



Business Environment™
Partnership

Environmental Placement Programme

Report 2008

Compiled by

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Summary of Achievements

58 placements took place this year; students and 50 Scottish businesses and organisations benefited from participation in the programme in the following locations:

- Edinburgh/Lothians
- Borders
- Glasgow
- Ayrshire
- Forth Valley
- Fife
- Tayside
- Grampian
- Highlands and Islands

2008 results:

- 1956.3 tonnes of waste diverted from landfill
- 2539.65 tonnes of CO₂ saved
- 2845.9 m³ water / effluent savings
- £827,889 total cost savings

Summary of Participants

Company Name	Region	Nature of Activities	Student	University	Course	Project Type
Aberdeen City Council	Grampian	Local authority	Laura Ann Duffy	Aberdeen	Geography	Biodiversity
Agricultural Management	East Lothian	Farming and Farm Management	Farlane Whitty	Edinburgh	Civil & Environmental Engineering	Biodiversity
AMEC	Grampian	Oil and Gas	Duncan Innes	Aberdeen	Geography	EMS
ASM	Grampian	Commercial Property Refurbishment	David Lamming	Aberdeen	Spatial Planning with Environmental Management	Waste Management
BAA Edinburgh	Edinburgh	Airport	Michal Len	Edinburgh	Geography	Environmental Impacts Assessment
Beild Housing Association	Glasgow	Housing Association	Marc Breen	Glasgow Caledonian	Environmental Management & Urban Planning	Recycling and Waste Management
Berwickshire HA	Borders	Housing Association	Cosmo Blake	Aberdeen	Conservation Biology	Renewables Survey
Bristow Helicopters	Grampian	Aviation	Veronica Mitchell	Aberdeen	Geography	Waste and Waste review
Central Scotland Forest Trust	Lanarkshire	Environmental Charity	Chloe Darling	St Andrews	Geography and Economics	Environmental and Cultural Review
City of Edinburgh Council	Edinburgh	Local Authority	Jules Colin	Edinburgh	Environmental Engineering	EMS
Diageo	Renfrewshire	Food and Drink	Scott McLeod	Stirling	Geography	Waste

Diageo	Ayrshire	Food and Drink	Neil Young	Aberdeen	Geography	Water
Diageo	Fife	Food and Drink	Chris Sproson	Edinburgh	Geography	Water
Dunfermline Building Society	Fife	Financial Institution	Anne Ruth Aitken	Stirling	Environmental Science	Green Transport
East Grampian Coastal Partnership	Grampian	Coastal Management	Robert Needham	Aberdeen	Marine& Costal Resource Management	Geopark
Fife Council	Fife	Local Authority	Dariusz Bazazi	Edinburgh	Environmental Geoscience	Green Awards Development
FST	West Lothian	Communications Solutions	Anna Davidson	Edinburgh	Sociology and Politics	Carbon Footprint
Gentech International	Ayrshire	Manufacturing	Findlay Smith	SAC	Environmental Management	ISO14001
Glasgow City Council	Glasgow	Local Authority	Gitanjali Nayar	Strathclyde	Environmental Studies	Sustainable Development
Growforth Ltd	Fife	Horticultural Wholesale	Chris Brown	Dundee	Geography	Waste Minimisation
Halliburton	Grampian	Oil and Gas Service	James Roebuck	Edinburgh	Chemistry	Carbon Footprint
Halliburton	Grampian	Oil and Gas Service	Morag MacDonald	Aberdeen	Geography	Supply chain
Havelock Interiors Division	Fife	Retail Shop fitting	James Bell	Aberdeen	Geography	Carbon and Waste Reduction
Heritage Portfolio	Edinburgh	Catering& Hospitality	Rebecca James	St Andrews	Environmental Biology& Geography	GTBS
Hillcrest Housing Association	Tayside	Housing Association	Andrew Woof	Dundee	Geography	Travel Research

