not available or when energy requirements exceed that of what is available from the sun, the diesel generator will automatically kick-in to provide additional power.

The storage battery is simultaneously charged while the diesel generator is in operation, thus optimising

fuel use and efficiency. The pre-charged batteries can then be used at night, which ultimately leads to a decrease in fuel requirements and minimisation of noise nuisance.

The Solartainer units were provided by Gaia, a small to medium enterprise (SME) located in Wales and based near to our Rail depot. The team were keen to support an innovative company and after a successful trial at the EV, would be keen to adopt on our other projects in Wales. The cost of hiring and operating three Solartainers over the period amounted to £2674.33, whereas the total cost of operating an 80kVA generator was estimated at £3877.39. Therefore, choosing to use the sustainable alternative saved the project £1203.06.

Visually, the Solartainer units communicated a clear message to stakeholders that Keltbray valued sustainability and was committed to reducing emissions.

Ecolite hydrogen tower lights were used as an alternative to diesel-operated lights. These lights were successful in providing uninterrupted lighting at night. The lights operated on automatic mode, meaning that they turned on and off depending on the sunlight, thus also providing further fuel savings.

The lights were provided by TCP, a SME based in Essex and local to the project, thus supporting local industry. The major advantage of choosing hydrogen over diesel units was the zero noise or carbon emissions.

Regarding cost, the diesel tower lights would have cost the project an estimated £4683, whereas the TCP hydrogen tower lights cost £5750. Therefore, the sustainable alternative worked out £1066 more expensive than the generic option.

When both alternative products are considered together, the project saved a total of £135.37 by choosing environmentally sustainable alternatives.

The carbon equivalent was calculated to quantify environmental savings. For the generic site, the associated carbon was estimated at 18734 kgCO₂e. The EV was calculated to cost 3038 kgCO₂e, therefore the carbon saving is estimated at 15696 kgCO₂e. The number of silent hours are also indicative of environmental gain. A 100% noise reduction was achieved through using TCP lights. In addition, the batteries and the solar power reduced the need to operate the internal generator within the solartainers, resulting in an average of 63% decrease in noise pollution per unit. As an added good practice, the project pledged to plant one tree for each close-call raised, done in conjunction with Green Earth Appeal, a not-for profit social enterprise promoting sustainability and productivity in rural communities in developing countries. This good practice led to the planting of 315 trees.

Lessons learned for future EV projects include:

1. Early planning is essential due to limitations within the supply chain
2. Sites often overestimate their energy demand. Without the intervention of the HSQE department, this site would have been powered by a 80 kVA generator, however in hindsight a 60 kVA generator would have been sufficient. Overestimating the energy demands of the site increases fuel usage and therefore carbon emissions.

The good practices achieved through implementation of The EV can be replicated across Keltbray companies, as well as other contractors to deliver significant and measurable environmental gains.

KELTBRAY STRUCTURES BOROUGH YARDS

AIM

The aim of the project was to improve how concrete waste is managed on site to reduce the water required from the concrete supply chain, reduce the skips required to dispose of concrete waste and to improve our overall day-to-day procedures for managing concrete waste.

Most new commercial buildings are built using concrete as the base material, but before concrete is actually bought to site for the designed building there are a number of steps prior to this, which if not managed properly can have a significant impact on the environment. These concern the distribution

These multiple processes required also present a significant environmental risk, as concrete wash water has a high level of PH which makes it alkaline and this presents significant risks to local land and water. This project aimed to manage and minimise these risks as far as possible.

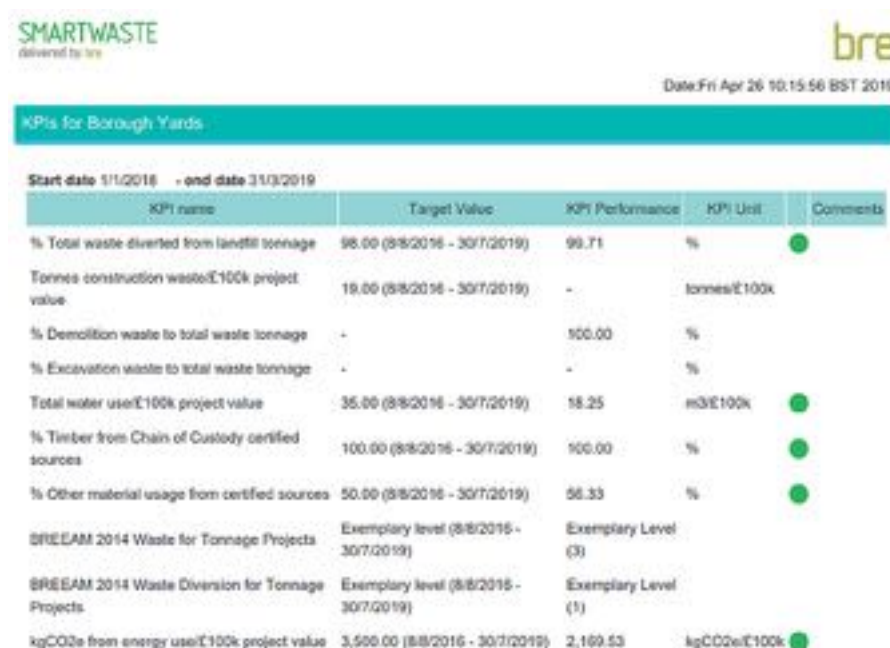
ACHIEVEMENTS

While the technology we implemented is ultimately a very well designed filtration system, the application of it to manage concrete washout and re-introduce water into the distribution network has huge potential.

The introduction of this system has enabled us to

better manage and control concrete wash water operations to prevent pollution as well as recover water for collection by our concrete supplier and re-introduction back into their processes.

The technology we chose not only improved the environmental performance and efficiency of our concrete operation, but over the duration of the project, it also paid for itself and provided financial savings.



of concrete to site, transferring it from the lorry to a pump, and then from there through a network of pipes which direct the concrete to the desired stage of the structure.

As well as the direct sustainability benefits to the project, there has been additional indirect value resulting from the system including removing the need for a concrete wash skip, and the associated

transport and carbon emissions for these journeys to and from site. In addition this helps to reduce water demand for the concrete distribution company as they are able to re-introduce the water collected from the systems storage tanks.

IN DETAIL

Keltbray have been involved in the Borough Yards project from the initial demolition stages, where we were Principal Contractor (PC) for the demolition, piling and groundworks packages and are now completing the structures package under PC, Wates.

The Keltbray project team were determined from the outset that this project was to be exemplar in terms of environment and sustainability.

First discussions with the client during the setup of the current structures package was around the management of waste water arisings from concrete operations. Typically concrete operations rely on bunded areas and skips with limited capacity to contain concrete during delivery and washout operations; that are then left to evaporate until the concrete cures and can then be removed as waste. Industrywide, concrete pouring operations rely on these old methods, and if these are not managed correctly they can cause significant environmental impacts, varying from spillages which can contaminate land and water, to the creation of unnecessary waste which needs to be stored and can be expensive to dispose of. Some of the newer technology available enables pH treatment of waste concrete wash water so it can be discharged safely, but the cost of these systems is prohibitive and requires additional resource inputs

for the pH adjustment process.

We wanted to address this and come up with the best possible solution for sustainability and economic viability.

We carried out extensive market research and the technology we chose was based on the environmental benefits it could realise for waste, water and carbon footprint management and reduction.

The technology introduced onsite was a simple filtration system, which allows all concrete residues from the operations on site to be filtered to extract water for re-use. Not only does this provide a system to properly manage the arising waste, but the water arising from the filtration is then collected by the concrete supplier when a delivery lorry is leaving site for re-introduction in their processes. The set up consists of a filtration tray a platform for the concrete skip to sit in and a water storage tank. The concrete skip is positioned in the holder above the tray and washout water in the tray passes through filtration bags where heavy insoluble aggregate remains in the bag while water passes through the porous material into the tray. The bags can then be lifted out and the aggregate material re-used as crush material or

keltbray Environmental Identity Report (EMR) Template Borough Yards

5.5 Waste Quantities for the Project to Date

	Tonnage	Mixed	Segregated	Waste management routes percentages				
	(tonnes)	(%)	(%)	Reuse	Recovery	Direct Recycle	Landfilled	Energy Recovery
Concrete (17 81 81)	270.00	0	100	0	0	100	0	0
Rein (17 81 81)	262.00	0	100	0	0	100	0	0
Insulation materials (non hazardous) (17 84 84)	50.00	0	100	0	0	100	0	0
Metals (17 84 81)	36.00	0	100	0	0	100	0	0
Plastic (excluding packaging waste) (17 82 82)	0.01	100	0	0	0	0	100	0
Timber (17 82 81)	48.00	0	100	0	0	100	0	0
Clay (13 81 13)	0.11	100	0	89	0	0	7	0
Soils (17 85 84)	5004.40	16	84	96	0	0	0	0
Hazardous waste*	0.21	100	0	0	0	0	100	0
Mixed construction and/or demolition waste (17 89 84)	320.00	100	0	0	96	0	2	0

removed as waste. Smaller sediment and aggregate sinks to the bottom and water flows over a weir into the second section of the tray, where any remaining sediment can settle and water can flow into the third and final section of the tray and pumped into a water storage tank for re-use. It is also compact and only occupies an area the size of an 8yard skip.

This very simple system has enabled us to control waste arising from concrete operations significantly better as well as raised the bar on how waste concrete washout water can be managed successfully with minimal inputs in terms of energy and resources into the process. Looking to the future, water scarcity is a great concern with two thirds of the world expected to face water shortages by 2025, so preservation of water is a top priority for Keltbray.

While the technology itself is ultimately a very well designed filtration system, the application of it to manage concrete washout and re-introduce water into the distribution network has huge potential. The built environment is scheduled to double over the next 30 years and much of these developments will rely on concrete. If such a system was to be widely adopted to filter water from concrete waste wash water, it totals a significant amount of water which can be re-introduced into the economy. The technology we chose not only improved the environmental performance and efficiency of our concrete operation, but over the duration of the project, it also paid for itself and provided financial savings. The system itself cost £11,000 to purchase, has minimal operational costs and has already paid for itself in 6 months versus the original option to hire concrete washout skips and other associated costs for crane use and pumping out.

As well as the direct sustainability benefits to the project, there has been additional indirect value resulting from the system including removal of weekly concrete wash skip, associated transport and carbon emissions for the weekly journey to and from site. In addition to reduced water demand for the concrete

distribution company as they are able to re-introduce the water collected from the systems storage tanks.

Due to the financial gain on the system, we bought the facility outright, which means that at the end of this project we can reuse it on future projects, and the benefits will directly multiply, with less concrete skips and also lower water usage from the concrete distribution companies as they can use what we have recovered.

The successful case study has gained us attention from other projects and clients that can see the sustainability benefits.

On top of the concrete filtration system achievements the project teams ambitions to be an environmental exemplar project really showed. In May 2018 the project was awarded a performance beyond compliance and Silver award by the Considerate Constructors Scheme for their performance and care for the environment, workforce and involvement with the surrounding community.

Other initiatives that the project team introduced included; rainwater harvesting for bootwashes, replacement of single use plastic cups onsite which was a suggestion from the workforce engagement program, as well as an ingenious way to recycle old hard hats into hanging flower baskets that aesthetically improved the entrances to the project at Borough Market.

As the structures work package commenced the project team sought a more environmentally friendly option for the mould oil release agent whose properties are both toxic and harmful for the environment. The project trialled and has now fully implemented vegetable oil as an effective and environmentally friendly alternative for use during the concrete works.



championing sustainability

Keltbray Group is a UK leading specialist business, which offers engineering, construction, demolition, decommissioning, remediation, rail, environmental services and reinforced concrete frame solutions nationwide.

We have a focus on sustainability at our core, from reducing energy consumption and curbing carbon emissions to developing more efficient technologies and attracting the next generation of talent into the industry.

With the help of the SMARTWaste online tool, we're measuring our organisation's waste, energy, water and ensuring the responsible sourcing and use of material, helping the business to divert over 99% of its construction and demolition waste material from landfill.

GREEN APPLE AWARD 2019

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KOREA AIRPORTS CORPORATION ENERGY MANAGEMENT

AIM

In preparation for the launch of the new climate system in 2021, Korea plans to reduce its greenhouse gas emissions by 37 percent from business-as-usual (BAU) levels by 2030. The Korea Airports Corporation, correspondingly, has been pursuing various greenhouse gas reduction activities to achieve the nation's reduction target. As a result, in 2018, we have reduced emissions by 35%, exceeding the government's recommended reduction target of 26%, and we have achieved results surpassing the government's recommended reduction targets for eight consecutive years.

Not simply settling with this, the Korea Airports Corporation is concentrating on 'Airport Energy Management', which secures the potential to reduce GHG emissions and emphasizes energy saving and efficiency enhancement.

Notably, we are perfecting our energy management techniques by improving building energy efficiency through remodeling of structures, establishing remote inspection system for power demand management, enhancing energy efficiency of heating and cooling through replacement of outdated boiler facilities, and introducing new and renewable energy; furthermore, we will contribute to building a sustainable energy system.

Celebrating its 39th anniversary this year, Korea Airports Corporation, as a public corporation specialized in airport operation established to efficiently construct, manage and operate airports, facilitate air transportation by fostering and supporting the aviation industry, and contribute to the development of the national economy and the welfare of the people, provides balanced air transportation services to 14 airports nationwide including Gimpo,

Gimhae, and Jeju International Airports. Moreover, in response to the rapidly increasing demand for air travel and to improve the accessibility of the island areas, we are constructing new airports, as well as improving our existing airport facilities and services to support our customers to use the airports more quickly and conveniently.

Solar Power and Geothermal Heat facilities of Gimpo Airport



Solar Power



Geothermal Heat

In addition, we are focusing on securing the competitiveness of energy management with the aim of establishing sustainable energy systems that are aligned with the international climate change

movements. This is because the success or failure of greenhouse gas reduction depends on how energy is saved and managed.

The 'Korea Airports Corporation Energy Management Project', which is promoted to save energy and reinforce efficiency, is composed of improving building energy efficiency through remodeling of structures, establishing a remote inspection system for power demand management, improving energy efficiency of heating, and cooling through replacement of outdated boiler facilities and the introduction of new and renewable energy.

1. Enhancing building energy efficiency through structure remodeling

Korea Airports Corporation is performing a leading role in building an energy-saving passenger terminal, in recognition that efforts in the building sector are important in reducing greenhouse gas emissions.

Gimpo International Airport's Domestic Passenger Terminal, which completed its remodeling in September 2018 (project period : 10 years, project expense : 250 billion won) adopted environmentally-friendly and energy-saving design methods from the early stages of remodeling design, to introduce new and renewable energy facilities such as solar and geothermal heat, high efficiency building insulation, high performance glass, and the latest high-efficiency equipment in the field of electrical and mechanical apparatus, and BEMS (Building Energy Management System) was installed to optimize energy demand management. As a result of these efforts, in February 2019, we achieved the first grade of building energy efficiency and the excellent grade of green building certification. Even in the future, we will devote our efforts to improve the energy efficiency of buildings while reducing greenhouse gas emissions by optimizing energy consumption through establishing efficient energy saving plans for our buildings.

2. Constructing remote inspection systems for demand management of electric energy

Korea Airports Corporation is striving to implement smart grids by actively promoting the project of establishing intelligent remote inspection system, which is a basic infrastructure but the core of energy demand management.

The intelligent remote inspection system is a system that enables automatic remote inspection and real-time usage information of meters using a bi-directional communication network, in which the central inspection center automatically inspects using computers and communication technology instead of manual records by personnel inspectors, thus civil complaints caused by the inspection errors are dramatically improved. It is a technology optimized for energy management that can efficiently manage energy usage

As this system is implemented at the airport, Korea Airports Corporation, the energy provider of the airport, can swiftly and accurately conduct inspections while the energy-using tenants at the airport can receive electricity bill information and customized services in real time, providing all with the benefits from efficient power use and voluntary demand management.

At present, the system has been completed in construction and is in operation for 654 electric meters of leasing companies of domestic, international, and cargo terminals of Gimpo International Airport, and 215 meters at the international terminal of Gimhae International Airport, and 67 meters at the international terminal of Jeju International Airport, and the system is improving the efficiency of power usage management.

3. Improving energy efficiency of heating and cooling by replacing outdated boiler facilities

In order to improve the efficiency of the boilers, Korean Airports Corporation is in the process of replacing the igniters of 32 old boilers at the national airports from ordinary burners to low NOx burners.

The low NOx burner is a burner that boosts the efficiency of the burner by attaching a small auxiliary flame to the flame burning in the boiler, achieving complete combustion and reducing the emission of nitrogen oxide (NOx), which destroys the environment, thereby creating an advantage where gas consumption is reduced and the economical efficiency is increased.

Korea Airport Corporation gets to reduce its gas consumption by 92,686 N•m³ per year through the replacement of the low-NOx burners, thus annually saving fuel costs by 65 million won. It will also contribute to air quality improvement by reducing the fine dust emission concentration.

4. Expanding introduction of new and renewable energy

Finally, in order to expand sustainable energy, Korea Airports Corporation established a “Roadmap of New and Renewable Energy” in 2018 and completed installation of three solar modules (65kW) and one fuel cell (60kW) by investing 1.9 billion won. As a result, Korean Airports Corporation is striving to produce environmentally friendly energy with 525kW of solar power, 397m² of solar heat, 1,372RT of geothermal power, and 60kW of fuel cells and plans to increase the amount of new and renewable energy such as solar and geothermal energy by 3.1 times compared with the current level by 2025.

KOREA AIRPORTS CORPORATION KOREA AIRPORTS CORPORATION'S NEW CSV(CREATING SHARED VALUE) ACTIVITIES

AIM

Since its establishment in 1980, the Korea Airports Corporation(KAC) has been the public enterprise specializing in airport operation in the Republic of Korea, which has enabled smooth air transportation through the construction, management, and operation of 14 airports nationwide, and has contributed to the development of the national economy and the enhancement of national welfare by fostering and supporting the aviation industry. We have been carrying out various CSR (Corporate Social Responsibility) activities for a long time in order to achieve our management's vision of being an 'airport group that leads the future with new customer values'. Recently, as the voices demanding sustainable growth and corporate social value creation have increased, the Korea Airports Corporation is also pursuing innovation based on

previous CSR activities and new differentiated strategies for CSV (Creating Shared Value) so that businesses and society at large can grow together.

In particular, we will speed up innovation through the development of greenhouse gas reduction aviation technology that maximizes the eco-friendliness of airports, the introduction of automatic parking fees discount for low-emission vehicles, and the promotion of social contribution for sustainable development in the local community. Furthermore, we will lead the realization of social values and contribute to sustainable development by implementing environmentally-friendly airports as well as airports that co-exist with the community.

ACHIEVEMENTS

As the Korea Airports Corporation(KAC) has

Recruit volunteers for "KAC Cool Roof Campaign"



**Recruit volunteers for
"KAC Cool Roof Campaign"**

KAC Cool Roof Campaign

1. KAC Cool Roof Campaign

김포공항 소공동체(지역 노년층)를 대상으로 'KAC Cool Roof Campaign'을 실시하여
국산 친환경 자재 적용을 통한 에너지 절감을 통해 도시환경을 개선하는 사업
* 참여 대상: 지역 주민, 자원봉사자, 학생 등 (사전 신청 필수)

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developed heating and cooling systems for both boarding bridges and aircraft in 2018, now it has four types of technologies targetted at reducing greenhouse gas along with the air-lighting LEDs, AC-GPS(Aircraft Ground Power Supply), and LED air-lighting individual control systems that have completed development. If this equipment is applied to the boarding bridges of international flights nationwide operated by Korea Airports Corporation, it can save 10.7 million liters of aviation fuel annually for aircraft using airport aprons, which can reduce the emissions of 27,820 tCO₂ of greenhouse gases.

Also, starting from June 2018, we have launched the “automatic parking fee discount service for low-emissions vehicle” for the first time in Korea at 10 major airports domestically. When low-emissions vehicle use the airport parking lot, parking fees are automatically discounted up to 50% without any evidence necessary of the low-emission vehicles.

This will improve the inconveniences associated with delayed departure and provide convenient services to 2.6 million low-emissions vehicle owners in Korea, and will contribute to the activation of a low-emissions vehicle supply.

The Korea Airports Corporation is moving away from simple supportive social contribution activities, and extending supportive social contribution activities to various residents. Specifically, these include the Cool Roof Campaign against Climate Change, the KAC Sky Road Green Accompaniment for Urban Regeneration, the installation of “porty yellow carpet” to prevent traffic accidents in child care zones, support for free weddings, “porty wedding”, “porty care services” to support the transportation of vulnerable populations, and the operation of youth start-up incubator centers and job support centers to create jobs. Through these activities, we are promoting coexistence with the local community, and we are growing into a more sustainable airport. We continue to carry out eco-friendly campaigns with the governments or relevant organizations to contribute to the creation of a national consensus and to spread

eco-friendly thoughts on greenhouse gas reduction practices.

IN DETAIL

The Korea Airports Corporation (KAC) has been promoting various CSR (Corporate Social Responsibility) activities to contribute to local community development by creating higher social values of the airport. In particular, our company is taking the lead in preserving the global environment while preparing future growth engines by achieving innovative achievements in the development of greenhouse gas emissions reducing technologies, residential supportive social contribution activities within the local communities, and green campaigns with governments and relevant agencies.

First, the Korea Airports Corporation(KAC) is making continuous investments toward developing green technologies to reduce greenhouse gas emissions. In 2018, KAC succeeded in developing “heating and cooling systems for both boarding bridges and aircraft.”

The “heating and cooling systems for both boarding bridges and aircraft” is the integrated system that combined the heating and cooling supply equipment for aircraft, which provides heating and cooling to the cabin when aircraft are aproned and their engines are



off, and the heating and cooling supply equipment for boarding bridges, which provides heating and cooling to boarding bridges that connect the passenger terminals to the aircraft entrances into a single piece of equipment. The advantages are reduced installation costs, reduced financial burden on airlines' aviation oil usage since they do not have to operate the aircraft's auxiliary engines, and reduced idle and greenhouse gas emissions.

Currently, it is installed at the Taejeon Airport for pilot operation. If it is installed on the international boarding bridges of the national airports operated by the Korea Airports Corporation, it is expected to annually reduce 10.7 million liters of aviation fuel for the aircrafts using the airport aprons (converted to greenhouse gas amounts of 27,820 tCO₂).

The development of heating and cooling systems for both boarding bridges and aircraft in 2018 is another development achievement for greenhouse gas reduction technology followed by the development of Korea's first air-lighting LED in 2013, the development of AC-GPS (Aircraft Ground Power Supply) in 2014, and the development of LED air-lighting individual control systems in 2015. These are all contributing to strengthening the competitiveness of green airports through eco-friendly technological innovations suitable for airport facilities.

Second, the Korea Airports Corporation(KAC) started the "automatic parking fee discount service for low-emissions vehicle" at 10 major airports in Korea from June of 2018 for the first time domestically. When low-emissions vehicles use the airport parking lots, this allows them to receive automatic parking fee discounts without having to check verifications of low-emission vehicles directly from the parking manager.

To do this, KAC linked the national airport parking management system to the government's low-emissions vehicle inquiry site in order to check the recognized vehicle numbers when entering a parking lot in real time and in order to build the system to

automatically up to 50% discount the parking fee for low-emission vehicle at the time of departure. This has improved the existing inconvenience of delayed and time-consuming departures of checking each verification, and drivers of low-emissions vehicles without evidence are also allowed to receive discounted parking fees at airports.

This service is considered as an exemplary case of innovative services in terms of it providing convenient services to the 2.6 million low-emissions vehicle owners in Korea and, at the same time, it contributes toward the increase of the low-emissions vehicle supply. This service is scheduled to be spread to public parking lots of local governments.

Third, the Korea Airports Corporation (KAC) has established an innovative social contribution goal of being a "socially responsible leading company that creates new value for customers and society at large" through a 2025 mid-to-long-term management plan, and continues to carry out various social contribution projects.

As a representative example of innovative projects for coexistence with local communities in a way that it escapes from the simple supportive social contribution activities, in July 2018, about 140 people including KAC employees, families and local residents conducted a "COOL ROOF campaign" to overcome the heat wave of local residents near airports by painting the white heat-shielding paint on the rooftops of 29 houses and three social welfare facilities of more than 30-years-old, heat-vulnerable houses to reduce indoor temperatures by 3 to 4°C. A cool roof has the effect of saving cooling energy costs by 20% per household during the summer, and it is expected to continue to be implemented in the future as a way to interact with the community and contribute to energy conservation and urban heat island mitigation.

Besides that, we are actively promoting social contribution activities for local communities, such as the promotion of the "KAC Sky Road Green

Accompany” for urban regeneration to improve the alleys of noise control areas, the installation of “porty yellow carpet” to prevent traffic accidents in child care zones, support “porty weddings” for free weddings (20 couples) and operation of “porty care services” to support the transportation vulnerable populations. The International Travel Voucher Program, commemorating the 60th anniversary of the opening of Gimpo International Airport, provides international travel opportunities to 231 people from 60 families in the vicinity of the airport.

Since 2010, we have sponsored hometown visiting costs every year to 5,583 people of 1,507 households of multicultural families, including Vietnam and the Philippines. We also carry out various projects such as youth overseas camps for knowing their mother’s country, healing English villages, Vietnamese classes, and mentoring for adapting to Korean society.

Recently, we have operated the youth start-up incubator centers and job support centers to operate a platform for economic activities such as start-ups and employment of the younger generation, and we are actively developing opportunities for pilot training and job creation projects by fostering interest and access to the aviation industry to help ease unemployment.

Porty : As the representative character of the Korea Airports Corporation, it was a combination of the syllables “port” from airport and “ty” from safety.

Third, the Korea Airports Corporation (KAC) is continuously carrying out the green campaign to build the national consensus and spread eco-friendly thoughts on greenhouse gas reduction practices. As part of our efforts to reduce greenhouse gas emissions during our ordinary working hours, our employees are continuing campaigns to leave green footsteps. The practices are those such as carrying personal cups (not using paper cups), turning off office lights at lunch time, and maintaining appropriate temperatures in the office; these began in 2009 and have continued to the present. In

addition, the airport has held events for green travel such as distributing handkerchiefs and fans for the “making green travel” campaign for travelers during the vacation season, and pledging for reducing greenhouse gas emissions to promise implementing green life.

During the holidays, we have made a “making Green holiday” campaign to promote practices such as unplugging electrical outlets when the on the way to a hometown or on the way back, using public transportation, and reducing the use of disposables when visiting ancestral graves. In particular, on April 23, 2019, at Gimpo International Airport, the Korea Airports Corporation and the Ministry of Environment jointly organized a “Green Airport, Eco-Friendly Travel Making” campaign as it entered Earth Day and Climate Change Week. It signed the memorandum of understanding (MOU) with the Ministry of Environment to spread awareness of the importance of adapting to climate change and to promote a reduction of greenhouse gas emissions. For airport users, we received a pledge to reduce greenhouse gas emissions and distributed eco-friendly souvenirs (eco-handkerchiefs), and we encouraged travelers to save disposable products. We will continue these promotional activities to raise awareness of climate change and spread eco-friendly travel ideas.

Besides those, we run an ‘energy consulting system’ for companies within the airport to guide the energy consumption patterns and conservation methods, and to operate an ‘airport carbon point system’ to provide incentives to residential companies with excellent energy savings.

With the number of participating companies increasing every year, this year, 453 out of 763 companies in the nation have participated in this event, reducing annual greenhouse gas emissions by 750tCO₂. In addition, we are continuously participating in the global ‘turn off the global lights’ event and the national ‘Energy Day’ event to promote Korea Airport Corporation’s commitment to conserving energy.

LK&PROJEKT PLAY OF LIGHT

The architectural design of a single-family house called “Play of light” is the work of Leszek Kalandyk and his studio LK & PROJEKT. This object by its nature belongs to the category of residences, in which a simple block, materials used and attention to detail give the block a unique character. Arch Deco, Barycz and Saramowicz have similar architectural implementations.



Awarded in the architectural competition World Architecture Design Awards 2019, the house called “Play of light” has 278 m2 of space and two floors. On the ground floor, the authors of the architectural design placed a living room and kitchen with a dining room, the first floor was occupied by three separate bedrooms with bathrooms, a wardrobe and an additional guest room.

The Leszek Kalandyk LK & PROJEKT studio's residence “play of light” gave an elegant and



subdued look. A simple architectural block was founded on the plan of the letter “L”, and the designer himself admits that he was inspired by the modernist style. The form of the house is formed by a geometric solid and large glazing, thanks to which the interior of the house takes place - included in the name of the residence - a play of lights. In order not to dominate it with detail or excessive furnishings, the authors of the architectural design limited themselves to the use of necessary elements and a minimalistic expression of the finish. Subdued colors and carefully selected elements of equipment harmonize with the elegant block impressively filled with light.



Play of Light - architectural implementation record

Location: Poland

Investor: private

Designers: Leszek Kalandyk LK & PROJEKT

Area: 278 m2

Implementation: 2018

Source: lk-projekt.pl, architecturepressrelease.com

LACON LONDON WITH KEY ENVIRO SOLUTIONS DIVERTING WASTE FROM LANDFILL

AIM

Lacon London and Key Enviro Solutions Limited consulted and then prepared a Waste Management Plan with the overall aim of developing a waste management system that meets the stakeholder's needs and contributes to economic and social development.

Our dedicated approach to waste management practices has mutual benefits, including increased opportunity with respect to meeting obligations, through economies of scale, and sharing of resources and targets.

Our aims are:

1. Securing ecologically sustainable development while promoting justifiable and social development
 - To protection of the environment through effective waste management measures
 - To protect the health and wellbeing of people
2. Avoiding and minimizing the generation of waste
 - Ensure the design and manufacture of products that avoid or minimise waste generation
 - Increase consumer awareness of waste minimisation issues
3. Reducing, re-using, recycling and recovering waste
 - Increase reuse and recycling rates of products
 - Reduce the percentage (%) of recyclable material to landfill
 - Ensure separation at source
 - Encourage the establishments of Material Recovery Facilities (MRFs)
 - Encourage waste to energy options
 - Support the diversion of high calorific waste from landfill to recovery options
4. Promoting and ensuring effective delivery of waste services
 - Ensure an efficient and effective solid waste management



- Implement free basic refuse removal policy for indigent stakeholder
 - Promote our waste management services
5. Safely disposing of waste as a last resort
- Stabilise quantity of waste disposed to landfill then reduce this volume
 - Improve landfill management to comply with legislation
 - Increase thermal treatment and conversion of waste to energy

ACHIEVEMENTS

We at Lacon London have the freedom to make operational decisions about our business that benefit our stakeholders. Our focus is on the long term vision for our company, which allows us to build strong, resilient relationships with our stakeholders. The benefits are open and transparent relationships, delivering sustainable solutions that support our stakeholders to meet their long term vision and objectives.

Working closely with our service provider Key Enviro Solutions Limited, Lacon London has achieved commercial success by respecting our environment and the communities in which we operate.

In recent times we have seen significant savings in the reduction of energy and reduced waste. Alongside our suppliers and industry experts we have adopted an environmental dashboard which records our consumption of resources and measures our carbon intensity.

Our achievements throughout 2018 - 2019 are:

1. Diverting waste from landfill – Significantly reduced figures
2. Cutting paper use
3. Promoting recycling schemes
4. Our providers use the greenest technologies for their vehicle fleet
5. Saving water and energy.

We've incorporated a number of environmental initiatives in our operations by switching to using green chemical products wherever possible. Our partnerships with some of our stakeholders have led us to achieve near zero to landfill.

IN DETAIL

Lacon London –v- Key Enviro Solutions Limited

Lacon London offers some of the most well connected office space in the Capital, with easy access to numerous Overground and Underground stations. Since the arrival of Crossrail at Farringdon and Tottenham Court road, Lacon London has become one of the best connected locations in London.

The area itself has its own distinct character, with the beautiful Georgian buildings lining Lambs Conduit street, which is now home to a growing number of independent eclectic shops and restaurants. This unique part of London is attracting more of the London's young affluent trendsetters, whom are the visionaries of our future. Alongside our service partner Key Enviro Solutions Limited we have listened to them, engaged with them and taken on board their vision for climate change as a whole.

The Savills Group Lacon London merging with our facilities delivery company Key Enviro Solutions have taken the first steps in making a difference to our small corner of London. We have established a group to provide our stakeholders with advice and support on energy, water efficiency management and continuous development through concept and innovations.

At the beginning of the process we interact with our selective partnering waste provider for product and installation solutions.

It is the aim, drive and determination of the Lacon London management team and Key Enviro Solutions Limited to ensure that our building of offices are a sustainable environment that minimises consumption

of energy, materials and water. By doing this, we can not only preserve these three fundamental commodities for future generations but we can contribute to minimising the effects of climate change.

Climate change is the biggest environmental problem we face today, collectively we have encouraged the need to think beyond the capital costs, taking into consideration:

By the way of cleaning materials we use locally sourced UK materials. Ensuring that all our chemicals and machinery are manufactured in the UK which, decreases the embodied energy of the products as it has less travel distance when compared to purchases from abroad hence the reduction of used fossil fuels during transportation.

In 2018 we introduced robust recycling and good housekeeping measures through training and design we are now in a position of surpassing our initial targets, we achieved this by:

1. Pre-sorting site waste
2. Reduction of the amount of materials
3. Maximise the efficient of used materials

4. Only use (where possible) materials that can be recycled, reclaimed with little or no reprocessing.

How we manage our waste:

One of our biggest environmental impacts is the generation and management of waste. Reducing our waste and recycling the waste we do produce reduces landfill, combats climate change and conserves limited resources.

