BIS | Department for Business Innovation & Skills

# PRACTICAL RESOURCE EFFICIENCY SAVINGS – CASE STUDIES

# Contents

**Report Content:**

# Introduction

There has not been a more important time than now for companies to be able to make monetary savings through minimising waste; by using less electricity, gas and water and to start thinking about waste as a potential source of secondary materials for re-use and substitution.

BIS commissioned Urban Mines to do a study on the potential for resource efficiency savings for businesses, supported by case studies of companies which had successfully implemented resource efficiency measures.

The main report, "Potential for resource efficiency savings for businesses" is available on the BIS internet This report contains the case studies that were used to support and illustrate the research.

http://www.bis.gov.uk/assets/biscore/business-sectors/docs/10-698-potential-resource-efficiency-savings-for-businesses.pdf

## Case Study Results

Many organisations were contacted to compile information to create illustrative case studies. Some of the case studies are newly compiled to illustrate interesting wins from resource efficiency, whilst some are based on previous information produced by individual support bodies which has been updated.

The case studies seek to demonstrate both the financial benefits (cost savings and pay back period where appropriate) and the environmental benefits measured in green house gas savings (carbon savings), including substitution of raw materials and use of secondary materials. They also illustrate the benefits from the uptake of improved waste management practices. All the case studies have been reviewed by Urban Mines's qualified environmental economist to verify the data and its presentation as far as practicable.

**The case studies cover:**

- **Construction**
- **Food, drink and tobacco**
- **Textiles**
- **Power and Utilities**
- **Chemical/non-metallic minerals manufacturing**
- **Metal Manufacturing**
- **Manufacturing Equipment and Other Manufacturing**
- **Retail and wholesale**
- **Other Services**

BIS is continuing further analysis of the data used in the main report, and is likely to produce another publication which will have an element of sectoral analysis.

The case studies show some of the variety of measures that can be undertaken by companies to become more resource efficient and save money, and these have been presented in a simple booklet so that other companies can draw upon them to take up their own resource efficiency measures.

# Case Study 20:20 Mobile Group Limited

## Sector: Other Services

## Size: Large

## Region: North West

## Company Overview

20:20 Mobile Group Ltd provides the mobile industry with a one-stop supply solution bringing together all major manufacturers' products (phones and accessories) into one Distribution Company.

## Project Overview

Groundwork Cheshire's Environmental Business Services Team visited 20:20 Mobile's Crewe headquarters as part of a North West Development Agency (NWDA) funded programme to undertake a review of current resource usage and opportunities to deliver savings.

Initially, an environmental audit was undertaken which involved reviewing the existing management systems and resource efficiency work undertaken to date. 20:20 Mobile had already implemented an ISO 14001 certified Environmental Management System (EMS) and had achieved significant savings through staff driven initiatives to reduce, re-use and recycle their waste streams. The company sent 435 tonnes of waste to landfill in 2006 and just 237 tonnes in 2008. Last year they recycled 631 tonnes of plastic, paper, cardboard and aluminium.

Environmental champions were established as part of the EMS development and the company had made some headway in reducing energy usage and associated carbon footprint at the time of the visit. This was mainly achieved through the introduction of monthly energy performance monitoring to facilitate the "Green" team to identify periods of high energy usage and investigate/ resolve the root causes.

During the initial resource efficiency audit to help make an assessment of the scope of any energy savings potential, benchmarking the energy use at the company's facilities against published standards for energy use was undertaken. By combining the outcome of the benchmarking comparisons with observations of the site's operations and discussions with the utilities team, a number of energy reduction opportunities were identified. These potential opportunities were prioritised based on cost of implementation, payback period and the environmental benefits/ carbon footprint savings.

## Benefits

### Energy

Anticipated savings of £77,200 (before costs) from implementing energy efficiency methods.

270 tonnes of $CO_2$ potentially saved p.a. after installation of energy efficient systems.

### Water

Forecast of £12,100 saved (before costs) from implementing water saving initiatives.

5.700$m^3$ of water potentially saved as a result of the water use audit.

Following the initial resource efficiency audit, a further detailed water audit was undertaken. Water use at 20:20 was benchmarked against water use in similar sectors to scope potential water saving opportunities for the site. Using the water benchmarking findings and water usage measurements undertaken during the audit, Groundwork developed a water mass balance model for 20:20 Mobile's operations. The model highlighted the biggest opportunity areas for water savings and a summary of water saving recommendations were prioritised and costed.

## Energy Efficiency

Voltage Power Optimisation is being investigated to reduce energy consumption, improve power factor, improve equipment lifetime and protect equipment from transients (energy spikes). The anticipated cost is roughly £60,950 to implement but with a savings potential of £54,363 this should only present a payback period of 13 months. The system should also save 305 tonnes of $CO_2$ per year.

The company is also looking to implement opportunities in priority areas identified through energy benchmarking. This includes energy efficiency lighting in the warehouse areas and an AC review.

20:20 Mobile Group Ltd will also reduce the heating of their Avnet warehouse building in the summer months. This should save them £1,497 as well as a $CO_2$ saving of 4.6 tonnes.

Thought is also being given to using local electric water heaters in lieu of running boilers to serve DHWs cylinder. This has a saving potential of £4,000, and should save 17.4 tonnes of $CO_2$.

*"As a business we are extremely conscious of our environmental responsibility and the need to always try and do more to reduce our energy consumption. The advice and expertise Groundwork were able to provide was invaluable to us and the detailed report they have put together will help us to make savings not just in the short term but also well into the future."*

## Water Savings

20:20 Mobile Group Ltd installed save a flush devices across their sites. This is forecast to save 380$m^3$ of water, resulting in a saving of £813.

They have also upgraded urinal flush controls and connected this to the mains. This has cost £1,700 to implement but is forecast to save 2140$m^3$ of water, resulting in savings of £4,518.50.

A rainwater/grey water recovery system for use in toilet flushing has also been recommended. The anticipated costs are £7,500 but the project has a saving potential of £8,651 and will save 4,041$m^3$ of water.

**20:20 Mobile Group Ltd**

Weston Road
Crewe
CW1 6BU
Tel: 01270 412020

## Support organisation details:

**Groundwork Cheshire**
Yarwoods Arm, Navigation Road, Northwich, Cheshire, CW8 1BE
Tel: 01606 723 160 www.groundwork.org.uk

**Northwest Regional Development Agency (NWDA)**
Renaissance House, Centre Park, Warrington, Cheshire, WA1 1QN
Tel: 01925 400100 www.nwda.co.uk

# Case Study AeroThermal Limited

## Sector: Chemical/non-metallic Minerals Manufacturing

## Size: SME

## Region: South West

## Company Overview

AeroThermal comprises a small group of companies that not only provide the ultimate turnkey engineering solution within their respective disciplines but also hold over thirty years of proven practical and technical experience within the aerospace, motor sport and process engineering industries.

## Project Overview

AeroThermal was made aware that the Sea Fish Industry Authority (SFIA) was offering research funding for a process which would treat shell fish and fin fish waste material in a manner which would enable the residue to be disposed of in an environmentally acceptable way.

The company was not ultimately successful in being awarded the research grant because the project was considered too ambitious by the Sea Fish review committee. The company offered, at its own expense, to conduct trials on a research and demonstration plant which it had designed and manufactured, at its own cost, for the treatment of municipal solid waste and food waste. The project was successful and now has worldwide commercialisation potential.

Through previous trials with other organic materials the company had already established that organic fraction which had been subjected to thermal hydrolysis not only increased the bio-methane potential of such materials through cell disruption, but also in addition, accelerated the maximum gas rate production in a significantly shorter time to that of untreated materials.

AeroThermal was therefore able to demonstrate that by sterilizing the organic fraction and through emulsifying the remaining flesh which was previously attached to the shell, the recovered liquid fraction became a useful feed stock for either fertiliser if blended with additional carbon (emulsified old newspapers) to reduce the protein level, or could be used as a material suitable for bio-methane production through an anaerobic digester.

The recovered shell from the process now being free of any organic matter could either be ground up to be used as a bio-filter or even as a non-chemical treatment for potato blight.

Considering that the base material started as something which nobody wanted and indeed was paid to take away, post treatment it has been transformed into a potential energy source and industrial filter medium.