Hillcrest Housing Association	Tayside	Housing Association	Craig Robb	Dundee	Environmental Management	Food Waste
Leys Estate	Grampian	Country Estate	Hollie Taylor	Aberdeen	Ecology	Environmental Management
Link Group	Edinburgh	Housing Association	Emile Martinot	Edinburgh	Mechanical Engineering with Renewables	Carbon Footprint
Macsween's of Edinburgh	Edinburgh	Food and Drink	Ruth Walker	Edinburgh	Geography	Environmental Management
Mathiesons	Forth Valley	Food and Drink	Scott McKirdy	Edinburgh	Chemical Engineering	Utilities Review
Matrix International	Angus	Brake, clutch & machined parts manufacturer	Thomas Kurka	Abertay	Environment and Business Studies	EMS
Monymusk	Grampian	Country Estate	Nicholas Cowan	SAC	Rural Business Management	Biodiesel Feasibility Study
Monymusk	Grampian	Country Estate	Charlotte Lane	St Andrews	Geography	Biomass Feasibility Study
New Caledonian Woodlands	Edinburgh	Environmental Charity	Lawrence Craig	Edinburgh	Chemical Engineering & Management	Green Product Development
Pentlands Science Park	Midlothian	Science Park	Jennifer McIntosh	St Andrews	Sustainable Development	Waste Minimisation
Pregis	West Lothian	Plastic Packaging Manufacturer	Scott Kerr	Heriot Watt	Environmental Management & Technology	Waste Minimisation
PSN	Grampian	Oil and Gas Support	Tracey Elrick	SAC	Sustainable Environmental Management	Waste Minimisation

Quaker Oats	Fife	Food and Drink	Pauline Pirie	Dundee	Environmental Science with Geography	Environmental Management
Quaker Oats	Fife	Food and Drink	Aisling Connolly	Dundee	Environmental Management	Waste Minimisation
Radisson SAS Edinburgh	Edinburgh	Hotel	Jennifer Woodhead	Edinburgh	Geography	Waste Minimisation
RD Energy Solutions	Midlothian	Renewable Energy	Joseph Padbury	SAC	Sustainable Environmental Management	Renewables Study
Renewable Devices Swift Turbines Ltd	Midlothian	Renewable Energy	Pete Birley	Napier	Mechanical Engineering	Renewables Study
Rodger Builders	Borders	Builders	Craig Marjorybanks	Aberdeen	Business Management	Biodiesel
Schoeller Bleckmann Darron Ltd	Grampian	Engineering	Louise McCafferty	SAC	Sustainable Environmental Management	Waste Minimisation
Schuh	West Lothian	retailer	Allan Love	Edinburgh	Chemical Engineering	Carbon Footprint
Scot-renewables	Highlands and Islands	Renewable Energy	Rowan Muir	Aberdeen	Marine& Costal Resource Management	Marine Renewable Study
Scot-renewables	Highlands and Islands	Renewable Energy	David Clouston	Edinburgh	Mechanical Engineering with Renewables	Marine Renewable Study
Scottish Government	Edinburgh	Government	Julie Nicholson	SAC	Sustainable Environmental Management	Biodiversity
Scottish Government	Edinburgh	Government	Jamie Auld Smith	Strathclyde	Human Ecology	Waste Minimisation

Senergy	Grampian	Oil and Gas Sector support	Luke Robertson	Glasgow	French and History	Environmental Awareness
Senergy	Grampian	Oil and Gas Support	Simon Byrne	Aberdeen	Geology	Carbon Offsetting
SG Baker	Angus	Packaging S	Ezzaldin Ibra	Abertay	Environmental Management	Carbon Footprint
The Natural House Company	Borders	Housing Development	Ben Williams	Edinburgh	Environmental Geoscience	Life Cycle Analysis
Turriff Contractors	Grampian	Utility Infrastructure	Matthew Robertson	SAC	Sustainable Environmental Management	EMS
West Lothian Council	West Lothian	Local Authority	Michael Geoghegan	Dundee	Geography and Environmental Science	Waste

Company Case Studies

Laura Ann Duffy

Aberdeen City Council

Laura Ann was placed with Aberdeen City Council to investigate the potential for improvements in grassland maintenance practices and create a future development framework for this. Laura Ann has designed a questionnaire to aid this exercise.