We have made a commitment in our Environmental Policy to reduce, by an annual target, the amount of waste we produce and increase the percentage of waste that is reused and recycled.

We have also set a target to stream a minimum of 60 per cent of materials for recycling at source and to recover a further 90 per cent from the general waste using a materials recovery facility (MRF) by July 2019.

We manage waste in accordance with the waste hierarchy, which ranks waste management options according to what is best for the environment. In practice, we:

- We try to prevent generating waste
- Have developed initiatives and use supplier



takeback schemes to reuse some items

- Stream materials at source for recycling where practical to do so
- Send general waste to a materials recovery facility
- Send non-recyclable wastes for energy recovery in preference to disposal
- Only landfill and incinerate wastes that we are legally obliged to

The 3 headings below identifies what happens to waste that is collected separately by our service provider Key Enviro Solutions Limited and their waste service partners

Waste sent for disposal

- Clinical waste
- Asbestos
- Radioactive waste
- Some chemical waste

Reuse schemes

- Catering platters
- Furniture
- Fisher packaging and Winchesters

Recycling or recovery schemes

- Confidential waste
- Lamps
- Green waste
- Bulky metals
- Mixed recycling (paper, card, plastics, glass and metals)
- Toners
- Waste Electrical and Electronic Equipment
- Batteries
- Mobile phones
- Solvents
- Tip boxes
- Vegetable oil

Mixed Recycling

We collect our recycling in blue mixed recycling bins. Collecting all of our recycling in the same bin keeps things simple and means fewer bins.

Our blue recycling bin is for more than just paper and card. It's also for cans, tins, glass, foil and plastics.

The rubbish bin is for tissues, hand towels, dirty food packaging, coffee cups, food waste and non-recyclable plastics. . All blue bins are identified and marked separately

1. Paper and Card

- White paper
- Coloured paper
- Newspapers and magazines
- Leaflets
- Envelopes
- Books
- Journals
- All grades of card

2. Glass

- All colours of glass bottles and jars

3. Metals

- All types of tins, cans and foil, including sweet tins and other similar items

4. Plastics

- Tubs: Containing non-food items for example hand cream, wipes, detergent and cleaning products; and food items such as soup pots and margarine tubs
- Bags: Plastic bags and polythene
- Bottles: All types of plastic bottles - if it has a lid it can be recycled
- Pots: Hard pots without lids, for example yoghurt pots and noodle pots
- Trays that hold fruit, vegetables, cakes and biscuits
- Moulded plastic packaging from non-food items, for example from batteries or memory sticks

Printer Cartridge Recycling



Laserjet and inkjet cartridges are collected, sorted and stored centrally by the Recycling Team for recycling.

In order to recycle printer cartridges we put the empty cartridge into the package of the replacement cartridge, secure the box and send it to the Recycling Team via departmental collection points.

Tube and Lamp Recycling

Fluorescent tubes and lamps are classed as hazardous waste and fall under the WEEE regulations, the law bans the disposal of all types of fluorescent tubes in the general waste.

All our fluorescent tubes and lamps are NEVER disposed of in the general waste bins and skips around the site; they are always separated from the general waste stream and sent for recovery/recycling.

Waste Electrical and Electronic Equipment (WEEE)

A corporate system has been set up for the disposal of computers, PC peripherals and historic WEEE. The Facilities Management Department arranges for the disposal of other WEEE

Conclusion

It is now evident that due to our robust recycling efforts we are further reducing pollution, conserving resources, saving energy, promoting the economy, and creating jobs.

It is our responsibility to ensure that waste is recycled, and to protect the environment for future generations. By instilling the morals of recycling into our own lives, community, and children we have and continuing to create an increased awareness on necessity to prevent waste and promote recycling.

LLOYDS BANKING GROUP

LLOYDS BANKING GROUP'S WAR ON WASTE CAMPAIGN

AIM

Lloyds Banking Group's goal (LBG) is to become a leader in supporting the UK to successfully transition to a more sustainable, low carbon economy. Through a dedicated Sustainability strategy, we have set ourselves a number of ambitions across the organisation, one of which is to be a leading UK bank in reducing our own carbon footprint and challenging our suppliers to ensure our own consumption of resources, goods and services is sustainable.

In the past year we have implemented a number of projects to meet our new operational waste reduction target of 80% by 2025 (2015 baseline). We already achieved our previous recycling rate target of 80% and our aim is to continue to improve on this.

To minimise waste and maximise reuse, we have endeavoured to;

- remove as much single-use plastic as possible,

- reduce the material we send to landfill and
- increase reuse and recycling

Key to our success was the engagement of employees, which meant we needed to create innovative ways to engage employees in our "War on Waste" campaign aimed at influencing behaviour change.

ACHIEVEMENTS

Through our combined initiatives we have;

Reduced 650 tonnes of waste in 2018, compared with 2017 - catering waste changes led to over 35 million fewer items entering our waste stream annually.

Diverted one tonne per month of waste from landfill to recycling and one tonne of food waste per year from landfill to anaerobic digestion at one of our largest office sites





Challenged our supply chain to identify non-recyclable and single-use items and developed ways to remove them. For example, eliminating plastic wrappings from our paper deliveries. Also, Mitie, our facilities partner, have adopted best-practice processes to support the reduction and proper management of waste.

Raised employee awareness of the importance of reducing and recycling waste through our innovative employee campaigns.

Increased the membership of our employee Sustainability Network after inviting staff to take part in a sustainability innovation challenge, we received over 150 ideas on how our people felt we could further improve.

Received over 11,000 views of our online #WarOnWaste campaign in April 2019, where the readership is usually around 4,000.

Had over 400 colleagues sign up to become a waste 'superhero' to help implement waste reducing projects in their building.

IN DETAIL

Lloyds Banking Group's ambition is to become a leader in supporting the UK to successfully transition to a more sustainable, low carbon economy. As a Group, we recognise the growing need for both individuals and organisations to act to reduce waste material entering landfill and minimise the use of our planet's finite resources. We have therefore, been focussing on eliminating single-use plastics and reducing the material we send to landfill.

Having already achieved our previous recycling rate target of 80%, our aim is to continue to improve on this. As part of our waste strategy, we've undertaken projects that ensure we look to prevent waste in the first place before looking at options for reuse and recycling; adhering to the principles of the waste hierarchy.

We work closely with our facilities partner, Mitie, who conducted audits to identify what employees disposed, the items generating the most volume and items that were recycled incorrectly. This gave us a starting point to better understand the waste lifecycle

of each item, from where it originated to how it ended up as waste.

At the start of 2018, our Group Property sustainability team, led by senior leadership, reviewed the opportunities to reduce waste and began developing our new waste reduction target, mobilising all key stakeholders including colleagues in our Sustainability Network.

We published best-practice messaging and information on new waste streams on our intranet pages and our online employee collaboration portal, Hive. We relaunched our employee Sustainability Network, and now have over 500 members. This forum generates lively discussion, helps deliver impactful projects and holds quarterly masterclass events; in June 2018 the topic was Waste.

In the second half of 2018, we launched the plastics project. Our aim was to minimise waste and maximise reuse by removing as many single-use plastic items thrown away at our sites as possible. We focussed on items commonly found within the general waste bins such as; disposable cups, condiment sachets, plastic straws and disposable cutlery and sought to replace them with reusable or sustainable alternatives.

We also gave a reusable KeepCup to 54,000 employees across all 48 of LBG's catered sites to support elimination of single use cups. Over 160 sustainability network champions across the UK helped distribute the KeepCups, advocating for the changes and answering questions from their colleagues. To support this, we imposed a 25p levy on the purchase of disposable cups. We also replaced all plastic with metal cutlery, and removed all vending machine cups, single-use sachets, wooden stirrers and straws. These have been replaced by refillable containers for the sugar and sauces, and reusable metal spoons rather than wooden stirrers. The payback for the investment in the KeepCups is very short due to the significant reduction in the need for purchasing disposable cups.

We have worked closely with our cleaning team and their supply chain to identify non-recyclables and single-use items within our cleaning products. We are working through a process to remove these items and switch to highly concentrated formulations and refillable bottles, resulting in less single-use plastics being used. All items are now recyclable as a minimum requirement.

We have trained our catering team, teaching them new practices to minimise the amount of food waste. In addition, all food packaging is being analysed with the supply chain providers to identify reusable or plastic-free alternatives. The reusable cups, cutlery and sauce bottles were the first initiatives. Single-use water bottles, takeaway and salad boxes are the next items to be removed and replaced with reusable items.

The result of our changes has seen a reduction in waste of 650 tonnes in 2018, against 2017. The catering waste changes resulted in over 35 million fewer items entering our waste stream each year. In early 2019, we announced our new waste reduction target – to reduce operational waste by 80% by 2025 (2015 baseline), and our plastic ambition – to eliminate 90% of single use plastics in our catering & cleaning operations in 2019 (compared to 2017).

This year we have also focussed on our organic waste. We attached food waste pods to General Waste bins, enabling employees to separate their food waste, as well as the organic waste segregated in our kitchens. Our organic waste is sent to anaerobic digestion facilities, diverting it from landfill.

To support this, we developed a new bin standard by improving the placement of the bins at more convenient locations and grouping bins together into "bin stations". We also developed a new creative suite of bin signs to provide clarity for employees on what should be placed in each bin. We rolled-out training to our facilities managers to ensure they have the necessary knowledge on waste best-practice and establishing processes to right-size their bin facilities.

OUR PLEDGES

We commit to an ambitious goal to accelerate working with customers, government and the market to help reduce the carbon emissions we finance by more than 50% by 2030.*

We pledge to support UK renewable energy projects, equivalent to powering on average 5million homes by 2020.**

We will fund 5million square feet of commercial real estate space to become more energy efficient with green loans by 2020.**

We will work with the Woodland Trust to plant ten million trees over the next ten years to expand the UK's carbon sink. During the lifecycle of the trees planted, 2.5 million tonnes of carbon dioxide could be absorbed, equivalent to the harmful emissions produced from eight years of UK waste management.***



Improvements to bin signage, placement and addition of food waste pods at one of our largest sites in Bristol led to one tonne per month of waste diverted from landfill to recycling and one tonne of food waste per year diverted from general waste to anaerobic digestion.

Engagement of our employees was also key to our success. We launched a #WarOnWaste employee campaign in April 2019, generating over 11,000 views and over 400 employees signing up to become waste 'superheroes'. We designed a series of challenges for staff to deliver in their teams to support the projects being delivered.

Our success in reducing our waste and improving our recycling rates has been down to several aspects: collaboration with internal stakeholders, challenging our supply chain to provide reusable alternatives,

backing from senior management and ensuring employee feedback was listened to.

As we look ahead to the rest of 2019, we are continuing to create innovative ways to engage colleagues in our #WarOnWaste campaign to change environmentally-harming behaviours, as well as ensuring waste-minimising facilities are in place. We are planning for further projects to be delivered during H2 of 2019 with an aim to remove 20 million additional waste items. We are confident given our success so far that we will achieve this.

MAILEN DESIGN

MEADOWS DAY NURSERY, NORTHUMBERLAND



We are an Architectural Practice who are responsive and creative in our design approach and successfully deliver projects with care, experience and personality. We have an obsession for materials and craftsmanship. We enjoy bringing inspiration and innovation to spaces, buildings and communities.

We believe in the value of making things well. Testing our ideas through the realities of building fascinates us. To achieve the high quality that we aspire to we invest intense care in our response to every place and brief. Our work is not complete until the building is occupied, and we continue to visit our projects long after they are built.

This nursery is the result of re-modelling of a greenfield agricultural site to create a nursery

provision for 80 children aged 6 months to 5 years in stunning Northumberland farmland.

Given its sensitive context it was necessary for the building to merge into the landscape and reflect the rural aesthetic of the surrounding agricultural vernacular. The building is arranged to frame the scenery while providing generous internal spaces and exterior play areas for. The scale and form aim to break up the mass to reduce the impact on the green belt and capitalise on solar gain and natural ventilation.

The crisp volumes are clad in carefully detailed natural materials that complement the rural setting while remaining contemporary. Ecological



performance is enhanced by sustainable technologies including photovoltaic panels, rainwater capture and a MVHR ventilation system. The building and site layout is befitting of its context and reduces impact on the openness of the green belt.

The notion of house & home led the design to develop the formal concept around a series of nursery 'houses', each forming a space for the

individual age groups. The new build part of the development is thus conceived as a cluster of three houses with children progressing gradually through the spaces as they grow up. The existing topography and new planting helps screen the major new build elements from view and the overall layout allows the nursery spaces to continue to have a connection to a protected shared south facing garden.





MAILENDESIGN

Architects & Designers

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We believe in the value of making things well. We have an obsession for materials and craftsmanship. We enjoy bringing inspiration and innovation to spaces, buildings and communities.

From our UK studios in London and Oxfordshire we design a range of building types at numerous scales with a strong understanding of context and a passion for sustainability.



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MAJLIS PERBANDARAN PASIR GUDANG WASTE COMPOSTING PROGRAM IN PASIR GUDANG, JOHOR MALAYSIA

1.0 PROJECT AIM

Pasir Gudang Municipal Council (MPPG) was established on 1st July 2008 under Section 3 of Local Government Act 1976 (Act 171). MPPG's area of jurisdiction is 311 square kilometres (31,132 hectares), including Mukim Tiram and parts of Mukim Plentong. In 2016, Bandar Seri Alam and parts of Taman Rinting (4,825 hectares) are two newly added areas of MPPG's area of jurisdiction. Currently, MPPG's total administrative area is 35,957 hectares comprising nine planning blocks.

MPPG's vision is 'Pasir Gudang, a prominent and affluent city'. Meanwhile, MPPG's long-term aspiration is to make its administrative area as a prosperous city developed in a sustainable manner with green urban environment characteristics, which emphasizing an inclusive social system. A famous city is not only for investment destination, but also as a tourist attraction and a suitable place to host world-class programs.

To achieve this long-term vision, MPPG needs to achieve two phases of short-term and medium-term visions, which are:

- a) Pasir Gudang Sustainable City 2019
 - i. Competitive and productive economy
 - ii. Environmental quality
 - iii. Prosperous community
 - iv. Optimal land use and natural resources
 - v. Efficient infrastructure and transportation
 - vi. Effective governance
- b) Pasir Gudang towards Green City 2020
 - i. Low carbon city
 - ii. Efficient and renewable energy usage
 - iii. Efficient and prudent use of resources

- iv. Efficient solid waste management
- v. Green neighbourhood development and public transportation system
- vi. Promotion of green lifestyle in the community

One of the relevant activities in achieving these visions is Waste Composting Program. This program begins with food waste composting that has been carried out by the Sanitation Section of Public Health Department, MPPG. The idea of carrying out food waste composting was resulted from the head of the Public Health Department's site visit to Kitakyushu, Japan, with the aim to reduce domestic waste and to extend the lifespan of waste disposal site in Tanjung Langsat. It is a new program with the collaboration of MPPG and Iskandar Regional Development Authority (IRDA), which aims to make Pasir Gudang as a green and healthy industrial city by 2025.

MPPG started with Takakura (sweet) method for food waste composting program which was launched by MPPG President on 15th January 2014 at Taman Air Biru, Pasir Gudang. Meanwhile, the saline fermentation method was carried out in February 2015, and the bacteria effectiveness is able to accelerate the decomposition process of food waste.

In the beginning, MPPG only run solely on food waste composting. However in August 2017, the commencement of dried leaves and wooden twigs composting was carried out at a tree planting site of the Landscape Department, MPPG. The dried leaves and wooden twigs composting has been carried out on a large scale. In addition, the processes of crushing dried leaves and wooden twigs as well as the use of Effective Microorganism (EM) have been done to accelerate the decaying process of dried leaves and wooden twigs.

2.0 PROJECT ACHIEVEMENT

MPPG has received recognitions related to the initiatives undertaken in national and community level. The received award is Green Neighbourhood Development Initiative Implementation Award 2017 for Waste Composting Program (Municipal/ Corporation category) in conjunction with the World Town Planning Day on 11th November 2017.

This successfulness is due to the effectiveness of various recycling operations not only in food waste composting and 'Reduce, Reuse and Recycle' (3R) but also in recycling of used cooking oil. In early 2015, MPPG managed to collect used cooking oil which recorded at 3,750 kilograms from 74 food premises and 20 premises. Meanwhile, 1,957 kilograms cooking oil were collected from 23 food premises and 25 individual premises in 2016, 2332.5 kilograms from 29 food premises and 22 individual premises in 2017, and up to 2595.5 kilograms from 32 food premises and 18 individual premises in 2018 around Pasir Gudang.

The pioneer project of food waste composting program started at Bakti residential area, Taman Air Biru, Pasir Gudang in January 2015, and extended to Taman Mawar residential area, by giving a briefing and demonstration of implementing the food waste composting method. These two areas are located close to low-cost and flat residential areas. Majority of the population comprises local community with low-income household, full-time housewives, and pensioners or senior citizens. It was a good opportunity for MPPG to develop the food waste composting program in these areas due to their abundant source and strength. The domestic waste disposal technique in these areas is done by collecting garbage in a waste collection point near the housing areas. Furthermore, MPPG has undertaken large-scale composting from 2017 until today with strong cooperation from 24-hour food restaurants and premises in Pasir Gudang.

The objectives outlined for implementing food waste

composting programs in Pasir Gudang are as follows:

- i. To establish partnership and cooperation among local community and agencies.
- ii. To improve knowledge and basic skills in managing solid waste at home.
- iii. To reduce odour pollution and lessen leachate leaks in residential areas.
- iv. To encourage recycling programs and reduce the use of chemical fertilizers for plants.
- v. To reduce the cost of domestic waste disposal and increase the lifespan of waste disposal sites.
- vi. To produce compost fertilizers for landscape section, nursery and green neighbourhood programs.
- vii. To improve health and hygiene of local community.
- viii. To create community that loves nature and always keeps the surrounding clean, vibrant and green.

3.0 PROJECT IMPLEMENTATION

The project is implemented using organic fertilizers (processed manure-based) at the MPPG nursery. The maintenance process of the existing trees is abundant when fertilization work is done by the nursery workers, which results in higher fertilizer purchase costs in every month.

As a solution, the process of dried leaves and wooden twigs composting are done by collecting dried leaves, wooden twigs and grass residues from the public gardens. Besides, grinding machine is used to crush the dried leaves and twigs. Then, the remaining dried leaves and grass are gathered in one place. The dried leaves, twigs with a mixture of grass residues will be wetted and added with Effective Microorganism (EM) to accelerate the decomposition process. It will be left for a week and mixed thoroughly on daily basis so that the decaying process of the leaves can be accelerated. This process takes about three months.

The composting process is combined with Rain Water Harvesting System (RWH) to get the main water source for watering purpose. This natural water source is derived from the Sungai Buloh catchment

pond using an electric water pump, where the pipeline is channelled from the river to the water tank. The improvements made indicate the innovation efforts undertaken in the project.

On the other hand, Mud Ball production consists of the mixture of e-Mas fermentation, soil and molasses. The method of producing Mud Ball begins with the act of separating foreign material from the ground. Then, Bokashi is added and mixed well. E-Mas solution is added (EM and molasses that have been fermented for a week) with 40% dampness and then it should be cluttered according to the size of the tennis ball. EM Mud Ball that has been produced and incubated for seven days with suitable fungal growth will be thrown to the river, pond or polluted area.

a) Problems encountered

- i. No productive activities among the community
- ii. The cleanliness and cheerfulness of the residential area are not taken into consideration
- iii. Low quality of cleanliness and tidiness of the green area and surrounding environment
- iv. The rising economy is not correspondent with the income of the community
- v. Negative attitudes and perspectives from the community at the beginning process of the program

b) Stakeholder

The implementation of this program was conducted with the cooperation between MPPG and the residents within Pasir Gudang administration area. MPPG is responsible for providing trainers in the related fields such as food waste composting, demonstration and guidance, supporting resources, free equipment, and medium for food waste composting activity.

The program lasts for two months and a half for each session, involving activities in the classroom and in the field with 50 participants representing a community for every session.

The stakeholder engagement approach between communities involves Taman Rinting 1, Taman Air Biru, and Taman Kota Masai neighbourhood communities. The selection of these neighbourhood communities is based on their high density population, active residential area, and has potential green areas to be used.

MPPG took initiatives to inform the communities through council members (representing every zone), meeting call for resident committees, and briefing session during 'gotong-royong' program. Besides, there are some benefits that will be received by them as a motivation to come and engage themselves in the program. For example, they will receive a complete set of food waste composting equipment, together with free basket and scope, as well as rewards or incentives to the most active community or institution in Pasir Gudang.

On the other hand, cooperation and teamwork spirit need to be enhanced in the community because they seem to be less familiar with each other. Moreover, less cooperation in incorporating food waste into the compost basket can be seen due to them being not diligent to clean and store excess food.

In terms of stakeholder representative in government agency, the Public Health Department in MPPG is the one who responsible in selecting and planning the implementation form, program location with suitable facilities for the comfort and benefits of the target group. The focus of the main program is to reduce food waste in the target area. The focus of main program is to reduce food waste in the targeting area. Furthermore, they become motivated to engage themselves due to the program module that is easy to be understood and practical to be implemented. The participants only need to collect food waste, clean up the food waste, fill the food waste into the compost basket, and ensure the basket is mixed thoroughly daily throughout the program. These kinds of activities involve housewives, senior citizens, pensioners, private sector workers as well as those who are interested.

THE PROCESS OF DRIED LEAVES, GRASS RESIDUES AND WOODEN TWIGS COMPOSTING AT THE NURSERY (ADDITIONAL NEW METHOD OF DISPOSING DRIED LEAVES, GRASS RESIDUES AND WOODEN TWIGS)



There are several things that can be gained from stakeholder's engagement in the community. The first one is by becoming a knowledgeable community, which the explanation and demonstration are provided with a complete learning module to provide people with better understanding and skills on how to care and manage the compost basket. Thus, the cooperation and knowledge increase in the community can be seen along with the increase in compost temperature, which indicates that the composting implementation is successful. The second one is better quality of life, by sharing experiences with each other and continuous guidance from composting units will lead to a successful composting. The third one is environmental sustainability, which integrated and systematic solid waste management can reduce the cost of maintenance and land use for good waste disposal.

On the contrary, some practices that did not work so well is the dependency on mentor (Food Waste Composting Unit, Public Health Department) to ensure the program continues to carry out. A frequent monitoring (observation at participating homes and giving responses to questions in WhatsApp applications) need to be done by the local authorities to ensure that the activities or programs continue to run and grow successfully.

Some of things that need to implement differently from now on is related to trainers' selection among the local planning authorities. Other than that, regular monitoring and support for participants must be conducted every month or week. Besides, the food waste composting programs together can be combined with other programs so that participants do not have to attend many times. All of the efforts are vital in order to achieve the key performance indicators (KPI) as well as to guide Pasir Gudang

community towards a high quality community, improve the community's economy, and ensure the sustainability of the community and the entire Pasir Gudang.

4.0 PROGRESS SO FAR

- Starting from 2016 until now, 733 participants have taken part in this program and still run the program.
- Monitoring is performed every 2 weeks by the Composting Unit and social media monitoring through WhatsApp group is also conducted.
- Briefing and demonstration sessions are conducted according to the prescribed learning modules to provide a complete understanding and skills regarding the basic food waste composting such as ways to take care of compost basket, how to cope with the presence of caterpillars and odour problems, as well as methods of caring and managing the composting activities
- The community uses their own compost fertilizer to plant vegetable trees in the green neighbourhood garden program. Compost results can be obtained and utilized by everyone involved in the program.
- Large-scale food waste composting has produced

6,236 kilograms fertilizers starting from 2016 to 2017, and 1,000 kilograms of fertilizers have been used in 2016 and 1,680 kilograms in 2017. The balance amount of compost fertilizers has been used for the green neighbourhood program managed by Landscape Department of MPPG.

- Food waste composting participants have reached 154 people (2016) and 478 people (2017 until now).

5.0 OUTCOMES SO FAR

- Achieved the key performance indicator (KPI) in guiding the Pasir Gudang community towards a high quality community, improve the community's economy, and ensure the sustainability of the community and the entire Pasir Gudang.
- Established an innovation in creating compost fertilizer and "Go Green" practice in Pasir Gudang area.
- Besides reusing food waste to make the compost fertilizer, the community also uses waste recyclable materials such as plastic bottles, tires, decayed woods and other materials to build an environmentally planting area and compost baskets.
- Became a good pioneer example to other communities in Pasir Gudang.

SALT AND SWEET FERMENTATION AND DECOMPOSITION METHOD (NEW METHOD)



6.0 BENEFITS EARNED

- Community involvement in the organized programs has a great impact in creating Pasir Gudang as a prominent and affluent city.
- The stakeholder's role in achieving the mission and vision of this program as well as in engaging good relationship

and transferring useful knowledge to Pasir Gudang community.

- iii. This program will also be developed into other housing areas within the Pasir Gudang jurisdiction area.
- iv. The organic waste compost fertilizer can still be used within three months after the decaying process.
- v. The use of chemical fertilizers which can pollute the environment can be reduced.
- vi. The risk of soil pollution and groundwater can be decreased.
- vii. The use of safe homemade organic fertilizers and save the cost of buying chemical fertilizers.

7.0 ISSUES TO BE ADDRESSED

- i. MPPG's achievement as one of the selected local planning authority for the Low Carbon City Assessment System will be affected.
- ii. The implementation of Low Carbon Action Plan Pasir Gudang is still low in terms of urban governance aspect.
- iii. The development according to low carbon city concept is still at a low level.
- iv. The aim of Pasir Gudang towards Low Carbon Cities 2020 may not be achieved.
- v. Green House Gas Emission (GHG) will increase from 3,564ktCO₂ eq (2010) to 8.574ktCO₂ eq (2025) if there are no mitigation measures to be implemented.

8.0 WHY DID YOU DO IT?

The idea of carrying out food waste composting was resulted from the head of the Public Health Department's site visit to Kitakyushu, Japan, with the aim to reduce domestic waste and to extend the lifespan of waste disposal site in Tanjung Langsat.

9.0 IMPLEMENTATION EFFECTIVENESS

The production of compost fertilizers from the remaining dried leaves, branches and grass is very effective as at the same time it reduces the disposal costs of those dried leaves, wooden twigs and field grass in the recreational areas within MPPG's area

of jurisdiction. The act of collecting dried leaves also reduces the risk of dengue breeding and the use of chemical fertilizers. Dried leaves composting is carried out by Landscape Department at MPPG nursery, Sungai Buloh Recreational Park and City Park because the waste is collected into a wire coil and crushed using a blender.

The fertilizers made from leftover dried leaves and twigs are also used to fertilize other flowers and ornamental plants in MPPG nursery. The usage of this compost fertilizer reduces the cost of buying chemical fertilizers and decreases environmental pollution.

10.0 INNOVATIVE ASPECT OF THE PROJECT

a) Garden Waste Composting

Garden waste composting consists of dried leaves and grass from the recreational area which maintained by MPPG. Previously, the waste from public parks was just being thrown away at the dumping site. Nevertheless due to this innovation, the waste material can be recycled and the nutrient pertaining in dried leaves and grass can be preserved for better use.

11.0 OBJECTIVE

- i. To reduce leachate spills in housing and business areas.
- ii. To reduce domestic waste, dried leaves, branches and grass residues at the recreational park area under MPPG's management.
- iii. To lessen the cost of maintenance and disposal of organic food waste, dried leaves, twigs and grass from being dumped into MPPG landfill.
- iv. To reduce the use of chemical fertilizers on the plantation at the MPPG nursery and recreational parks, as well as to preserve and protect the environment.
- v. To decrease the breeding sites for Aedes mosquitoes and to reduce the number of dengue cases.

Pasir Gudang "Green and Clean Industrial City"

- Pasir Gudang Municipal Council (MPPG) was established on 1st July 2008 under Section 3 of Local Government Act 1976 (Act 171). MPPG's area of jurisdiction is 359 square kilometres (35,957 hectares), including Mukim Tiram and parts of Mukim Plentong. MPPG's vision is 'Pasir Gudang, a prominent and affluent city'. Meanwhile, MPPG's long-term aspiration is to make its administrative area as a prosperous city developed in a sustainable manner with green urban environment characteristics, which emphasizing an inclusive social system. A famous city is not only for investment destination, but also as a tourist attraction and a suitable place to host world-class programs
- Low Carbon Urban Governance is one of the actions mentioned in Low Carbon Society Action Plan for Pasir Gudang 2025. It outlines the development planning, planning control process and mechanism to attract developers, land owners and industrial players to rationalize the 'Green and Clean Industrial City' vision.
- MPPG as the authority that controls urban growth at local government level needs to ensure that the implementation of policies are in line with economic plans, national physical plan, structure plan, local plan, guidelines, act, and bylaw by national level as well as state level.
- However, the implementation of Low Carbon Urban Governance in achieving Low Carbon Society Action Plan agenda is quite new to MPPG. Development planning, planning control process and planning control mechanism shall be the main actions for MPPG to strengthen its credibility in achieving good urban governance.
- In general, the project aims to formulate objectives to reduce carbon emission and establish low carbon initiatives for short, medium and long term implementation of each department in Pasir Gudang for the year 2017-2025.



MAJLIS PERBANDARAN PASIR GUDANG MULTI-STAKEHOLDER ENGAGEMENT IN NEIGHBOURHOOD GARDEN INITIATIVE IN PASIR GUDANG, MALAYSIA

AIM

The initiative was inspired by the Chief Minister of Johor's wishes in 2016 to create a neighbourhood project in order to coordinate the community and build a unity bridge among them through racial diversity participation.

Starting from 25 November 2016, MPPG via Pasir Gudang Foundation became the first local planning authority in Johor in establishing a proactive initiative related to community awareness program. The program is a community gardening project which focusing on neighbourhood gardens. The program location was provided by MPPG at no cost (open space), assisted by cost of RM 20,000 to implement integrated projects for the provision of goods and tree seeds.

A comprehensive involvement method in this program encourages active participation, develops good relationship between MPPG and residents, and supports the provision of special cost and monitoring from time to time. The main purpose of the program is to assist and strengthen the Urban Agriculture Program which is monitored by the Pasir Gudang Foundation and the Landscape Department of MPPG. The management is then being fully managed by the local community committee. This method is able to empower the community through the involvement of residents in easy-to-use fertigation technology activity within the city area. The pilot project involved 20 participants, and meetings with the participants were carried out regularly at MPPG.



ACHIEVEMENTS

1. NATIONAL INNOVATION AWARD - 2015 – SUSTAINABLE CITY (MURNINET)
2. NATIONAL INNOVATION AWARD - 2016– SUSTAINABLE CITY (MURNINET)
3. RECOGNITION FROM KPKT FOR RAIN WATER HARVESTING UNDER PLANMALAYSIA - 2016,
4. RECOGNITION FROM KPKT FOR COMMUNITY COMPOSTING UNDER PLANMALAYSIA - 2017.
5. SHORTLISTED FOR GREEN INITIATIVE PROGRAM IN 2018 - RAIN WATER HARVESTING, WALKABLE AND CYCLING.
6. RECOGNITION FROM EPU/UN IN SUSTAINABLE DEVELOPMENT GOLD PROGRAM WITH ASEAN CONFERENCE 2018 IN EVERLY HOTEL ,PUTRAJAYA.
7. NOMINATION FROM GREENTECH , KETTHA FOR LOW KARBON CITIES FRAMEWORK (LCCF) 2018

IN DETAIL

The Neighbourhood Garden initiative is a programme

co-owned by the Landscape Department and the Public Health Department of MPPG in assisting the city rejuvenation process into a Green and Healthy City by 2025.

By working together, greater efficiencies were achieved in resource planning and public engagement by these two departments towards the development of 'Smart Residents' with clean, green, healthy and city-loving inhabitants. Although the initiative has proved successful, activating and engaging community members was the single biggest hurdle whilst exiting the program (at the point of sustainability) remains a work-in-progress.

THE OBJECTIVES

Establishing cooperation among local communities and agencies;

- Improving basic knowledge and skills in the fields of agriculture, animal husbandry and fishery;

- Help save the cost of daily household expenses;
- Increasing Interest in the community, especially the youth in agriculture
- Promote the recycling programs and the use of organic materials.
- Create a community of love for the environment, always taking care of happiness, hygiene and local greenery

MAIN PARTNERS AND STAKEHOLDERS

The implementation of the Neighbourhood Garden program was jointly developed and implemented by the MPPG, the Center for Entrepreneurship and Professional Development (APEEC), the Resident's Association of Pasir Gudang, University Putra Malaysia (UPM) along with the Malaysian Agriculture Research Development Institute (MARDI) and the non-governmental organization 'Yayasan Pasir Gudang' (MPPG Foundation).





**Cymbopogon
Citrates**



Curcuma Longa



**Vietnamese
Coriander**



**Zingiber Officinale
Roscoe**



Ipomoea Spp



Centella Asiatica



Cosmos Caudatus



**Capsicum
Frutescens**

INNOVATION

Consistent with the aspirations of its 2025 plans, the Municipal Council took the lead in convening a number of key stakeholders in a pilot 'Neighbourhood Gardens' initiative with the Air Biru neighborhood in 2014, Cendana Neighbourhood Gardens(2015), Flora Height Neighbourhood and Air Biru neighborhood (2016-2017), Balau neighborhood(2018). The local social-economic profile is primarily industrial, with households typically comprising blue-collar workers, pensioners, single parents and the self-employed.