**Processing System**

*"AeroThermal Ltd has spent a considerable amount of time, effort and money in developing this unique waste processing system, initially focused on municipal solid waste arising.*

*However, it soon became apparent that the process also works well on high organic fraction, like food waste, so when we became aware that there was a national problem with the disposal of fish waste, we felt we were well suited to help."*

Christian Toll,
Operations Director

## Energy Efficiency

The organic fraction from municipal waste is in excess of 50% which can be used as an energy source for either direct injection into the National Gas Grid or local conversion to electricity.

## Water Savings

Processed water is recovered, cleaned and returned to the water industry. At the same time water recycling is maximised in the process ensuring the export of water is kept to a minimum.

## $CO_2$ Emissions

Both $CH_4$ and $CO_2$ will be consumed as a fuel source in the power generation phase of the system. While there will be $CO_2$ in the exhaust emissions of the generator. However this is a natural occurring by-product of most energy generating processes. The key difference with the system is that it is derived from a non-hydrocarbon, no-fossil fuel source.

## Waste Minimisation

By autoclaving the residual shell fish waste there is no waste material. The organic fraction having been made suitable for anaerobic digestion converts 80% of the volatile solid into bio-gas of which over 65% is pure bio-methane. The remaining shell now flesh free and sterilized can be ground up and made into a substrate suitable for use in bio-filtration or as a treatment for potato blight.

The digestate which is the liquid fraction from the anaerobic digester after it is discharged from the plant can be dewatered with the water recovered being sent through a water purification system and returned to source and the recovered solid used as a fertilizer.

## Financial Savings

AeroThermal has designed a range of waste processing equipment which maximizes recovery of recyclables and waste to energy. Subject to geographical location, the feed stock, the availability of electrical grid connection or gas main connection, typically payback period is in the range of three to five years.

**AeroThermal Limited**
2 Allens Lane
Hamworthy
Poole
Dorset
BH16 5DA

Tristan Lloyd Baker – Commercial
Director, lb.t@atguk.com

## Support organisation details:

**Sea Fish Industry Authority**
Origin Way, Europarc, Grimsby, N E Lincs, DN37 9TZ
Tel: 01472 252300 www.seafish.org

**Resource Efficiency Knowledge Transfer Network (RE KTN)**
Tel: 0151 347 2937 www.resource-efficiency.org

# Case Study Alloy Bodies Ltd

## Sector: Metal Manufacturing

## Size: SME

## Region: North West

## Company Overview

Established in 1969, Alloy Bodies is a well known Commercial Vehicle Body Specialist, renowned for innovative designs, volume production, and accurate production planning. With a production capacity of 50 vehicles per week, ranging from 3.5 tonne Lutons and Dropsiders, through to maximum length and weight Boxes, Curtainsiders and Furniture vehicles.

## Project Overview

In 2008, Alloy Bodies faced increasing energy prices which drastically increased the overheads and costs of production, resulting in reduced competitiveness in an already slowing marketplace. This situation provided the extra incentive to divert resources to reduce their energy consumption.

With continuing support from a 'Groundwork in Manchester' advisor, Alloy Bodies identified their main areas of energy consumption and began to look at opportunities of reducing them. They initially started with an energy survey which highlighted compressed air and lighting as making up the vast majority of their electricity bill.

While long term opportunities were being considered, staff energy awareness schemes were implemented, ensuring all employees were aware of the costs of wasted energy to the environment and the business.

The longer term projects are now underway and include significant investment in a new energy efficient air compressor, a new lighting system throughout the site which includes energy efficient fittings and bulbs along with sensors to further reduce energy consumption. To reduce the gas bill, Alloy Bodies are also installing energy efficient heating units throughout the site which are estimated to be up to 60% more efficient than the current units installed.

The company has also accessed support from the Enworks consultancy bank to identify opportunities for improving their waste management.

Alloy Bodies operating costs have been reduced through changes that have already been made and are currently being implemented, enabling the company to remain competitive and viable which in turn safeguards sales and ultimately jobs.

## Benefits

### Financial

£30,000 savings realised p.a. from improving maintenance on compressed air system.

Expected savings of £46,000 over 2.7 years by upgrading to a more energy efficient lighting system.

Expected saving of £50,000 over 1.6 years by upgrading to a more energy efficient heating system.

£7,000 savings forecasted by increasing staff awareness of energy efficiency.

### Waste/Material

£24,000 forecasted savings p.a. through ongoing action improving waste management and disposal.

## Alloy Bodies worked to:

## Energy Efficiency

Improve maintenance of a compressed air system by identifying and repairing leaks. £30,000 saved per annum!

Upgrade its lighting system with more efficient fittings, bulbs and light sensors to make full use of skylights and natural daylight along with PIR sensors to deactivate lighting when not required. £46,000 savings over 2.7 years!

Upgrade the heating system, replacing gas blowers with more efficient units. New units will be fitted with automatic shut offs so they are deactivated when doors and shutters are open. £50,000 savings over 1.6 years!

Increase staff awareness of energy efficiency. Energy data logging undertaken and results were communicated to staff. A switch off programme now implemented for breaks, lunch and end of day. £7,000 immediate saving!

## Waste Minimalisation

External support was sourced through the Enworks consultancy bank. Peter Greifenberg was employed to undertake a waste survey to identify opportunities for improving waste management and reducing the costs associated with waste disposal.

The company has since improved its handling of raw materials resulting in less damage. This on-going action is expected to realise cost savings in the region of £24,000 p.a.

## $CO_2$ Emissions

The reduction in energy consumption will enable Alloy Bodies to considerably reduce the volume of $CO_2$ it is responsible for emitting by more than 500 tonnes per annum.

**Alloy Bodies Ltd**
Clifton Street Trading Estate
Miles Platting
Manchester
M40 8HN
Tel: 0161 205 7612

## Support organisation details:

**ENWORKS**
Fourways House, 57 Hilton Street, Manchester, M1 2EJ
Tel: 0161 236 6348 www.enworks.com

**The Carbon Trust Head Office**
6th Floor, 5 New Street Square, London, EC4A 3BF
Tel: 020 7170 7000 www.carbontrust.co.uk

**Groundwork Manchester, Salford, Stockport, Tameside & Trafford**
Timber Wharf, 42-50 Worsley Street, Castlefield, Manchester, M15 4LD
www.groundworknw.org.uk

# Case Study Argos Direct

## Sector: Retail and Wholesale

## Size: Large

## Region: South East

## Company Overview

Argos Direct is the home delivery arm of high street retailing giant Argos. It delivers a wide range of general merchandise bought online via www.argos.co.uk to homes throughout the UK and Ireland. Both companies are part of the Home Retail Group, which demerged from GUS plc in 2006.

## Project Overview

As a national home delivery specialist Argos Direct operates a primary and secondary distribution system. After the goods have been picked and packaged at one of three distribution centres, they are loaded into containers which are then trunked in pairs, using a fleet of almost 100 draw-bar trailer units, to one of 28 sites around the country. The containers are then transferred to some 650 seven and a half tonne DAF LF rigid trucks ready for delivery to the doorstep.

Each of these trucks is on the road for five and a half days a week. Annually they travel in excess of 50,000 miles, mostly in urban conditions, and often involving considerable acceleration and braking as well as frequent kerb contact, as drivers are obliged to minimise disruption to traffic while unloading.

Argos Direct prides itself in the on-time delivery of its goods. With thousands of packages being handled daily, the reliability of the fleet is paramount. As a result, vehicle and tyre maintenance must therefore be exemplary. Equally, Argos Direct takes its corporate social responsibility extremely seriously. As part of its environmental policy, it decided to fit retreaded tyres to the rear drive axles of all its commercial vehicles wherever possible.

Argos Direct entered into a tyre management programme with Bandvulc Tyre Control (BTC) several years ago. BTC arranges for regular tyre inspection on all vehicles and will often move tyres between axles or wheels to maximise their life cycle. When a tyre reaches the end of its working life, it is removed from the vehicle and returned to Bandvulc.

Using Argos Direct's own casing system, tyres are retreaded using the 'procure' method before being returned to stock ready to be re-fitted. During 2008, of the many thousands of replacement tyres fitted to the commercial fleet, just under 50% were retreads.

## Benefits

48% of replacement tyres for its commercial fleet are retreads.

159,000 litres of oil saved.

103,000 kg of rubber saved.

425,000 kg of carbon emissions saved.

2,400 remould tyres fitted.

## Environmental Benefits

The environmental benefit of fitting remould tyres to such a large fleet is immense and is a key part of the environmental policy for the company and its corporate social responsibility agenda.