During her project Laura Ann investigated grassland maintenance practices used by other local authorities; a questionnaire was sent to 163 other local authorities that have implemented a Grassland Biodiversity Action Plan. This survey highlighted key issues that Aberdeen City Council should address to ensure the success of their efforts to preserve and enhance the city's species-rich grasslands. A further task developed from this has been case study reports from other local authorities on good and bad standards of practice for initiating the GBAP.

The desk-study analysed maintenance practices on grasslands, seeding options and also opportunities for funding for future development of grassland areas. The desk-study also involved communicating with other councils by telephone and holding face-to-face interviews with scientists and environmental service staff of other councils. Laura-Ann as part of the desk study reviewed the ground maintenance manual of Aberdeen City Council's districts, compiled them together and made recommendations on design elements and topics to be included, before producing a PDF template which the council could use to produce an informative reference for frontline staff.

Following the analysis of survey results and interviewing grassland experts, Laura identified four areas highlighted by the project that could be addressed. One of her primary recommendations is the introduction of a 'Biodiversity Week' across the city to help raise awareness with the general public and highlight the key issues behind the council's action to include a biodiversity newsletter, family fun day events and opportunities to promote volunteering opportunities.

Farlane Whitty

Agricultural Management Ltd

Farlane was based at Agricultural Management in Haddington, East Lothian with the following objectives:

Primary Objectives for the management of Rural Stewardship Schemes:

- Assessment of the current state of the habitat sites.
- The creation of a map based GIS database detailing the sites and features under management. This involved transferring existing paper maps to a digital and therefore more versatile format.
- Update, adapt, reorganise and refine an existing table based database.
- Create the basis of a project to bid for future funding to maintain and improve the habitat and environmental features.

To achieve these objectives, Farlane was given use of a 4x4 off road vehicle, a camera and GPS plotting equipment for inspecting and scouting habitats. In order to create and develop the two databases, he received training in the computer programmes involved.

Results

Farlane identified accidental nonconformities with the schemes that would have resulted in withheld payment, in time for them to be corrected. This benefits both AMH and the environment.

Furthermore, his work will assist the company to deliver the requirements of the new Scotland Rural Development Programme. Farlane has provided AMH with clear, concise and ordered databases of their existing schemes in a digital format. The potential value of the SRDP to AMH and its clients is substantial, both annually and cumulatively over the five years of the scheme.

Duncan Innes**AMEC**

Duncan was placed with AMEC to assist in the revitalisation of their Environmental Management System, over offices in Aberdeen, London and Great Yarmouth.

AMEC did not have efficient energy monitoring in place so a monitoring system was set up to trend patterns of consumption over time. On closer inspection of energy use within offices, it was found that photocopiers and vending machines were left on 24 hours a day. A recommendation was made for the fitting of "vend-sense" appliances on each of the machines that were estimated to reduce the consumption of energy in each machine by 60% P/A.

Waste audits were carried out in all UK offices in Aberdeen, London and Great Yarmouth to assess the extent of recycling. It was found that each office had a recycling rate of around 40% so there was a great deal of room for improvement. It was noted that vending machine cups were proving to be put into general waste so the recommendation of introducing a "save-a-cup" scheme into all offices, reducing the waste stream of cups into general waste to 0%

An opportunity was also realised for new recycling bins in the London offices which were more aesthetically pleasing.

From an Environmental Management System perspective it was also suggested that AMEC keep in regular contact with their waste contractors to secure regular records of weights and types of materials being recycled so that monitoring can be further enhanced and add to the continual improvement aspect of the ISO 14001 certification.

The findings of this project will aid the Office Services department with developing aims and objectives for the UK offices as well as revitalising and adding strength to their ISO 14001 certification.

David Laming**ASM**

David was placed at Accommodation Services Management (ASM) to organise and manage the disposal of office furniture in the most profitable and ethical manner and avoid it being sent to landfill. David created an inventory of the furniture and then developed a list of potential buyers as well as negotiating sales, co-ordinating logistics for the uplift, delivery and instalment of items.