SOME KEY LEARNING FROM THE INITIATIVE ARE AS FOLLOWS:

Keeping the communities engaged and consistently energized was challenging at first, along with several occurrences or issues. However, participation and cooperation from the community began to increase

following a successful harvest. As an indicator, the Taman Flora Neighbourhood Garden yields as much as USD 800 per harvest with a combination of produce. With such an impact, the community felt motivated to work harder, accumulating knowledge and applying their skills in agriculture, improving their living environment and pushing harder to increase their income through the program. Their efforts have not gone unnoticed as they now have support from their respective local councillor

MAJLIS PERBANDARAN PASIR GUDANG RAINWATER HARVESTING SYSTEM IN PASIR GUDANG, MALAYSIA

AIM

In general, the project aims to formulate objectives to reduce carbon emission and establish low carbon initiatives for short, medium and long term implementation of each department in Pasir Gudang for the year 2017-2025.

One of the activities that has been proposed by MPPG is related with rainwater collection or harvesting system (sistem penuaian air hujan) or known as SPAH. In 2016 and 2017, MPPG has received an award for the development of National Neighborhood Initiative for Rainwater Harvesting System in municipal category.

SPAH has been applied in Pasir Gudang for the purpose of building plan approval. A retrofitting process for the installation of SPAH is done on several types of buildings including institutions, commercial, industrial, and government buildings from June 2017 to June 2018. MPPG has also identified public buildings which operated by MPPG to be the pioneer initiatives in promoting SPAH installation at the early stages. The buildings are MPPG Nursery Site and Semai Bakti Stall.

MPPG has also identified ten retention ponds that are suitable for SPAH landscape. This implementation reduces the need for generating water as the water



LOCATION OF EXTRA WATER STORAGE TANKS



from lake is used for landscape watering in MPPG

PURPOSE OF THE PROJECT

SPAH elements such as piping system, rain tank, air pumps and others should be clearly shown in the plan for the following types of buildings:

- a) In respect of residential buildings, SPAH should be installed only for bungalows and semi-detached houses having an area of approximately or more than 100 m.
 - b) In relation to all categories of separate buildings that have roofs of the same area or exceed 100 m
- PROJECT RELATIONSHIP

SPAH project is implemented based on a government campaign that aims to reduce the amount of bills from time to time and to ensure that the amount of bills will be reduced every month. This systematic and practical way of watering trees and plants is hoped to bring lots of benefits to MPPG. The target for this project is 30% reduction in water bills at MPPG nursery. Based on the graph, this SPAH project is implemented due to the high cost of water consumption in nursery.

ACHIEVEMENTS

1. NATIONAL INNOVATION AWARD - 2015 – SUSTAINABLE CITY (MURNINET)
2. NATIONAL INNOVATION AWARD - 2016– SUSTAINABLE CITY (MURNINET)
3. RECOGNITION FROM KPKT FOR RAIN WATER HARVESTING UNDER PLANMALAYSIA - 2016,
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5. SHORTLISTED FOR GREEN INITIATIVE PROGRAM IN 2018 - RAIN WATER HARVESTING, WALKABLE AND CYCLING.
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7. NOMINATION FROM GREENTECH , KETTHA FOR LOW KARBON CITIES FRAMEWORK (LCCF) 2018

IN DETAIL

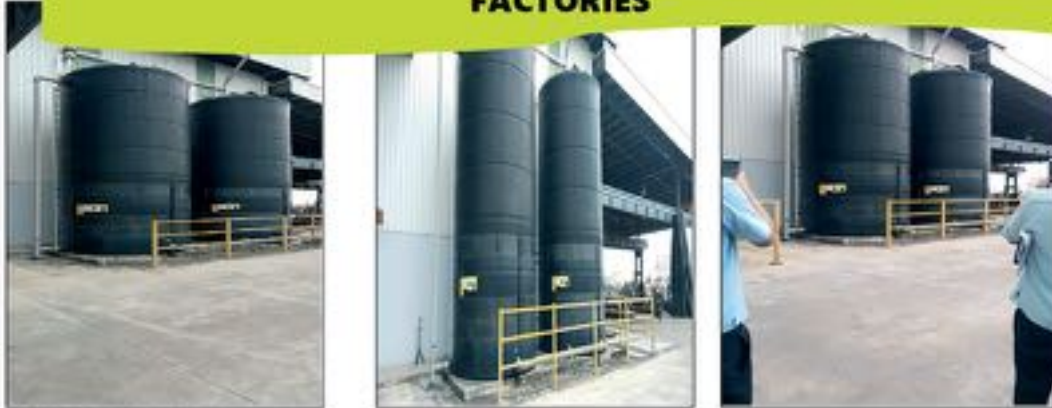
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EXAMPLE OF RAIN WATER HARVESTING SYSTEM IN FACTORIES



NOV FQS SDN BHD

1. This factory has 4 tanks that can hold approximately hold 10,000 gallons of rain water.
2. Collected rain water is used for water testing pressure procedures.
3. Excess rain water will overflow out of the tanks into the water catchment pond.
4. Each tanks has filters to filter out debris before water is collected into the tanks.
5. The tanks are located in front of the building for easy maintenance.

on several types of buildings including institutions, commercial, industrial, and government buildings from June 2017 to June 2018. MPPG has also identified public buildings which operated by MPPG to be the pioneer initiatives in promoting SPAH installation at the early stages. The buildings are MPPG Nursery Site and Semai Bakti Stall.

MPPG has also identified ten retention ponds that are suitable for SPAH landscape. This implementation reduces the need for generating water as the water from lake is used for landscape watering in MPPG.

PURPOSE OF THE PROJECT

SPAH elements such as piping system, rain tank, air pumps and others should be clearly shown in the plan for the following types of buildings:

- a) In respect of residential buildings, SPAH should be installed only for bungalows and semi-detached houses having an area of approximately or more than 100 m.

- b) In relation to all categories of separate buildings that have roofs of the same area or exceed 100 m

PROJECT RELATIONSHIP

SPAH project is implemented based on a government campaign that aims to reduce the amount of bills from time to time and to ensure that the amount of bills will be reduced every month. This systematic and practical way of watering trees and plants is hoped to bring lots of benefits to MPPG. The target for this project is 30% reduction in water bills at MPPG nursery. Based on the graph, this SPAH project is implemented due to the high cost of water consumption in nursery.

Long Term Benefits

MPPG has succeeded in reaching the target of lowering the water bill rate after the project was carried out with a decrease of 46%.

MANOR WALKS SHOPPING & LEISURE PROJECT BIOSPHERE

AIM

The rationale behind this project is to ensure that as a service partner at a busy community shopping centre we met the objectives of the client to provide attractive surroundings for customers through biodiversity in the local community and minimising the environmental impacts.

We appreciate the challenge of finding the balance between meeting the customer's requirements and the conservation of natural resources. Therefore, we

see this project as key in underpinning our objectives of showing consideration for the environment, contributing to biodiversity and 'doing our bit' in the drive to enhance local habitats whilst going a step further by ensuring that we put the effort into extending this education to users of the centre.

Our aims:

- To improve environmental performance and encourage the efficient use of resources.
- To support the wider goals of sustainable development, including social benefits through community and staff involvement.
- To deliver educational content to our local community and schools about Bio diversity.
- To establish a code of best practice for others to follow and aspire to lead within the retail industry.
- Create a natural and pleasing environment for staff, visitors and tenants; while maintaining a healthy and wealthy nature environment for wildlife.

ACHIEVEMENTS

Reduction in water use from mains supply which has maximised environmental and costs benefits with an estimated saving of approx. 4000 litres over the summer period 2018.

Increase in the variety and number of resident species on site including, insect, bird nesting and invertebrate habitats.

Positive increase in the availability of habitats on site which will contribute to the local ecosystem including 10 bird nests, 10 bee homes, 2 bee hives, 2 bug hotels and 2 natural composting areas. Self-sustainable flora and fauna through natural and effective landscaping control and development. Creation of a native seed bank display within the



Passionate about the environment: Joseph Goddard.
© ABM UK

centre for education and information for shoppers on our biodiversity plan.

Development of localised nature trail for schools to educate through site visits, this is linked in with QR coding technology that develops a web-based information archive of plants and local information. Introduction of Bee hives and bee houses to increase pollination of local native flowers and shrubs and support bee population.

IN DETAIL

ABM have been providing services at Manor Walks Shopping and Leisure since 2012 and work alongside the managing partner, Workman Retail and Leisure. In 2014 we started engaging with the client on their objectives around biodiversity to improve the efficient use of natural resources such as water.



Advance Northumberland are a local landlord for this community shopping centre and we knew we could do more than what was initially discussed. We wanted to create self-sustainable streams within the site to protect and enhance the habitat through biodiversity whilst engaging with our shoppers, staff and community. We recognise we are an integral element of biodiversity for Cramlington and our operations have a major part to play in it.

The project has many branches to it which leads us to focus on; preparing, protecting and driving

innovation within the workplace whilst supporting the environment. At an initial cost of £2,500 from the landlord and managing agent, we have developed a strategy and now have longstanding environmental actions in place.

We have built greenhouses to improve the aesthetics of a service area to create a self-sustainable plant growing site. Through the process of growing seed (from existing native species plants) we have reduced our plant purchases to NIL. The greenhouses are eco-friendly and have an integrated water butt for rain collection coupled with solar / wind powered irrigation systems for both internal and raised bed watering. The additional flowers grown have increased the plant areas within the centre which creates a welcoming environment for shoppers whilst enhancing the habitat for insects, birds and bees through pollination areas.

We feel we are responsible for the conservation of individual species of plants and animals, the preservation of their habitats and the natural processes that sustain them. We are continually looking at sites around the centre to protect and conserve nature and we have delivered multiple habitats to provide this including bird boxes, living walls and bug hotels to

support local insects, habitat and plant species.

The bug hotels have created a natural habitat that contributes and increases the number of invertebrates, such as bumblebees and solitary bees, which are declining in numbers so by providing homes we can contribute to their conservation. The creation of hedgerows and natural compost also manages soil erosion with no chemical fertiliser used, just natural products.

We have developed the bee population through

training with the National beekeeper's association which has allowed us to install hives for honey bees. We have worked closely with local schools to create Bee houses for solitary bees, bird boxes and feeder streams reusing copse from around the general site. We are going to develop this and further our educational notice boards with live feeds to show the importance of pollinators and their worth to the ecosystem.

Growth of the living walls has enabled us to use the extensive, disused wall spaces of the retail units whilst supporting the environment. The living walls have been created in two prime areas of the centre and have increased the botanical diversity of the site providing valuable habitats for invertebrates and nesting sites for small bird species.

The whole project has highlighted our ongoing commitment to protect the environment whilst working in partnership with our client. It has also fulfilled our ISO 14001 responsibilities for continual improvement by implementing a biodiversity programme which in turn wider benefits our community. The ABM policy is to make a difference, everyday; and this has been at the forefront of the biodiversity strategy. We want to get as many people as possible involved with our initiative and enlist the help of local allotment societies, schools and visitors to educate and enhance our local environment for the better of the community.

Short and long term benefits within this project have been with the educational benefits with local schools understanding the need to reduce, reuse, and re-purpose waste and how to protect the environment we live in. We have invited schools to speak with our employees to educate them, creating an understanding of the Biodiversity cycle and the need to protect it. We have produced a nature trail for students to complete on their visit to site to engage with the students in an interactive way which has proved beneficial as children felt fully inclusive to our commitments. Future benefits of the project will be the reduced waste and subsequent costs as well

as the increase of habitat loss which will prove the success of the project in the long term.

Innovation through technology is one of the great attributes to this project with future development of a localised video feed that will deliver live video to the visitors, staff and tenants everyday about the success we are having through their involvement in this project. Technology will play a major part in future educational involvement as we develop films and documentaries on the progress of the Bio Diverse plan at Manor Walks.

This project has been designed to be able to roll out across any shopping centre or public space with potential to offer clean air zones through planting of various tried and tested plants (moss, shrubs, trees). This best practice approach has been promoted across multiple ABM UK sites with great effect and shows how we are expanding our project for the benefit of the environment. We also hope that by regular engaging and promoting our efforts more people will make small changes to support and care for the environment.

Further development for Manor Walks would be to implement roof gardens and vegetable gardens which are currently underway as a direct result of the success of our project. The scheme would benefit the community further by supplying fresh produce to local residential homes and schools for use or producing seed to grow themselves. The learning curves achieved throughout our journey has enabled all those involved to understand and appreciate the need for a diverse, green and clean environment and enjoy working on creating a positive position for our staff and visitors.

MARMAX PRODUCTS LTD RECYCLING GAME BOARD

AIM

The aim of the recycling game board is to create not only a fun game for children, but also to educate children about the effects waste and plastic pollution are having on our climate, oceans and sea life as well as encouraging turn-taking, communication with peers and sharing.

ACHIEVEMENTS

The Recycling Game Board offers an interactive game for children to not only have fun, but to also develop their turn-taking, sharing and cooperative play. However, the main achievement of the game board is to teach children about the devastating effects plastic waste is having on our planet, and how they can help by recycling, taking their litter home or placing their litter in a bin.

Plastic waste in the ocean is huge on everyone's agenda - so to create a game which can teach children the rewards of recycling, and the

consequences of throwing their rubbish on the beach or street was something which Marmax Products are passionate about.

Marmax uses recycled plastic material for the game board to keep in line with recycling and saving the planet.

IN DETAIL

Plastic waste is becoming a huge problem worldwide. From being shown on the news, to the David Attenborough series Blue Planet II, everyone is aware of the devastating effects that plastic waste is having on our oceans. There are millions of tonnes of plastic waste being dumped into our oceans every minute of every day, killing all ocean plants and sea life. It is estimated by the year 2050, there will be more plastic in the ocean than there will be fish. Marmax Products manufacture all their products from recycled plastic, therefore preventing this plastic from entering the ocean and producing high quality outdoor products.

Marmax wanted to help to educate future generations about the effects plastic waste has on our planet and how they can prevent this from happening by recycling and changing their habits towards plastic waste. Marmax Products have been working with recycling company Recoup, to come up with a game for children to enjoy, as well as educating them about the devastating affects plastic waste has on our planet and how recycling can assist in helping to save the planet.

The Recycling game is a simple board game, where up to four players can play. The players roll a dice and move around the board, coming across both good and bad squares as they go. The first person to the finish wins the game.

The good squares are anything from buying a bag





for life, using the bag for life and recycling at home to arranging a litter pick. This can advance the player for several spaces. The bad squares are anything from being caught littering and leaving litter at the beach to starting a fire in the woods. The player can move back spaces or miss their next turn. In each of the four corners of the game, there are information boxes which give the children information and facts on plastic waste, recycling and how they can prevent it. There are also squares which feature Marmax Products. When these are landed on, the player can advance spaces.

By creating this game, Marmax wanted to ensure that they are not only adding another fun game to their collection, but they are also ensuring that children have fun while being educated at the same time. By creating this game, this can also encourage children to participate in games with their peers as well as learning turn-taking, communication, sharing and even teamwork. Children are also able to use their imagination while playing. They could use the information they have learnt from the game and re-enact the information back to their peers; not only showing that they are aware of the effects, but to also make others aware.

The Recycle Game is produced on a recycled plastic board which is attached to Marmax's Recycled Plastic Heavy Duty or Junior Picnic Benches, so children can sit with their friends while playing the game.

MC GEE

INITIATIVES DESIGNED TO HELP IMPROVE LONDON'S AIR QUALITY

AIM

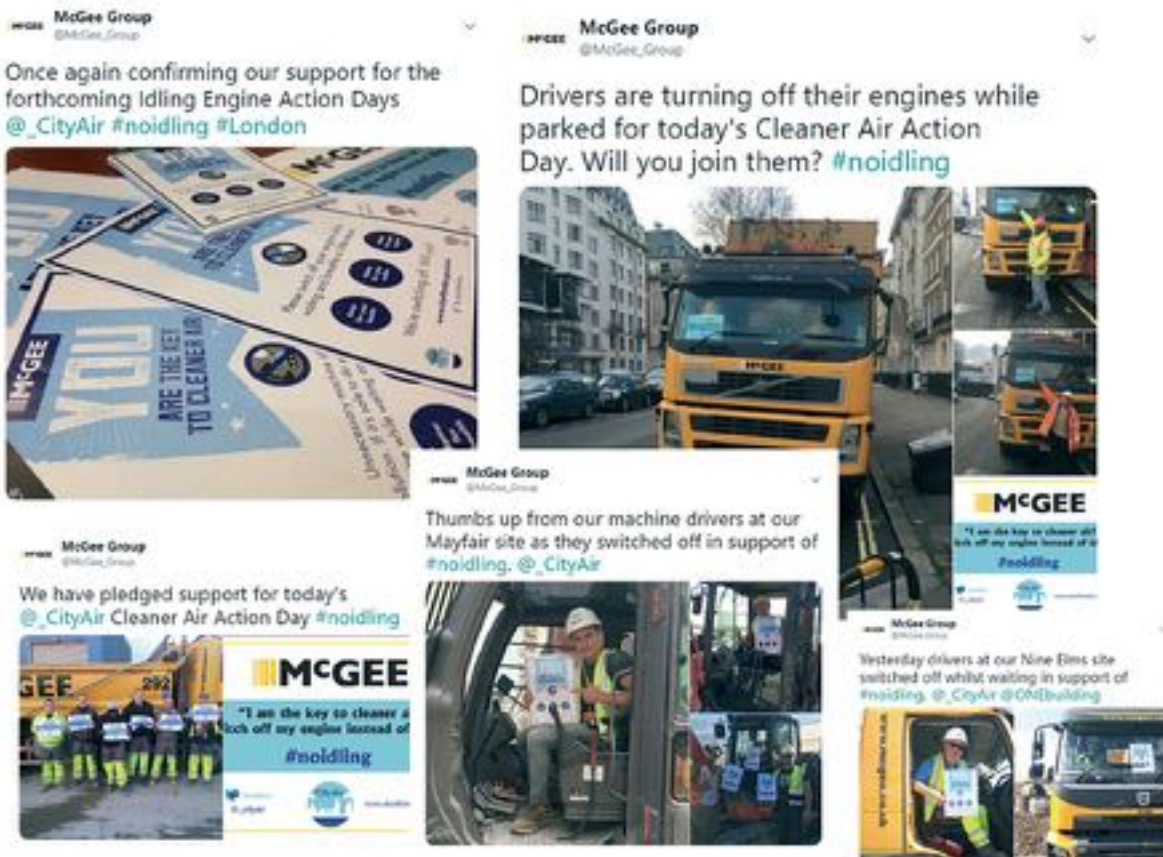
As a London-based specialist contractor delivering world-class construction projects, it's our responsibility to do all we can to look after the planet on which we live.

Our environmental considerations, therefore, play a major role in our daily operations, as we strive to always deliver environmental best practice, whilst looking for new methods, new initiatives, and new innovations so we can deliver major projects for our

clients - whilst being a considerate constructor and caring for our planet.

It is common knowledge that London has an ongoing problem with poor air quality, and this is something McGee wants to help change!

Climate change will only be addressed if individuals, businesses and government organisations collectively take responsible steps to reduce CO2 emissions as much as possible and then offset the remaining unavoidable emissions.





At McGee, our carbon reduction aims seek to:

- Calculate/measure our carbon footprint
- Reduce carbon emissions
- Offset unavoidable carbon emissions through carbon offset projects

Through these aims, we hope to take steps to combat global climate change, and specifically improve London's air quality.

Climate change impacts on all of us and we need collective action to tackle it.

ACHIEVEMENTS

Through a combination of policy implementation, industry best practice and innovation, collaboration with manufacturers and industry stakeholders, we are minimising our impact on the environment. Our carbon reduction and offset achievements include:

- Additional £2m investment in operating a state-of-the-art fleet of lorries
 - Meeting new Government regulations ahead of programme
 - Introducing hybrid machines for emission-free excavations
 - Implementing fleet tracking software in delivering efficient and sustainable construction logistics
 - Forming a partnership with King's College London to improve emission inventories with 'real world' engine data
 - Delivering a tree planting scheme to offset carbon emissions
 - Introducing electric/hybrid company cars as Policy and being the first UK construction company to invest in an all-electric van
 - Actively taking part in City of London anti-idling campaigns and nominating clean air champions
- Exchanging industry best practice with our peers, clients and other industry stakeholders is an important part of pulling together to deliver a step change across the construction industry. Recognition of a Green Apple Award is one of the ways we can cast the net far and wide in terms of sharing our environmental achievements.

IN DETAIL

ABOUT US

We are a multi-disciplined specialist contractor delivering world-class decontamination, asbestos removal, demolition, piling, civil engineering and construction services, either as standalone disciplines or as an integrated solution. Supported by in-house recycling, transport, plant and equipment we are fully equipped to deliver many of the UK's most high profile and challenging projects, safely, on time and within budget.

We have been in business for 60 years and we are proud of our reputation as a family business which takes its responsibilities to its employees, the environment and the local communities in which we work extremely seriously.

SUSTAINABILITY

CLEAN AIR CHAMPIONS

We support the City of London's campaign by encouraging drivers to switch off their engines while stationary. If stationary for more than 60 seconds, turning the engine off saves money on fuel, reduces wear and tear on the vehicle and improves the air quality of the area, which is better for everyone's health. Through introducing on-site 'clean air champions', attending clean air workshops and promoting no idling on site through 'cleaner air action days' we have helped to raise awareness of how everyone can play their part.

ELECTRIC VEHICLES

We have future-proofed our business after becoming the first construction company in the UK to introduce LDV's EV80 to our fleet of vans. LDV's EV80 is the first in a new generation of cleaner, alternative fuel vehicles and offers energy efficiency, stronger power, and an enhanced eco-friendly performance. Our company policy enables employees to select vehicles from electric or hybrid manufacturers, which has been in place since 2014 and illustrates the team's commitment to going green.

LONDON LOW EMISSIONS PARTNERSHIP

We are pleased to be working in partnership with the London Low Emission Construction Partnership (LLECP) – a project funded by the Mayor of London and Transport for London. We are facilitating a pioneering on-site study, conducted by King's College London. Working with Emissions Analytics using a portable emissions measurement system (PEMS), a new way to improve emission inventories with 'real world' engine data is being developed. It is hoped this approach will be more accurate than the existing method and the results will feed back into future NRMM policy for London.



EURO 6

Announced earlier this year, McGee has invested a further £2m in our truck fleet to increase road safety, exceed environmental compliance, and optimise operational efficiency.

This latest substantial investment ensures compliance with the Low Emission Zone standards for exhaust

emissions, NOx and other pollutants.

The new vehicles represent a continued upgrade to McGee's FORS Gold accredited fleet of McGee yellow tippers, skip lorries, sweepers, medium and large flat lorries, articulated tractors, trailers, and low loaders.

MEETING NRMM REGULATIONS AHEAD OF PROGRAMME

New emission control requirements came into effect in 2015 and aim to improve air quality by reducing key pollutants from burning fuel such as diesel, petrol and natural gas.

A number of new 'Tier 4 final' machines have recently joined the McGee fleet, including Liebherr R946's, Hitachi ZX135's, Thwaites dumpers and Atlas Copco Compressors.

To ensure Non-Road Mobile Machinery (NRMM) compliance, McGee has completed a programme to retrofit 40 legacy machines, including: Liebherr R954, Hitachi EX 455, Volvo EC460's which has involved the installation of a diesel particulate filter (DPF) to the exhaust systems and the use of Selective Catalytic Reduction (SCR). The project was undertaken in conjunction with Green Urban Technologies and took six months to complete. In fact, the project – which was completed in 2016 – was the biggest major conversion programme to be undertaken by Green Urban at the time.

The entire McGee fleet meets new emission control regulations – all ahead of the London 2020 Low Emission Zone regulations deadline.

HYBRID EXCAVATORS

A conversion programme has been completed which includes three 5 tonne mini excavators and one 12 tonne midi piling rig converted to full electric power, removing the diesel engines and replacing them with three-phase electric motors of the same power ratings. The machines are now emission-free, with much-reduced noise levels for operation in a low headroom configuration.

Recognising these efforts, McGee has been presented with a Sustainability Award for 'Promoting Positive Sustainability' at Battersea Power Station Phase 3A. We were awarded the first place Award for our innovative use of hybrid excavators on site.

LOCATU

Our projects are supported by our in-house transport and logistics.

Through the introduction of the LOCATU fleet tracking system, we have increased efficiency and reduced vehicle congestion around our sites by working on a 'right place right time' basis. This also extends to sub-contract vehicles.

LONDON LOW EMISSION CONSTRUCTION PARTNERSHIP

We are working in partnership with the London Low Emission Construction Partnership (LLECP) – a project funded by the Mayor of London and Transport for London - to facilitate a pioneering on-site study conducted by King's College London.

Working with Emissions Analytics using a portable emissions measurement system (PEMS), a new way to improve emission inventories with 'real world' engine data is being developed. It is hoped this approach will be more accurate than the existing method and the results will feed back into future NRMM Policy for London.

CADDINGTON GOLF CLUB

Owned and redeveloped by McGee, Caddington Golf Club has not only created a beautiful landscape for its customers to enjoy a round of golf but a fantastic home for wildlife. As part of our commitment to the environment, sustainability and off-setting our unavoidable carbon emissions, the redevelopment created wildlife habitats, saw 6,000 trees planted, including Oak, Hornbeam, Hazel and Wild Cherry, along with other plants and wildflowers.

ELECTRIC VEHICLES

Demonstrating our commitment to being green, we have a company car policy in place which enables employees to select vehicles from electric or hybrid

manufacturers. Managing Director, Brian McGee is a strong advocate of greener motoring and himself drives an electric Tesla.

In May 2019, we became the first construction company in the UK to introduce LDV's EV80 to our fleet of vans. LDV's EV80 is the first in a new generation of cleaner, alternative fuel vehicles and offers energy efficiency, stronger power, and enhanced eco-friendly performance.

The EV80 is the first electric van that McGee has invested in.

For McGee, introducing the EV80 all-electric van is the next step in our continued commitment to investing in our fleet and reducing our environmental footprint. The construction industry can play a significant role in improving air quality in London through the introduction of electric or hybrid vehicles to reduce emissions, and we are pleased to be leading the way with this initiative.

Mark Barrett, general manager LDV UK & Ireland said; "It's great to see companies like McGee pave the way in their industry to a greener future. More and more fleet buyers and van drivers are moving from fuel-dependent engines to hybrids and pure-electric models. It's not just a positive decision that affects their business and green credentials; it's about the wider picture – the future of the planet."

CLEANER AIR CHAMPIONS AND ACTION DAYS

Unnecessary vehicle engine idling by not switching off when stationary adds to pollution. Ever mindful of the well-documented issues within London of poor air quality, primarily due to emissions from road vehicles, the Transport and Environmental teams partnered with the City of London Corporation to become 'Clean Air Champions'.

McGee drivers are encouraged not to leave their engines running during loading and unloading, although all new lorries are fitted with eco engines which cut off if the vehicle is stationary for a couple of minutes.

If stationary for more than 60 seconds, turning the engine off saves money on fuel, reduces wear and tear on the vehicle and improves the air quality of the area, which is better for everyone's health. Through introducing on-site 'clean air champions', attending clean air workshops and promoting no idling on-site through 'cleaner air action days' we have helped to raise awareness of how everyone can play their part – no matter how simple or small the initiative seems.

WE'RE COMMITTED TO BEING GREEN



McGEE

McGee is a multi-disciplined specialist engineering contractor delivering world-class **decontamination, asbestos removal, demolition, piling, civil engineering, construction and recycling services**, either as standalone disciplines or as an integrated solution.



At McGee, we're committed to acting responsibly in all we do. We're proud to be raising the bar in considerate construction and going above and beyond industry best practice to reduce our impact on the environment.

From safeguarding the environment in the communities where we operate, leading initiatives in air quality and maintaining an industry-leading fleet, to leaving behind a positive lasting legacy long after we have left a site - We're proud to be playing our part.

In 2019, our efforts to being green were recognised with a number of prestigious awards:

- International Green World Ambassador Award
- Silver Green Apple Award for Environmental Best Practice 2019 for initiatives in Air Quality
- Bronze Green Apple Award for Environmental Best Practice 2019 at Victoria Road for HS2 (demolition)
- Silver Green World Award for Environmental Best Practice 2019 at The Londoner, Leicester Square

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MERCEDES-BENZ INDIA PRIVATE CONSERVATION AND STRENGTHENING OF NATURAL RESOURCES

AIM

This project aims at conservation of natural resources and promoting interventions that will create awareness among local community for its sustainable use on long run.

ACHIEVEMENTS

The initiative was developed to create comprehensive and detailed documentation of loss of above mentioned natural resources in upper catchments of one of the major river watershed in the state

of Maharashtra. This first step of scientific documentation of the status of natural resources in itself is an achievement, as this document can be used as baseline to create multiple action plans related to natural resource conservation, watershed planning to create sustainable livelihood options for the local tribal community.

Secondly, the initiative involve local tribal community in every single step of the project such as planning, designing, execution and its sustainability. Awareness



Starting with one village, the initiative in its third year has now spread over 9 villages from the catchment of Ghod and Bhubra river of Ambegaon taluka, Dist. Pune. The rivers feed Dimbhe dam which irrigates larger part of peninsular land downstream. At the same time, the initiative will provide water to around 3700 people from of 9 villages in the upper catchment of mentioned rivers. Previous studies have shown, that a grownup tree sequesters around 7-18 kg carbon (this figure varies at species and individual level). With this estimate, saplings when grown up, will consume large quantity of CO₂ from the atmosphere and help in reducing negative impact of climate change locally.

IN DETAIL

What did the project involve doing?

The project involves conservation of natural resources along with strengthening livelihood of local communities. A methodical approach of project planning and execution is as follows: For

understanding the water scarcity issues, depletion of natural resources and problems associated with it, village level meetings were conducted. This was followed by technical assessment of possible solutions with the help of subject area experts. Local NGO partners along with villagers were involved in execution of designed solutions. Consecutively communication with the local Forest department authorities were commenced for identification of forest lands.

Why did you do it?

The effects of natural resources depletion was seen recently in various parts of Maharashtra state as altered rainfall started triggering drought by 2013. The severity of drought gradually increased in following years resulting in less rainfall, poorly managed existing water resources and simultaneously leading to drought conditions. The severity increase in following years creating impact on agricultural, industrial and overall economic pressures on state and central government.



Being an automobile industry whose majority of operations are directly dependent on Natural Resources & with above mentioned background, MB India is motivated to strengthen the natural resource in rural areas & support the village level water conservation initiatives in the areas which are drought prone, are part of catchment of major rivers that feed to main water reservoirs & affected severely in recent years. With the help of baseline data collected from different government & non-governmental organizations, MB India initiated water conservation activities in various drought hit villages of Maharashtra state. Step by step MB India created water conservation structures in 8 villages between span of years 2014-2018 which included construction of new water structures, de-siltation & renovation of existing old structures & mobilization of community for water conservation program. Similarly, to address the issue of degradation of green cover, Mercedes-Benz India initiated plantation of 30,000 trees in rural areas covering 8 villages which are in vicinity of Wildlife Sanctuary and home for many threatened species of flora & fauna. As trees perform major role in maintaining soil moisture, arrest rate of soil erosion, recharge ground water & act as key performer in reducing effects of carbon emission by directly consuming atmospheric carbon. The plantation was done in different steps in which first step of nursery development program started in late winter where the whole community participated in seed collection, creating appropriate seed beds for sapling raising & continuous watering. The saplings were then introduced in the identified degraded areas by community itself. For this whole process every villager was paid on a daily wage basis.

What did it cost and where did the money come from?

The project was funded from Corporate Social Responsibility funds of The Company. The exact budget of the project cannot be disclosed due to company policy.

Preventive Environmental Protection Measures:

Hilly areas receive tremendous rains in monsoon and in open slopes it increases surface runoff and also increase rate of soil erosion. This project aims at giving watershed treatment in the catchments area i.e. hilly slopes by trenches and plantations to arrest the soil in the area and reduce soil erosion and surface runoff, protecting hilly slopes and reduce siltation rate in the newly created structures.

Resource protection:

Water is very critical natural resource that has large level importance in all human activities. And due to same, exploitation of the resource is also very high. This project aims at not only repairing natural resources but also, to design a sustainable model that will contribute to strengthen the natural resources on long run and has higher replicability so that, the same can be adopted at wider level and achieve more sustainable and quality results. Plantation of native trees helps in holding soil and decreased surface runoff of rain water and ultimately help in recharging ground water table. With increased soil retention rate, the moisture retention rate also increases, resulting in increased nutritional quality of soil. This project creates benefits like providing plantation landscapes, thereby contributing to improved soil fertility and food security, improved availability and quality of water resources, reduced desertification, increased biodiversity, creation of green jobs, economic growth, and increased capacity for climate change resilience, adaptation and mitigation

Protection of Natural Habitats:

This initiative aims at restoring natural habitats through integrated watershed conservation and re-introducing native trees in degraded forest areas. While plantation of 30,000 trees in 9 villages near Bhimashankar Wildlife Sanctuary which is also home for Malabar Giant Squirrel, an endemic



and threatened mammal which needs continuous canopy for its survival. This plantation project will result in enhancing habitat conditions and also will create multiple micro-climatic habitats for variety of creatures. It has shown in previous studies that, restoration of habitats in the vicinity of protected areas act as better Buffer Zone for biodiversity of the area and reduce the direct impacts of human interference on core forest zones

Raising Environmental Awareness of Employees or Externals:

Covering over 9 villages for strengthening their natural resources, the team first mobilized the community where environment awareness is very low and thus has resulted in exploitation of natural resources. The project was designed in a way that community was also participated in multiple activities that provided opportunities to create ownership in the community for the environmental cause and understand the need of natural resource conservation as impact is visible toward end of the execution. Hence, the project has created strong awareness in around 3700 villagers in 9 villages. The project

execution model also has generated employment for the community and due to this economic model, the same has gained more attention of the villagers not only to sustainably use the natural resources but also to protect these resources. Plant species selected for the said project are local origin and good economic value in terms of fruits and non timber products. That in turn will act as alternative livelihood option for the community.