Fitting remould tyres is an ongoing and permanent programme for the company with a well established methodology.

Although there are cost savings made in the process these are not possible to quantify and are not the main driver for the business.

The three main areas reflected in the practice of fitting remoulds are savings on carbon dioxide emissions, oil and rubber.

## Carbon Dioxide

There is a massive 182.3 kgs of $CO_2$ saving when a remould tyre is used. This means that Argos saved 425,000 kg of $CO_2$ in 2008.

## Oil Saving

Fitting a processed tyre which has had a new tread fitted saves an average of 68 litres of oil per tyre. Argos had 2,400 remould tyres fitted during 2008 equating to 159,000 litres of oil saved in the year.

## Rubber Savings

Each remould tyre requires less rubber and it has been calculated that on average 44 kgs of rubber is saved per tyre. This equates to 103,000 kgs of rubber during 2008.

**Argos Direct**
489-499 Avebury Boulevard
Central Milton Keynes
MK9 2NW

## Support organisation details:

**WRAP (Waste & Resources Action Programme)**
The Old Academy
21 Horse Fair
Banbury
Oxon OX16 0AH

'More information on WRAP's work can be found on www.wrap.org.uk'

# Case Study Atherstone Accident Repair Centre Ltd

## Sector: Other Services

## Size: SME

## Region: West Midlands

## Company Overview

Atherstone Accident Repair Centre have built a solid reputation with accident repair for over 18 years and have consistently chosen the manufacturers' standard repair methods, putting them in good standing with insurance companies, brokers, fleet companies and the private motorist.

## Project Overview

Atherstone Accident Repair Centre is revolutionising the marketplace with a green innovation that will slash thousands off its annual energy bill. It is the first in the country to install an eco paint booth that runs entirely on electricity.

Because the system totally eliminates gas use there are no $CO_2$ stack emissions. Plus the savings from cutting the booth's energy use by about 80% and improved productivity mean the firm's £60,000 installation costs should be recouped within three years.

In fact the system is so carbon friendly that it qualified for Carbon Trust interest free finance.

Atherstone Accident Repair Centre's owners found out about the eco system after joining a Warwickshire County Council scheme designed to help companies pinpoint areas where resource efficiency can be improved and money saved.

Traditionally spray booths in the automotive body shop industry use gas or oil burners to generate heat in the paint finishing process. The new technology is similar to that used in slim electric decor wall and ceiling panels and under floor heating systems and means the body shop can eliminate gas or oil as an energy source.

The infra red high temperature system heats the booth for both the paint and drying cycles, and is about 75% efficient in filtering and recirculating air, creating the cleanest and most environmentally efficient booth available in the UK.

## Benefits

£20,000 p.a. savings realised by cutting the energy usage by 80%.

Eliminated gas use contributes significantly to a reduction in overall greenhouse gas emissions.

Qualifies for Carbon Trust interest free finance.

£50,000 p.a. saved in total from implementing more energy efficient measures.

## Energy Efficiency

The infra red high temperature system on the new paint booth heats the booth for both the paint and drying cycles, and is about 75% efficient in filtering and re-circulating air, creating the cleanest and most environmentally efficient booth available in the UK. The new technology means the body shop can eliminate gas or oil as an energy source.

As well as removing all sources of $CO_2$ emissions from the site, Atherstone Accident Repair Centre has also changed their lighting which has reduced energy usage and have become better at recycling.

By adopting new measures, annual savings of more than £50,000 have been achieved and Warwickshire County Council business support officer, Stephen Lewington, who leads the Resource Efficiency Club, said the Atherstone firm was in the driving seat when it came to saving energy and other environmental improvements.

Proof that green business is good business is that savings made by many of the 40 participating companies were as much as £2,500 per employee in the last 12 months.

**Atherstone Accident Repair Centre Ltd**
8 Carlyon Road
Atherstone
CV9 1LQ
Tel: 01827 712 090

## Support organisation details:

**Warwickshire County Council – Environmental Support for Business**
Shire Hall, Warwick, CV34 4SA
Tel: 01926 414145 www.warwickshire.gov.uk

# Case Study Bourne Prepared Produce

## Sector: Food, Drink & Tobacco

## Size: SME

## Region: East Midlands

## Company Overview

Bourne Prepared Produce, part of the Bakkavör group is a leading supplier of fresh foods. Since opening its factory in Bourne, Lincolnshire, in 1987, the business has expanded keeping pace with the growing demand for ready prepared salad products.

## Project Overview

To help the company stay within its consent limits for water supply and discharge, Bourne Prepared Produce collaborated with Aquabio Limited to install a water treatment process that would suit the increasing demands of the business.

Aquabio's advanced membrane bioreactor (AMBR) process is an aerobic biological treatment system comprising an intensive activated sludge process with the biomass separation stage carried out by ultrafiltration (UF) membranes.

The UF membranes replace the settlement stage in conventional activated sludge systems and effectively revolutionise the process. The separation of biomass from treated water using membranes not only provides filtered quality, offering possibilities of re-use, but also allows very high biomass mixed liquor suspended solids (MLSS) concentrations to be developed in the bioreactor without the detrimental effects usually associated with traditional settlement techniques. After the treated waste water has been made bacteria free it then undergoes a reverse osmosis and ultraviolet disinfection process to achieve potable quality.

*"Bakkavör – Bourne Prepared Produce (formerly Bourne Salads) undertook to install this plant in partnership with Aquabio Ltd to demonstrate our environmental commitment. As a result we have made a huge impact on water savings, both incoming and trade effluent and proven ourselves to be pro-active in reducing our environmental impact".*

Jamie O'Connell,
Water Management Technician

## Benefits

Out of the daily treated 1,200 cubic metres of water, 450 cubic metres is reused.

75% fall in direct mains sewer discharge.

Incoming mains water reduced by 45%.

5 year pay back period.

## Water Savings

The results have been dramatic. Out of the daily treated 1,200 cubic metres of water, 450 cubic metres is reused within the factory resulting in a 45 per cent drop in mains water dependency.

Further discharge to the mains sewer has been reduced by 75 per cent.

Other benefits include reduced hardness of water leading to a less frequent de-scaling of machinery and a decrease in the amount and concentration of caustic detergent used to clean equipment.

The potential savings in water use and discharge meant the investment could be regained in 5 years.

**Bourne Prepared Produce – Bakkavör**
Spalding Road
Bourne
Lincolnshire
PE10 0AT

Tel: 01778 392952
www.bakkavor.com

## Support organisation details:

Advice Line 0800 585794
www.envirowise.gov.uk

# Case Study DENSO Manufacturing UK Ltd

## Sector: Machinery & Equipment (other manufacturing)

## Size: Large

## Region: West Midlands

## Company Overview

DENSO Manufacturing UK Ltd. (DENSO) established in 1990 is part of DENSO Corporation, a world leading supplier of advanced automotive technology, systems and components producing air conditioning units, heaters and engine cooling systems for the automotive industry. DENSO achieved an ISO 14001 Environmental Management System certificate in 1995.

## Project Overview

DENSO has applied waste reduction and re-use techniques to its manufacturing processes and with the assistance of government funded organisations such as the National Industrial Symbiosis Programme (NISP) and Envirowise, the company has managed to improve its efficiency, cut costs and reduce waste to landfill. Ultimately reducing $CO_2$.

One waste that is generated in DENSO's manufacturing process is a Potassium Aluminium Fluoride based material, which is classified by the Environment Agency as a Hazardous Waste and therefore is subject to high disposal costs.

Having implemented a zero waste policy at the site, DENSO was keen to explore sustainable ways in which this hazardous material could be reused – especially as it was costing the company £30,000 to dispose of the 15 tonnes of the material collected each year.

DENSO has been a member of NISP since early 2007 and as such alerted the West Midlands' team to its problem.

The NISP team searched through its national resource monitoring database and found a potential link with Coventry based Mil-Ver Metals, a leading producer of primary base and secondary aluminium alloy ingot.

A series of meetings involving the two companies and NISP took place to investigate the feasibility and logistics of transporting and reusing the material.

The scheme was put into place and sees Mil-Ver collecting, reprocessing and reusing up to 15 tonnes of this material a year as part of its alloy manufacturing process.

## Benefits

£30,000 cost savings from reuse of Potassium Aluminium Fluoride and reduction of hazardous waste to landfill.