During David's placement he facilitated the delivery of some 5548 separate items of furniture to over 100 different educational and charitable organisations. He also generated a small proportion of commercial sales that generated income for the company.

Michal Len**BAA Edinburgh**

Michal was placed with BAA Edinburgh with the aim of creating an environmental aspects and impacts register.

All twelve airport departments were analysed on the basis of their interaction with the environment. These were quantified using a scoring matrix created at the start of the project. The main function of the register is to have a clear way of prioritising problematic areas quickly and effectively by having all aspects for each department ordered by a significance score.

Prior to the placement no such document was available. It is necessary to have it in place during the ISO14001 audit that the airport is striving to achieve in the near future.

Currently each department can have a look at their own list and try to meet BAA group targets. Edinburgh airport now has a comprehensive list of their own aspects and impacts.

Michal has created a working, interesting and useful document for the airport as well as instructions for future users to have it updated where and when appropriate. The idea is that more people from each department will see the document and keep it live thus remove the factor of subjectivity.

Marc Breen

Beild Housing Association

Marc is studying Environmental Management and Urban Planning student at Glasgow Caledonian University. Marc was placed with Beild Housing Association in Glasgow to investigate the potential and capacity for setting up recycling facilities for the 5000+ residents/tenants. Marc created a questionnaire and from the responses, calculated that currently there is 21.37% recycling capacity, but potential to increase this to 29.34% capacity. This means that Beild could potentially divert 1155 tonnes of waste from landfill per annum. Results of the questionnaire showed residents were willing to take part in more recycling schemes and 87% of schemes worked with at least one local charity to reuse old furniture from vacant flats.

Marc realised that resident participation would be key in any successful projects. He replaced local authority recycling bins for bespoke mini-recycling sites where appropriate which would better suit the locality and resident/tenant demographic. Other types of recycling could also be encouraged outwith Local Authority led provisions. Charity partnerships could be utilised for recycling old furniture and goods by developing the internal intranet system. Such projects should also be aimed at increasing the residents/tenants social mobility, physical and mental activity/health and help foster better community relationships with the scheme and its local area. It was identified that local projects had to be run with the relevant local authority. Better communication between the Local Authorities, Schemes and other social enterprises or charities with more support from (and co-operation with) other housing association in that locality mean that common issues could be addressed collectively. Resources could also be pooled where appropriate. Marc also noted that a more organised nationwide support structure could help these Associations tackle common issues and provided suitable ways to benchmark progress. The project also highlighted the possibility of developing a bespoke "Green Award" system for Associations to support and reward schemes in the development of their "green" credentials.

Cosmo Blake

Berwickshire Housing Association

Cosmo is going into 3rd year of a degree in Conservation Biology at the University of Aberdeen. He was placed with Berwick Housing Association to carry out a renewable energy survey for the site. The Berwickshire Housing Association (BHA) has used Renewable Energy Systems (RES) for many years but has never completed an official survey on whether they work efficiently, save money or reduce CO₂. In addition, the association was also keen to establish the tenants view on the renewable systems installed within their homes.

Four different RES were identified for the survey: Solartwin, Sunspace, Sunwarm and Drimaster Ecosmart. Cosmo helped create a questionnaire for the tenants that aimed to identify household energy usage and opinions on each renewable energy system. He then selected which tenants to visit and contacted them to organise a suitable time. Houses with a RES were compared to those without. The tenants were asked if they could provide an energy bill to help with the comparisons. Cost savings per year were identified as well as the subsequent reduction in CO₂. The results from this survey will be used to promote the effectiveness of the RES to hopefully gain further funding for more installations. Other recommendations from the survey have been passed on to Berwickshire Housing Association.

Cosmo's placement also involved being a key organiser for a Green Day event. This event was to promote renewable energy and to help people in the Borders reduce their household bills and reduce their impact on the environment.