Who and what benefited?

- Local Community: 394 villagers received direct job opportunity through forest restoration initiative while, 3700 villagers receiving periodic benefit due to water availability in the villages.
- Ecosystem: Both of the Water and Forest conservation initiatives are creating directly impacting the long term sustainability of the ecosystem in the area by strengthening the ecosystem services in the upper catchment of the rivers.
- Biodiversity: Being located in the Western Ghats, the biodiversity hotspot and one of the World Heritage site, this initiative has long term impact on the habitat restoration for the existing biodiversity.
- Community downstream: Restored watersheds strengthen and ensure sustainability of the natural resources. These initiatives on long term will contribute to ensuring sustainability of natural resources.

Was there anything innovative about the project?

The project model of build and execution in itself is innovative. Usually the conventional water management and plantation projects executed at spot locations i.e. locations that are not part of bigger watersheds, does not involve communities in the local area for execution of the project therefore does not create a multi-dimensional impact on the ecosystem of the location. This project covers a holistic approach in addressing natural resource protection related issues by connecting dots

of ecological restoration, watersheds and local community.

Can other organisations/communities benefit from implementing your methods?

The project is highly scalable due to its simplicity of methodology. The replication and scalability shall benefit both community organizations and individual beneficiaries with its higher success rate and its sustainable module. The intervention will also help larger communities downstream as the water secured from the catchment with integrated watershed and restoration method the plantation shall secure more water on long run.

What did you learn from the project and are you planning any further development? As mentioned above, this initiative targets multiple issues related to ecosystem services by integrating community. Community's readiness for implementation of activities and their support in equal contribution in execution and ensuring sustainability is a process that needs multiple interactions. Therefore, community mobilization and getting maximum involvement in this initiative was a learning experience.

The initiative was developed over certain period of time, which also involved technical planning. Deliberations with area experts, existing research and devising methodology for execution was an important learning which gave critical insights regarding interdependency of these ecosystem services and keeping holistic approach can create larger impact.

NATTA BUILDING COMPANY REDUCING PLANT EMISSIONS

AIM

The aim of the project was to plan and launch a company-wide performance improvement scheme for accurately and efficiently measuring machine outputs allowing environmental improvements by reducing the companies carbon footprint. Improvements include reducing the number of machines onsite thus reducing machine emissions and other environmental factors with a positive economic benefit whilst not compromising production.

The Natta Plant division was tasked with machine efficiencies to be monitored and improved by 20% during 2019 so a plant utilisation system was required to be able to assess success. In addition to this, the Natta technical division were tasked with employing additional resource to optimise the use of the Trimble GPS system across all site with 90% of earthworks models arriving on site prior to the Trimble system.

The Plant system monitors machine hours highlighting which excavators are using eco mode (reducing consumption and emissions admitted). Machine drivers are awarded bonuses to encourage the use of eco mode.

The idea was introduced by Natta's Managing Director in line with one of the company's 2019 goals, undertaking a philosophy of lean construction to reduce the carbon footprint by 15%. The project was rolled out companywide with the Natta Plant division taking on the role of recording, collating and distributing the data throughout the company so that improvements can be achieved. In order to reduce the carbon footprint, investment continues to be made in new technologies and innovations to empower the workforce to increase production whilst reducing our impact on society. Attached reports show data collected by the plant system resulting in a league table to encourage sites to be the best,



most efficient site enhancing machine optimisation by using eco mode to reduce emissions, amount of fuel used and running costs.

ACHIEVEMENTS

We tailored and designed the reports to provide the relevant information. We are not aware of any other companies doing this in our area, but it is something other organisations could benefit from if they were to replicate the methods across their organisation.

We are learning that the project is working; providing sufficient data allowing us to make improvements with machines onsite resulting in a reduction in emissions without compromising our output and targets to meet the client's deadline. We are in the process of rolling it out across all plant machines that don't currently provide the information required to make these improvements.

With over £500K invested in the last year, the system enables the operator to visualise (via a tablet) what excavation is required, therefore improving not only its efficiency but its productivity and quality. Natta Plant is running the largest fleet of Trimble GPS supported machines in the UK. The unprecedented level of feedback information is enabling us to reduce emissions but increase productivity on site with the minimum number of machines thus reducing our carbon footprint. A cost benefit allows us to redeploy machines across the business as necessary, maximising the usage of our entire fleet.

Employees are benefiting from safer sites with less machinery, traffic and emissions with bonus incentives to use machines more efficiently. Local communities and residents based around our working sites are benefiting from less noise pollution and reduced traffic to and from the sites on the surrounding roads.

This project has aided us in the renewal of the FORS Silver accreditation reaffirming our commitment to road safety, efficiency and environment protection. All vehicles are FORS Silver standard

with all vans limited to 70 mph reducing emissions whilst on residential roads and around sites.

With the combination of the two systems; plant monitoring and Trimble GPS, we have been able to increase our efficiency beyond the 20% target set, and we strive to improve this further to provide the environmental and productivity benefit that are part of company key performance indicators.

IN DETAIL

The overall efficient use of the latest machinery has resulted in a big reduction of carbon emissions, less fuel consumption, less nuisance impact and less dust.

We have created an economical benefit from an environmental benefit measure which is the perfect combination for a "green" business, it is a win-win.

We believe in a productive green way to make business to give back to the society the benefit we get from them.

We have invested in the latest soil stabilisation and recycling machinery which is unusual for medium size business like us.

The project was driven from the very top based on a personal belief in reducing our environmental impact and to inspire other to do the same. The challenge was handed to our project managers and supported throughout by the senior management team. The management fully understood and supported the fact that a larger than usual initial build cost of £650,000 would ultimately be off-set by the low running costs and supported the project throughout.

As a result of the project the awareness of environmentally friendly practices amongst staff has also increased and we have been running behaviour change training to encourage employees to follow environmentally friendly procedures in a daily basis. We would like to achieve a environmental culture within our company.



We are proud of the achievements within the community as usually construction and community doesn't get on really well we have set a good relationship with the residents and neighbours of our house development. We haven't got any neighbour complaint and we have got good feedbacks from some of them who left observation cards in our site post box.

As previously mentioned the community is benefited from the reduction of dust, noise and carbon omissions.

Also we trained local people for the use of our machinery so it helped the community and also the fuel consumption reduction as we didn't have to bring employees.

After an initial investment in machinery of £650,000 we have saved up to today, in a year time, £1,000,000 on importing materials to our site. We didn't have to buy the following imported materials which we priced when we estimated the job;

- 6F2: it is coming from the demolition materials

passed through our crusher. It was used in scaffold and crane mats

- Type 1: it is coming from the concrete piles left over passed through our crusher. It was used in road and footpath sub bases
- 10-20mm shingle: it is coming from the existing ground passed through our screener. It was used in drainage bedding and external details
- Top soil: it is coming from the existing ground passed through our screener. It was used for landscaping

Also we got economic benefit with the existing soil stabilisation so we didn't need to use as much material as designed due to the improvement of the existing ground below sub bases for roads and footpaths.

This project is easily economically measurable as it is affecting numbers of lorries and m3 of materials which got price for the area of the project and which we priced when we estimated the job.

As stated previously we have basically saved £350,000 in this project and the benefit will be bigger

in the next one as we don't have to invest in the equipment, just maintenance.

We got a big social and environmental benefit as we are reducing the Decibels of the job down to 85 from 87 which could cause workers to lose their hearing and/or to suffer from tinnitus (permanent ringing in the ears). Also the reduction of carbon emission and dust due to the minimization of lorry traffic

We have also created 2 job for local people who were trained to operate our recycling machines.

After the success of this project we are willing to replicate the process in as many projects as possible. Also promote our idea to encourage other companies to follow our process and, in this way, help the environment as we think it is a good way to benefit human and business at the same time. We are very positive that there is always a way to work together in construction and we don't like the idea of old fashion construction companies which don't really care about what's around and consequences of bad practice at work.

The aim of the project was to demonstrate how to successfully complete the groundworks using range of recycling technologies that others could replicate. We plan to implement many of the technologies ourselves on future projects and we hope leading by example will encourage other developers to do the same.

We will actively be promoting the technologies and designs used in the project to other developers and are willing to share our experiences and offer technical advice if requested.

NATTA

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Experts in civil engineering and with an award-winning portfolio of full design and build projects, Natta's capability offers a 'one-stop' solution for all projects.



Our Services:

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NORTHERN IRELAND WATER CASTLE ARCHDALE INTEGRATED CONSTRUCTED WETLAND (ICW)

AIM

Hot on the heels of designing its award-winning Stoneyford Integrated Constructed Wetland (ICW), Northern Ireland Water embarked on designing a second ICW, this time to replace the mechanical wastewater treatment works (WwTW) at Castle Archdale Country Park in County Fermanagh.

Popular with tourists and day trippers, Castle Archdale Country Park boasts 20 acres of woodland, gardens and meadow on the shores of Lower Lough Erne, owned and managed by the Northern Ireland Environment Agency (NIEA).

Castle Archdale WwTW had been constructed in the 1980s to serve the caravan park and the NIEA offices located within the country park.

Over 30 years on, the aging conventional WwTW was struggling to cope with the massive fluctuations

in flows between summer and winter periods, with increasing operational intervention and maintenance required to keep the works compliant.

In 2014, NI Water looked at options to replace the old works. They needed a flexible solution and wanted one that would integrate comfortably with the country park surroundings.

Having previously researched ICWs for its Stoneyford application, NI Water deemed an ICW would offer them a flexible, sustainable solution which could be merged effortlessly with the surrounding parkland and enhance the area's biodiversity.

ACHIEVEMENTS

The development of Castle Archdale ICW involved strategic engagement to bring on board the myriad stakeholders whose buy-in was vital to the success of the project.





NI Water engaged the services of VESI Environmental Ltd, pioneers of the ICW concept in Ireland, to develop the design for the new wetland, and started the process of leasing the land from NIEA for its application.

Having secured land, planning permission and stakeholder approval within 6 months, work got underway on constructing the ICW in late 2015. The project's achievements can be summarised as:

- Lower construction cost than conventional aeration process
- Reuse of on-site materials
- Solar panels to power telemetry
- Ease of commissioning/decommissioning
- Ability to tolerate variable flows/influent quality
- No sludge tankering
- Sustainable over 50+ years
- Reduction of over 90MW of electricity demand in a rural area
- Removal of noise pollution at an amenity area (replaced a noisy aeration works)
- Increased biodiversity/wildlife habitats
- Landscape fit and enhanced scenery
- Creation of an aesthetically-enhanced area with 150m of walking trails

Offering a simple but robust treatment process in a

fully sustainable manner, the Castle Archdale ICW recently became the subject for a TV series which explores some of NI's most iconic and unknown engineering feats.

IN DETAIL

In 2015 NI Water sought to upgrade Castle Archdale Wastewater Treatment Works (WwTW), a small mechanical plant in rural Co. Fermanagh serving a population equivalent (PE) of 25 in winter, rising to over 900 in summer.

Built in the 1980s, Castle Archdale WwTW was struggling to meet its consent to discharge to Lower Lough Erne. The plant had reached the end of its useful life and was becoming increasingly inefficient due to the energy costs associated with continuously running aeration blowers.

With the WwTW catchment limited to a caravan park and a small number of country park offices, maintenance of the works was heavily influenced by seasonal flows i.e. the management of the transition from winter loading to peak loading at the start of the caravan season.

Rather than replace the mechanical works with another conventional activated sludge process, NI Water looked to a more pioneering, greener solution

that would be able to cope with the fluctuation in demand.

At that time NI Water had just recently completed an in-depth study of ICWs for a 1,000 PE project at Stoneyford and were aware of the benefits of the ICW application, if sufficient land was available.

This environmentally-friendly solution is particularly suited to rural areas and accommodates seasonal fluctuations in flow, thus it was ideally suited to Castle Archdale. ICWs have a proven track record with low cost, low energy and low maintenance compared with more conventional mechanical-based processes.

However, often the biggest obstacle facing the construction of a constructed wetland – as was the case at Castle Archdale – is the amount of land needed – typically 35m² per person.

With the surrounding land at Castle Archdale owned by the NI Environment Agency (NIEA), NI Water were

confident that they could bring their environmental partners onboard with this eco-friendly, sustainable solution.

NI Water engaged VESI Environmental, pioneers of the ICW process in Ireland, and together they devised three key objectives for the project:

- The ICW should preferably be unlined using only materials within the existing site.
- The design should integrate the wetland into the landscape and enhance its biological biodiversity through the containment and treatment of influents within emergent vegetated areas.
- The aesthetic placement of the constructed wetland into the local landscape should enhance the site's ancillary value and nature management.

A low impact design - that would nestle effortlessly into the country park and add amenity value - was developed which quickly gained support from key stakeholders. Having undertaken the relevant environmental site surveys, planning permission was granted and the contract for the project was subsequently awarded with earthworks commencing in October 2015.

How does it work?

Put simply, the ICW at Castle Archdale was designed and built through human technological processes that occur naturally in indigenous wetlands. Castle Archdale cleans wastewater naturally. It is the plants themselves that play a major part in cleaning the water. The wetland, but its treatment capabilities are based on a complex integrated system in which the water, plants, micro-organisms, the sun, substrate and air interact to improve water quality.



The ICW design endeavours to optimise natural biological, chemical and physical processes of pollutant removal in a way that is compatible with the local aquatic and terrestrial communities which does not transmit negative impact to adjacent aquatic and terrestrial ecosystems.

Odours within an ICW are minimal and are managed by providing shallow water and dense vegetation within the ponds.

What does it contain?

Castle Archdale ICW is made up of a series of shallow densely vegetated ponds with free surface water flow through the system.

It consists of:

- Two settlement ponds
- Three treatment ponds
- Interconnecting pipework
- Varied wetland vegetation in ponds
- Deep water area with fish in final pond
- Photovoltaic flow monitoring
- Solar panels for critical alarms
- Sample point at outlet to final pond
- Maintenance road for access to ponds
- Gravel paths between and around ponds
- Grasscrete vehicular access to site
- Chestnut paling to screen settlement ponds
- Native trees and mixed blackthorn & hawthorn hedge to site perimeter

The Castle Archdale ICW contains 14,000m² of wetland ponds with a further 8,600m² of gently sloping embankments and gravel paths which can be used for dog walking. The settlement ponds comprise a variety of vegetation - around 20,000 plants of emergent species - to control malodours, enhance biodiversity and aid visual appearance.

Wastewater flows from the settlement pond through the densely planted treatment ponds under gravity flow. As the water progresses through each pond it

becomes cleaner as pollutants are naturally removed.

The ponds are arranged in sequence to maximise the retention time of the influent (wastewater) - design retention time being 90 days - and provide the natural opportunity for effluent breakdown with a resultant high-quality discharge to a small, local watercourse.

Built for less than half the cost of a conventional WwTW (£0.8m instead of £1.8m), and in half the time, initial flows to the ICW commenced in spring 2016 and a 12-month monitoring period followed.

The performance at each pond has been comfortably meeting NIEA's discharge licence limits of biochemical oxygen demand (BOD) 15mg/l, suspended solids (SS) 25mg/l and ammonia-N 3mg/l. As the planting matures and the ICW climatises further, even better results are expected.

Since the completion of Castle Archdale, NI Water has adopted the ICW application for two other sites and aims to introduce even more where land can be secured. An advocate of sustainable solutions, the company has been proactive in sharing its knowledge on the ICW application to wider industry.

With visitor numbers to the Castle Archdale area potentially increasing every year, NI Water has recently taken the decision to revert back to the original discharge location of Lower Lough Erne - to futureproof compliance - and is currently completing the installation of a new outfall using trenchless technology.

Castle Archdale ICW has attracted widespread interest from engineers and environmentalists alike and has recently been the subject of a TV series, produced in conjunction with the Institution of Civil Engineers, which explores some of NI's most iconic and unknown engineering feats.

PAYBYPHONE METERS FOR TREES

AIM

Meters for Trees, from mobile parking payment provider PayByPhone, is the first carbon footprint reduction programme of its kind in the UK. Launched in June 2019, Meters for Trees supports PayByPhone's council clients to reach their environmental goals by incentivising them to scrap their parking machines in favour of PayByPhone's cashless parking technology. Cashless parking improves air quality by removing the need for enforcement vehicles, which would otherwise be on the roads collecting cash from traditional parking machines, clocking up miles and releasing harmful tailpipe emissions. For councils who sign up to Meters for Trees, PayByPhone commits to offset roughly one tonne of carbon dioxide for every ten council parking machines by donating one tree to the council and saving one tonne of carbon dioxide through the Portel-Pará REDD project, a Verified Carbon Standard (VCS) audited project in the Amazon rainforest that combats deforestation.

ACHIEVEMENTS

Kensington & Chelsea Council was the first client to sign up to Meters for Trees. It had experienced a high degree of theft and vandalism against parking meters and was eager to begin removal of the machines and start reaping the air quality benefits. PayByPhone worked closely with the council offering advice and guidance about how carbon offsetting worked.

Kensington & Chelsea has eliminated seven tonnes of emissions from its streets after taking parking machines out of service, thanks to no enforcement vehicles driving 23,000 miles each year for cash collection and machine maintenance. Vandalism and theft from machines have also been reduced, saving the council an estimate £120,000 annually.

The compelling rationale behind Meters for Trees and the media attention it has gained has placed the company firmly on the radar of other councils, and Jonny Combe, PayByPhone's UK CEO, has been invited to speak about the programme at various high-profile events, and was approached by Sky TV to discuss digital transformation in the public sector. With Meters for Trees, PayByPhone has made it clear



it is a company that is serious about making a positive environmental impact.

IN DETAIL

In November 2018, 33-year old Jonny Combe was brought in from BMW Group as PayByPhone's UK CEO to lead an aggressive expansion. Combe was keen to identify a strategy that would support the company's plans for rapid growth while at the same time demonstrate the green-thinking in its business model. Leading by example, PayByPhone itself achieved Carbon Neutral Status in spring of 2019. PayByPhone understands its local authority clients' goals and ambitions related to environmental concerns and lowering emissions - an even more sensitive issue for those in highly urbanised areas.

So, seeing how quickly Carbon Neutral Status could be achieved, Combe realised they could help their clients work towards their own green goals, and Meters for Trees was born.

Launched in June 2019, Meters for Trees is the first carbon footprint reduction programme of its kind in the UK. The programme supports PayByPhone's council clients to reach their environmental goals by incentivising them to scrap their parking machines in favour of PayByPhone's cashless parking technology. Cashless parking improves air quality by removing the need for enforcement vehicles, which would otherwise be on the roads collecting cash from

Swapping parking meters for trees



In a bid to help local authorities tackle the dual problems of rising car use and decreasing green cover, mobile parking payments firm PayByPhone has this week created a new initiative which incentivises the discontinuation of parking machines through reforestation.

Called Meters for Trees, the scheme allows councils to make a commitment to reduce the number of parking machines they operate over a set period of time, in return for the donation of one tree from PayByPhone. The firm will donate one tree for every 10 machines which are taken out of service and also pay to offset one tonne of CO₂ through credit schemes which help reforest the Amazon rainforest.

This week saw the first local authority, Kensington and Chelsea Council, sign up to Meters for Trees. At the same time, PayByPhone has planted trees near its headquarters in Hatfield House, Herts, and invested in carbon offsetting, to the point that it is now verified as a carbon-neutral business.

traditional parking machines, clocking up miles and releasing harmful tailpipe emissions.

For councils who sign up to Meters for Trees, PayByPhone commits to offset roughly one tonne of carbon dioxide for every ten parking machines that exist in a council's estate by donating one tree to the council and saving one tonne of carbon dioxide through the Portel-Pará REDD project, a Verified Carbon Standard (VCS) audited project in the Amazon rainforest that combats deforestation.

PayByPhone benefits from Meters for Trees financially as their client roster and user transactions grow, but more importantly, the councils benefit from the reduction in pollution, and growing crime and theft from parking machines. Moreover, PayByPhone users benefit from the improvement in air quality in the areas in which they live and work. To take part in Meters for Trees, PayByPhone clients only

need to commit to reduce their pay-and-display machines and calculate of the number of miles driven to collect money from, and to maintain, pay-and-display machines. The implementation of Meters for Trees is uncomplicated, quick and inexpensive; councils can make the switch at their own pace while still making an immediate impact by offsetting their emissions. For prospective local authorities, Meters for Trees may be a deciding factor in tenders. For PayByPhone, the cost of purchasing the trees and the funds that go to the rainforest project are counterbalanced by the increase in transactions when parking machines are removed.

Kensington & Chelsea Council was the first client to sign up to Meters for Trees and was eager to begin removal of the machines. PayByPhone worked closely with the council every step of the way, offering advice and guidance about how carbon offsetting worked. With the removal of its parking machines, Kensington & Chelsea has eliminated seven tonnes of emissions from its streets, thanks to no vehicles driving 23,000 miles for cash collection and machine maintenance. Vandalism and theft from machines have also been reduced, saving the council approximately £120,000 each year. Councils across the country are proactively contacting PayByPhone to learn more about the programme.

The concept of removing parking machines and planting trees in their stead was both creative, innovative and very timely. Pay-and-display machines are pieces of equipment that need maintenance and that are subject to vandalism. They are unsightly street furniture that block pedestrian routes and access, particularly for the visually impaired, and for users of wheelchairs and mobility scooters. At a time when major news outlets are highlighting the urgent need to plant more trees, Meters for Trees is playing its part not only by planting more trees in the UK, but also by supporting a verified programme combating deforestation in the Amazon. These points, coupled with making life easier for vehicle drivers through cashless parking payments, Meters for Trees ticks many boxes and is very appealing.

PayByPhone set out to be environmentally proactive as a good corporate citizen, never realising quite how much an initiative like Meters for Trees would resonate with local authorities. Feedback from councils has been outstanding, with many clients eager to sign up as soon as possible. Kensington and Chelsea is delighted to be the first adopter of Meters for Trees and to be held up as an example for other councils that are considering signing up. The media attention and the compelling rationale behind Meters for Trees led PayByPhone to quickly sign up a number of other clients to the programme.

The success Meters for Trees has had to date, and the prospective success the future holds for it, has inspired PayByPhone to look for new ways to develop and to grow programmes as well as making green thinking part of its everyday business decisions.

For companies that don't produce goods or services with a natural green angle, and for those that don't want to create a gimmicky PR stunt with a false sense of environmental concern – so-called astroturfing – the thought of going green can be daunting. PayByPhone embraced this challenge head-on with Combe's brainchild, Meters for Trees, resulting in positive outcomes not only for them and for their clients but also – more vitally – for the environment.

PayByPhone's Multi-Award-Winning Programme



Swapping parking machines for trees & cleaner air

Since its launch in 2019, our **Meters for Trees** programme has been going from strength to strength. We are continuing to encourage more councils to offset their carbon emissions in 2020 with our green initiative.

To find out how to get involved, please visit: metersfortrees.co.uk



 **paybyphone**



PETERBOROUGH CITY COUNCIL

NENE BRIDGE BEARING REPLACEMENT PROJECT

AIM

How do you repair an ageing bridge with a dual carriageway running across it, a railway line and a navigable river running below it, without interrupting the flow of traffic?

How do you strengthen the structure of an iconic local landmark, while respecting its distinctive, award-winning design?

And how do you carry out the work when the original structure wasn't designed for refurbishment?

On behalf of Peterborough City Council, Skanska's Infrastructure Services team has come up with an innovative solution to all these issues, to deliver the £5 million structural refurbishment of the Nene Bridge in Peterborough. Constructed over the River Nene in the 1980s, the Nene Bridge is an award winning structure, known for its iconic 'V' shaped piers, and serving a major traffic route. Skanska is carrying out extensive works to the bridge, including strengthening piers and repairing the collapsed bearings supporting the 35 year old dual carriageway structure. The aim of the Project is to complete the construction works on Nene Bridge whilst mitigating risks and impacts on the River Nene, local river boat users and the local environment.

ACHIEVEMENTS

Bespoke dam design which negated the need for piling in the river bed to construct a working platform for the bridge pier strengthening.

- Reduced fuel consumption, emissions, noise and vibration by switching of pumping equipment rather than continuously running for the project duration.
- Reduced fuel consumption through reduced plant movement by using an Air Skid System to move

- heavy formwork panels from one pier to the other.
- Use of lightweight concrete that is recycled from fly ash, a byproduct from coal fired power stations, as an alternative material to virgin concrete.

The embodied carbon reductions relating to diversion of fly ash from landfill and reduced vehicle movements during batching were also considered when choosing this material.

IN DETAIL

Peterborough City Council commissioned works to undertake strengthening of the piers and repairing collapsed bearings on Nene Bridge, Peterborough.

The Bridge is in a challenging environment, with an Environment Agency classified Main River and railway running underneath it, and its close proximity to residential housing. Innovations which reduced environmental impacts and subsequently economic costs are described below. Reduced impact on the river bed through design The Project Team were challenged with creating a safe working access in order to complete reinforced concrete encasement of the piers situated in the River. The initial proposal was to construct a steel working platform on piled foundations, however on development of a detailed design it required 70 steel piles to be driven into the riverbed, with significant cost and negative environmental impact to the riverbed.

Due to the potential environmentally negative impacts on the riverbed, the Team explored an alternative solution and identified a non-intrusive portable dam structure, Portadam. The Portadam structure involves placing and linking steel frames on top of the riverbed rather than piling anything into the riverbed. A heavy gauge plastic sheet is present on the front of the frames. The water contained within the dam is then over pumped, with the weight of

the water on the riverside of the dam sealing the structure. This system was significantly faster to install when compared to the steel platform and significantly reduced the impact on the sensitive river environment, including zero disturbance to the existing riverbed upon install and removal.

Reduced emissions through reduced plant use The design of the Portadam allows for some leakage of water through the dam requiring continual dewatering through a pump. The Site Team took it on themselves to run a trial to reduce the use of the dewatering pump, hence saving fuel use and costs. The Team successfully completed trials of turning off the pump and allowing the water level within the dam to balance, prior to dewatering the working area. This allowed the team to reduce the use of the pump to only 24hrs a week, in order to complete temporary works inspections.

The reduced use of the pump equated to a reduction in fuel consumption by 85%, saving an estimated 576 liters of fuel per week, equating to £9,800 savings on fuel costs for the duration of the Project.



Figure 1 - Portadam installation showing minimally invasive nature of works

The works on each pier require the removal of sections of concrete and preparation of the existing pier surface, which was completed using hydrodemolition method.

This involves spraying water as a high-pressure jet in order to scarify the concrete whilst leaving the steel reinforcement undamaged. The Site Team developed an environmental best practice approach to containing and treating the water from the

hydrodemolition works resulting in treatment of the water on site so it could be discharged back into the River.

This involved encapsulation of the scaffolding to ensure all water spray and mist was contained. When constructing the temporary concrete slab, the Site Team installed a sump to be used to pump out the water, in addition to ensuring there was sufficient falls within the slab for the water to be directed to the sump. The water from the hydrodemolition works was pumped from the sump and treated using a Siltbuster HD80 unit, prior to discharge to a vegetated area adjacent to the River.

The pH levels of the water were continually monitored by the Siltbuster unit to ensure compliance prior to discharge. Following the completion of the hydrodemolition works, the team mitigated the risk of future contamination by jet washing the slab clean and treating all arisings using the Siltbuster unit.



Figure 2 - Pollution prevention whilst completing hydrodemolition works Reduced plant movement and resultant air emissions through use of the Air Skid System

Moving the heavy formwork panels from one pier to another with restricted headroom could mean a lengthy and expensive process of dismantling and rebuilding them requiring a significant amount of manual handling and plant movements. The use of a crane to lift the panels safely was not possible due to the existing bridge deck.

Therefore the works were programmed and priced based on the full dismantling and erection of the formwork panels. The site team identified an air skid

system as a potential method for lifting manoeuvring the panels, which involves placing air skid pads under the formwork, and skating it into its new position on 2mm of air.

The team successfully trialled the method, initially moving half a panel without the void formers installed. As confidence was gained in the method, the team developed and were able to move entire panels with void formers in-situ. This saved 90% of time and 70% of cost when compared to the original plan, in addition to eliminating plant movements on this particular work operation.



Figure 3 - Use of the air skid to reduce manual handling and plant movements

Use of recycled Lightweight Concrete The design to strengthen the existing piers involved the encasement of the piers using reinforced concrete. Rather than using virgin concrete, the Design Team identified lightweight concrete (Lytag) as suitable alternative both reducing the load on the structure and having environmental benefits.

Lytag is formed using the fly ash, which is a byproduct from coal-fired power stations. Using Lytag instead of virgin concrete also reduces the embodied carbon within the products used through diversion of fly ash from landfill and reduced vehicle movements during batching.



Figure 4 - Lightweight concrete The Project Team has gained a significant amount of experience in conducting technically challenging construction works in an environmentally sensitive location and reducing environmental impacts through environmental best practice.

Costs from the Project have also significantly been reduced by implementing the Air Skid System and reducing plant movements. Additional benefits to the local community have included reduced noise pollution through minimising plant movement and switching off pumps.



Figure 5 - Photos of completed reinforced concrete jackets

PGT-RECLAIMED WHY CUT ONE DOWN?

AIM

PGT-Reclaimed was founded in 1998 and for 21 years has been driven by founder Ian Burden's mantra of "why cut one down when you can use what's lying on the ground".

Ian, who had travelled to Vietnam from Australia, had the idea to create a company using reclaimed wood when he spotted piles of discarded pallets outside a shipyard. He set to work to find a perfect formula to treat this reclaimed wood to build the furniture that has since become iconic.

Through PGT-Reclaimed's style of manufacturing, the company supports a sustainable world by using reclaimed wood that is 100 percent certified by the Forest Stewardship Council. One of the company's focuses is to reduce carbon emissions with practices including using recycled sand paper, honey-comb in packaging and recycling water.

From the beginning, products have been hand-made using old-English carpentry techniques that consume little electricity. They are finished via a multi-step French polishing technique using water-based materials which create a clean working environment for PGT-Reclaimed's workers, and longevity for the end users.

PGT-Reclaimed's aim is to continue being a leading recycled furniture manufacturer to help people from around the world make more responsible decisions that contribute to preserving the environment.

ACHIEVEMENTS

In its 21 years of operation, PGT-Reclaimed has strived to instill manufacturing processes that commit to limited environmental impact, from using reclaimed wood, to manufacturing products by-hand, to using non-toxic, water-based finishes. The company's achievements are vast, including:

- PGT-Reclaimed was the first company to manufacture lifestyle furniture using 100 percent reclaimed wood, certified by the Forest Stewardship Council
- The company believes it saves 50,000 trees from being cut down each year
- The company continues to spread messages of conservation with PGT-Reclaimed's video "Why cut one down" attracting thousands of views via the company's international and Australian Facebook, and Youtube
- PGT-Reclaimed has been recognised for its focus on 'green' manufacturing winning:- 2018 Environmental Excellence by the Supply Chain and Logistics Association of Australia- 2018 World Grand Champion at the Green World Awards

In addition to the above, PGT-Reclaimed prides itself on being sustainable regarding the work it provides



people locally in Vietnam. Currently there are more than 500 workers at its factory, with a 'For a Greener Future' policy to positively support, engage and retain team members. The company is also connected with over 50 suppliers with excess of 3,000 employees all benefitting from PGT-Reclaimed's good practices.

IN DETAIL

PGT-Reclaimed, founded by Australian Ian Burden, was the first designer and manufacturer of lifestyle furniture made from 100% reclaimed wood, certified by the Forest Stewardship Council (FSC). When PGT-Reclaimed began in South Vietnam in 1998, it disrupted the furniture industry with its innovative and environmentally conscientious practices.

The company thrives on respect; for the culture of the Vietnamese people, the environment and everyone the company comes in contact with, such as distributors and customers, when exporting around 3,300 tonnes of furniture each month, to almost 20 countries. Over the years the company has built long-term relationships with a number of reputable retailers, including the UK's Barker and Stonehouse, NEXT, Arighi Bianchi, Sweden's MIO, USA's West Elm, Pottery Barn, Crate and Barrel, La-Z-Boy, New Zealand's Salamander Enterprises and Australia's Forty Winks.

The company's impact on both customers and consumers has been emphatic, demonstrated by accolades from retail partners, such as in 2011, when it was awarded West Elm's "Supplier of the Year", and in 2018, was recognised as the model factory for the furniture industry by MIO's auditor. The company was also recognised as

La-Z-Boy USA's "Best Gold Level Supplier" in 2018, won 2018 World Grand Champion at the Green World Awards and was awarded Environmental Excellence by the Supply Chain and Logistics Association of Australia.

Contributing to a sustainable world:

PGT-Reclaimed has been built upon a business model based on preserving the environment, using recycled timber as the core material, and minimising environmental impact during manufacturing. The mission of conservation is always top of mind, demonstrated through reclaimed wood incorporated throughout the factory, and conservation classes taught to workers. Workers learn about the benefits of preserving trees, including how trees are more useful alive than cut down, as a pine that is alive produces 2,700kg of oxygen for two people to use in a year.