15 tonnes of hazardous waste no longer going to landfill.

£100,000 cost savings in two years by introducing a pallet re-use and resale scheme.

£172,000 annual cost savings through energy efficiency initiatives across the plant.

100 and 187 tonnes of carbon emissions offset in 2007 and 2008 through employees' efforts.

## Waste Minimisation

### Flux monitoring

By applying liquid flux to intricate areas of condenser units instead of using flux powder and by purchasing ready-coated flux material, the company reduced its hazardous waste generation by 22% in the first year. In addition, the total flux weight of each condenser has reduced from 18g to 5g.

### Re-usable wipes

The company changed from using single-use tissues, required to wipe down machinery, to washable cotton wipes. Investigations showed that the purchase and disposal of tissue were more expensive than purchasing and washing cotton rags. In the first year, the change resulted in a £5000 reduction in hazardous waste.

### Pallet re-use and resale

All pallets that were recycled are now sorted and re-used. This has led to savings of approximately £100,000 in the first two years.

### Water

DENSO people are proud of their environmental activities such as the underground tanks that collect and treat the rainwater from the roof of the plant.

This water is then reused in the production process at the plant, helping them reduce water consumption.

## Energy Efficiency

Energy savings have been achieved throughout the plant by installing waste heat recovery systems to the abatement plant, by fitting variable speed drivers to optimise the running speed of water pumps in the cooling towers, and by localised control of process air supplies. Through these initiatives, approximately £172,000 annual energy savings have been achieved across the plant.

**DENSO Manufacturing UK**
Queensway Campus
Hortonwood
Telford
Shropshire
TF17FS
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## Support organisation details:

**National Industrial Symbiosis Programme**
44 Imperial Court, Kings Norton Business Centre, Pershore Road South, Birmingham, B30 3ES. T: 0845 094 9501
enquiries@nisp.org.uk www.nisp.org.uk

Advice Line 0800 585794
www.envirowise.gov.uk

# Case Study DLA Piper Scotland LLP

## Sector: Other Services

## Size: Large

## Region: Scotland

## Company Overview

DLA Piper is a global legal services organisation. In January 2007, it introduced a Global Sustainability Initiative affirming its commitment to reduce environmental impact. In December 2007 it achieved global certification to ISO 14001. DLA became the first international legal practice to gain this accolade and achieved one of the core objectives of their Sustainability Initiative.

## Project Overview

DLA Piper's Glasgow office occupies four floors of a six-storey building and includes offices, a kitchen and toilets.

Staff at DLA Piper in Glasgow acted on advice from Envirowise (eg. through seminars, the 'big splash' campaign and measurement counselling visits). The office implemented no and low-cost measures, which have resulted in reduced costs and environmental impact, and an improved corporate reputation and working environment.

DLA Piper has made significant efforts to reduce business travel and the associated carbon emissions by using technology such as teleconferencing, videoconferencing and web presentations. Any carbon emissions produced through essential air travel are offset by purchasing carbon credits. In 2007, 54.5 tonnes of $CO_2$ were offset at a cost of £270.

DLA Piper monitors and measures its use of energy, water and paper, which provides the data to support the over £46,000 cost savings that have been achieved since 2006.

*"We have improved our environmental performance and achieved great success through the several initiatives we have implemented but, most importantly, from the commitment shown by staff."*

Martin McLean,
Facilities Manager,
DLA Piper

## Benefits

Since 2006, savings of 57 tonnes of $CO_2$ have been realised, equating to £9,000.

20 tonnes of waste recycled p.a.

£1,300 p.a. saved from water reduction, along with a one-off reimbursement of £36,000.

£47,000 saved in total from implementing new measures.

## Energy Efficiency

Since 2006, in Glasgow, DLA Piper has saved £9,000 and reduced its $CO_2$ emissions by 57 tonnes through the implementation of a range of energy saving measures. These include:

- Fitting energy efficient lamps and passive infrared (PIR) occupancy sensors in two lifts and the garage area.
- Putting timers on internal staircase lighting and meeting room refrigerators that contain bottled water only.
- Installing proximity sensors to vending machines.
- Replacing existing equipment with energy efficient models (eg. washing machine, refrigerator, liquid crystal display (LCD) computer monitors).
- Implementing a 'switch off' policy with security team.
- Installing energy efficient boilers and calorifier.
- Fitting temperature controlled radiator valves.
- Installing double glazing (6th floor) and draught proofing strips to windows and internal doors.

## Waste Minimisation

DLA Piper has implemented a waste segregation scheme that has generated significant environmental benefits and cost savings. The scheme includes paper, glass, batteries, aluminium, plastic cups, furniture and toner cartridges. The overall recycling rate in the office is 26%, which is well above the municipal waste recycling rate for Scotland. On average, 20 tonnes of waste are recycled each year.

## Water Savings

The office has implemented various water conservation measures throughout the building, which have resulted in annual savings of £641. These include reducing the building water pressure, fitting dual-flush mechanisms in all toilets and installing a new water chlorination system for water tanks.

To reduce the water-meter fixed charge, the 50 mm water meter was replaced by a 40 mm meter. This resulted in a reimbursement of £36,000 and on-going annual savings of about £600. By tracking its water use, DLA Piper is able to identify water leaks quickly and repair them.

**DLA Piper Scotland LLP**
Glasgow office
249 West George Street
Glasgow, G2 4RB
Tel: 08700 111 111

## Support organisation details:

Advice Line 0800 585794
www.envirowise.gov.uk

# Case Study Dow Corning Ltd

## Sector: Chemical/non-metallic Minerals Manufacturing

## Size: Large

## Region: Wales

## Company Overview

Dow Corning is a global manufacturer of silicone-based materials. Its 65 hectare site at Barry in South Wales employs around 600 people in manufacturing, research and development. Barry is an integrated site developing, commercialising and producing silicone-based products and intermediates for use by customers worldwide. The company participates in the Chemical Industry's Responsible Care® programme and has won a number of environmental awards.

## Project Overview

Silicones can be manufactured as either fluids or elastomeric products for uses including lubrication, sealing, bonding, releasing and defoaming. Various feedstock ingredients are produced at the site by reacting silicone with methyl chloride in fluidised bed reactors to give a mixture of methyl chlorosilanes.

The main product , dimethyldichlorosilane, is separated out and hydrolysed to produce a crude silicone polymer which is used in downstream finishing processes that lead to the generation of over 7,000 products. Hydrogen chloride (HCl) is a by-product of the hydrolysis reaction. This is recovered and reacted with methanol to produce more methyl chloride.

Dow Corning examined its main manufacturing process and various finishing processes for opportunities to reduce hazardous waste.

This case study provides an outline of some of the initiatives Dow Corning has undertaken to reduce costs through lessening its environmental impact.

## By-Product Exchange

One of the main success stories has been the symbiotic relationship of Dow Corning with a neighbouring company, Cabot Carbon Limited.

Monomethylchlorosilane, one of the by-products from the fluidised bed reactor in the main manufacturing process, is exported by interconnecting pipework to Cabot Carbon where it is used in the manufacture of fumed amorphous silica. Some of this product is fed back to Dow Corning to manufacture elastomer products.

## Benefits

£10,000 p.a. saved through the elimination of hazardous waste.

23% reduction in methylchloride raw material use.

Cost savings of £25,000 p.a. through raw material substitution.

11% reduction in raw material through reuse initiative.

Gases from the fumed amorphous silica process are cleaned by Cabot Carbon via a recovery system, including a series of scrubbers. The scrubber liquors, consisting mainly of HCl, are returned to Dow Corning for re-use in the production of methyl chloride. This reduces the amount of chloride based raw material that Dow Corning would otherwise have to buy.

During periods of no methyl chloride production, Cabot Carbon was historically unable to feed back HCl. Installation of an intermediate buffer tank provided an uninterrupted supply of HCl and enabled Dow Corning to reduce the number of road tanker deliveries of methyl chloride raw material by 23%.

*"Eliminating and minimising hazardous waste from our production processes, or moving them up the waste hierarchy to provide better environmental outcomes, fits directly with our company's corporate core value of sustainability."*

Mike Squire, Environmental Team Leader

## Material Reuse

### HCl Recovery from a Finishing Process

An intermediate product, trimethylchlorosilane, is used in a finishing process to produce hexamethyldisiloxane. The chlorides generated from this process used to be neutralised with lime, with the liquors from the reaction being discharged to sewer after filtration and the filter cake landfilled. Now, HCl is recovered and re-used in the methyl chloride production reaction, thus eliminating the need for the neutralisation and filtration processes. The revised process has reduced tanker deliveries of methyl chloride raw material by a further 11%.