Veronica Mitchell

Bristow Helicopters

Veronica has recently graduated from the University of Aberdeen with a degree in Geography. Veronica was placed at Bristow Helicopters Ltd in Aberdeen to review waste management at the site. Concurrently, there was a need to establish an energy monitoring system to determine where changes to energy usage could be created.

Veronica's initial task was to conduct a waste audit at the site in order to establish the main waste streams. From the results she was then able to quantify the amount of waste sent to landfill and what proportion was being recycled. The audit highlighted the need to ensure that adequate facilities were put in place to allow the segregation of recyclable waste from offices and engineering operations. Cost savings and recommendations were established and Veronica presented her findings to the company.

Veronica has also created an energy monitoring system at the Aberdeen site which can be rolled out to other Bristow Helicopter bases. In order to make the recommendations transferable to other bases, guidelines were included in the company report for waste minimisation and energy monitoring. In total Veronica estimated that there could be a total of 11 tonnes of waste diverted from landfill, with a total cost saving of £14,346.

Chloe Darling

Central Scotland Forest Trust

The Central Scotland Forest Trust is a charitable organisation and leads the partnership which is creating the Central Scotland Forest. The Forest covers 620 square miles, bounded by Glasgow, Falkirk and Edinburgh. Chloe's main tasks were researching cultural planning as an approach to engagement in the Forest. During the placement Chloe researched the possibility of running training courses in the Forest, installing public art works, establishing voluntary networks, organising festivals and events, running community and education programmes, creating a visitor centre. She also looked at possible cultural activities based on the new world Heritage Site at the Antoine wall. Throughout this time, a wide spectrum of contacts was created and the base research was left for the Trust to develop its cultural planning approach.

Jules Colin

City of Edinburgh Council

Jules was placed with the City of Edinburgh Council. The Council has proposed that Edinburgh becomes 'The most Sustainable City Region in Northern Europe' by 2015 and becomes a 'Carbon Zero Economy' by 2050. In line with these green targets, Jules was placed to participate in the implementation of an Environmental Management System (EMS) for its headquarters.

Jules' main task was to perform a baseline assessment: to form the foundation on which the EMS is built. He collected data from the current environmental performance and the existing management practice.

His study has provided a better understanding of the Council's structure and processes. It enabled identification of potential cost reductions on waste management by improving waste collection scheduling. It should generate savings between £8,000 and £12,000 per year. Staff are now able to check data reliability. It was especially relevant for staff travel because the huge amount of information makes data analysis complex. Mileage accuracy has also been improved.

Scott McLeod

Diageo

Scott McLeod carried out a waste minimisation project at Diageo Kilmarnock to help the company achieve their 'Zero Landfill' target for 2011. Scott's first task was to investigate areas of waste generation across the site. This involved speaking to staff members from the different departments, and observing the processes at each area. A waste map was then drawn up to show what waste was created, and where. The map also showed what waste was being reused or recycled and the process of how waste was collected and disposed of. Further information was then sourced from contacting local recycling companies. It transpired that significantly more material could be recycled than expected; for some departments almost all waste could be diverted from landfill. New procedures were then put in place for the disposal and collection of all the extra recyclable items. Posters and signs were also put up around the bottling halls encouraging staff to reuse and recycle. Emails were sent to the team leaders to inform them of reusing and recycling possibilities.

Scott then researched alternative procedures for the reduction, recycling and elimination of certain wastes. Recommendations included shredding certain materials instead of sending them to landfill, purchasing a reverse vending machine for all cans, bottles and cups on the site and purchasing new hand dryers to eliminate the use of paper towels.

Neil Young

Diageo

Neil was placed at Diageo Sheildhall to perform a water audit. Water flows through the plant were investigated and quantified to a high resolution to identify and areas where water could be reduced.