PGT-Reclaimed's culture is themed upon sustainability. A Company Choir sings The Reclaimed Song at each week's assembly, written to tell the company's story and intentions of 'making old new'. The PGT-Reclaimed message unites employees and because of the work they are provided and the



value they're shown, retention levels are high. Of over 500 workers, 56 percent being male and 44 percent female, 29.7 percent have worked at PGT-Reclaimed for more than five years, with 45 employees in the "10 year club".

A contributor to positive retention includes PGT-Reclaimed's "For a greener future" compassionate policy, which provides workers access to education and assistance for housing, medical, dental and more.

Preserving the environment:

PGT-Reclaimed's founder has built the company on using discarded timber, drawn from old pallets, which would otherwise be taken away and burned.

The idea of using reclaimed timber came to Ian when the Vietnamese Government and World Heritage Council clamped down on logging in 1997. Ian saw potential in producing high quality furniture using reclaimed wood and worked with the FSC to develop a Chain of Custody to prove the sourcing of the wood was ethical and authentic.

Ian's theory is "why cut one down when you can use what's lying on the ground?" and through the

company's processes, PGT-Reclaimed believes 550,000 trees have been saved from being cut down, generating enough oxygen for millions of people to inhale over a year.

Twenty-one years since PGT-Reclaimed began, it is still adhering to the same principles of environmental conservation, all the while communicating its effort throughout the company, its customers, and via social media, hoping to inspire others to preserve the environment.

Reduce and reuse:

From the beginning, Ian decided furniture would be made using old-English carpentry methods. Compared to factories that use staple and glue methods, PGT-Reclaimed initiated a floating panel method to ensure the furniture would best showcase the wood's personality, charm and character and be durable to last a lifetime.

Over the years Ian has established a plethora of processes to ensure the reclaimed wood is treated correctly to withstand any climate throughout the world. This includes a minimum 21-day treatment process where the wood is kiln-dried, with off-cuts fuelling the fire. Nothing is wasted.

PGT-Reclaimed's products are made 100 percent by hand, with no robots. Tracks to move the furniture are wheel-based, rather than electronic conveyor belts. These processes, with no machinery, means that less electricity is needed.

In addition to manufacturing processes, electricity has been reduced



through replacing traditional lights to LED, and by allowing natural light to enter the factory via the roof or the side walls. These actions have contributed to energy being reduced, from 1,726,700kWh in 2014 to 1,474,700 kWh in the last year.

Greener and cleaner:

Since PGT-Reclaimed began, its finishes have always been unique, created using a multi-step French polishing method, to produce a stunning patina.

The company's finishes became even more unique a few years ago when PGT-Reclaimed turned its processes upside down to use 100 percent water-based materials, replacing Nitrocellulose (NC). Although NC isn't considered toxic, using water-based materials instead means there is less of a chemical smell in the air, with minimal residue. This move provides a more comfortable environment for employees and has increased consumer satisfaction. Currently (as of June 2019), 95 percent of PGT-Reclaimed's furniture has transitioned to being completed using 100 percent water-based finishes. This new way of working with finishes meant that PGT-Reclaimed needed to ensure it was responsibly managing water run-off. The company installed a Production Waste Water Treatment system costing over \$US100,000 in 2017. This system comprises 13 tanks fitted under the factory to allow water to pass through with solids collected and turned to mud to be discarded in general waste, and the recycled water is used to wash the toilets or water the garden.

For a Greener Future:

PGT-Reclaimed continues to elevate its environmental practices, while continuing to grow the company to build upon production to encourage more consumers to make better decisions.

The company plans to build a new factory in the coming years, but in the interim, has doubled its office area of 3,300 square feet to allow for initial growth.

PGT-Reclaimed will never be complacent on its goals to further decrease its impact on the environment during manufacturing.

The company has experienced an incredible 21 year journey and continues to lead the recycled furniture industry, while setting a high standard to inspire consumers and companies.

PGT-Reclaimed continues to work towards a greener future, doing its part to prevent climate change to benefit future generations.

PREMIER FOODS IMPROVED WASTE MANAGEMENT

AIM

To implement as effective waste management programme to form an integral part of the sites Environmental Management System with two key objectives the first of which being the achievement of “Zero to Landfill” and the second to be come “Zero 2” the definition of which is “Zero to Landfill and Zero Cost” which is achieved by waste minimisation, applying the “Waste Hierarchy” of Eliminate,- Reuse - Recycle - Recover. To create a sustainable environmentally mindset throughout the workforce across the whole of site by way of engagement, information, instruction and training in order to reduce and minimise sites environmental impact. Environmental suggestion schemes, championing fresh ideas and looking at Best Practice across the industry along with working closely with our waste partners Biffa Integrated Waste Management to ensure legal compliance, great service levels and of

course maximise rebates and minimise costs.

The latest phase of our project is our “War on Plastics” which as part of which we have targeted single use plastics across site both in our manufacturing processes and also areas including the site canteen.

ACHIEVEMENTS

Environmental Champions recruited and trained 2013
Zero to landfill achieved 2013 (859t 2012)
2013/2104 Net waste cost £161,952
2014/2015 Net waste cost £163,425
2015/2016 Net waste cost £155,516
2016/2017 Net waste cost £141,782
2017/2018 Net waste cost £52,751
2018/2019 Net waste cost £42,557
7 consecutive ISO14001 audits spanning three and a half years receiving zero non conformances.



Projects implemented to help drive these results include:

The use of waste salt to soften water for site boiler operations.

The installation of pumps in bunds to allow rain water to be safely disposed to trade effluent as opposed to being tankered off site with significant cost and environmental savings.

Monitoring the fat traps collection service which ultimately lead to collections being moved from weekly to monthly.

Improved hazardous waste management including maximising how waste glue was packaged and transported reducing collections from quarterly to annually.

The installation of pumps in bunds to allow rain water to be safely disposed to trade effluent as opposed to being tankered off site with significant cost and environmental savings.

Heat exchangers project within the Sauce manufacturing process drastically reduced the amount of waste food.

Elimination of single use plastics including spoons, ear plug cases, sauce sachets and plastic water cups.

IN DETAIL

On reviewing our EMS (Environmental Management System) it was evident that one of our most significant environmental aspects was waste in all sorts of form as such for ethical, moral environmental



and of course financial we set out to reduce this “risk” as far was reasonably practicable with the ultimate aim of “Zero 2”.

Our first move was to recruit specialists in the field and Biffa Integrated Resource Management were chosen to be our waste partners on this journey as they had the experience, knowledge and contacts that are required for such a monumental task.

Many of the aforementioned projects required little in the way of capital however some did require significant investment such as our salt reclamation and Sauces yield projects but by far the biggest investment was on the engagement of staff winning hearts and minds which was key to our success.

Whilst Zero To Landfill was achieved in 2013 and our first Zero 2 achieved four times last year the objective is far from completed and many of the low hanging fruit was harvested some time ago and whilst our focus now is on plastics as is most of the world our longer term projects include looking at the viability of CHP, Combined Heat & Power plants where some of our sites waste could be used as a form of bio fuel along with the potential for an on site A.D. Anaerobic Digester where our food waste could be used to supply some of the sites energy requirements out of our significant site food waste streams.

Whilst the above are longer term projects we have just begun to work with Company Shop / Approved Foods / Local Charities and Food Banks to ensure that as much as possible of our edible food waste stays in the chain for human consumption in line with our commitment to such projects such as Champions 12.3. WRAP and Courtaulds.

RG GROUP

RG GROUP BRUNEL HOUSE, BRISTOL

AIM

The project was the refurbishment and fitting out of an existing building (former council offices) with historical ties in Bristol to sustainably deliver new 246 bedroom student accommodation whilst developing and maintaining community relationships. Works included re-instating a Grade II listed façade with external works including an existing horse bazaar and soft and hard landscaped areas.

The project was registered under Considerate Constructors and BREEAM with a target of Excellent set by the Client. 44 week Scheme, 812 People involved, 7,517 sq m, £9.8 million cost.

ACHIEVEMENTS

Achieved sustainable development with ongoing community and biodiversity benefits. Planting of new wildflower lawns and landscaping enhancements providing new habitat and food for existing and rare fauna species, notably small blue butterfly, shrill carder and carrot mining bees. Understory planting

of native shrubs, natural debris materials used to create “cairns” to enhance topography and provide invertebrae interest.

Translocated flora species – ivy broomrape, bee orchid and common spotted orchid. Upgrade of bird/bat boxes to be made from recycled materials by UK company with 10% of proceeds going to Bat Conservation Trust. Increased no. of swift boxes from 5 to 20 and installed solar powered call system. Change of nest boxes to help starlings which are in need of conservation.

Consultation with national and local conservation groups to increase chances of colonisation and ensure long term deliverable management programme.

Introduced local community gardening club to client so they have an ongoing interest and hand in the development via ongoing maintenance, studying and surveys.



Substantial reuse/salvage of materials and items on site.

Low cost and programme implications that can be easily replicated and rolled out across future projects. Site team buy in and participation at various events throughout life of scheme.

IN DETAIL

As a company we have decided to emphasize leaving the areas we work in biodiversity positive,

we feel as a construction company that we have a responsibility to protect the existing environment and provide to the local communities areas that benefit them and the local wildlife for years to come, as such once we were awarded the scheme the wider team collaborated, set targets, aims and means of achievement.

The building located in the centre of Bristol was grade II listed and the façade had to be retained and refurbished, the footprint of the site was incredibly tight so excellent logistics were needed to be able to retain existing materials on site. The team looked into the history of the building which showed it had previously been the Great Western Hotel, part of Isambard Kingdom Brunel's visionary scheme to provide an integrated route of travel between London & New York.

This inspired many of the projects achievements and linked a common theme throughout the project. As the scheme had significant hard & soft landscaping areas and the old horse bazaar area we engaged with the RSPB, BugLife & the Bumblebee Conservation to see what could be achieved. As a result an enhanced scheme was proposed which the client accepted. This offered substantial gains not just to local and UK biodiversity but an opportunity for the local University student groups to be involved with ongoing maintenance and studies. It also provided attractive green mindfulness areas for the occupants to reconnect to nature along with areas that promote social integration within the grounds. We delivered: 331m2 wildflower turf, 218m2 wildflower seeded, 370m2 flowering lawn

Landscaping enhancements –

understory planting of native shrubs, natural debris topography providing invertebrae interest, retainers included solitary bee habitat.

Translocated ivy broomrape, bee orchid & common spotted orchid.

Increased swift boxes from 5 to 20 and installed solar powered call system to increase chances of birds using, changed location.

Change of Schwegler nest boxes to 3S to help starlings which are in need of conservation but cannot access small holes.

Relocated bat boxes as advised by RSPB for greater uptake chances. Upgrade of boxes to recycled



materials by UK company with 10% of proceeds going to Bat Conservation Trust.

6 bee bricks from Buglife

Kidney Vetch planted for small blue butterfly, its sole food source – it is declining in the UK and has been spotted around the Bristol area.

Carrot Mining Bee is a rare species but has been previously spotted in the area planted wild carrot to promote food sources. Shrill carder bee in danger of extinction, the wildflower mix provides its food source.

Interpretation boards installed so the final residents

can relate to what the area provides and feel engaged.

The longer term benefits also include that the 5 year habitat management plan was extended to 10 years & incorporated advice from the conservation groups and Wildflower Turf and the client was introduced to Roots Community Gardening Club, part of the local university, who will assist with ongoing maintenance, studies and surveys on the site, these surveys will also feed back into the conservation groups records.

Community links with local artist who did an impressive onsite mural reflecting Brunel's influence on the city and the building history and the bronze sculpture in the horse bazaar which was rescued, refurbished and reinstated by another local artist.

Due to the enthusiasm of the senior team and the proposals it was possible to get a large proportion of the 812 people directly involved with delivering the biodiversity and community achievements and the site undertook additional initiatives such as banning plastic bottles on site, working with Bristol Homeless and Foodbank charities and fundraising for British Heart Foundation.

Costs - the conservation groups provided their expertise free of charge, site clearance and surplus building materials free to create habitats, incurred costs involved the wildflower lawns, increase & uplift in bat & bird boxes, Interpretation Boards, RHS Insect Mansions – totalling £11,884, this was a relatively small figure for the size of the project.

In summary a Grade II listed building in Bristol demonstrated how challenging refurbishment schemes can benefit both the local community, its end occupants and UK challenged wildlife and habitat. The scheme to convert it to student accommodation was enhanced by liaising with conservation groups, local artists and the local student university groups to deliver a project that protected existing flora and fauna, increased habitat and provided new areas for rare UK species. The residents have engaging green areas that aid social and mental wellbeing, the local community gardening group are involved with ongoing maintenance and valuable wildlife studies and artists have provided work which preserves and educates about the history of the building and city.



A case study was done on the project is available to the wider construction industry for use and replication.

SAUDI ARAMCO

SAUDI ARAMCO INNOVATIVE FLARE GAS RECOVERY SYSTEM (FGRS)

Although gas flaring has negative environmental and economical impacts, it is indispensable in the oil and gas industry for safety reasons in case of process upsets or an emergency. However, Saudi Aramco has innovated a revolutionary and an innovative system called the Flare Gas Recovery System (FGRS).

FGRS is a system to recover flared gases from the flare header at Gas and Oil Separation Plants (GOSPs) through a multi-phase ejector. Not only does it eliminate flaring completely, but it also saves energy by utilizing the plants' existing infrastructure (high pressure from the discharge line of water injection pumps) instead of new compression units. This makes Saudi Aramco FGRS more sustainable and distinguishes it from conventional FGRS. So Saudi Aramco FGRS has the best of both worlds, it protects the environment, and saves energy and useful natural resources.

Because of the simplicity of this system, the relatively short Return on Investment (ROI) and its successful implementation at one of the facilities, this project will be implemented at all other facilities in Saudi Aramco.

"We are committed to reducing greenhouse gas emissions by focusing our research, development, and funding on high impact technologies that reduce cost and create significant environmental advantages." - Amin H. Nasser, the President and CEO of Saudi Aramco.

This statement from our CEO makes Saudi Aramco's commitment to spare no efforts to reduce greenhouse gas emissions and protect the environment very clear.

Because one of the main sources of greenhouse

gas emission is industrial gas flaring, which is sometimes unavoidable due to safety reasons, Saudi Aramco has several great initiatives to minimize gas flaring. One example is retrofitting all of its many gas flares with the HPAAS (High Pressure Air-Assisted System) which was invented by one of its engineers to facilitate smokeless flaring. Despite that, Saudi Aramco never stops exploring better solutions. Therefore, we went the extra mile by another innovation known as the flare gas recovery system (FGRS).

This innovation with the first-of-its-kind design came in a time where all efforts were mainly focusing on reducing flaring as completely stopping it seemed unattainable with existing practices. However, driven by their citizenship and accountability, a team from Saudi Aramco came up with the FGRS which completely eliminates flaring by recovering flared gas at Gas-Oil Separation Plants (GOSPs) and reprocessing it again.

What did the project involve doing?

Flare Gas Recovery System (FGRS) is an initiative project from a team in Saudi Aramco to reduce gas flaring at GOSPs to protect the environment and increase the production.

Why did you do it?

The main objective of this project is to eliminate gas flaring in order to protect the environment and increase energy production by avoiding even small amounts of flaring.

What did it cost?

The project cost was significant.

If quantifiable, what did the project achieve in terms of sustainable development, economy, environment and/or equity?

FGRS is an inherently sustainable innovation since from an environmental point of view, as explained above, the system is so revolutionary that can recover all the flared gas. Before the FGRS, this would have sound too ambitious as all efforts were mainly aiming at flaring reduction.

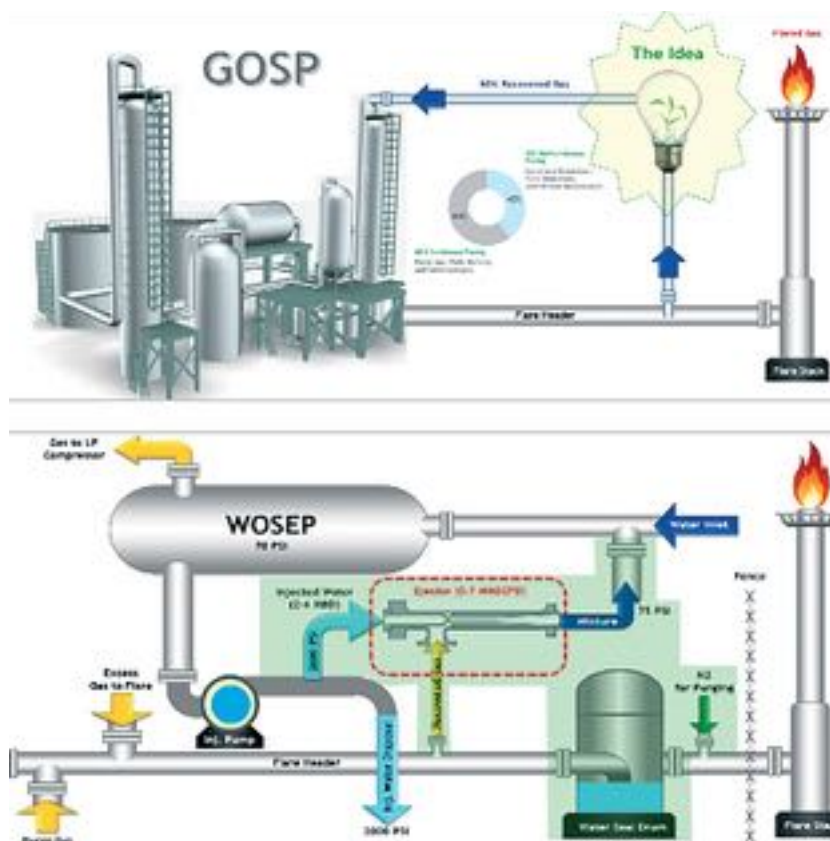
From an economical point of view, opposite to conventional techniques which would require compression units that would increase the return on investment (ROI) exponentially, the system relies on the existing equipment to recover gas. This means that a useful natural resource (gas) is being recovered at no operational cost. Therefore, in comparison to 10 years in conventional methods, the ROI is estimated to be around 3 years.

Who and what benefited?

The company benefited from this project since the system helps in recovering valuable natural resources, which has a positive impact on the environment. In addition, it helps supplying enough energy to the world.

Longer term benefits?

FGRS is a unique, innovative, first of its kind, cost-effective system. Moreover, it offers the following advantages:



- Protects the environment by eliminating continuous flaring and reducing emissions.
- Increases revenues, by delivering recovered gas to customers.
- Recovers the investment within 2 years, compared to 8 years, for the conventional FGRS.
- Protects the assets by extending the flare tips' lifecycle and reliability, as FGRS results in a smaller flame, and hence lowers the chances of pressure capping (flame accumulation on the flare tip).

Was there anything innovative about the project?

Initially, the easiest option to recover flared gases was using conventional FGRSs, which would require compressing systems (compressor, drums, coolers, and other accessories).

This was doable and it would have still helped to achieve the project's objective (minimizing flaring to protect the environment).

However, because Saudi Aramco always thrives for excellence and innovation, the team was looking for a more innovative and cost-effective solution.

This was indeed what happened as the team came up with a marvelous technique to recover the flared gases. The idea was to capitalize on the GOSPs' existing infrastructure to recover flared gases. To better explain the idea, let us briefly go through the GOSP process.

The attached figures describe the GOSP process and the project implementation. During normal operations, the produced oil is initially processed at GOSPs which receive wet crude from oil wells and separate it into dry crude, gas and water. While the dry crude and gas are shipped for further processing, the water is processed in the Water & Oil Separator (WOSEP) vessel to de-oil it. After that, the water is injected back to the reservoir via high pressure injection pumps.

So unlike Conventional FGRSs, the innovative system utilizes the high pressure in the discharge line of the water injection pumps to boost the pressure of the gas recovered from the flare header by using a two-phase ejector. The ejector receives gas from the flare header and water from the pumps. Then, the mixture is sent to the WOSEP where the gas will be recovered to the gas compression unit.

The ejector is placed to implement compressible fluid mechanics concepts. This supersonic ejector consists of two converging-diverging nozzles (CDN). The high speed at the exit of the first CDN creates an area of very low pressure profiles therein. The flared gas is connected from the main flare header to this particular area of the ejector. Then, to allow the multi-phase fluid to flow to the WOSEP by differential pressure, the fluid passes through the other part of the ejector (the other CDN). The pressure will be increasing in the converging part until the velocity reaches a sonic value at the CDN's neck. Then, the pressure will be further increased in the diverging part of the nozzle with a subsonic velocity. At ejector's

exit, the fluid will flow to the WOSEP and the flared gases will be recovered from there.

The beauty about this invention is the simplicity of static equipment that avoids adding complexity to an already complex system. Since the successful startup of the FGRS in February 2019 at one of the GOSPs, zero-flaring has been observed at that facility and because of its remarkable and stable performance, it will be implemented at all other GOSPs as well.

Can other organizations/communities benefit from implementing your methods?

This project can be beneficial to all companies in the oil and gas industry and a result if its success, it is planned to be implemented at all other facilities in Saudi Aramco.

What did you learn from the project and are you planning any further development?

The project helped in motivating the employees, promoting their innovation and teaching them to never underestimate simple ideas.

SKANSKA UK

BATS SYMPATHETIC CAR PARK LIGHTING

AIM

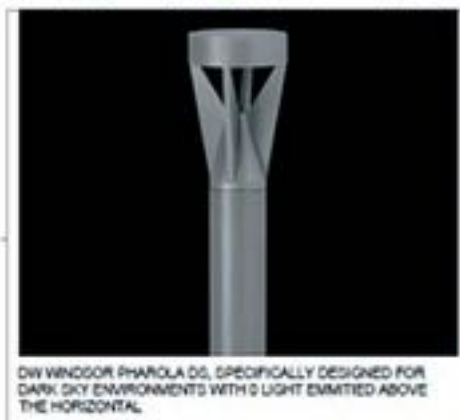
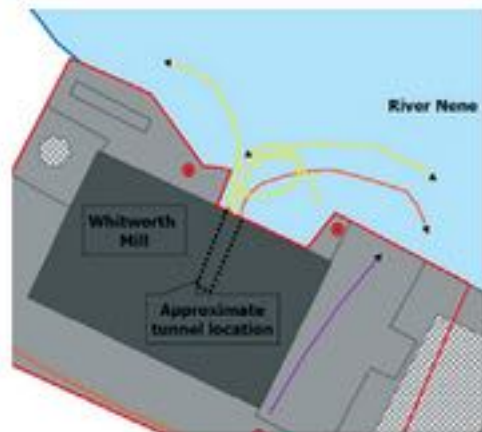
The project scope comprised redevelopment of a derelict warehouse area within Peterborough, including the construction of a new access road and car park area, which required street lighting installation for its safe use.

An initial Bat Survey indicated that bats were present in the area. Based on this information the aim of the project was to undertake the works with minimal effect on the local bat population and in compliance with relevant environmental legislation.

ACHIEVEMENTS

Skanska, working for its Client, Peterborough City Council designed a bespoke lighting solution which satisfied development needs whilst mitigating light exposure risks to the local bat population. The Project involved development of a car park and installation of lighting assets.

Following initial identification of bats in the area, Skanska designers commissioned a full Bat Survey to gain a greater understanding of the local bat species, to influence lighting design. The output was a bespoke lighting product positioned at a height



Plan 1 (Top left): Lighting design plan with bat flight paths marked
Plan 2 (Top right): Site Plan including flight paths of bats over the River Nene
Photo 1 (Bottom left): Bespoke lighting design solution

below the bats flight path, with 0% upglow and minimised glare, hence mitigating risks to the local bat population.

The Design Team involved gained a greater understanding of working within areas inhabited by bat species and will use this knowledge to influence future street lighting design in Peterborough.

IN DETAIL

Peterborough City Council championed the redevelopment of a derelict warehouse area with river frontage within the Fletton Quays area of Peterborough.

The works entailed development of a new access road and car park area, which required street lighting installation for its safe use. A detailed Bat Survey was commissioned during design stage of the project. This identified the presence of a variety of bat species in the area. In addition, bats roosts were identified nearby in manmade tunnels, which historically were used to take grain from river barges into a flourmill located adjacent to the proposed new car park (Plan 2).

The Bat Survey also plotted the routes the bats flew as part of their nighttime feeding habits (Plan 1) Due to safety concerns which could result from installing limited lighting in the proposed car park, Peterborough City Council were keen to consider innovative solutions which would serve the purpose of the works but also limit the light exposure to bats.

The challenge was to provide a suitable level of lighting for the car park so that it could be safely used at night, whilst making sure any proposed lighting wouldn't adversely affect the local bat population. The works were also to be undertaken in accordance with The Institution of Lighting Professionals Guidance Note 08/18;

Bats and artificial lighting in the UK, which outlined risks of LED light exposure to bat species. After looking at the bats flight paths and feeding habits in detail, only one species of bat, Soprano Pipistrelle, was found to be using the car park area as a flight path. All the other bat species only used flight paths over the river, bypassing the car park.

Further research undertaken to understand the flight path undertaken by the Soprano Pipistrelle bats uncovered that they fly at between 2-10 metres above ground level. This information enabled the designers to look at a low mounting height lighting solution, which would satisfy the Councils desire for lighting and not be detrimental to the Soprano Pipistrelle bats.

The solution was a bespoke designed lighting bollard with a height of 1m, which was Dark Sky compliant (minimized glare whilst reducing light trespass and skyglow), with 0% upward light out ratio (Photo 1).

The use of this bespoke lighting solution enabled the car park, and in particular the disabled bays, to be lit to a suitable level for safe use. The Council has now approved this design and the approach will be considered for schemes in the future.

SOUTH EAST WATER WOODGARSTON MARKETS

AIM

The Hampshire Chalk aquifer in our Woodgarston Catchment is adversely impacted by high Nitrate concentrations above the drinking water standard set by the European Union based on health limits. Since 2015, with the support of Natural England and Catchment Sensitive Farming, South East Water have investigated the sources of Nitrates within the catchment. Results indicated that the primary source is from arable land use and that existing farming practices are contributing up to 70 milligrams per litre of Nitrate (mg/l N), which is 20 mg/l N above the drinking water standard.

South East Water set up a farmer lead steering group, routinely attended by 14 agricultural holdings

within the Woodgarston catchment covering 1800 ha. The farmers in the catchment have shown incredible engagement and understand the need to protect water as a resource for future generations. Woodgarston Markets an innovative project, a farmer lead idea, to explore the opportunities for new markets and approaches to sustainable farming practices, through the supply-chain. This is a new concept of 'Upstream Thinking'!

The primary focus is on Nitrate reduction, however, the project aims to deliver wider environmental improvements, social benefits, economic viability of their agricultural businesses and set-up circular economies within the catchment.



ACHIEVEMENTS

A bespoke evaluation framework for individual agricultural farm businesses and opportunities for collaboration between farms within the Woodgarston catchment was developed.

78% of the land holdings within the Woodgarston catchment have actively engaged with the Woodgarston Markets project.

One-to-one interviews evaluated individual farm businesses, their operations and current supply chains with detailed evaluation of the following areas:

- dependency upon pillar 1 and 2 environmental payments,
- existing supply chains and linked agricultural production,
- alternative supply chains (linked with existing agricultural production and potential diversification),
- circular economy (linking with other farmers in the catchment and local supply chains),
- current and future diversification,
- barriers and limitations.

Outcomes of one-to-one interviews and agricultural

business evaluation were aggregated to form a catchment perspective. The project identified where there is the potential for shared specialist equipment, agricultural partnerships, individual farm and group farm diversification, branding opportunities and circular economies, with the primary aim to reduce Nitrate concentrations in the catchment.

New market opportunities also empowers the farm businesses to reduce their dependency upon environmental payments, without having a negative impact upon the environment, and given the tools to ensure that their agricultural business is profitable and self-sustaining. A key government ambition in the farming sector.

IN DETAIL

The Hampshire Chalk aquifer in our Woodgarston Catchment, near Basingstoke, is adversely impacted by high Nitrate concentrations above the drinking water standard set by the European Union based on health limits. Since 2015, South East Water has been investigating the source of the Nitrates in the catchment and the primary source is from arable land use.

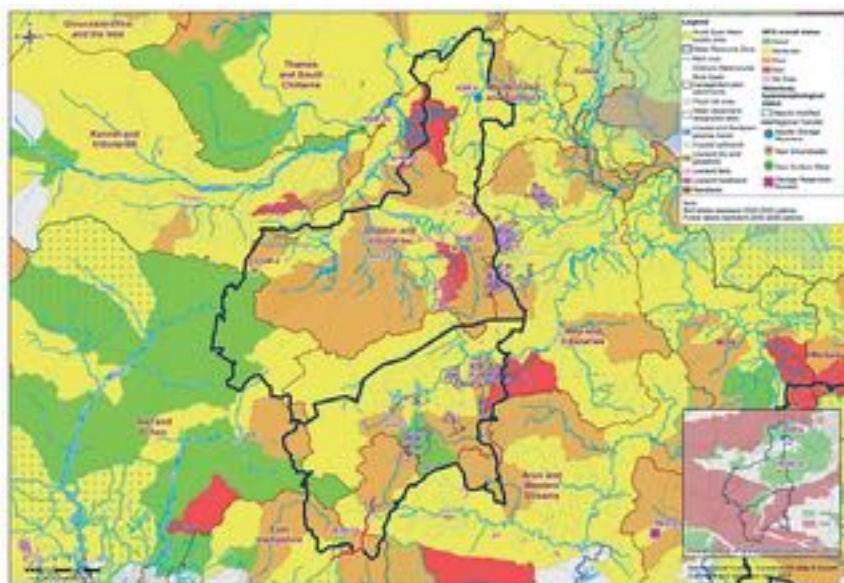


Figure 3 Key environmental constraints in western supply area

In most Chalk soils, it is generally recognised that 40 per cent of applied nutrients are not utilised by the cash crop, meaning that potentially 40 per cent of excess nutrient is being lost straight to the Chalk aquifer. Additionally, during the growing season, farmers apply more nutrients to obtain marketable protein content in cash crops like milling wheat, resulting in more leaching of Nitrates to groundwater. Our investigation results

indicated that the primary source of Nitrates is from arable land use and that existing farming practices are contributing up to 70 milligrams per litre of Nitrate (mg/l N), which is 20 mg/l N above the drinking water standard.

Potential risks in changes in agricultural policy, land use, market pressure and leaving the European Union, has meant that agricultural businesses have to either intensify agricultural production or diversify in such a way that there may be a complete disassociation with existing agricultural land use. Working in partnership with our Hampshire Catchment Sensitive Farming Officer we have had exceptional engagement with farmers within the Woodgarston catchment and set up a pioneering farmer lead steering group in 2016. Our Woodgarston Markets project, is a 2018 project born from the Woodgarston farmer steering group, to address the issue of Nitrates in raw water

sources, whilst ensuring that farms can still operate as profitable agricultural enterprises.

The Woodgarston Markets project is so innovative and industry leading that Natural England pledged collaboration funding along with funding through South East Waters environmental improvement programme to initiate the project. All farms are businesses and rely upon making a profit on their cash crops grown. It is common place to find farms that are struggling as a business inherently linked to poor farming practices, lack of environmental awareness or unintentional pollution incidents. Through the Woodgarston Markets work we aim to

understand each farm enterprises supply-chain, why they farm in the way they do, seek opportunities for diversification, alternative sustainable markets for sustainable farming and environmental improvements in a time when the economic forecast is uncertain. Collaboration on all levels is key for a sustainable and profitable future, whether it be for water or food production.

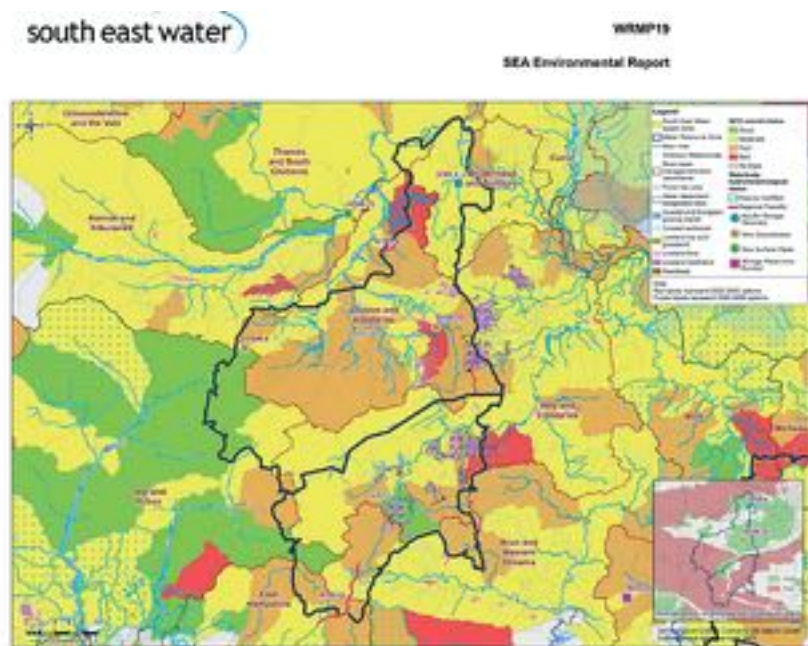


Figure 8.3 Preferred plan-options: water context- western region

As part of the project, it was necessary to understand each agricultural business individually, particularly in relation to land use and existing supply chains. 1403 ha of land holdings (out of the 1800 ha) have engaged directly with the project. Results of interviews indicated that all agricultural businesses received the (pillar 1) Basic Farm Payment (BPS). For two of the agricultural businesses interviewed, BPS was the difference between the farms making a profit vs a loss and going under. For the others BPS equated to 18 to 20 per cent of the farm income, a figure considered too high. This indicates significant change is required in the near future if farming businesses

are to be self-sustaining, which is a government ambition.