### Substitution of Toluene

Dow Corning has minimised the use of toluene as a clean-out solvent. One of the site's raw materials is supplied contaminated with xylene which was extracted and collected in drums as a waste material. The extracted xylene is now re-used in place of toluene, saving over £25,000 p.a.

## Process Change

### Elimination of Hazardous Spent Filter Cartridges

Historically, all spent filter cartridges from the finishing processes were placed in one hazardous waste skip. However, it was discovered that only one process actually produced spent cartridges that were hazardous waste. This was because a filter aid used to remove spent catalyst was classed as hazardous. The process was changed to incorporate a liquid catalyst, which is inactivated at the end of the reaction and is left in the product. This change eliminated the need for the filtration process and thus use of the filter aid. As a result, £10,000 p.a. year was saved in reduced waste disposal costs as the skip for spent filter cartridges could now be classed as non-hazardous.

**Dow Corning Ltd**
Cardiff Road
Barry
Vale of Glamorgan
CF63 2YL

## Support organisation details:

Advice Line 0800 585794
www.envirowise.gov.uk

# Case Study ENER.G

## Sector: Power & Utilities

## Size: Large

## Region: West Midlands

## Company Overview

Birmingham Heartlands is a major general hospital managed by the Heart of England NHS Foundation Trust in Bordesley Green, East Birmingham. Heart of England NHS Foundation Trust is one of the largest in England. It includes Birmingham Heartlands Hospital, Solihull Hospital, Good Hope Hospital and Birmingham Chest Clinic.

## Project Overview

The Combined Heat and Power (CHP) scheme delivered by ENER.G enables Birmingham Heartlands Hospital to generate its own electricity in a purpose designed Energy Centre, cutting emissions of $CO_2$ by 1,700 tonnes per year.

The new, aesthetically designed, Energy Centre is located near the hospital's landmark main entrance. The new Energy Centre, which was installed by ENER.G Combined Power, replaced ageing coal fired boilers which had served the Trust well for many years. The new system comprises a state-of-the-art gas fired tri-generation system that creates electricity, steam or hot water for the winter heating and chilled water for use in the air conditioning systems during the warmer summer months. Improving the chilled water system has allowed cool air to reach parts of the hospital that were not previously serviced, increasing comfort for patients as well as hospital staff.

The £5 million programme, financed by ENER.G was structured around the principles of a Public Private Partnership contract, and included a £403,000 grant from the Carbon Trust under the Government's Community Energy Programme. ENER.G provides the trust with a guaranteed level of performance for the system over a 15 year period.

*"We were attracted to this new system, as not only will it save money and conserve resources, but it also complies with government targets to cut down carbon emissions and damaging greenhouse gas."*

Geoff Fox
Facilities Manager of Estates

Heart of England
NHS Foundation Trust

## Benefits

1,700 tonnes of $CO_2$ saved p.a.

Expected savings of £688,000 p.a. from new energy efficiency programme.

## Energy Efficiency

ENER.G installed and maintains the purpose-built Energy Centre that houses a highly efficient Combined Heat and Power system (CHP) plus other plant including steam raising boilers and an absorption cooling system.

The CHP system generates electricity and recovers the majority of the heat created in the process. In conventional power stations this heat is simply wasted into the atmosphere through power station cooling towers, much energy is also lost along the many miles of electrical distribution cables needed to bring the power to site.

The new Energy Centre accommodates a 1,165 kilowatt CHP unit that uses an MTU gas engine. Chosen due to its compact and efficient design, this is capable of producing steam and is connected to the hospital's main heating system. This unit is also connected to a 300 kilowatt absorption chiller to produce chilled water from waste heat in the warmer months. This means the existing electrically powered chillers will run much less frequently during the summer and that spare cooling capacity can be used to provide air conditioning to areas of the hospital which had not previously benefited from this.

Work has also been carried out to upgrade lighting with 1800 high efficiency, low energy fittings, which will further reduce emissions and energy costs.

**Birmingham Heartlands Hospital**
Bordesley Green East
Birmingham
B9 5SS
Tel: 0121 424 2000

## Support organisation details:

**ENER.G Combined Power Ltd**
ENER.G House, Daniel Adamson Rd, Manchester, M50 1DT
Tel: 0161 745 7450 www.energ.co.uk

**The Carbon Trust Head Office**
6th Floor, 5 New Street Square, London, EC4A 3BF
Tel: 0800 085 2005 www.carbontrust.co.uk

# Case Study MAHLE Engine Systems UK Ltd

## Sector: Metal Manufacturing

## Size: Large

## Region: Scotland

## Company Overview

MAHLE Engine Systems UK Ltd is based in Kilmarnock, Scotland. The factory has been operating since 1947 and currently employs over 460 people. The company specialises in the development and manufacture of aluminium and copper based bi-metals, which are fabricated into bearings, bushings and thrust washers. The plant supplies global engine manufacturers both in the highway and off-highway sectors.

## Project Overview

MAHLE identified water use as a priority area for improvement at its Kilmarnock site and signed up to the Envirowise Big Splash initiative for assistance in evaluating water usage. The subsequent work helped to identify the areas where water management could be improved further, including on-site support with:

- Conducting a water mass balance of the site in order to help develop an understanding of the hydraulic loading of the major points of water use and identify where, how and why water is used.
- The implementation of a two day staff training workshop on the costs of water use to highlight the importance of water usage throughout the site, with an identified saving of over 11,000 $m^3$/year.

Appraisal of the water mass balance aided prioritisation of the water saving measures that MAHLE has tackled first to realise significant savings.

Mahle replaced a basic 'Total Loss' water cooling system which was used for cooling a casting process for many years. Mains water would be used to circulate through the casting system (once) before being directed down the drain as waste water.

This was replaced with a water chilling system, which provided a 'Closed System' allowing all water to be re-circulated therefore avoiding waste and essentially improving the water consumption dramatically.

*"Although MAHLE were already aware that there was a concern with water usage on site. It wasn't until Envirowise supported an on-site assessment that the significance of water wastage was actually recognised."*

## Benefits

An identified saving of over 11,000 $m^3$ p.a. by implementing staff training on water usage.

A realised saving of around 1,800 $m^3$ p.a. from installing energy efficient taps and detectors on the water system.

Savings of over £6,000 p.a. realised by replacing the existing total loss system.

The instant saving of over £22,000 p.a. by repairing a faulty pipe and ball valve.

39,000 $m^3$ of water saved in total p.a. since audit.

## Water Savings

A 30% reduction in water use was realized which equates to 39,000m$^3$/year and a saving of £27,500 p.a. This was achieved by implementing the following measures:

- The use of percussion taps throughout the site and the introduction of passive infrared detectors in toilets.
  - Water savings of around 1,800 m$^3$/year realised.
- Installation of a coil cast chiller to replace the existing total loss system has reduced operating water costs.
  - Savings of £6,000/year realised.
- The replacement of a faulty ball valve and repair of a leaking pipe.
  - Instant savings of over £22,000/year realised.

*Through the ongoing process of environmental improvement Mahle has come to understand one thing very clearly: When you educate and communicate the objectives of your project to all personnel within the workforce, it is always surprising how many people become involved and offer a variety of good, workable ideas.*

**MAHLE Engine Systems UK Ltd.**
Riccarton
Kilmarnock
Ayrshire
KA1 3NA
Tel: 01563 521190

## Support organisation details:

Advice Line 0800 585794
www.envirowise.gov.uk

# Case Study Rascards

## Sector: Chemical/non-metallic Minerals Manufacturing

## Size: SME

## Region: North West

## Company Overview

Rascards Limited, established in 1996, manufacture plastic store cards. They have a £3 million per annum turnover. Manufacturing takes place 20 hours a day 5 days a week. Rascards produced 58 million cards between October 2007 to September 2008.

## Project Overview

Rascards were keen to review their environmental performance, so initial discussions were held with Groundwork Merseyside who arranged for an external consultant from the North West Development Agency (NWDA) supported ENWORKS Programme to visit them.

The review prompted the company to assess their waste allowances at each stage of manufacturer and to implement measures to reduce waste when laminating.