The largest use of water was the water purification plant or demineralization unit. This purifies water to a very high standard before it is mixed with the 70% whisky spirit. As the investigation proceeded, it became clear that the large volumes of water used to clean the filters in the demineralization unit could either be reduced or recycled, to investigate the possibility for this course of action a pilot plant was bought on site. A pilot plant is a small purification unit for investigating the feasibility of introducing a larger, permanent plant. The findings indicated that several of the filters were being cleaned unnecessarily and high quality water was being wasted. Water usage was reduced by installing timers on the device used for cleaning the large storage vessels and tankers. Flow reducers were also fitted on taps and trigger operated spray handles on larger wash sinks reduced the flow of water and the water needed for washing the components by between 15-20%.

Chris Sproson

Diageo

Chris Sproson has recently graduated from Edinburgh University with a BSc in Geography. Chris was placed with Diageo at their plant in Leven, Fife to optimise the company's CIP. CIP stands for 'clean in place'. It is a highly automated process for cleaning pipes and vessels without the need for disassembly. This makes it more efficient and less labour intensive than manual cleaning. The Leven site uses two different CIP sets to clean the bottling lines consisting of 3 stages (pre-rinse, hot flush and final rinse) and lasting between 80-120 minutes.

To date, Chris has shortened the CIP by 10 minutes on one bottling line. If successful then this will be applied to other bottling lines. The evidence gathered also suggests that it is possible to recapture the final rinse water of a CIP, which can then be used for the 'pre rinse' of the next CIP. If implemented fully, these schemes will save £194,037 and 1400 m3 water per year.

In addition to this, other objectives such as investigating and reducing the volume of water consumed by the air eliminator pipe were accomplished, with additional savings of £739 per year. Post CIP product run-off was also studied. Product run-off is consists of the first 60 litres of product after a CIP which is disposed of and recycled. Although this was not reduced, closer and cheaper recycling option are currently being looked for. Chris has also applied himself to other aspects above and beyond his remit. Examples include the discovery of 2 broken rotary spray heads in the vat rooms (all vat spray heads were subsequently serviced to eliminate the risk of insufficient cleaning and product contamination). Persistent glitches with the CIP have also been discovered by the student and are being rectified in order to further reduce the CIP duration.

Anne Ruth Aitken

Dunfermline Building Society

Ruth was placed at the head office of Dunfermline Building Society to help with the introduction of a green transport plan. Ruth carried out an audit of the site to get an overview of facilities available, the accessibility and the transport links that served the site. Ruth also carried out a travel survey of head office staff and analysed the data. This provided information on the staff travel habits and what would be needed to enable the staff to change the way they travel to work.

The key findings of her audit and survey showed that:

- There were not enough parking spaces on site for the number of employees
- Solo car driving was the main mode of transport for travelling to and from work
- 31% of staff lived in the same postcode area as the head quarters

- Over 50% lived within a five mile radius of the head quarters
- The potential increase of staff using more sustainable transport was worked out using this survey data
- The majority of the staff did not want to change their mode of transport; convenience, flexibility and cost were the main reasons
- If changes were put into place there could be an increase in the number using sustainable transport

The information collected could then be used to give recommendations and help in the formulation of the Green Transport Plan and also be used to assist in the staff consultation process.

Robert Needham

East Grampian Coastal Partnership

Robert Needham was placed with the East Grampian Coastal Partnership to investigate the feasibility of establishing a UNESCO Geopark based around the Highland Boundary Fault which will include Stonehaven. This project was initiated by the Stonehaven Tourist Group in association with the East Grampian Coastal Partnership. The project involved gathering information from established UK Geoparks, summarising the UNESCO application criteria, identifying the potential boundary of the Geopark and geological, natural, historical and biodiversity features within it and assessing different methods of interpretation for potential tourists.

Robert found that it would be feasible to meet the UNESCO application criteria; however amongst other factors this would require financial support and a lead organisation to drive the project forward. Robert was able to identify a potential boundary for the Geopark from Arbroath to Torry Battery on the East coast, stretching inland to meet the existing boundary of the Cairngorms National Park at Glen Prosen, Kirriemuir and Glamis before circling back to the coast at Arbroath. In addition Robert recommended that a Regionally Important Geological and Geomorphological Sites (RIGS) group be established as well as further contact with relevant organisations to investigate the creation of a steering group.