All of the agricultural businesses had begun to think about the eventual phasing-out of the BPS, what that meant for their farm, and what farm subsidies might look like in the future. Those interviewed believed that benefit to the public and/or the environment would be a key part of any new subsidy scheme that may come into being in the future, and were orientating the growth and future direction of their operations accordingly. “Being able to tell the story” of what they do for the environment or the public was a common theme.

The agricultural businesses were open to exploring ways to add value to what they are currently doing and protecting the environment. It was understood that new ways of working would be required to meet the deficit from both the removal of BPS, and reduced yields through limiting nitrogen applications. Examples included:

- expanding an added-value operation, driven by the development of a low nitrogen farming brand, which could have the potential for a premium for environmentally friendly production. Consumer and retailers in the UK shift around supply chain traceability and agricultural production, there are a growing number of UK food manufacturers relying claims around responsible local sourcing. The farms interviewed were interested in exploring and developing a regional brand which could help them achieve a premium for their products, or access different markets.
- reducing on costs ‘on’ costs by dealing directly within circular economies locally, or investing further into agricultural or non-agricultural diversification. Local diversification of interest included niche products, the establishment of a collaborative farm shop, on-site distillery and visitor centre for herb oils or visitor’s centre for education school visits and sales of products.

One of the barriers the farms had previously found was the availability of finding suitable supply-chain partners and the lack of time and skills available for sales and brand marketing. The project also sought to engage the supply chain and manufactures as well as farm businesses in the Woodgarston catchment. Potential new supply chain opportunities were reviewed, both locally and on a regional and national scale. Through the project we are looking to link up these opportunities to make a real difference.

Whilst we are just beginning to embark on this journey, South East Water believes that this new innovative concept of ‘upstream thinking’ for markets, primarily driven by stakeholder engagement, should be the new way of thinking about catchment management for sustainable, profitable farming and resilient catchments for protecting water quality (including reducing Nitrates), water quantity and protecting the environment.

We are committed to collaborative working in future with farm businesses, the supply chain, and stakeholders for a more sustainable future. This is just the first step for the Woodgarston Markets project.



How we protect the environment and increase biodiversity

Protecting and conserving our environment is really important to us and a high priority in our day-to-day operations.

Our supply area is unusually rich in biological diversity, protected landscapes and rare species. As a major landowner and guardian of some of the region's most precious environmental resources, we have robust policies and procedures in place to ensure the areas where we operate are protected and enhanced.

Some of our achievements include:

- 32 Sites of Special Scientific Interest (SSSI) in favourable or recovering condition
- active management and control of invasive non-native species (INNS)
- conserving a range of Priority Habitats, including:
 - 970 hectares mixed deciduous woodland
 - 246 hectares rare chalk grassland
 - 148 hectares freshwater ponds, rivers and standing waters
 - 13 hectares heathland
 - 7 hectares wet woodland

How do we do this?

By working in partnership with organisations such as Natural England, Environment Agency, Buglife, the Wildlife Trusts, and the South Downs National Park Authority.

Before any water supply work begins, our team of environmental professionals ensures the environment is protected at every stage. We also have a staff volunteer programme dedicated to carrying out observation tasks on company land.

Want to know more?

Visit

corporate.southeastwater.co.uk/environment



SOUTH EAST WATER PESTICIDE AMNESTY

AIM

Unused and out-of-date pesticides and chemicals can pose a real threat to the environment and to water resources if they are stored incorrectly or disposed of improperly. If they get into raw water, treatment costs can run into the millions, and some pesticides and chemicals are so persistent in the environment that the affects can last decades.

Between October and November 2018, and with the support of Catchment Sensitive Farming, South East Water offered a pesticide amnesty in the River Teise surface water catchment and the Pembury and Hartlake groundwater catchments, to facilitate the anonymous safe disposal of pesticides from farmers, land managers and other pesticide users. The response we had proved how urgently this amnesty was needed!

The driver for this pesticide amnesty was the results of a similarly successful campaign that we ran in 2017 in partnership with Affinity Water and the Hampshire and Isle of Wight Wildlife Trust in the River Loddon surface water catchment. That campaign recovered over 980 kg of agricultural chemicals from 20 farms. The three main types of pesticide were herbicides,

insecticides and fungicides and represented 68 per cent of the total recovered.

ACHIEVEMENTS

A total of 1,056 kg of agricultural chemicals was collected from 23 farms across the three catchments. 901 kg was identified as pesticides or other agricultural substances, with some fertilisers, veterinary medicines and other “unknown” substances also recovered.

Herbicides, insecticides and fungicides were the three main types of pesticide recovered – around 74 per cent of the total. 57 kg of pesticides were no longer approved for use in the UK. Around 3 kg of insecticide and a rodenticide containing Cyanide were identified as having been withdrawn from use in 2004. Although this amount is relatively small, the point is that these chemicals had been stored for over 15 years instead of being disposed of properly.

The cost of the pesticide amnesty was £9.40 per kilo – an unequivocal financial investment in removing a significant risk to water quality, especially when compared to the cost of treating raw water contaminated with this quantity of pesticides.

IN DETAIL

Our pesticide amnesty campaign involved removing unwanted and out-of-date agricultural chemicals from our Pembury and Hartlake groundwater catchments and our River Teise surface water catchment in the wider Medway area.

Marketed agricultural chemicals can be banned by

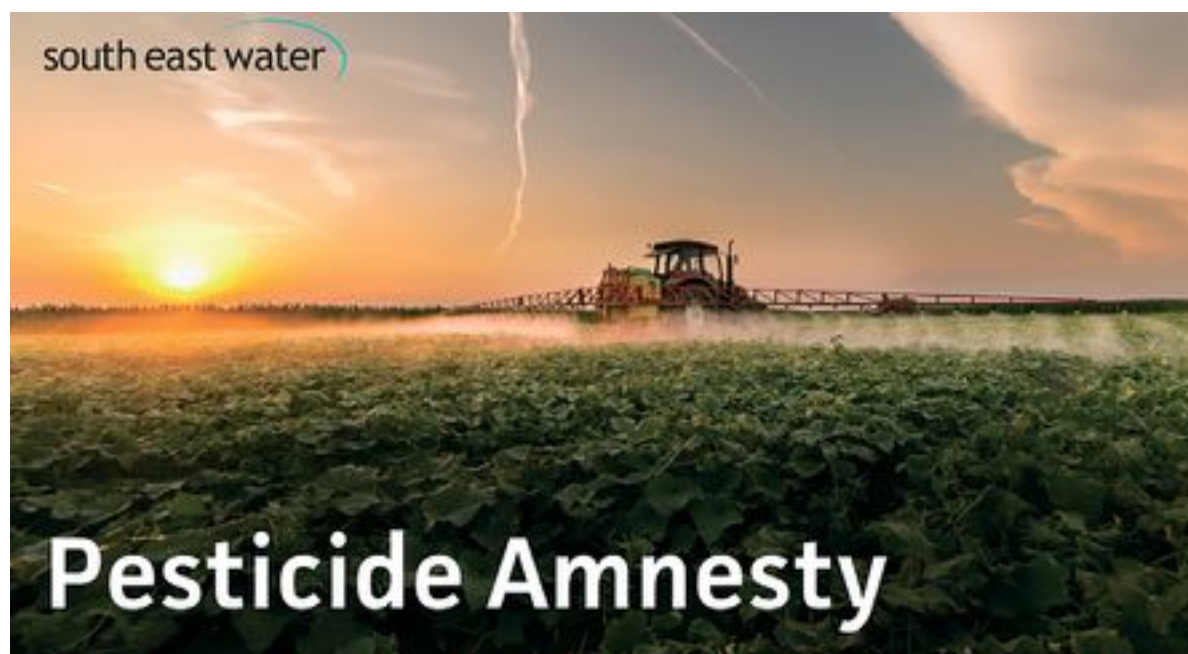


the European Union for a number of reasons, such as human health concerns or persistence within the environment causing ecological harm. If farmers have an excess of these chemicals post banning they can sometimes end up storing them for a number of years, as waste disposal can be difficult and time consuming to arrange. Occasionally unwanted chemicals also end up being stored. If these chemicals are incorrectly stored or disposed of they can cause a considerable threat to the environment, ecology and ecosystems, and pose a significant risk to water resources.

Some types of types of pesticides in raw waters can be removed through treatment processes such as Granular Activated Carbon (GAC), but these treatment processes are expensive to build and

operate, potentially meaning increased costs for consumers. Costs for a new GAC filter system at Pembury water treatment works, where the pesticide amnesty was promoted, exceeds several millions of pounds with regeneration and operational costs running into hundreds of thousands (approximately £500,000). Additionally the carbon footprint of operating a single GAC filter is 3,000 kg CO₂ per year. The most cost-effective option is to remove unwanted pesticides and chemicals from the catchment before they have chance to enter the water environment and become a problem - this was the goal of the amnesty.

The driver for this pesticide amnesty was the results of a similarly successful campaign that we ran in 2017 in partnership with Affinity Water and the Hampshire



Free, licenced and confidential disposal of unwanted pesticides

South East Water and Catchment Sensitive Farming have launched a **pesticide amnesty** scheme in the River Teise, Hartlake and Pembury water catchments – enabling farmers, growers and land managers to legally and safely dispose of unwanted or out-of-date chemicals, pesticides and biocides **free of charge!**

and Isle of Wight Wildlife Trust in the River Lodden surface water catchment. That campaign recovered over 980 kg of agricultural chemicals from 20 farms. The three main types of pesticide were herbicides, insecticides and fungicides and represented 68 per cent of the total recovered.

Our second pesticide amnesty, in 2018, was a principal initiative run through our environmental improvement programme. South East Water took a pioneering approach in 2015, partnering with its Regulator, Natural England, to help deliver our environmental improvement programme. Our Catchment Sensitive Farming Officers are employed through Natural England but funded by South East Water – a unique partnership that some other companies in the industry have now followed. Working with our Medway Catchment Sensitive Farming Officer and a specialist waste contractor we launched the pesticide amnesty campaign in October 2018 to farmers and land managers within the River Teise surface water catchment and the Pembury and Hartlake groundwater catchments. The application window was open for a month and the response was breath-taking, indicating an imperative need for such an initiative.

The results demonstrated conclusively that a considerable amount of unwanted chemicals were being stored in the three catchment areas and that the offer of a safe, anonymous, licenced disposal was very attractive to the agricultural community. A total of 1,056 kg of agricultural chemicals was collected from 23 farms across the three catchments. 901 kg was identified as pesticides or other agricultural substances, with some fertilisers, veterinary medicines and other “unknown” substances also recovered. Herbicides, insecticides and fungicides were the three main types of pesticide, with a combined mass of 786 kg, equivalent to 74 per cent of the total amount.

The three largest volumes of pesticide recovered were the insecticide Permethrin, the herbicide Amitrole (which is no longer approved for use in the UK) and the herbicide Cycloxydim. 57 kg of pesticides recovered by the amnesty were no longer approved for use in the UK.

3 kg of insecticide and rodenticide were identified as having been withdrawn from use in 2004. Although the amount is relatively small, the implication is that these chemicals have been stored for over 15 years rather than being properly disposed of.



STEP 1

Check to see if you are within one of the qualifying areas – see map overleaf.



STEP 2

Contact ChemClear before 31 October 2018 to arrange your free collection.



STEP 3

ChemClear will arrange a convenient collection time and date with you.

Don't delay! This offer is for a limited time only – on a first come, first served basis.

*Terms and conditions apply – see overleaf.

Pure know h₂ow

The total cost of the amnesty was within the budget established by South East Water and represents a per kilo recovery cost of £9.40. This is considered to be a respectable financial investment to eradicate a significant risk to surface water and groundwater quality, especially when compared to the cost of treatment of raw water.

Those involved in the campaign quoted the reaction from farms as a success.

James Woodward, Medway Catchment Sensitive Farming Officer, said: “We understand that pesticides are essential in modern farming and we know that farmers in Kent are keen to do all they can to store and use them responsibly and correctly. By helping farmers to safely dispose of these chemicals once they are redundant, we’re ensuring they won’t ever find their way into watercourses which could affect drinking water quality, or cause damage to the environment.

“We work closely with the farming community to raise awareness of the risks to the environment and encourage people to carefully check sheds and outbuildings for out-of-date or illegal stocks of chemicals.”

Debbie Wilkinson, South East Water’s National Environment Programme RSA Investigations and Groundwater Catchment Management Lead, said: “We’re delighted with the success of this pesticide amnesty.

“Although we successfully remove chemicals from raw water before it’s put into supply, it’s a much

more sustainable and cost-effective solution to work with farmers to reduce the chances of pesticides entering our water resources in the first place.”

Through this initiative there was significant opportunity to both manage environmental risk, but also reduce operational costs. Farmers and land managers benefited by knowing that the chemicals were properly disposed of by a waste contractor and were no longer a risk to the environment. South East Water was one of the first water companies to implement an innovative amnesty approach and after huge success we will continue to roll out amnesties to other catchments at risk of contamination from unused chemicals in future years.

Following the success South East Water have had with this amnesty, and the Loddon amnesty promoted in 2017, other water companies and wider catchment partnership groups have followed suit running their own pesticide amnesty campaigns with similar success.

ST MARKS SHOPPING CENTRE LINCOLN

ST MARKS WASTE MANAGEMENT PROJECT

AIM

There were three principal aims of our project.

1. To Improve our recycled percentage of our total Waste from 25% to 50%. We send Zero to landfill. St Marks has a small team of 3 with a wider cleaning team of 4. We do not deal with our tenant's waste and all of our waste is produced through our public waste bins and a small amount from our offices. Contamination is an issue and our project sought innovative solutions to solve this.
2. We aimed to improve engagement on environmental issues with our team, tenants, visitors and customers.
St Marks is an attractive site and we wanted our stakeholders to understand how we were setting out to maintain and improve sustainability.
3. We wanted to obtain increased PR via local media for our projects so as to engage a wider audience and to share best practice with other city stakeholders.

ACHIEVEMENTS

Our project achieved an increase in our recycling rates from a base of 25% to 50%. This is steadily increasing and we are hoping to reach 75% by the end of 2019.

Our team understand the importance of recycling and are committed to making improvements.

We set up the first outdoor coffee cup recycling scheme in the county, currently achieving collection of 1200 cups per week.

We are educating children about recycling, making it fun and innovative through our talking 'Recycle Robin' bin.

Engagement of our team, tenants and customers

has increased and PR in the local media around our projects has received great feedback.

We have set up the first chewing gum recycling scheme in the city. Other city Stakeholders have asked for details and will look to implement.

We have been approached by two colleges to assist with their waste Management programs.

The wider achievement has been that other stakeholders are taking up our ideas. This will bring wider benefits to our environment.

We recently won the business category in the Lincolnshire Environment Awards. David Bellamy is one of the patrons of these awards and we were thrilled to win.

IN DETAIL

Our Project aimed to increase the percentage of recycled waste from the total waste produced by



our centre. We needed to be innovative as we do not collect tenants waste. On average our recycled percentage of our total waste was 25%. All our waste is produced via public bins throughout the centre and a small amount produced by our office. We have a small team of 3 with a wider cleaning team of 5.

We appointed a recycling champion from amongst the team and ensured that the project was discussed weekly at our management meeting.

Our company asks that we create goals for ourselves each year and our team each created goals around sustainability.

We looked at the issues that were contributing to our low percentage of recycled waste. These were identified as follows.

1. Lack of team knowledge and ownership.
2. Contamination from food waste, mainly coffee cups.
3. Poor information for customers on which items should be placed in each type of bin.

4. Lack of knowledge around collection bin sizes and how the percentages are arrived at.
5. Landscaping waste.

We set about tackling these initial issues as follows.

1. We asked for a volunteer from amongst our cleaning team who was keen to learn and make a difference.

We came up with a process whereby the public bins could be checked for contamination and incorrect bin use.

We visited our waste company's recycling site with our team.

We invited our consultants, New Star, to attend site to give us advice on how we could address our low recycling rates.

2. We began to investigate how we could deal with our main source of contamination, namely coffee cups.

We soon discovered that there were several

obstacles to overcome if we wanted to create a recycling scheme.

The main schemes do not operate on outdoor sites and do not collect cups in our area.

We consulted with our bin supplier and they agreed to create a prototype for us.

We contacted the head office of our tenant Costa and met with them to discuss collecting of cups from the site and they agreed.



We engaged our marketing team to create the signage and instructions for the bins.

The Scheme was launched in May 2018 and we are collecting 1200 cups per week.

In order to further improve on the scheme's use. We have designed and installed information boards which tells customers what we are doing and why.

3. We decided that improving our signage on the bins across the centre would lead to less confusion as to what could be recycled and what was general waste. We designed new signage and this was recently installed across the centre.

4. We engaged with New Star and our waste company to try to improve the measurement of our waste. We changed the sizes of our collection bins so that they could be more accurately measured. We amended the numbers of collections in order that we did not increase our carbon footprint by carrying out increased deliveries.

After implementing the above, we turned our attention to further innovation and how we could engage more with our customers.

We had previously installed a talking Penguin bin in our gardens to encourage children to throw away their litter correctly. We decided to add a further talking bin, this time to be called 'Recycle Robin'. We are in the process of choosing a voice for the Robin via a local radio campaign on BBC Radio Lincolnshire. Children need to tell us why they think looking after the environment is important to them and we will select a

winner. We have designed specific signage for the two talking bins in order to make clear what can be place in each bin.

Another part of the project has recently been installed is a chewing gum recycling scheme. We have collaborated with a company called Gum Drop and have installed their bright pink containers on several of our lamp posts. The interior container is made from recycled chewing gum. We launched this scheme on World Environment day, June 5th when we held an event on site with other city environmental stakeholders. We gave away Recycled chewing gum key rings, which act as receptacles for used gum that can then be returned to Gum Drop free of Charge and made into a variety of items. Customers were amazed by this and we received fantastic feedback.

Our event was picked up by BBC Radio Lincolnshire, who interviewed us for a piece on their drive time show.



We communicate our projects to our tenants via a quarterly newsletter. They in turn share news of their environmental projects.

Costs

In total the various projects cost £5,000 and this was funded via our Service Charge.

Benefits

Customers enjoy a clean tidy environment and in turn the centre remains tidy as less litter is dropped.

Children are encouraged to recycle and to respect the environment.

Our cleaning team have less chewing gum to deal with and are able to devote time to other tasks.

Our Recycling rates have increased substantially and our aim is to reach 75% of our total waste.

Future developments

We are planning to collaborate with some of the schools who took part in the environmental awards.

During our event on world environment day we were approached by two colleges who have asked us to assist with courses on waste management in September this year.

We have distributed our project amongst other stakeholders in the city and have attracted interest from the local BID and other property owners in our recycling strategy.

We were looking into plastic bottle recycling as a possible future project. This has now become a project to reduce the use of plastic bottles completely. We are planning to install a water station and drinks fountain. We are collaborating with a wider project organised by Visit Lincoln which aims to engage café's and bars in the city to become water refill stations.

Awards

We recently entered the project for the Lincolnshire Environmental awards. After submitting our entry, we were visited by the judges. We were thrilled to be shortlisted in the business category. The next step was a presentation to a panel of judges with questions. We went on to be announced as winners.

We have been ISO 140001 accredited since 2010.

Our Operations Manager won Sustainability Champion of the year in our company's responsible property awards last October. She has been shortlisted for an IEMA award this year.

STEELITE INTERNATIONAL LIMITED

CENTRIFUGE RECLAMATION

AIM

To reduce the environmental impact of our plant through using innovating technology to reduce the sites needs.

We are the biggest UK manufacturer of ceramic tableware for the hospitality market employing just over one thousand employees in the Stoke on Trent area.

We have installed two centrifuge systems which are now used to reclaim waste glaze from our spraying processes, with the extracted water being reintroduced into our wash off booths rather than using fresh town water. We used to have waste glaze going to an effluent press, taking up labour, then when the material was pressed it was skipped and sent to landfill.

The system cost the company £245,000 to install, the first of its type in our industry so it wasn't without risk, but we had faith in the system and had the board of Director's backing from the start.

ACHIEVEMENTS

What have we saved:-

1. Glaze (contains many minerals, mainly frits) - Approx. 2 tonnes per week saving £95k per annum.
2. Water used for the wash off process - saving 55,000 litres of water per day, saving £15k per annum.
3. Skip and landfill costs - We dropped 2 x 8 yard skips per month saving £4k per annum.

The sites glaze preparation rooms now look modern and this is a great story to tell potential and existing customers.

The project team now has a new lease of life, following such a great environmental result. We have already shared our experiences through the British Ceramic Confederation (BCC) as if this works for us it should work for others.

IN DETAIL

Steelite International is a world leading manufacturer and supplier of award winning tabletop and buffet solutions for the hospitality industry. Listening to our customers has allowed us to offer innovative solutions in china, metal, glass, wood and melamine. Servicing over 140 countries, we are committed to offering the best in functionality and design, while minimizing the effect on our environment

Steelite International proudly produces over 500,000 pieces of tableware every week - 140,000 of those are cups, which weigh the same as 5 double decker buses. Explore videos that take you through every step from raw materials and mould making, to backstopping and glazing are turned into the world class finished product that is distributed to over 140 countries.



Steelite International is working closely with a number of suppliers and organisations, and continually monitoring, developing and improving procedures to create minimum impact on the community and environment, while ensuring maximum efficiency and cost savings for the future sustainability of the business.

Steelite's centrifuge reclamation machinery works by spinning waste material out of wastewater at very high speed, resulting in clean water rather than cloudy water. Apart from significantly reducing water usage, it saves glaze and lowers energy usage on the site too.

Supported by a £250,000 investment by Steelite, the system saves the company 100 tonnes of glaze per year as well as 20 cubic meters of water per day.

Patrick Griffin, Site Services Director at Steelite said: "We're delighted to have won an Engineering

Gold Green Apple Award for our latest system and approach to water recycling. The water is no longer going to waste, we're lowering site energy usage, saving glaze, and we've even reduced the amount of chemicals in the process to reclaim glaze which has improved the wastewater that does leave site.

"To our knowledge, this is an industry first. We hope it serves as inspiration for other companies and industries that can do something similar to reduce the global impact that manufacturing has on finite resources."

Steelite has long been a champion of sustainable initiatives. In 2008, it joined the Green Organization with a vision to communicate and offer advice on what companies can do to improve their environmental impact. In 2010, Steelite won its first Gold Green Apple award in the Recycling sector for its Lamella filtration system reducing body material waste by reclaiming it from the sites waste water prior to the water going to drain. In 2013, Steelite won a Silver Green Apple award for achieving these goals and ensuring 0% to landfill.

Environmental Policy

Steelite International has been certified to the ISO 14001:2004 Environmental Management Standard (EMS) since the certificate's introduction in 1996. In addition, with new targets set through the Green Initiative to cut wastage of raw materials, energy and water, Steelite International is determined to reduce the company's carbon footprint and impact on the environment.

Steelite International is a member of The Green Organisation that rewards and promotes environmental best practice around the world and the Staffordshire Business & Environmental Network, which aims to help local businesses reduce environmental impacts while also generating profits.

Steelite International has a dedicated, innovative approach to caring for the environment. In 2007, the



business became one of only five companies in the UK to install a Lamella system. Steelite is the only tableware manufacturer to use a Lamella system for recycling clay waste.

Since its installation in July 2007, the Lamella machine has recycled a staggering 350 metric tonnes of clay body per year, which equates to:

- 350 tonnes of clay per year that does not need to be quarried – reducing impact on the landscape and the energy required to remove/purify it.
- 350 tonnes per year that does not need to be transported to Steelite International from Cornwall – creating savings on vehicle emissions and the use of fuel.
- 350 tonnes of waste material per year can be re-used that would otherwise have been sent to landfill – reducing landfill and the impact on the environment by saving fuel and vehicle emissions that would have been created to transport the waste.



In addition to creating clay to re-use, fewer chemicals are now required to separate waste. This has a positive effect on the environment and water discharged from the site is also purer.

The Lamella has significantly reduced Steelite International's impact on the environment. The company now recycles in excess of 90% of manufacturing waste. In 2010 Steelite International received a Green Apple Award for the Lamella project.

Ultimately, the Lamella has contributed towards the sustainability of tableware manufacturing, as well as saving natural resources and subsequently, assisting in the reduction of global warming.

Steelite International remains committed to its environmental policy and continues to implement new methods to reduce its commercial impact on the planet.

Steelite International's Made in England – Made for Life campaign promotes the benefits of British manufactured tableware, and underpins the four elements of our mission statement. This is our commitment to you. We make our products and serve our customers with this in mind – everything we deliver is for life.

SWAN CENTRE

WASTE MANAGEMENT - TEAM, TENANTS AND COMMUNITY

AIM

The new waste management strategy at the Swan Centre has been put in place to improve recycling performance, reduce costs and ensure a zero waste goes to landfill. A key part of the strategy was to engage key stakeholders including the team, the tenants and the local community with a one team approach. In addition the project aimed to ensure no negative impact on service delivery or the customer experience at the Centre.



ACHIEVEMENTS

The waste management project at the Swan Centre introduced 9 separate waste streams which resulted in a +110% improvement in segregated waste recycling (from 30% up to 63%). The remaining waste is now incinerated to generate energy ensuring zero

to landfill.

The one team approach strategy has engaged the team, tenants and community. Working together the Swan Centre has partnered with Eastleigh BID to enable 80 local businesses trading throughout the Town Centre to recycle their cardboard through us. This has diverted additional waste from outside the Centre going to landfill and also generate a small income to reduce waste costs for our tenants. Waste costs have been reduced by -57.5% (from £80,000 to £34,000) saving £46,000 per annum. The Centre Manager actively promotes the awareness of sustainability initiatives in the local community. As well as implementing a Town Centre cardboard waste system the Centre Manager recently presented at the Eastleigh Business Conference and received an Eastleigh Business Award for helping to "Create a Greener Borough."

IN DETAIL

The Swan Centre waste management strategy set a clear goal to "improve recycling and reduce costs, engaging all stakeholder with a one team approach."

To deliver this core objective the strategy focused on 3 key areas:

- 1, INVESTMENT IN ADDITIONAL EQUIPMENT – To support the +110% improvement in recycling performance and to help generate the financial saving of £46,000 per annum the Centre first had to invest £28,000 in new equipment to improve the waste management process. The equipment identified included:
- 2, TUG AND TRAILER – the introduction of a new tug and trailer enabled the Centre to combine waste produced from Swan Shopping and Swan Leisure that was previously treated as 2 separate operations. The increased scale made it possible



to consider introducing additional waste streams and improve performance.

- 3, CARDBOARD, POLY AND DMR COMPACTORS – the introduction of 3 new compactors enabled additional waste streams to be created. This improved recycling performance and also generated a new income source for the Centre helping to reduce the overall waste management cost for our tenants.

INTRODUCTION OF 9 SEPARATE WASTE STREAMS –

Strategically positioned waste recycling areas has enabled our tenants to easily separate the majority of waste before it is collected by the Centre team.

Working together the team and tenants across the Centre are now able to generate 9 separate waste streams including:

Cardboard, Glass, Food, Plastic, Poly, Metal, Cans,

General (for energy) and DMR. The introduction of additional waste streams has significantly improved recycling performance and also significantly reduced the cost.

3) STAKEHOLDER ENGAGEMENT – TEAM, TENANTS & COMMUNITY –

TEAM – generating positive results without the support and commitment from the team at all levels would be impossible. The team is key to everything we do and sustainability is always high on the agenda at the Swan Centre. The team are engaged from day one with their induction and this continues with on the job coaching, employee recognition schemes, team builds and regular communication ensuring environmental success is celebrated and rewarded. “The amount of segregated waste that we are now getting from the tenants has increased a lot and makes recycling much easier. The amount we are now recycling has exceeded my expectations.” Tony Jarvis, Cleaning Operative.

TENANTS – the Swan Centre works in partnership with its tenants ensuring the waste management process supports their needs. The key is face to face communication from the team at all levels. This includes regular 1-2-1 updates, more formal tenants meetings and even multilingual signage where appropriate. “Recycling is very clean, efficient and fast at the Centre. The Swan Centre staff are helpful and knowledgeable, and work with us, rather than against us and always consider things from our side of the business.” Wiktoria Pawlos, Restaurant Manager, Prezzo.

COMMUNITY – the Swan Centre is always looking for ways to support and engage with the local community. Working in partnership with Eastleigh BID the Centre now recycles cardboard waste from 80 local businesses. This initiative has helped to divert waste away from landfill, reduce waste costs for the local community and also generated an income for the Centre that was used to reduce waste management costs.



The Swan Centre also works closely with Eastleigh Borough Council. Camilla Sharp, Head of Economy and Business Liaison said “Eastleigh Borough Council’s stated aims are to create a Prosperous and Green Borough for its Healthy Community to live and work in. The Swan Centre share these ambitions and is a major ally and contributor, participating in a best practice panel at the 2018 Eastleigh Business Conference with other local businesses involved in waste management and energy efficiency. The Centre’s management has proven the cost-effectiveness of environmental friendliness by introducing recycling and waste management schemes that have provided a cost saving of over 50%. This, among other sustainable initiatives led the Council to select the Swan Centre for one of three Green Borough Awards in 2018.”

MOVING FORWARDS:

Whilst the Swan Centre waste management initiative has already generated some great results we are already aiming to build on this success. A new recycling stretch target has been introduced to further improve performance. By the end of 2019 the Centre aims to be separating 75% of its waste and has already achieved 71% last month.

In addition to promote the importance of sustainability throughout the community the Centre is hosting its own sustainability challenge in August inviting local schools, clubs, charities and community groups to take part in our Greener Borough campaign.

SHARING BEST PRACTICE:

A case study summarising the Swan Centre’s Waste Management Strategy has been put together to enable Ellandi to share this best practice with its portfolio of 30 shopping centres throughout the UK.

TANAP NATURAL GAS PIPELINE TRANSMISSION CO. TANAP NATURAL GAS PIPELINE PROJECT

AIM

Trans-Anatolian Natural Gas Pipeline (TANAP) Project is a pipeline system of 1,850 km length in Turkey, passing through 20 provinces, creating a sustainable environment, gifting new species to science, blessing biodiversity and embracing cultural heritage. Enhancing the current awareness in the country, with a diverse and inclusive team, a more sustainable environmental management perception and know-how were inherited to new generations, on top of new initiatives in biodiversity and cultural heritage.

A comprehensive environmental management system implemented to ensure the achievement of sustainable development goals (SDG). Some major examples are given below;

- In order to increase quality of the education under SDG #4, 14,580 books on waste management were distributed to children in nearby villages and during Project implementation 132,909 people (both employees and contractor personnel) received

environmental training modules for total man-hours of 86,774.7.

- Women employment was supported in the Project under SDG#5&10. There were 48 women which means 39% of the whole environmental team.
- In 19 main and fly camps, WWTPs and WTPs were installed and operated throughout the pipeline route passing from 20 provinces under SDG#6.
- TANAP Main Control Center Building awarded with LEED® Gold certificate under 2009 New Construction and Major Renovations category under SDG#7.
- Preparation of 500m. EUNIS Level 3 habitat map of TANAP Project, with biological baseline data, was a new study to country under SDG#15. For the minimization of carbon footprint of the Project, an objective of plantation of 4 trees against 1 tree cut during Construction was implemented.

TANAP established a sophisticated environmental management system with a cradle to grave approach. Starting from Environmental and Social Impact



Key mitigation measures for terrestrial habitats and species

FOR HABITATS	<ul style="list-style-type: none"> • Top soil management • Collect endemic and/or non-endemic seeds of natural plants of the regions to control erosion at sloping areas • Use certain endemic flora species seeds for bio-restoration (additional seeds will be collected from nearby areas against erosion on sloping areas) • Locate project components on previously disturbed areas rather than new areas where possible • Maximize the use of existing corridors/roads • Avoid using sensitive areas if extra land is required for project activities • Control invasive flora species
FOR SPECIES	<ul style="list-style-type: none"> • Avoid construction during reproduction seasons of sensitive wildlife (Time constraints) • Seed or bulb collection, translocation, relocation • Giving some of the collected seeds of endemic species to the gene bank, use some of these seeds for biorestore • Harvesting and storing herbaceous plants (which carrying SCC arthropod species eggs) near the ROW in the aerated conditions, so eggs can be hatched and individuals will not has any damage.

Key mitigation measures for freshwater habitats and species

FOR HABITATS	<ul style="list-style-type: none"> • Conduct construction works during the time when flow is low and limited timeframe (Time constraint: April-June) • Restore the water passages to the condition before the construction where possible • Minimize impact to riparian vegetation • Avoid impact and removal of gravel • Minimize erosion • Install silt screens and sediment traps • Restore riparian vegetation
FOR SPECIES	<ul style="list-style-type: none"> • Avoid construction during reproduction seasons of freshwater fish (Time constraints) • Minimize habitat loss • Restore the bottom structure • Restore the riparian vegetation (spawning areas)

Assessment (ESIA) baseline studies in 2012-2014, route selection had 8 revisions to identify a technically feasible pipeline centreline, with a reasonably low impact on environment and land use. Hydrological Properties,

A three stage consultancy configuration was used during the preparation of the ESIA Report. Golder worked as a global ESIA 3rd Party for TANAP, who had also prepared the methodology for Baseline studies for local ESIA 3rd Party, Çınar, to be in compliance with International Framework. Impact

assessment methodology was set and cumulative and transboundary impact assessments were conducted by Golder. Throughout ESIA report preparation phase, approximately, \$7,000,000.00 was used. The general methodology used by Golder for Environmental and Social Impact Assessment Studies is based on the Drivers-Pressures-State-Impact-Response (DPSIR) Framework developed by European Environmental Agency (EEA) for a highly transparent analysis of the impacts on the various environmental and social components through the life cycle of the project. This was a GIS based methodology for the evaluation of the transboundary impact on the international waterways within the country and for the preparation of a guidance note, submitted to the approval of IBRD, World Bank in 2015. Final quality check was conducted by another independent 3. Party, ERM. An integrated approach with the aim of meeting all national regulatory requirements and the requirements of International Finance Institutions (IFIs) was followed during the ESIA process.