The review highlighted that when producing cards on short runs there was approximately twice as much waste of electrical energy, machine time and staff time. Resource efficiency opportunities were identified particularly for the rapid turnaround and shorter production runs when processing small orders.

The more frequent changeover, wash-down, and set-up, resulted in lower machine utilisation and reduced output capacity. The company appreciated that they recovered the additional costs associated with short runs from the customer.

The company also realised that the proportion of "test to sample sheets" on a short run was significantly greater than on a large run.

Analysing PVC sheets (which form the core of the cards) over the period October 2007 to September 2008, identified the waste level to be 30%. Clearly the number of changeovers and set-ups impact on the waste and production output potential of the company. These are now to be monitored, with the impact of changeovers properly evaluated.

Rascards' energy spend was £50,000 p.a. and due to increased energy use and prices, Rascards looked into the possibility of expanding into a neighbouring unit and held discussions with their electricity supplier about the need for a new substation. The company requested that the resource efficiency review should look at energy saving opportunities.

### Benefits

- $CO_2$ Savings 56 tonnes p.a. identified.
- Financial savings £7,800 p.a. achieved and £29,000 p.a. identified.
- Energy savings 88,000 kWh p.a. identified.
- Water savings of 20$m^3$ achieved.
- Timber packaging savings of 4 tonnes p.a. achieved.

## Outcome of Resource Efficiency Review

### The resource efficiency review identified a range of actions many of which Rascards have now implemented, or are pursuing:

**Reduce Base load by 25%**
Through the management of energy and process measurement, it should be possible to reduce the base load by 25%. Savings of 88,000 kWh p.a. were identified and are being targeted.

**Reduce Night Use**
A switch off campaign should enable a reduction in the night use of the electrical equipment to an average of 7,000 kWh/month.

**Address air compressor pressure relief valve discharges**
The pressure relief valve on the larger compressor was opening and discharging every 7 seconds, due to the air distribution pipe work being undersized. The installation design and sizing should be checked and corrected. Potential savings of 23,125 kWh p.a. have been identified.

**Optimise use of PVC sheet, laminate and magnetic tape**
It became apparent that PVC sheet, laminate and magnetic tape waste could be reduced by reducing "overs allowances" at all stages of production and reducing the number of changeovers and set ups. 236 tonnes p.a. of savings were identified.

**Develop a waste forum**
By setting up a local waste 'forum' it may be possible for neighbouring businesses producing similar wastes to negotiate preferential prices with local waste contractors.

As such, a number of businesses could use the same waste carrier, agree a common day for collection at all the premises and negotiate a reduced transport cost. This might also provide an opportunity for recycling.

**Reduce general waste through further segregation**
Cardboard and magnetic tape waste containers were segregated and recycled to reduce general waste costs.

The company who takes the PVC off-cuts agreed to take the cardboard and plastic magnetic tape containers away for free. Savings of 250 tonnes p.a. were achieved.

**Negotiate with supplier to reduce timber packaging**
The German supplier refused to change packaging so Rascards now sources PVC from an Italian company who supplies the PVC sheets without the timber cages and at a higher quality. Savings of 4 tonnes p.a. achieved.

**Reduce Water Usage by installing Water saving devices**
There are 8 toilets with old style 12 litre flush cisterns which are now fitted with water saving devices 'Hippo bags'. 20$m^3$ p.a. water savings achieved.

**RAS CARDS**
Unit 2 Appin Road
Argyle Industrial Estate
Birkenhead
Wirral
CH41 9HH

## Support organisation details:

Support was provided via Groundwork Merseyside and by an external consultant from the ENWORKS consultant bank.

**Groundwork Merseyside:**
Tel: 0151 726 2740
Website: www.groundworkmerseyside.org.uk

# Case Study Sainsburys

## Sector: Retail & Wholesale

## Size: Large

## Region: South West

## Company Overview

The Sainsbury's Dartmouth store opened in August 2008 and was specifically designed to reduce both its operational and embodied carbon. The store was built with respect for the use of natural resources, including energy, water, waste, timber and land, and acts as a test bed for elements that can be rolled out across the Sainsbury's estate.

## Project Overview

The brief at Dartmouth was to introduce the best environmental thinking and engineering to design a supermarket that is not only kinder to the environment, but is also capable of being used as a model to roll out across the estate.

It was fundamental that this model could be used as a blueprint for Sainsbury's new-build supermarkets. As a result, the entire building process was reviewed, not just the building itself, but included looking at materials, technologies and engaging with customers and colleagues.

The store utilises renewable energy, reducing its overall $CO_2$ emissions by 40%. A biomass boiler heats both the building and water by using locally sourced wood pellets. The building has been designed to achieve an air-tightness 50% better than building regulations. Rainwater harvesting will save circa one million litres of mains water every year, meaning 60% less mains water usage as a result.

Other measures, such as 'quiet revolution wind turbines'™ are used to power the checkouts and natural light from Sunpipes is used across the whole building – a first for retail in the UK.

These measures contribute to cutting overall electricity usage (kWh) by a third and reducing energy consumed from the national grid by a dramatic 50%.

For the first time in the UK, the timber structure of the building was designed by B&K Timber Structures, in a similar way to steel frames by using a computerised system. By doing this, all the connection points were designed in 3D enabling pre drilling of the fixing positions which meant that the timber frame could be installed by the same workforce who would have installed a steel frame in a similar amount of time.

### Benefits

40% reduction in $CO_2$ emissions achieved.

33% reduction in kWh use.

50% reduction in grid/ main supplied energy.

Over 90% of construction waste recycled or reused.

1,000,000 litres of mains water saving per annum.

## Design

A key consideration of the designing of the building was to ensure that it had the minimum impact on its location. For that reason the building was sunk into the hillside on which it sits. The excavated soil was then utilised in the landscaping around the site. The building itself, with its undulating roofline, follows the form of the surrounding rolling countryside.

The embodied carbon footprint of the building was measured. For example, by looking at the embodied carbon footprint of plasterboard Sainsbury's was able to save circa 44 tonnes of plasterboard by not using it to line the inside of the store frame.

A Biomass boiler has been installed to heat the building. This uses locally sourced recycled woodchip that would have otherwise been wasted and saves Sainsbury's 150 tonnes of $C0_2$ each year. This is enough energy to make 8.75 million cups of tea.

The building materials used in the construction of the store are environmentally friendly, chosen from the Building Research Establishment (BRE) Green Guide. Where possible local lime render has been used, as well as recycled and recyclable materials. Over 90% of the building waste has been recycled.

## Energy Efficiency

Energy consumption has been reduced by 33%, compared to a similar sized store, by using natural light from 84 sun pipes with automatic dimming.

The lights in the warehouse and office automatically turn off when not in use and collecting the cold air from the chillers keeps the store cool in the summer.

Two wind turbines have been erected providing power for all of the checkouts.

These environmental technologies, plus other initiatives, have helped to reduce Sainsbury's National Grid energy consumption by 50%.

## Water

A Rainwater Harvesting System has been installed to flush all toilets and irrigate landscape plants.

The store has been designed so that it uses 60% less water. Each year Sainsbury's uses one million litres of recycled rainwater to flush the toilets at Dartmouth. To enable a reduction in water consumption, the taps turn themselves off, the toilets are the lowest flush possible and waterless urinals have been installed.

*"At Sainsbury's we take a deep interest in the impact of our operations and this is as relevant today as it was in 1869 when we opened our first store to bring good-quality, safe food into the reach of poorer parts of London.*

*Being a responsible retailer is part of our heritage and our customers continue to tell us that social, environmental and ethical concerns should remain at the core of how we do things."*

Quote from
Justin King, Chief Executive

**Sainsbury's Dartmouth**
Nelson Road
DARTMOUTH
Devon
TQ6 9AH

Tel: 01803 832944
Contact: David Penfold

# Case Study SNA Europe (UK) Ltd

## Sector: Metal Manufacturing

## Size: SME

## Region: Yorkshire & Humber

## Company Overview

SNA Europe (UK) Ltd is part of the American Snap-on Corporation and has operated from its Rotherham site since 2000. They manufacture a wide range of band saw blades including their carbide tipped band saw, used to cut a variety of metals including titanium and nickel alloys, tool steels and aerospace alloys. The purpose built plant has facilities for milling, grinding, heat treatment and finishing processes.