Dariusz Bazazi

Fife Council

Dariusz was placed at Fife Council to assist with the development of the Green Business Fife Awards. He was tasked with identifying potential award sponsors, researching and making potential categories and judging criteria. Dariusz also looked at developing a marketing and communications strategy to effectively promote the awards to businesses in Fife. He also looked at organising a set of environmental events and workshops. Dariusz helped Green Business Fife develop the awards successfully. He was able to contact companies for sponsorship and develop a marketing strategy including developing a promotional flyer. He also updated the Green Business Fife website. The placement was beneficial and the work Dariusz was done has been invaluable to the network. It is expected that the preparation work carried out for the 2009 awards could be used for awards in future years as well as for the first event in 2009.

Anna Davidson

FST

Anna Davidson undertook an eight-week placement with FST Technologies Ltd, a printing and communications solutions company with approximately 80 staff based in Livingston, West Lothian. Anna's objectives were to determine FST's Carbon Footprint and to investigate the supply-chain Carbon Footprint of a bank statement. She was also tasked with making recommendations for footprint reductions, verification of the footprint calculations and potential achievement of carbon neutral status for the business.

During the 8-week placement Anna worked with staff at FST and companies within the supply chain, to gather data on the lifecycle footprint of a statement. With the help of staff at FST she developed tools for the calculation of a statement's carbon footprint, for the ongoing accounting of FST's Carbon Footprint and for the monitoring of electricity usage on site.

In her recommendations she identified greenhouse gas emissions savings opportunities in air-conditioning, lighting heat-recovery and staff commuting. These amounted to a total potential CO2 emissions saving of up to

120 tonnes of Co₂, or up to 20% of the current carbon footprint. Considerable cost savings were identified as a result of the energy savings recommendations.

Recommendations also looked at reducing the lifecycle carbon footprint of a statement. This included looking at the entire supply-chain involved in the production and transport of paper, right through to the disposal of the statement by the customer. Opportunities to reduce the footprint by making 'green' choices in procurement, printing and transport were identified. The costs and opportunities of gaining FSC and PEFC chain-of-custody accreditation were also investigated.

Anna also looked into the opportunities and costs associated with FST gaining verification of the footprint calculations through ISO 14064 and gaining accreditation for footprint reductions through the Carbon Trust Standard.

Findlay Smith

Findlay was placed at Gentech International in Ayrshire. His placement aim was to "implement procedures for Gentech to be aligned with the requirements of ISO 14001". With these procedures being implemented after the completion of the project, it would be hoped that the company could then go for accreditation of ISO 14001 at some point in 2009.

Gentech International

Findings of the Gentech Project were from both the basic study of the ISO 14001 requirements, and also the GAP Analysis. The study of the requirements, found that for ISO 14001, a simple cycle was conceived as being the best method of completing the whole process. The process was based on a 'PLAN-DO-CHECK-IMPROVE' Cycle, with each section of this cycle being split into subsections.

The second area of the findings of this project were from the GAP Analysis which covered which areas of Gentech were causing concern; the environmental aspects and impacts in these areas; and where possible procedures could be introduced to monitor and reduce the impacts which were causing concern.

Findlay produced recommendations which included the use of a waste audit, to calculate Gentech's total waste and of all this waste, how much of this can be recycled. Once this has been completed, this should be conveyed to the staff and separate bins for each bin should be placed at strategic points within the work and kitchen and dining areas. Other recommendations were given to Gentech International and these must be taken into account for when the company goes for ISO14001 accreditation in 2009.

Chris Brown

Chris was placed at Growforth Ltd, a wholesale nursery in Fife. The aim of the placement was to look into three aspects of the company in regards to waste minimisation, recycling and carbon cutting. These were waste plastics, composting and the company's haulage. The overall aim for Chris was to create a business plan looking into the best options available for each of the components.

Growforth Ltd

The project highlighted that Growforth would be able set up a waste handling system that could directly divert up to 3.72 tonnes of waste plastic from landfill to be sent on to a recycling company to be put back into the UK market. This could also save the company up to £643 per year on skip hire and uplift if all plastic (and cardboard) was recycled. A system was also created with Dobbies Garden centres to assist them in handling their waste plastics.