Physical baseline data collection highlights mostly in 2013-2014 :

PM-10 and PM-2.5 sampling, at a total of 162 points
SO₂, NO_X, and O₃ sampling, at a total 40 points
Noise and vibration measurements, at a total 69 points

Baseline soil contamination field studies at 105 sampling stations

For the wet season (spring/May 2013) and dry season (summer/July 2013) 327 and 218 sampling points were determined respectively for surface water quality measurements.

Groundwater sampling was conducted at 37 locations

Biological baseline data collection highlights:

TERRESTRIAL & FRESHWATER:

A total of 246 sampling stations, chosen for terrestrial flora studies, 87 SCC,

A total of 43 sampling stations, chosen for aquatic flora studies, no SCC,

A total of 133 sampling stations for mammals, five SCC,

A total of 152 sampling stations for birds, two SCC and five potential SCC,

A total of 133 sampling stations for reptiles, four SCC and seven potential SCC,

A total of 133 sampling stations for amphibian species, one potential SCC,

A total of 243 stations for terrestrial invertebrates, 34 SCC,

A total of 12 high sensitivity habitats, which are defined in accordance with National Biological Diversity Strategy and Action Plan.

A total of 189 sampling stations for freshwater fish and macroinvertebrates, 13 SCC fish species and one potential SCC macroinvertebrate were identified

MARINE:

A total of 45 fishermen surveys for marine mammals and turtles studies, four potential SCC, no breeding area;

A total of 6 sampling stations for marine fish studies, no SCC or their breeding area;

A total of 17 sampling stations for marine soft bottom macrobenthos and marine flora studies, 11 sampling stations for marine hard bottom macrobenthos, no SCC were identified.

A third party monitoring company was the part of the sophisticated Environmental Organization of TANAP Project with a budget of around \$10,800,000.00 throughout construction life time. This monitoring will continue during operations phase with a two years budget of around \$1,000,000.00.

Among the endemics identified along the route, following 10 new species to science were identified as arthropods; *Chrysolina n. sp.*, *Tipula n. sp.1*, *Dioctria n. sp. 1*, *Dioctria n. sp. 2*, *Muzimes n.*

sp., Hilara n. sp. 1, Hilara n. sp. 2, Hilara n. sp. 3, Hextoma n. sp., as flora; Verbascum sp. Nov.. This is one of the most innovative aspect of the Project. Once the ongoing studies are completed to record the newly identified species into the literature, the species will be named in accordance with the scientific methodology followed by preparation of scientific publications in the form of articles and will be published in the scientific index (SCI) journals. The new species, which are highly endemic and show a limited distribution in their regions, will then be registered in the IUCN Red List, as the most comprehensive Global Conservation Status Inventory.

To increase the awareness of the employees about the environmental priorities, 132,909 people (both employees and contractor personnel) received environmental training modules for total man-hours of 86,774.7 during the Project.

Contractors gathered and reported complicated environmental data, which were conducted throughout construction, such as environmental analysis on air, water, noise etc., biodiversity monitoring, follow-up and registry of wastes, trees-cut etc. Below, some highlights as Project upto-date data is demonstrated;

Total number of water quality samples taken are 1616, total number of air quality samples taken are 290, total number of noise quality samples taken are 410.

Total amount of hazardous waste generated is 1,570,284 kg.

Total amount of non-hazardous waste generated is 20,667,899 kg.

Total amount of hazardous waste recycled at licensed facilities is 462,544 kg.

Total amount of non-hazardous waste recycled at licensed facilities is 7,375,653 kg.

Total amount of hazardous waste disposed at licensed facilities is 1,101,345 kg.

Total amount of non-hazardous waste disposed at licensed facilities_ 11,671,966 kg.

16,008 of fauna (including fishes) were relocated and registered during construction.

Total water abstraction (groundwater, surface water, municipality) during construction was 2,424,037 m3.

TANAP is committed to managing the potential effects of the Project on biodiversity by implementing the biodiversity mitigation hierarchy (i.e. avoiding, minimizing, rehabilitating and offsetting). The first three steps of the mitigation hierarchy were incorporated in Project design, ESIA, Biodiversity Action Plan (BAP). BAP identified 67 terrestrial and 27 freshwater critical habitats.

The last mitigation hierarchy is met with Biodiversity Offset Strategy (BOS), which was prepared with the purpose of providing a practical and achievable offset scheme for TANAP. As the TANAP Project covers such a large geographic area and as biodiversity varies greatly across this extent, an ecoregion approach of Olson et al. 2001 was used. As a Commitment of BOS, Biodiversity Offset Management Plan (BOMP) will be prepared by the end of 2019 and implementation will start. BOMP studies started with five campaigns on consecutive sections of the corridor along the pipeline starting from the west to the east as both on terrestrial and freshwater habitats as follows:

- first campaign: a pilot site visit was conducted. 36 surveys were completed along the TANAP LSA between Ipsala and Biga.
- second campaign: field data collection was conducted with the use of the new field form between June 4th and June 9th 2018. In this occasion 36 surveys were completed along the TANAP LSA between Biga and Ankara;



- third campaign: field data collection was conducted between June 25th and July 7th 2018. In this occasion 60 surveys were completed along the TANAP LSA between Ankara and Erzincan;
- fourth campaign: field data collection was conducted and between July 27th and August 3rd 2018. In this occasion 38 surveys were completed along the TANAP LSA Erzincan and Ardahan;
- fifth and sixth campaigns: field data collection was conducted between September 16th and September 29th 2018. In this occasion 23 surveys were completed along the TANAP LSA between Ardahan and Posof.

As of 2019, potential offset locations were identified as a preliminary stage. Once the BOMP of the Project was officially completed in 2020, biodiversity offset projects will start to be implemented with the stakeholders that will create a high biodiversity value.

ensuring a net gain for TANAP Project and Turkey.

106 cultural heritage areas that have never been known until now were identified. Many of these areas were registered to the Cultural Inventory of Turkey. This number reached to a total of 154, with 48 of them being chance find areas. Alaybeyi 1st Degree Archaeological Site, TANAP Project LOT 1, SP2, KP 335 was discovered during the trench excavation. The archaeological site came up with the findings that will rewrite the history of the archeology of the region. During the excavations, many tombs and tomb gifts were found together with the architectural structures. According to the results of carbon analysis (C14) carried out in local laboratories, the oldest settlement in Alaybeyi dates from 4720 B.C. to 4553 B.C. (i.e. Chalcolithic Period). Depending on the anthropological examinations made on bones, it was also understood that people living in a

Mediterranean-type population with carbohydrate-weighted diets, and diseases such as tooth diseases and Mediterranean anemia (thalassemia) are common. These results show that Alaybeyi Mound is the oldest settlement known to date in Northeast Anatolia. Burials, architectural remains and pottery repertoire of the region had been well documented as a result of Alaybeyi excavation. On the other hand, excavation offers a new perspective on the existence of mother goddess cult for Karaz Culture, which is from the term of early bronze Age of Transcaucasia and East Anatolia. Burials with horse remain, show strong similarities with Central Asian burial traditions, which demonstrates a need of cultural research. Remains of mining clinker are the earliest examples of metal productions.

Until today, 900-1000 artifacts, which were revealed during the salvage excavations, were transferred to related Museums. Examples of those artifacts include oil-lamps, coins, statuettes, mother goddess idols, tear bottles (unguentarium), daily usage cups of various periods, kitchen cups, bronze artifacts, ornaments, jewels, grave steles etc.

Biological baseline data collection lead to the preparation of 500m. EUNIS Level 3 habitat map of TANAP Project, which is unique in Turkey and will create a rich database for the further country specific studies.

Cultural Heritage Management System of TANAP changed the known history of Asia Minor, which is shared through Symposiums. TANAP-Archaeological findings books about all excavated archaeological sites and findings were prepared at the beginning of September with the support of relevant museum directorates. Publishing process is ongoing.

Sharing lessons learnt is the basic principle to ensure a life-long enhancement process within the EMS of TANAP Project, which will support environmental awareness of the country. Therefore, lessons learnt cases were presented to the employees through various means such as tool box talks, brochures,

e-mails. Outside Project was represented with 2 papers and 2 posters in IAIA 2018 Durban, South Africa, 38th Annual Conference of the International Association for Impact Assessment, Environmental Justice in Societies in Transition.

As part of the lessons learnt process; the results of the salvage excavations of TANAP Project was presented at the 27th Museum Salvage Excavations Symposium, hosted by Ministry of Culture and Tourism in April, 2018. Erzurum Museum, Kütahya Museum and Bursa Museum. TANAP Senior Archaeologist attended International Symposium of Propontis and the Surrounding Cultures on behalf of TANAP, for presenting the Project's archaeological works in the region, as of October 2018.

4 articles about the TANAP Çökköy excavation will be written by TANAP Senior Archaeologist and ANKON Anthropologist in the Kütahya Museum book at 2017. This book will be published as «TANAP Special Issue». Alaybeyi Salvage excavation book will be prepared and published under the Erzurum Museum Directorate till September, 2019. Salvage excavation book about the Kalebayır, Şevketiye and Üzümlü archaeological areas will be prepared and published under the control of Bandırma Museum Directorate till October, 2019. Replica artifacts were reproduced with the permission of the Ministry of Culture and Tourism for archeology awareness and shared with our shareholders and public officers.

Besides ISO 14001 Certificate of the Project, TANAP Main Control Center Building was awarded with LEED® Gold certificate under the LEED® under 2009 New Construction and Major Renovations category thorough green and sustainable actions taken during both design and construction period. Below are significant implementations that are categorized by general LEED® headings:

- Sustainable Sites
- Water Efficiency
- Energy and Atmosphere
- Material and Resources
- Indoor Environmental Quality

Approved by the Nature



TANAP: DIVERSIFYING ENERGY SOURCES FOR EUROPE

Building upon the success of numerous mutual projects between Azerbaijan and Turkey, two nations are taking a giant step in European energy markets. It is Trans-Anatolian Natural Gas Pipeline, TANAP, an energy bridge between the rich Caspian gas reservoirs and Europe! Turkey and Azerbaijan have worked together to materialize this colossal project aiming to meet the growing natural gas demands of Europe and Turkey, as well as to diversify the energy sources for the Region.

"APPROVED BY THE NATURE"

TANAP carefully implemented a biodiversity mitigation hierarchy to protect natural resources and incorporated this sensitivity in Project design, construction and operation. During the preparation of the Project ESIA and Biodiversity Action Plan, 67 terrestrial and 27 freshwater critical habitats were identified. Furthermore, 9 fauna and 1 flora species, which were not previously recorded in the scientific literature, have been discovered.

A total of 154 cultural heritage areas dating from the Byzantine Period back to the Chalcolithic Period (4720 BC) were discovered and registered in Cultural Inventory of Turkey with ca. 1200 unique artifacts that were unearthed.

TCI CO., LTD.

INTEGRATING THREE ELEMENTS OF SUSTAINABILITY IN PRODUCTS: CIRCULAR ECONOMY, RENEWABLE ENERGY AND NET ZERO CARBON EMISSIONS

TCI Co., Ltd. is an ODM company that manufactures functional drinks, dietary supplements and facial masks on the basis of agricultural biotechnology. Since TCI deeply realizes the need for comprehensive practices when confronting climate change and promoting sustainability, it has actively probed its own industrial features and created health and skin care products that integrate “three elements of sustainability”: “Circular economy of agricultural raw materials recycling”, “Renewable energy”, and “Net zero carbon emissions”. First, the useless agricultural waste bought from local farmers is largely reused by extracting functional ingredients for making health care and skin care products. The remaining agricultural residues after extraction are further fermented into organic compost that fertilizes TCI’s own farm. Secondly, the energy consumption of the manufacturing processes is driven from the solar panels installed on the rooftops of TCI’s factories. TCI uses sunlight to manufacture sustainable products. Finally, all carbon emissions from the manufacturing processes and the factories achieved carbon neutrality by carbon reduction strategies and purchase of carbon credits, which creates TCI’s net zero-carbon products. This project

has brought a large amount of economic resources to small local farmers and created community value, gathered green economy for brands, driven green manufacturing, enhanced Taiwan’s global sustainability competitiveness, and refined corporate management. This project is an innovative practice in sustainability since it expends the development of circular economy from the back-end recycling to the source-side reuse. And it makes the manufacturing processes of “all products” achieve net zero carbon emissions instead of only a single product’s carbon footprint that is usually applied by other companies, which is a bold practice of a manufacturer actively confronting their carbon emissions.

What did the project involve doing?

Health products integrating three elements of sustainability: “Circular Economy”, “Renewable Energy”, and “Net Zero Carbon Emissions”

1. Creating Circular Economy of Agricultural Biotechnology

TCI Co., Ltd. is an ODM company from Taiwan specializing in the manufacture of functional drinks, dietary supplements and facial masks. On the basis of the R&D and manufacture of agricultural biotechnology, it has created a new business model of “circular economy of agricultural raw materials”. TCI uses



TCI installed solar panels on the rooftops of all factories to self-supply renewable energy.



a large number of “agricultural by-products (wastes)” as raw materials for manufacturing. That means it reuses the parts that were originally discarded as agricultural wastes and converts them into resources. In more details, the “Bio Resource Data Mining” innovated by TCI is used to fully explore and excavate the nutrients and special effective ingredients of these agricultural by-products. Through this method, TCI creates new applications of agricultural by-products. After finding the effective ingredients, TCI then further utilizes unique plant extraction technology to extract those ingredients with efficacy from agricultural wastes and make high-performance functional health products and skin care products, which creates whole new value to those agricultural by-products.

Most of the agricultural by-products that are reused are purchased from small-scale local farmers, farmers under contract, food processing factories, etc. These by-products include banana peels, banana flowers for their stamens, young green jujubes (waste after fruit thinning), young guavas, young citruses, peanut skins (waste of peanut products), red quinoa shells (waste after peeling), buckwheat hulls, longan shells, coffee

cherry (coffee bean is the seed whereas the fruit part is useless), wasabi leaves (wasabi sauce is only made by wasabi roots), And eggshell membranes. TCI uses advanced the R&D and extraction technology to re-create high added value to these agricultural wastes. For example, it extracts flavonoid active substances with detoxifying effects from longan shells to create longan shell coffee that can protect the liver while

refreshing. And high-concentration serotonin extracts from banana peels are used to create functional foods that help to release stress and improve sleep quality.

Among them, the application of the red quinoa shells is even up to four times of utilization, which return to the origin in the end. This application achieves comprehensive cycling and reuse. First, the shelled red quinoa is usually used for cooking and adding flavor and nutrients to the staple food. TCI planted 6 hectares of organic red quinoa at its own Sunrise Farm in Taitung, Taiwan. It uses “the remaining shells in the process of shelling red quinoas” to extract Formosa RubyTM (the extract winning the Geneva International Invention Exhibition - Gold Medal and Special Award). The Formosa RubyTM is then used to make Pearlosophy (a fruit and vegetable drink with pomegranate and red quinoa extracts). This product can promote collagen proliferation with the efficacy of anti-aging and anti-wrinkle. Secondly, “the remaining shell residues after extraction is then added into noodles to make organic red quinoa noodles”. The

rich dietary fiber is beneficial to digestion so the noodles become a staple food product for improving gastrointestinal health. Finally, “the remaining shell residues are fermented by microbial strains and converted into organic compost,” and returned to the red quinoa field at the Sunrise Farm to fertilize the land. In addition, the laboratory and field tests showed can significantly facilitate the growth of plants than commercial organic fertilizers.

Therefore, TCI emphasizes the comprehensive use of agricultural resources through the model of agricultural circular economy to maximize the use of resources. TCI puts the circular economy of agricultural raw materials into practice with innovative and diversified applications.

2. Using Sunlight to Make Sustainable Health Products

About 85% of Taiwan’s electricity comes from fossil fuels. But TCI actively promotes the renewable energy development in Taiwan by boosting solar-powered factories. TCI has established 5,530 square meters of 930 kW solar panels on the rooftops of all factories in Pingtung Intelligence Manufacturing Center for self-supply, which provides 20% of renewable energy out of total energy consumption. This application accelerates the energy transition of the manufacturing process to solar energy, and reduces the use of fossil fuels. The goal of using sunlight to make products and the active actions of building green factories have become the keys for TCI to be recognized and approved by RE100 (a global initiative launched by The Climate Group and CDP requiring global corporate members to commit to 100% renewable energy) in 2018. From the beginning that the scale of our company did not meet the RE100 standard to the end that our actions made RE100 notice the prospect of the renewable energy development in Taiwan, TCI as a small and medium enterprise has become the first company in Taiwan to be listed in RE100, and committed to sourcing 100% renewable energy by 2030.

3. Health Products with Net Zero Carbon

As one of the manufacturing industries, TCI produces more carbon emissions than other industries. Therefore, in addition to the Eco Facial Mask Factory that reduces energy consumption and carbon emissions from the factory building itself through certified by the U.S. Green Building Council (USGBC)’s LEED Silver Green Building Certification and ECOCERT Organic Certification, TCI starts conducting annual ISO14064-1 carbon inventory since 2018. With the voluntary carbon reduction standards, TCI achieves PAS 2060 carbon neutrality through the AC energy-saving program, afforestation project and purchase of carbon credits from forests. This action creates pioneering products with net zero carbon from the manufacturing process.

• Why did you do it?

TCI started from trading business 30 years ago and has gone from OEM to R&D and ODM in recent years. Since the current chairman, Mr. Yung-Hsiang Lin, comes from a rural village in Taichung, Taiwan, he has affections, familiarity and acumen to Taiwan’s native crops and plants. Therefore, TCI turns to agricultural biotechnology as the basis, and targets at Taiwan’s native plants or fruits for innovative research and development.

With the competition of the industry, TCI must abandon the old concept of business management. The chairman sees the competitiveness and trend of “Sustainable Operation” in the future. He is even aware of the global crisis, such as global warming, endangered species and resource catastrophe. Consequently, he started to reflect on how business management can balance social welfare, resource recycling, ecological rehabilitation, environmental protection and economic development, and to seek a balanced relationship between business development and sustainability of nature.

Therefore, TCI actively focuses on finding the force point within the manufacturing process that can



122 researchers of the R&D team and nine laboratories with different attributes, TCI devotes to exploring the possibility and diverse application of the circular economy of agricultural waste. Additionally, the rooftop solar panels on our factories cost USD 1.5 million for construction, which launches the action of green energy factories. In addition, USD 0.1 million was invested in the

improve resource recycling and reduction. In the meantime, TCI seeks to differentiate itself from others, breaks through the business framework, and explores the circular economy model with its own industrial features to create irreplaceability.

When clean energy technology and disclosure of carbon emissions have gradually become prominent, TCI deeply realizes the necessity of enterprises in climate leadership. As a result, it actively invests in renewable energy and carbon reduction strategies to mitigate and adapt to the impact of climate change.

TCI would like to work towards to make a difference, and wants to exert positive influence to improve the world. It aims to drive innovation that can benefit the planet. TCI has set sustainability as the core goal for future competitiveness. And the development of “the product that combines three elements of sustainability” is one of our big steps forward.

• What did it cost?

In 2018, TCI has invested USD 15 billion in R&D, accounting for 5% of the total revenue. Through

afforestation project, and another USD 0.1 million was spent in carbon neutrality of factories every year. In the past two years, it has invested USD 0.2 million in net zero carbon manufacturing.

- If quantifiable, what did the project achieve in terms of sustainable development, economy, environment and/or equity?

TCI reuses about 800 metric tons of agricultural by-products each year, and creates about 300 times of commercial value for agricultural waste, which is useless originally. Therefore, TCI was awarded the Excellence Manufacturer of Circular Economy Technology by the Industrial Development Bureau, the Ministry of Economics of Taiwan in 2018. In addition, the purchase of agricultural by-products from small local farmers has brought economic resources to the local communities and promoted equity of economic and community development.

The rooftop solar panels provide 1 GWh of renewable energy per year, helping reduce the use of 2 GWh of power from fossil fuel over the past two years, equal to approximately 1,100 t-CO₂e carbon emissions,

which alleviates the negative impacts on the environment and climate.

TCI cooperated with the Forestry Bureau of Pingtung County to adopt 17.25 hectares of a land for afforestation activities. This reduces accumulatively about 450 t-CO₂e reduction for the atmosphere. In addition to the energy-saving of 259,243 kWh by the AC improvement, TCI voluntarily purchased 14,552 t-CO₂e of carbon credits in the past two years and achieved net zero carbon emissions of our factories.

The project promotes four of the United Nations Sustainable Development Goals (SDGs) including 7 Affordable and Clean Energy, 12 Responsible Consumption and Production, 13 Climate Action, and 3 Good Health and Well-Being, which thus creates a concrete practice in the international sustainable trend for the biotechnology industry.

- Who and what benefited? Longer term benefits?

“Connect Local Agriculture, Create Community Value”

TCI attaches great importance to the value of local development. The agricultural circular economy model brings an additional USD 0.9 million economic benefits to local farmers and small farmers under contract, and thus creates community value and makes better use of resources on the planet. Through the purchase of agricultural waste, TCI has created health care products with high added value, sold



TCI's Chief Sustainability Officer were in the forums of 2018 Global Climate Action Summit and COP24 and sharing TCI's experiences in circular economy, renewable energy deployment, and carbon neutrality.

them globally and won international invention awards. This demonstrates that TCI uses its own expertise to make Taiwan's small farmers and native plants shine on the international stage.

“Gather A Green Economy for Brands”

TCI provides ODM services, and has reached a wide range of customers, brands and suppliers. Through this project, the sustainability concepts and practices can be vertically integrated into suppliers and brand customers' operations. In addition to the health and skin care products that bring health and beauty to the global consumer's life, “Green Factories” and “Environmentally Friendly Products with Net Zero Carbon” even attract and encourage new brand customers to join in promoting the development of sustainable products collaboratively. This trends creates green economic value while mitigating the burden of product manufacturing on the planet.

“Use Corporate Influence to Drive Green Manufacturing”

Through the practice of becoming a green enterprise and holding conference meetings, TCI actively

encourages more companies to jointly promote sustainability strategies, enhance the industry' awareness of self-inspection on their own companies and factories, increase the emphasis of enterprises on sustainable practices, and further develop plans in response to the international common goal of carbon reduction and energy-saving to take on the responsibility of enterprises for environmental sustainability. With this, it can aggregate the strength of enterprises to advance a whole new sustainable business model of greater scale, build a green value chain, and balance the conflicts between industrial development and environmental protection.

“Green Industry Enhances Taiwan’s Global Competitiveness”

Taiwan started from agriculture in the past. The development of agricultural circular economy brought innovation to Taiwan’s agricultural development. TCI has successfully promoted the agricultural circular economy, green building factories and green manufacturing. And it joined the global top-notch enterprises to accelerate sustainability actions jointly by participating in international initiatives and commitments. As the first Taiwanese company listed in RE100, TCI leverages its corporate leadership to elevate the global competitiveness of green manufacturing and renewable energy development for Taiwan, and let the world see Taiwan’s efforts for a more sustainable future.

“The Practice of Sustainability Improves Corporate Management”

The successful development of green products strengthens the employees recognition of our company’s philosophy and execution, including the increasing awareness of the staff in our factories on the green building factory and the improvements of equipment efficiency, the confidence of the sales department in developing the green product markets, and the more strict impact assessment of materials on the environment by the procurement department.

All of these changes have brought positive management benefits to the business operation.

- Was there anything innovative about the project?

The two major innovations in this project are the unique and comprehensive application of agricultural waste and the practice of carbon neutralization of the manufacturing processes. First of all, the current circular economy focuses more on the recycling of back-end waste, while the source-side resource cycling and reduction measures are relatively few. TCI leverages its own industrial features and, through the biotechnology, makes the raw materials on the source side from useless agricultural waste to health products with brand new value contributing to human health. It is an innovation developing of circular economy. In addition, at present, there aren’t many companies that implement carbon neutrality at their factories. TCI actively establishes green factories with energy-saving and net zero carbon emissions. This makes the manufacturing processes of “all products” achieve net zero carbon emissions instead of only a single product’s carbon footprint that is usually applied by other companies, which is a bold practice of a manufacturer actively confronting their carbon emissions.

- Can other organizations/communities benefit from implementing your methods?

TCI belongs to the manufacturing industry, and has higher carbon emissions compared with the general industry. Therefore, the promotion of renewable energy and carbon management in factories are absolutely possible for other organizations to implement. And the agricultural circular economy of TCI can be used as a business case to encourage companies to explore from their own industrial features, and to enable companies to strengthen their thinking about circular economy strategies from the source end of the value chain. Moreover, TCI’s business case can encourage the companies to integrate diverse elements

of sustainability into business activities, and to incorporate the essence of enterprise to confront the current and future global climate challenges.

- What did you learn from the project and are you planning any further development?

“Rare Plant Conservation”

In the future, TCI will use the existing core technology of R&D to cultivate stem cells of rare plants into more individuals through the cultivation and extraction technology of plant stem cells. In addition to the commercial value of extracts, it is the reproduction of Taiwan’s disappearing native and rare species that is more important.

“Science Based Targets Initiative (SBTi)”

In addition to the implementation of the net zero-carbon factory, the actual carbon reduction measure needs more attention. In 2019, TCI has begun to set up SBT and explicit carbon reduction targets and timeline complying to the internationally approved scientific standards. And TCI puts the overarching goals set by the 24th Conference of the Parties to the United Nations Framework Convention on Climate Change (COP24): keep global temperature rise below 2°C, with efforts to limit warming to 1.5°C into practice!

“We focus on people’s health in the future; but in the meantime, we must ensure the future world will still be clean and pretty for them to live in.”



A Variety of Products & Dosage Forms

Liquid Nutrients

- Functional Drinks
- Double² NUTRI Liquid Sachets
- Emulsified Fish Oil Drink
- Jellies

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- Powders
- Tablets
- Capsules
- Grain Meal Replacements

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- Bio-cellulose Facial Masks
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- Face and Body Targeted Patch Masks
- Essences
- Creams



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TRINITY WALK SHOPPING CENTRE TRINITY ECO WALK

Based in the heart of Wakefield city centre, Trinity Walk opened its doors in May 2011 - one of the first centres in Europe completed after the financial crash. Home to around 70 stores, we cover 560,000 sq ft including a 1,000 space car park. Our unique design makes us an open air hybrid shopping centre/high street to integrate us into the city centre.

In 2016 we reached our highest ever occupancy levels and it was at that point our operations manager, Tiernan Barrett saw an opportunity to take the centre and store staff on a journey to make major changes to improve our sustainability and go beyond what was simply expected.

We feel strongly about our responsibility to the environment beyond any legal and regulatory requirements – not just because it's 'trendy', but because we believe in it.

We also saw tough financial times on the horizon too. For our tenants with the now challenging high street climate, for the ever-rising cost of energy for us and them, and for the challenge to keep service charge costs as low as possible.

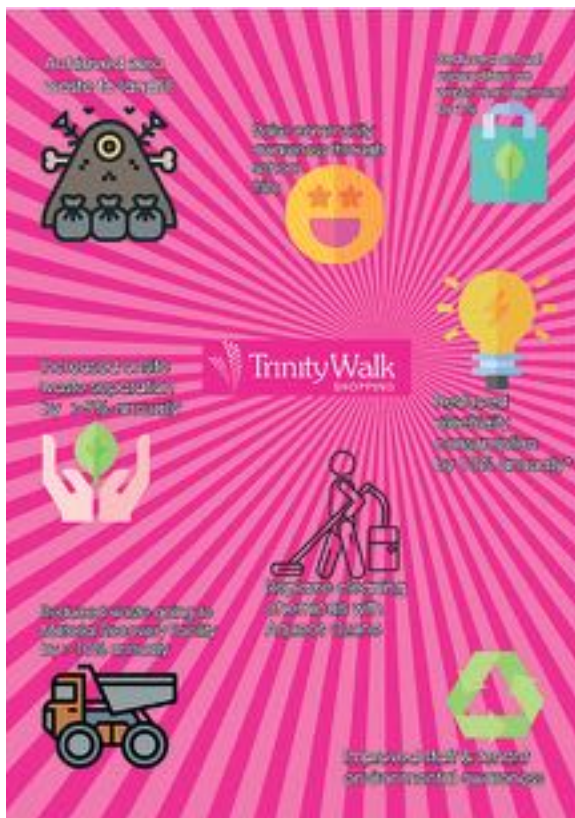
It made complete sense – improve our green credentials and save money in the process.

We had to reduce our carbon footprint by improving our environmental performance in terms of waste management processes, energy consumption and pollution prevention.

Did it work? Yes and we'll explain. We:

- Achieved zero waste to landfill
- Increased onsite waste separation by more than 5% annually
- Reduced waste going to Material Recovery Facility by at least 10% annually
- Reduced annual expenditure on waste management by 2%
- Reduced electricity consumption by 10% almost yearly
- Improved staff/tenant environmental awareness and actions
- Replace cleaning chemicals with Aqueous Ozone
- Reduce cleaning chemical expenditure
- Site staff trained in pollution incident responses
- Raise environmental awareness in community through school trips

What did the project involve doing?



We set out some clear aims in early 2017 so we could track and monitor our progress. Below we have outlined our aims and how we achieved them.

o Ensuring zero waste went to landfill

Any waste not separated on site is taken to a material recovery facility for sorting. Non-recyclable waste becomes refuse derived fuel



o Increase onsite waste separation by at least 5% annually

Proud to say this has been achieved every year, with the latest being 18.66%! The stats: 2016 vs 2015 = 6.89%, 2017 vs 2016 = 5.66%, 2018 vs 2017 = 18.66%

We think this is unique – our Centre Presentation team (cleaning) separate waste from every single bin they empty every time, every day. Using pickers,

they go through the clear bin liners to take out all recyclable waste with coffee cups being picked and separated as part of a new scheme. No extra staff or budget required – it shows their dedication to the cause.

Thanks to a partnership with SWSNewStar, we ran one-to-one visits with tenants to explain our aims, our reasons, and practical tips on how to improve recycling and waste separation like encouraging tenants to avoid contaminating recyclable waste with food. This had a huge impact on our figures.

Our staff who have wholeheartedly bought into this. One chap, Antony, has been an absolute star, often separating waste by hand, and recognised with a quarterly staff award. He's one example of a dedicated team.

It goes back to our previous point about winning the hearts and minds of the people who work here, in centre and in stores.

o Reduce general waste going to a Material Recovery Facility (MRF) by at least 10% annually

We are over the moon with our results – all percentages show the decrease in amount of waste sent for sorting at the MRF. The stats: 2016 vs 2015 = 18.88%, 2017 vs 2016 = 19.54%, 2018 vs 2017 = 11.1%

Many of the points outlined above relate to this target. By increasing separation on site, we reduce the need for it to be separated off site – reducing costs.

o Reduce annual expenditure on waste management by 2% or more annually

Despite rising costs for waste management, including recycling and new additional costs for recycling coffee cups, we have managed to reduce expenditure every year since 2015.

Note that when we have new/additional tenants, costs naturally rise beyond our control so the target is ambitious but may not be possible to be met.

The stats (shown as reduction in spend %): 2016 vs 2015 = 0.42%, 2017 vs 2016 = 12.79%, 2018 vs 2017 = 4.06%

o Reduce electricity consumption by 10% annually

Another ambitious target, but further proof we care – and we like a challenge!

We could lie and say we did it, but what's the point in that? So here are the stats. 2016 was modest, but 2017 was massive, just missed out on target in 2018 (due to new store openings) and we are on track to beat target in 2019.

The stats: 2016 vs 2015 = -2.4%, 2017 vs 2016 = -11.06%, 2018 vs 2017 = -8.04%, 2019 vs 2018 -11.04% (predicted)

How did we achieve this? A major review of energy usage was conducted by Tiernan. We've reduced energy consumption every year since 2013, but as a result of measures since 2016 it has stepped up significantly. Lamps/bulbs replaced with energy efficient LEDs. Motion activated PIR sensors/timers added to lighting in public/staff areas including service corridors to save electricity. Use of Lutron control panels employed to turn off unnecessary lighting out of hours. New way of controlling management centre heating and cooling, including creating sub-zones where heating/cooling can be activated or switched off completely rather than 'always on'.

Introduced innovative adjustments to operation of large service yard and retail car park smoke extractor system, checked and approved by the Fire Service and Building Control.

In total these measures have saved around 353,546 kwh since 2013 and on target for a further 99,000

kwh reduction in 2019 compared to previous year.

With so many variables, like additional new retailers opening and energy costs, it's always going to be a challenge, but we are ambitious and confident through innovation that we can continually beat target year after year.

o Replace cleaning chemicals with non-chemical alternatives and reduce cleaning chemical expenditure

Every drop of cleaning chemicals (other than toilet limescale remover) since 2016 have been replaced by Aqueous Ozone using the Lotus Pro system where tap water is infused with ozone which then converts back to water and O₂.

It is highly effective at killing germs, eradicating approximately 99.99%.