## Project Overview

The company made the decision to tackle rising energy costs by taking proactive measures to reduce energy consumption. A Carbon Trust review of potential opportunities was commissioned, which identified possible savings of £38,000, representing over 10% of their expenditure on energy.

SNA Europe (UK) requested assistance from the Manufacturing Advisory Service (MAS) to implement these savings, and MAS energy specialist, Alex Mardapittas, of EMS was called in to oversee the implementation.

Significant improvements were achieved as a result of the initial programme of work and the company has since gone on to initiate a further two MAS energy reduction interventions.

As a result of these interventions insulating jackets have been fitted onto all the factory's furnaces, resulting in a reduction of electricity consumption by 7.2%. The factory's lighting was also reassessed, and after the installation of a lighting optimiser into the circuit a 20% reduction in power consumption was recorded.

In addition, MAS has also assisted the company in preparing to sign a Climate Change Agreement (CCA) with the Department of Energy and Climate Change (DECC) which has reduced their Climate Change Levy (CCL) by 80% in return for meeting energy reduction targets. The types of companies eligible for such agreements were widened significantly in 2005 and SNA Europe (UK) fell within one of these categories.

EMS now provides continued assistance to ensure that energy reduction targets are met. Through close association with MAS, the company was made aware of the Business Resource Efficiency & Waste Small Scale Capital Grants scheme. They applied for, and were awarded, a grant of £10,000 towards a new compressor, which is anticipated to save the company a further £22,000 in energy expenditure.

## Benefits

Energy savings of £9,300 p.a. have been achieved.

A reduction of £23,000 p.a. has been obtained in CCL.

Value added has been increased by £32,300 p.a.

A reduction of $CO_2$ emissions of 53 tonnes p.a. has been achieved.

Further savings of £25,500 p.a. are anticipated following completion of a third MAS project, and their recent grant-subsidised investment in a new compressor.

## Energy Efficiency

It was identified that over a 48hr period one furnace was consuming 18.33kW of electricity during heat-treating and 11.78kW during idling. A flexible insulating jacket was subsequently designed, manufactured and fitted and power consumption was again monitored.

The results showed that consumption during running had fallen to 16.73kW and whilst idling to 11.26kW. Overall a reduction of 7.2% was being achieved. That's £897 saved per annum! Similar jackets were designed for the other furnaces and similar savings were achieved.

Power consumption on the factory lighting was also data-logged and the effect of introducing a lighting optimiser into the circuit was measured. This showed that savings of 20% could be achieved by such means and SNA Europe (UK) installed the device.

## $CO_2$ Emissions

MAS also assisted the registration of SNA Europe (UK) for a Climate Change Agreement. As part of the Government's commitment to reducing carbon dioxide emissions, the Climate Change Levy (CCL) was introduced on all company bills for nonrenewable energy.

Because it was recognised that this could cripple energy intensive manufacturing, the CCL Rebate Scheme was introduced, which gives a rebate of up to 80% of CCL for companies in suitable industries in exchange for their commitment to meeting energy reduction targets.

An energy analysis identified the exact percentage of energy consumed by the eligible processes as well as establishing the possible energy reductions that the company could commit to over the next 7 years.

The application through the Heat Treatment Federation was successful and produced annual savings of £23,000 per annum.

**SNA Europe (UK) Ltd**
Sales Office
Moorhead Way
Bramley
Rotherham
S66 1YY
Tel: 01709 731731

## Support organisation details:

**The Carbon Trust Head Office**
6th Floor, 5 New Street Square, London, EC4A 3BF
Tel: 020 7170 7000 www.carbontrust.co.uk

**MAS Yorkshire and Humber (South Yorkshire Branch)**
Innovation Technology Centre, Advanced Manufacturing Park,
Brunel Way, Catcliffe, Rotherham, S60 5WG
Tel: 0870 011 1875 http://www.mas.berr.gov.uk/

# Case Study SPL Ltd

## Sector: Retail & Wholesale

## Size: SME

## Region: North West

## Company Overview

SPL Ltd, a private family business, was founded in 1956 and imports and exports (from five continents) exotic foods. They supply extensively to large supermarket chains and other multiple retailers, as well as cash & carry groups, manufacturers and catering wholesalers.

## Project Overview

SPL Ltd worked with Groundwork Oldham & Rochdale on a number of projects over recent years. When the free resource efficiency review became available for SPL Ltd they were more than happy to accept.

A meeting was arranged between Graham Riley (SPL Ltd) and two Groundwork business advisors, which involved discussion with Graham and a tour around the company premises.

A resource efficiency diagnostic tool was used to identify the company's main areas of energy use, water use and waste production.

Important information on electricity, gas and water consumption and associated cost was collected and on gathering this information, the two advisors broke down each of the company's processes looking for inefficiencies in use and irregularities in utility consumption.

Examples of such areas were:
Incoming capacity of electricity, electricity use of vending machines, office equipment and water coolers, the charging and use of the company's 10 fork lift trucks, temperature control and thermostatic temperature and water use in toilets, sinks, and the associated surface water drainage charge.

The same process was used when looking at waste produced by the company, including their current waste contractors and costs for waste management.

The key behind the savings achieved for SPL was understanding their gas, electric and water consumption. Only once monitoring was checked against their meters could they establish resource efficiency benefits.

## Benefits

£2,100 savings p.a. realised from using timers for Fork Lift Trucks.

£3,300 savings p.a. from fitting vending machines & water coolers with timer switches.

£500 p.a. saved just from reducing temperature in the office by 4˚C.

£3,500 savings p.a. from renegotiating their waste contract.

23 tonnes of $CO_2$ p.a. realised.

## Energy Efficiency

Implement overnight charge up policy, using timers, for Fork Lift Trucks (FLT) to take advantage of night time rate:

- £2,100 saved!

Implement driver efficiency training and navigation equipment:

- £13,000 forecasted saving!

Fit vending machines and water coolers with timer switches to ensure they are switched off when not in use (overnight and during bank holidays):

- £3,300 saved!

Ensure FLT battery chargers are depleted by 80% before putting on to charge:

- £800 saved!

Reduce temperature in offices by 4˚C:

- £500 saved!

Insulate the office area:

- £300 forecasted saving!

## Waste Minimisation

The resource efficiency audit was carried out across the business by the Groundwork advisors and required just 2 hours of Graham Riley's time from SPL.

Following the recommendations of the audit, SPL renegotiated their waste contract. SPL Ltd now recycle all of their waste cardboard, through the use of a cardboard compactor and external recycling company and have achieved savings of £3,500 p.a.

## Water Savings

Install save a flush devices:

- £300 saved!

Replace turn taps on all sinks with push down and/or aerator spray taps:

- £234 forecasted!

SPL Ltd was quoted a saving of £30,634 from installing a rainwater harvesting system. The costs of implementing the system exceeded the potential savings that could be gained and it was deemed unfeasible to install. Whilst looking into a rainwater harvesting system, SPL queried their surface water drainage charge and identified the incorrect billing of this charge. This resulted in savings of £6,307 from reducing from band 8 to band 7.

Graham Riley of SPL Ltd Says:

*"Thanks to Groundwork, cost savings of over £70,000 were identified.*

*The fact that the majority of these were simple low to no cost opportunities, through a small amount of effort, we have already achieved large savings of over £15,000."*

**SPL Ltd**
Drury Lane,
Chadderton
Oldham OL9 7PH

Graham Riley
graham.riley@spluk.com

## Support organisation details:

**Groundwork Oldham and Rochdale**
Groundwork Environment Centre, Shaw Road,
Higginshaw, Oldham OL1 4AW
www.gwor.org.uk

**ENWORKS**
Fourways House,57 Hilton Street, Manchester M1 2EJ
www.enworks.com

# Case Study The Plough Inn

## Sector: Other Services

## Size: SME

## Region: South West

## Company Overview

The Plough Inn is a small business comprising a hotel, restaurant and public house facilities. It employs approximately 15 staff both full and part time. B2 is the building surveying division of BKW Chartered Surveyors, a small firm specialising in small projects for individual clients with services designed to minimise client cost.

## Project Overview

The Plough Inn was flooded during the heavy rains of 2007 (the Gloucestershire floods).

The premises were closed for refurbishment. Plant and equipment were damaged. The owner, having received an off-the-cuff comment about global warming being the cause, decided to use maximum energy and water efficiency techniques in renewals and engaged B2/ BKW Chartered Surveyors to restore the property and investigate what new systems could be implemented.

Consideration was given to on-site energy production, improved energy delivery and recovery and the operational methods used by the business.

The property was repaired and refurbished, including undamaged areas, with efficient heat delivery and new operational techniques in the kitchen area.

The professional input was much higher than usual and so the project was undertaken on a joint venture basis.

Ground Source Heat Pumps were installed in the property with the Beer Garden being the main heat source for the site.

A new plant room was constructed to house and display the system as an educational Point of Information for customers and to encourage others to consider using similar systems.

The existing heating system was replaced with an under floor radiant system and hot water was reconnected to provide dispersed local source points from the main hot water generator.

The kitchen was renewed with all electric appliances using latest induction cooking systems with variable power and high efficiency grills and an oven with rapid warm up times and faster cook times (around fifteen times faster).

## Benefits

64% Energy savings realised.

Ground source heat pump, energy efficient refrigeration and cooking equipment installed saving £15,000 p.a.

Water recycling installed for cleaning plant, reducing water consumption to around 50 litres per day.

Anticipated payback period 5 years.

Appliances use water filtering and recycling with heat recovery. Timers were added to allow single use auto shutdown to prevent the "always on" approach previously used.

## Expenditure Details

The capital cost of the energy efficient equipment is around 300% of the standard alternatives.

It took around 200% of the time input for the additional research required to tailor the systems to this particular requirement.

Staff acclimatisation was around one week. Build times were increased by around 5 weeks since some of the work would not otherwise have been required. Other traditional systems are around 10 days longer.

The payback period was predicted to be 12 years. However, it is anticipated that this will be achieved in 5 years based on current savings.

The rooms are more comfortable to use. Warm-up times are significantly reduced. The kitchen is able to respond much more quickly to special requirements and orders.

The systems are quieter and neighbours have also benefited from this.

Project manage, Mark Blooman, from B2 Surveyors, said:

*"The systems have been working very well and it took only a little time to get used to them. Energy savings have exceeded predictions and comfort is much better".*

The Plough Inn was commended in the Construction and Renovation category of the UK National Energy Efficiency Awards 2008, UK CEED.

**Top Tip for Other Companies**

Do it.

Avoid the schemes that sound extra green and stay practical. Negotiate with suppliers – they are keen to increase take up of new technology and will help you. They can also apply for grants on your behalf.

**The Plough Inn**
The Plough at Kelmscott
Kelmscott
Near Lechlade
Gloucester
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# Case Study Tullis Russell Coaters Limited

## Sector: Machinery & Equipment (other manufacturing)

## Size: SME

## Region: North West

## Company Overview

Tullis Russell Coaters Limited is situated in Bollington near Macclesfield. They were formed in 2001 and are a manufacturer of coated products such as postage stamps and security papers, and also provide tailored solutions for individual customers. The company has been providing printers and postal authorities worldwide with high quality papers for over 20 years.

## Project Overview

Ground work Cheshire's Environmental Business Services Team visited Tullis Russell Coaters as part of the Resource Efficiency Programme to undertake a review of current resource usage and opportunities to deliver savings.

An Environmental Audit was undertaken with the Health, Safety and Environment Officer and a number of opportunities were identified within energy use, waste and water. There was also a review of the existing management systems present within the company. A number of these have since been achieved with other initiatives still in the pipeline, such as the implementation of Variable Speed Drives on the coating machines and mixers in the colour shop. ISO 14001 had already been implemented and certified by Tullis Russell Coaters.

Following on from the resource efficiency audits, Groundwork has undertaken follow up visits to support the client in the delivery of the opportunities using internal Resource Efficiency Specialists.

Further visits have also taken place to undertake a Carbon Footprint Assessment and Corporate Responsibility Audit.

Health, Safety and Environmental Officer for the company, Paul Williams, said of the audit:

*"Tullis Russell Coaters Ltd is accredited against ISO 14001 Environmental Management System. One of the philosophies behind the management system is to continually improve processes to reduce the company's environmental impact. To achieve this we have targeted energy efficiency, waste minimisation and water reduction.*

*The professional support from Groundwork has resulted in a number of comprehensive studies being undertaken. The studies have identified significant improvement areas and created a business*

## Benefits

£185,000 savings p.a. within paper waste through simply following best practice on each of the lines.

£16,000 savings through installation of an Economiser Unit using waste heat from the flue to pre heat steam boiler feed water.

Energy consumed reduced to the extent of some 55000 kW of gas usage per annum.

232 tonnes of waste/ recycled paper saved per annum.

Forecast to have cut energy consumption by up to 80% by 2010.

*action plan. The action plan has been captured on an online toolkit, which has tracked the progression of all the improvements and given us a real time account of all the saving made to date. These savings have shown to everyone on site the importance of continually improving environmental performance."*

## Waste Minimisation

£185,000 savings p.a. realised within paper waste through simply following best practice on each of the lines. This equates to 232 tonnes per annum of waste/recycled paper that used to go for recycling and/or landfill that no longer will occur.

These improvements have come about partly by being able to have new equipment; a precision paper sheeter, that has allowed more precise raw material base roll widths and consequently less trimming waste.

Education of best practice throughout the processing has also been implemented, using single point and tool box talks, following comprehensive waste mapping. This has led to the further elimination of waste arisings at source.

## Energy Efficiency

£16,000 savings realised through installation of a Economiser Unit using waste heat from the flue to pre heat steam boiler feed water.

The economiser has reduced the energy consumed to the extent of some 55,000 kW of gas usage p.a. and a corresponding reduction in carbon footprint of 11 tonnes of $CO_2$ per annum.

Payback Period – 0.9 years

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# Case Study Wilson James

## Sector: Construction

## Size: Large

## Region: London

## Company Overview

Unilever are a manufacturer of leading brands in foods, home care and personal care. Many of their home care products are market leaders including Cif, Comfort, Domestos and Persil. Within the personal care market, they are global leaders in products for skin cleansing, deodorants and antiperspirants. Unilever House is a main office location for the company situated in Victoria Embankment, London.

## Project Overview

The Unilever House project team shared the aspiration of delivering the most sustainable project possible in the refurbishment of the headquarters. The project commenced in October 2004 as part of a 3 year redevelopment of the Unilever house, 6-storey, 400,000 square foot project located near Blackfriars Bridge in the City of London.

Three of the key targets were to:

- Ensure key material deliveries to site were consolidated in SE London
- Source construction materials locally wherever possible
- Re-use and recycle 95% of materials and equipment.

To facilitate these aims the project was one of the first to benefit from the use of the London Construction Consolidation Centre (LCCC) at Bermondsey where all materials for the project except aggregates, structural steel, cladding and major plant) were initially delivered.

The use of the centre enabled the main barrier, a restricted delivery point in close proximity to the Crowne Plaza Hotel, to be overcome by ensuring deliveries were kept to a minimum, closely co-ordinated and timed.

The logistics team conducted on-site tool box talks to train contractors in the relevant logistics procedures. Information sessions for all site management were undertaken to ensure understanding of the LCCC methodology. A trade contractor information pack was issued to all parties which contained the written logistics strategy and procedures.

## Benefits

£200,000 of unused materials returned from the project instead of being disposed of.

Waste materials taken to the construction Consolidation Centre for processing.

76% of waste materials were recycled.

Reduced traffic flow in the surrounding area and increased productivity on site.

Over 6,000 tonnes of steel and 17,000$m^3$ of concrete were removed and recycled.

Trade Contractors were required to order their work pack call-offs and each order was recorded by the site Logistics Manager and forwarded to LCCC for picking and delivery.

At the LCCC materials were re-packed into day work packs and forwarded to the site. Upon receipt at the site the day work packs were delivered directly to the individual work faces, thus reducing traffic flow and congestion in the surrounding areas and increasing productivity onsite.

Individual contractor supply chains were established to focus on providing a robust just-in-time materials delivery schedule.

## Materials

In all, some 13,200 pallets were handled by the LCCC over a 2 year construction period. At project completion the extent of un-used materials, returned to the centre, rather than ending up in waste skips, amounted to 38, 26 tonne lorry loads at full capacity, calculated at a value of £200,000.

## Waste Management

Waste generation was recorded on a monthly basis and in total the project generated 3,384 tonnes at an average of 140 tonnes per month of which a minimum of 76% was re-used or recycled. In addition, 90% of all delivered pallets were returned to the LCCC for collection by the individual suppliers.

**Wilson James/Bovis Lend Lease for Unilever**
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