We installed a Lotus Pro unit in the main cleaning room. Mains water passes into a stabilizer cartridge within this unit which adjusts the water's mineral content to allow the Aqueous Ozone to remain stable for up to 4 hours as a disinfectant and a couple of days as a cleaning agent.

This water infused with ozone is 50% stronger as a disinfectant and much faster acting than chlorine based products – and importantly far more eco-friendly.

But why? The benefits: no risk of spillages affecting watercourse, harmless to users, reduction in costs compared to previous cleaning agents, reduction in delivery frequency, reduction in waste packaging, reduced documentation requirements by almost complete elimination of COSHH risk assessments and Safety Data Sheets and associated staff training in the same.

o Improve staff and tenant environmental awareness

We could not do it alone and needed to win the

hearts and minds of our retailers, who themselves face tough trading nationally with less staff.

Tiernan worked with our partners at SWSNewStar to do individual store visits to explain why we wanted to make these improvements. SWSNewStar were able to provide them with practical advice, best practice and guides. We also designed posters for their staff areas indicating exactly what type of recycling needed to go where – and what not to add in to the mix.

o Ensure all site staff are trained in pollution incident responses and provided with all tools necessary

As part of this work, a detailed Pollution Incident Response Plan has been produced and reviewed. Regular training carried out and well stocked spill kits provided throughout centre. Kits suitable for acids, alkalis, coolants and fuel. Clay mats are also provided to cover drainage.

Petrol interceptors serve both car park and service yards, monitored by alarm panels and emptied annually or when necessary.

o Raise environmental awareness in the local community via school trips

From a commercial point of view, today's children are tomorrow's shoppers so we wanted to engage with them and their families.

Show how our green projects make a difference – even inspire them.

We focused our schools trips around sustainability, safety and surprise. Our first ever school trip took place recently and the school said one of the highlights were the cleaning and recycling elements.

Showing them the cleaning machines, talking about Aqueous Ozone, explaining zero waste goes to landfill all captured their attention.

• Why did you do it?

Because it's the right thing to do. We feel strongly about our responsibility to the environment beyond any legal and regulatory requirements – not just because it's 'trendy', but because we believe in it.

We also saw tough financial times on the horizon – for tenants trading in a challenging climate, ever-rising cost of energy and the challenge to keep service charge costs low.

It made complete sense – improve our green credentials to impact less on the environment around us and save money in the process.

• What did it cost?

Until 2016, there was no additional funding available to implement new sustainable projects. No extra budget for 'green' staff means we had to be smart and invest to improve and make savings.

In 2016 and 2017 £10,000 was allocated to our sustainability project, with £6,500 in 2018 and £5,000 in 2019. The decline is a positive as after implementing our initiatives they are set to pay back within three years, hence the drop.

• If quantifiable, what did the project achieve in terms of sustainable development, economy, environment and/or equity?

Throughout this application we have highlighted the aims and results of each piece of work that contributes towards our masterplan so we won't go over them again – we appreciate how many applications you have to read!

We've achieved almost all of our targets, going well beyond what was required and in many cases, the ambitious targets we set ourselves. Where we haven't met a target, there's been a reason e.g. additional retailers opening for business.



In a nutshell, what we have done during the project period since 2016 is remove chemical cleaners, reduce electricity consumption by more than 300,000 kwh, massively increase on site waste separation, reduce amount of waste separated off site, ensure not a single gram goes to landfill and introduce extended new recycling streams from coffee cups to pallets. More to be done, but we can take it to another level.

- Who and what benefited?

Put simply – the environment, our centre and our retailers.

- Longer term benefits? Cost savings?

The long term benefits are a significant reduction in chemicals on our malls and in the air, less energy consumption meaning a smaller carbon footprint.

Please see supporting documentation for detailed cost savings across waste and energy.

Waste separation could have caused an increase in recycling-related costs, but Tiernan has led the team towards achieving greater separation on site (see previous and below).

- Was there anything innovative about the project?

Zero waste to landfill, replacing all chemical cleaners with Aqueous Ozone cleaning technology and the new school trip service are three of our most

innovative elements of the overall project. It's great to see us ask the kids how the percentage of all our centre's waste they think goes to landfill and then watch their faces when we say "ZERO!".

The most recent school and staff found that one of the highlights as it linked to the curriculum. We linked this all together with a behind-the-scenes tour of the centre, showing them the Aqueous Ozone cleaning equipment and explaining how we separate our waste and handle to the benefit of the environment – even if it means more work. It's worth it.

Our staff are an innovation in themselves. Our Centre Presentation team (cleaning) separate waste from every single bin they got go empty every time, every day. Using pickers, they go through the clear bin liners to take out all recyclable waste with coffee cups being picked and separated as part of a new scheme here. No extra staff or budget required.

- Can other organisations/communities benefit from implementing your methods?

Yes. This project has been driven from the top down. Our centre manager, Cormac, has 100% empowered our operations manager, Tiernan, to drive this.

Cormac encouraged Tiernan to make this application with help from our comms guy. Tiernan is the sort of guy who comes in early, cracks on, makes a difference but doesn't shout about it. He rolls up his sleeves and leads by example – he was the first to hand-separate waste to show the team how it could be done.

Our approach can hopefully help other shopping centres and developments just by making small changes and turning them into big ones. Our door is fully open.

- What did you learn from the project and are you planning any further development?

We have learnt that any environmental and sustainable improvement that can be made absolutely should be. It makes a difference. It's not always easy, it doesn't always come cheap initially, but the benefits to the world around us are massive.

Subject to proposals and approvals, we are looking to use our roof space for solar panels. We are also investigating the use of beehives on the roofs.

We have more plans too...

TUSKER GREEN CAR SCHEME

AIM

To reduce carbon emissions across new schemes

Tusker have a commitment to reducing carbon emissions in the UK through the adoption of cleaner, more efficient and lower emitting vehicles. In an effort to direct employees to these type of vehicles via the Car Benefit Scheme offered by their employers, Tusker has been setting up and managing schemes where there are limits on the CO₂ of the cars offered to employees. While this limits the choice available to some organisations, it promotes lower-emitting vehicles and enables organisational objectives to be achieved.

Tusker are leading the way with this. Initially the first to be completely carbon neutral as an organisation in the automotive sector, Tusker are now taking their commitment to the environment one-step further with the promotion of ULEV only schemes, highlighting the benefits to individuals and the environment of hybrid and electric vehicles.

ACHIEVEMENTS

Launch of 15 new car schemes with limits of 75g CO₂/Km per vehicle.

It was unclear at the beginning of the project whether or not customer organisations would be keen to

commit to a lower-emissions scheme, given the projections of take-up were lower. Thanks to Tusker's diligence in determining savings levels, promotion of the range of cars available, and educating employees on the benefits of lower emission vehicles, scheme launches have exceeded expectations with over 10 of the 15 schemes launching in the past 12 months.

Tusker have further promoted the adoption of ULEVs with a commitment to providing free of charge charging posts for a number of customer employees, each time a driver takes a plug-in vehicle. This has been instrumental to increasing adoption levels at customer organisations and has furthered the infrastructure to support electric vehicles across the UK.

IN DETAIL

Tusker's aim has always been to minimise the impact of having a new car on the environment. For over 10 years now, each car that Tusker puts on the road is carbon neutral, with the tailpipe emissions offset at an internationally accredited project in a developing country.

While this was a fantastic, unique offering from Tusker, it only provided a counter balance to the emissions, rather than reducing them in the first place.

Battery Electric Vehicle (BEV)



Pure electric vehicles that are powered wholly by battery and are zero emissions

Plug in Hybrid Vehicle (PHEV)



Plug-in hybrids combine an electric motor with a combustion engine. Typically the battery range is circa 20-30 miles and then the petrol or diesel engine will kick in when the charge is depleted



THE MOST AFFORDABLE WAY TO DRIVE ELECTRIC AND NO ONE IS TALKING ABOUT IT.

Tusker has been in talks with manufacturers to plan the adoption of electric and hybrid technology on new and existing models of cars in the UK. Following those talks, there has been an increase in the numbers of vehicles available with lower emissions now available in the UK and on the Car Benefit Scheme. Pressure from Tusker has also meant a reduction in prices that has made the cars more affordable on the scheme and developments in technology have ensured their attractiveness to car scheme drivers. As a result, Tusker are able to offer ULEV-only schemes or lower emissions schemes, to new and existing customers.

In the past year, Tusker has launched schemes at large organisations including ENGIE, Cornwall Council, Leeds City Council, Guys and St Thomas' NHS Trust, all where cars are limited to being 75g/CO₂ or lower. Dramatically reducing the impact of having a new car on the planet. Having a green car scheme is compliant with a number of organisational

objectives to reduce carbon emissions and is a feel-good for all involved.

Tusker's strategy fits with the government's strategy of encouraging more people into lower emitting cars as part of the "road to zero" campaign. As 'Benefit in Kind' tax is lower for drivers and tax breaks are available for employers this has enabled some public sector employers to save over £550k in just three years. With austerity squeezes still evident for NHS Trusts and councils across the UK, this is much needed funding for key services in our community.

Longer-term, Tusker are heavily promoting ULEVs and their benefits, not only in terms of the environment but also in terms of financial benefit to organisations, and aims to see further adoptions of another 10 new ULEV-only schemes in the next 12 months.



For those organisations who are keen not to limit their employee's choice of cars by CO2 levels, Tusker has added a "ULEV option available" to the car listings on their website, in order to direct people to the electric and hybrid options of the cars, even if they weren't originally looking for that type of car. Regular promotions providing free of charge charging points for drivers at home are also in force at Tusker, in an effort to maximise the take up and remove any barriers to adoption.

Tusker have always led the way in terms of innovating with their Car Benefit Scheme. They're still the only car benefit provider to have an entirely carbon-neutral fleet, and now the only provider to offer a ULEV or low-emitting car scheme to organisations. These innovations would be easily adopted by competitor organisations, although perhaps less lucrative in the beginning due to nervousness over electric vehicles still prevailing in some areas, adoption levels are increasing and "doing the right thing" is moreover more important for Tusker, as one of their key brand statements. Tusker will continue to identify opportunities to reduce carbon emissions in all

aspects of their operation. It's part of the company's ethos and continues to be central to planning and development within the organisation.

As a result, Tusker has been the recipient of a number of awards – 28 in the past 2 years, most recently Best Workplace Car Scheme, 2019, UK from AI Global Media and Car Benefit Scheme Provider of the Year, 2019 from Corporate Vision Magazine

UK WASTE SOLUTIONS LIMITED SETTING THE BAR

AIM

Before partnering with UKWSL, more than 40% of Marston's waste was considered general waste. With the incumbent supplier providing zero visibility to end disposal destinations, Marston's had to assume that all their general waste was being sent to landfill.

In 2016 Marston's set itself a target to recycle food waste at 80% of food led sites, segregate Dry Mixed Recycling across 80% of the estate & recycle glass bottles at 95% of the sites. Added to these targets was an ambition to achieve zero waste to landfill. All goals were created to be achieved by 2020. These goals were created as a legacy of Marston's relationship with their previous supplier.

From the outset of the relationship with UKWSL both sides worked together to create a clear plan to review service specifications, site specific requirements and to propose and implement changes that would meet and exceed the goals being created.

Both parties committed to audit the full estate to identify improvement opportunities that would focus on optimising, rationalising & minimising the service specifications at each site.

ACHIEVEMENTS

The partnership was founded on a mutual

commitment to fully engage with innovation and continuous improvement, sustainably transforming waste management. This hands-on partnership goes beyond the transactional relationship most waste providers have with their clients, leading to our success in achieving Marston's 2020 environmental targets by mid-2018.

A robust waste management strategy and out-of-the-box circular economy solutions led Marston's and UKWSL to achieve a landfill diversion rate of 99.27%, exceeding the 99% national threshold for Zero Waste to Landfill. This represents a significant improvement from the 60% landfill diversion previously achieved. Being the first in the hospitality sector to reach Zero Waste to Landfill, Marston's hope to pave the way for other businesses to rethink their own waste management.

UKWSL and Marston's have gone beyond current good practice by supporting the development of closed loop solutions. Marston's have been tackling the issue of plastic waste by redesigning all pub gardens using Plastecowood's innovative material manufactured directly from Marston's plastic waste. For every tonne of waste that Plastecowood process, a tonne of material is produced meaning that nothing is going to waste. The product can then be recycled again at the end of its lifecycle, resulting in a permanent circular economy.



Historic Waste Hierarchy Performance



2018 Waste Hierarchy Performance



IN DETAIL

UKWSL & Marston's 2-year project was designed to maximise recycling and move from 40% to 0% landfill. UKWSL engaged with 100+ suppliers to understand their disposal methodology. Through UKWSL's robust supplier selection criteria we appointed 83 who would ensure recovery via RDF/ SRF/EFW etc. Audits were completed across 1000+ sites to engage managers ensuring recyclables are source segregated providing a clear understanding of financial/environmental impacts of change.

Marston's employed a Waste & Recycling Co-ordinator to work alongside the UKWSL's Account Manager & Director. Marston's senior management were driven by their goal to be the first in the sector to achieve the desired environmental credentials.

Marston's committed to changing working cultures across the estate putting recycling at the forefront of the agenda for employees, making source segregate

the 'norm'. Achieving 'zero landfill' helps mitigated future cost increases associated with general waste and has made Marston's the first of the big 5 pub chains to achieve this goal.

Educating employees about source segregation required all sites to have posters and internal bin labels to make it obvious about the do's and don'ts for each stream. The initial cost incurred was £6,000. At the start of the partnership UKWSL guaranteed Marston's £150,000 budget reduction within year 1 and a further £100,000 delivered in year 2. UKWSL were confident from the offset that the savings could be achieved & gave Marston's the money. This commitment ensured that the marginal start-up costs were more

than offset by the overall savings delivered.

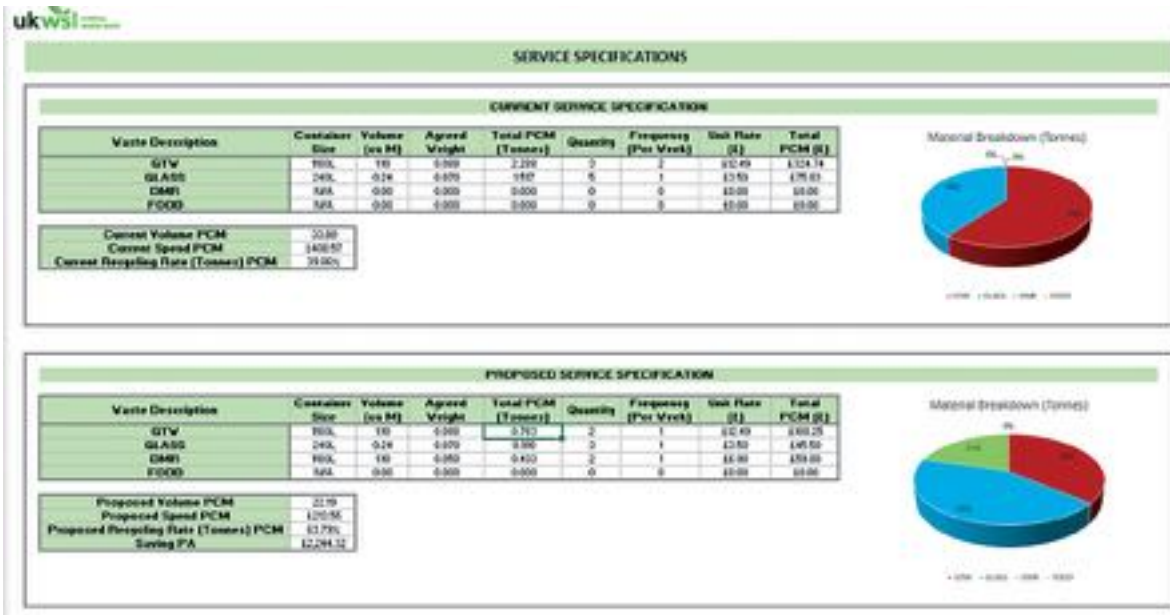
This commitment from UKWSL paid off when Marston's achieved a total saving of £587,000 by the end of year 2 (6% budget reduction).

Marston's have implemented a process whereby new site openings have a default logic around recycling. Historically sites were mobilised with a general waste led solution with the previous contractor. This reflects the cultural change over the last 2 years.

2020 targets and performance are as follows:

- 95% of sites to recycle Glass. Currently 99%
- 80% of sites to recycle DMR. Currently 98%
- 80% of sites to recycle Food. Currently 82%

In the last year UKWSL has handled circa 30,000 tonnes of Marston's waste.



- General Waste 7,854 tonnes
- Food 11,196 tonnes
- Glass 4,162 tonnes
- DMR 6,259 tonnes

The project has resulted in 73.34% recycling, 25.93% recovery and just 0.73% landfill. 1031 sites, 14,500 employees, and the local economies of the 105 service partners collecting all materials across the UK felt the environmental and economic benefits associated with mobilising a zero landfill, recycling led solution.

Alongside the substantial savings delivered and the environmental credentials achieved, Marston's have also reaped the long-term benefits associated with change. All sites now have waste segregation at the forefront of their agenda and all employees have access to waste associated e-learning modules as part of their induction programme. This cultural change has meant that the recycling improvement amendments made to services across the estate have been maintained. Staff fully understand the environmental and financial benefits associated to optimising, rationalising and minimising their waste services.

We believe innovation can't be delivered without engaging suppliers and employees. Within the recommendations for change, UKWSL not only focused on technical specifications, but also identifying ways to change the working culture. Bespoke internal signage and an e-learning video were created to ensure all staff were made aware of the need to segregate. Tools highlighted the efficiency impact each site was having on the business and the environment. Key to the ongoing project is demonstrating to General Managers how change reduces costs and improve their P&L.

UKWSL introduced Recycling League Tables to engage sites and encourage friendly competition to improve performance. This helped to make waste relevant to managers and incentivised them to make self-driven changes to their day-to-day operations.

UKWSL engages staff via a national awards programme. The "Recycler of the Quarter" award is issued to the site with the lowest waste spend per £ of sales. Other awards include "Most Improved Performance" and "Area Manager" of the Year. Vouchers are given for staff to spend as they see fit. Photo opportunities are utilised to promote awareness internally and externally.



Highlights

- 1,024 sites
- 98.22% service success rate across our supply chain
- 478,500 scheduled collections per annum
- 73% recycling with a further 26% of waste being sent for recovery and less than 1% being sent to landfill
- 'real-world' zero-waste-to-landfill by 2019
- 6% reduction in the customers budget
- Cost saving target for year two within 14 months



Testimonial

"We chose to work with UKWSL because they offered fresh innovation to our business that we hadn't received from previous suppliers. We have been impressed with the quality of communication we receive and how they resolved challenges that arose during the mobilisation process. UKWSL are supporting Marston's to identify and deliver cultural changes that have a positive long term environmental and financial impact on our business operations. Their attitude and the emphasis they place on continuous improvement will help Marston's deliver and exceed our sustainability targets for waste".

Marston's - Waste and Recycling Coordinator

Marston's are the first out of the big 5 pub chains to achieve zero landfill by utilising the outsource model. This model taps into SME's where a lot of innovation goes unnoticed. SME's can't traditionally bid for national contracts, so their infrastructure remains largely untapped. The outsource model unlocked this

infrastructure for Marston's & local suppliers.

Best practice within Marston's can be replicated across any business within the hospitality sector. Marston's aren't protective about their solutions. They openly share and debate issues and solutions

at forums such as the “Hospitality Carbon Reduction Forum” so that others can improve their environmental credentials.

DEVELOPMENT?

We have been fully committed to achieving the ambitious goals set out at the start of the relationship. We quickly learnt that cultural change was required to engage staff and deliver new sustainable solutions. Keeping the workforce interested in waste is challenging but fundamental to driving long-term change.

Marston's continues to look for solutions to improve recycling rates further and has goals to reduce and reuse more waste in the years to come. Identifying and implementing closed loop solutions is top of the agenda.

Marston's are looking to further their success by:

- Reducing general waste through improved segregation
- Forecasting glass bin requirements based on drinks sales, perfecting collection scheduling
- Driving social media campaigns to celebrate performance and encourage other companies in the industry to make the same commitments
- Continually improving the lowest performing sites by re-auditing and re-engaging.

The continued success of the project has meant that Marston's has been recognised as the first of the big 5 pub chains to achieve zero landfill & together we have been shortlisted finalists at the following awards:

- 2019 MRW National Recycling Awards. Three categories: Recycling Excellence, Partnership Excellence & Food Waste Innovation
- 2019 Global Good Awards
- 2019 Edie Awards
- 2017 Recycling Excellence Awards

WAITINGS LTD

RABY COTE TES (TRADE EFFLUENT SEWER)

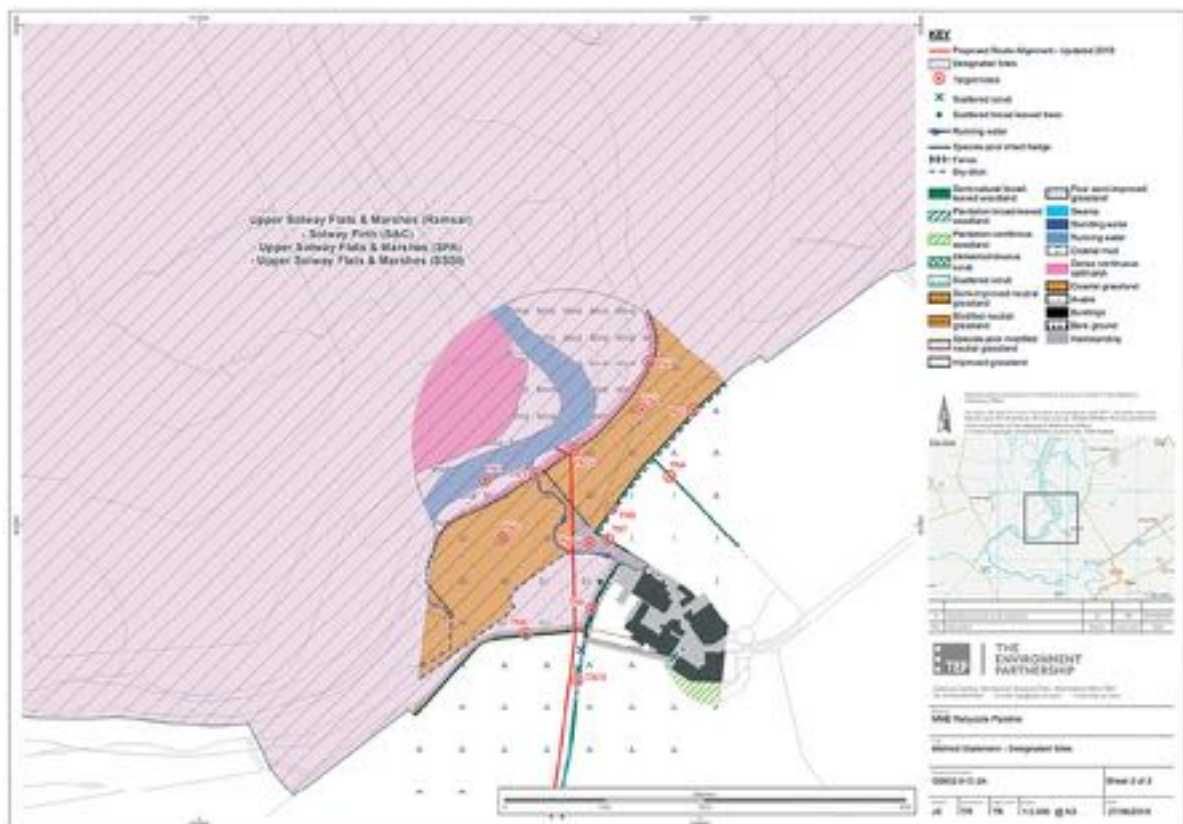
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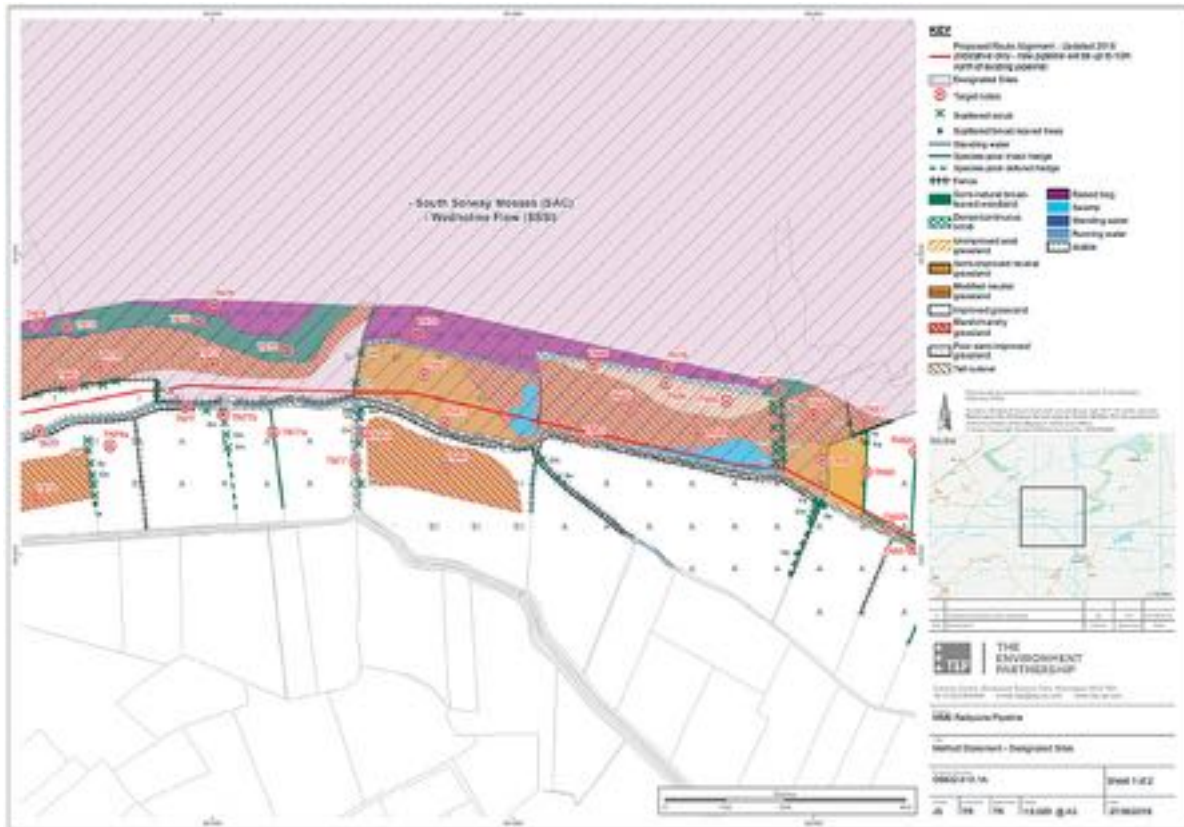
11km of Open cut trench excavation across agricultural land at varying depths to install a new gravity fed 400/450mm ductile Iron pipe with pre-made inspection chambers to replace the existing 450mm diameter trade effluent sewer on behalf of United Utilities from the Futamura works in Wigton town centre to the Outfall at Raby Cote farm. The pipeline has to be installed across two areas designated as SSSI, as well as crossing working farm land. the aim of the project was to identify the environmental needs, implement and develop special working methods and ensure that all parties working on the project adhere to these control

methods. Making sure that the least possible impact was burdened on to the environment during the construction phase of the project.

ACHIEVEMENTS

Early engagement with ecologists and Natural England made it possible for them to draw up an agreed action plan for the works, which was then handed to the principal contractor and filtered down to Waitings Ltd. This allowed us to develop working methods and get these in for approval prior to works starting. This not only sped up our time on site thus reducing our footprint on the project, but it also allowed us to better plan the works around strategic/ sensitive areas, again minimising our time on site and





the reducing our overall impact on the environment.

IN DETAIL

The project entailed using large heavy construction equipment in the form of 25t excavators and tracked dumpers to dig 'open cut' trenches to install 11km of new 400/450mm pipework to take trade effluent to its discharge point. The project crossed a Special Area of Conservation (SAC) and a SSSI, so the construction team had to make sure that our methods of work could be carried out, and where our normal process of working was considered to have too great an impact, we diversified and adapted to the environmental challenges so that the impact of the project was reduced. The total contract value for the works that

Waitings carried out is £2.8m and the client who funded the project is United Utilities. The project had zero environmental incidents and no non-conformance's during the construction phase. The new pipeline was installed to increase the security and longevity of the effluent discharge line, leading to more confidence with the local residents that there is now less of a risk of pollution from the pipe breaking through agricultural traffic.

The methodology of back filling the trench with subsoil then a layer of topsoil before capping off with a 300mm layer of subsoil created a low nutrient condition suitable for the proposed seed mix to establish, where typically topsoil would be the final reinstatement layer for which the seed mix could be sown.



Early consultation with ecologist on projects is paramount so that we can adapt any working methods and improve on our impact - all construction work has an impact but if we can lessen it and learn each time then this has to be positive, it also reduces any down time on the project by having all the information up front things can be planned and organised to elements of work can be scheduled in to work with the environment and not against it ie when birds are nesting, when the land is too dry and under stress already, when fish are migrating to spawn etc.

WISER WASH TESTIL KONFEKSIYON DI. TIC. A.Ş. DEVELOPMENT OF OZONE EFFECTING SYSTEM WITHOUT USING HARMFUL CHEMICALS

IN DETAIL

Recently, some alternative bleaching methods as well as conventional bleaching chemicals have begun to be used.

Conventional bleach chemistries used in bleaching include sodium hypochlorite, potassium persulfate, potassium permanganate, hydrogen peroxide, sodium perborate, sodium percarbonate, and benzoyl peroxide.

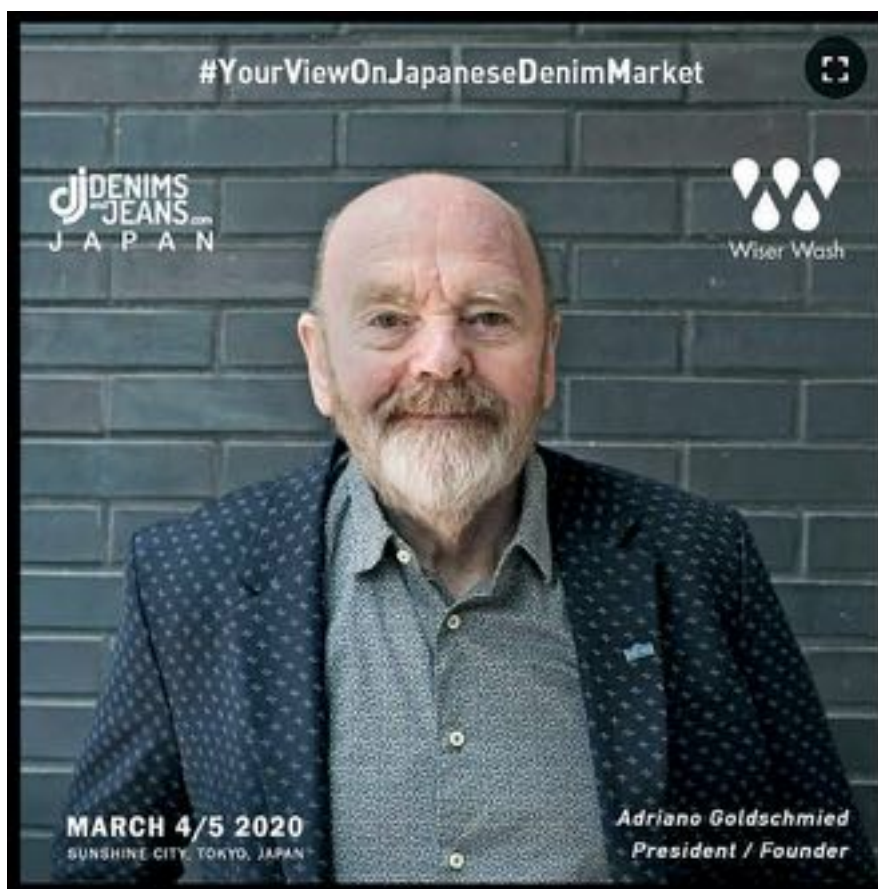
Scientific studies have been carried out according to the known state of the art. However, it has been determined as a result of research that it is not industrial. In this study, an alternative bleach ozone effect was applied. Only the ozone can be used with different techniques without the use of any harmful chemicals, and the textile washing and effect giving process has been achieved.

With the system developed within the scope of the project, Technical specifications and visual designs of products between conventional bleaching and ozone bleaching

were compared. In terms of both technical and visual aspects, successful results have been obtained in comparison with the conventional method in ozone technology.

It has also been observed when no chemicals are used in the washing process and water consumption has reduced the rate of 60-90%.

Denim fabric is a kind of woven fabric which has been produced mostly from cotton fiber and also used fibers such as polyester, elastane, linen and viscose





20% OF INDUSTRIAL
WATER POLLUTION

comes from
textiles treatment and dying



200,000 TONS
OF DYES

are lost to
effluents every year



in recent years and has a wide range of patterns that can be touched with various grades, dyed with horse dyeing, warp indigo dyestuff in classic types.

Waste waters containing metals, phenols, toxic compounds and phosphates can be found in waste water due to fibers, chemicals and auxiliary substances used in textile production processes.

These components, which are often resistant to conventional biological treatment, can be treated without purification in conventional wastewater treatment systems. Therefore, chemical oxidation methods are much more effective in the treatment.

Chemical oxidation with ozone is the most suitable process for color removal in textile wastes.



Oxidation is more effective when mineralization is not efficient and economical.