Chris's research also highlighted the potential for Growforth to carry out composting of green waste onsite. This would provide a channel for a number of customers to have their waste recycled. In addition, a possible

relationship with a local composting company was looked into and began development in order to set up and run the system.

Finally, the company's haulage was identified as the biggest contributor to the company's carbon footprint. Chris research into alternative fuel types and identified a company who specialise in second generation biodiesel. This potentially could see the company cut up to CO₂ emissions by a considerable degree as well as savings on running costs.

Chris was able to highlight and recommend suggestions in waste handling that would significantly reduce the companies waste and costs, as well as identifying positive changes to the transport of the company. Moreover, he established important links with local companies that could see business relationships launch with financial and environmental gain for the company.

Morag Macdonald

Halliburton

Morag was placed with Halliburton to reduce the company's impact on the environment by optimising the quantity of purchased goods. She also researched best practice in responsible purchasing/ sustainable procurement and liased with the company's environmental specialists and design a 'Greener Supplier Questionnaire' to assess suppliers' environmental performance and create a feedback mechanism for targeted suppliers with information on how they might improve their environmental performance.

Morag also was responsible for supplier information packs which include best practice guidance for green procurement, green supplier questionnaire, packaging saving tips and contact details for environmental guidance. She also designed a webpage to increase staff awareness of local suppliers, businesses and waste minimisation organisations as well as creating a 'Green Procurement Action Plan' for 2008/09. She also updated the Halliburton webpage, detailing local suppliers and waste minimization opportunities and organisations.

James Bell

Havelock Interiors Division

James Bell was placed at Havelock Europa, Dalgety Bay, which is a large company specialising in shop-fitting and corporate interiors. James' overall goal was to reduce the amount of waste sent to landfill and reduce the carbon footprint of Havelock Europa.

Through designing signs and posters, James was able to ensure that proper use was made of the company's biomass boiler, resulting in a 75% reduction in waste to landfill since the scheme started, representing an annual saving of £43,000 and 322 tonnes of CO₂.

James' cost/benefit analysis into cardboard recycling yielded the recommendation to purchase a cardboard baler, which has been approved by key board members and to be included in the budget, representing an investment of £8,000. James's research estimates that this will be offset by reduced landfill costs and cardboard rebate inside 2.5 years, with annual profit estimated at £3,000 p.a. thereafter. James also devised an office recycling programme which will save an estimated £1,000 p.a. in landfill costs, and a CO₂ saving of 4 tonnes p.a.

Energy awareness procedures and staff energy training have also been planned and ready for implementation. A range of basic energy saving practices is forecast to result in a 5% reduction in electricity costs (conservative due to high machinery consumption), representing an annual saving of £14,000.

Rebecca James

Heritage Portfolio

Rebecca James has just completed a BSc in Environmental Biology and Geography from the University of St Andrews. Heritage Portfolio is an Event Catering and Management company that operates within heritage style

properties including Castles, Palaces, Stately Homes and buildings of distinction. They offer a turnkey service to clients to deliver everything from weddings to corporate events and private parties. They also have a retail division operating five cafes in the National Galleries of Scotland, the National Museum of Scotland and Hopetoun House in South Queensferry.

They already have an environmental policy in place, and their five cafes were accredited with the GTBS in 2007 (four Silvers, one Bronze). The purpose of the project was to gain Green Tourism Business Scheme (GTBS) accreditation for Heritage Portfolio's head office in Edinburgh. Rebecca collected data that would help support the application. She compiled a staff questionnaire to try and gauge current attitudes and knowledge and use it to tailor a programme for the company's needs. Energy saving and recycling was made easy and intuitive; for example, personal waste bins were replaced by personal Mixed Recycling bins, allowing a range of materials to be recycled at the desk. Rebecca set up energy and waste audits, behavioural change programmes, environmental education, awareness and training programs. The key findings were that the company's carbon footprint for 2008 was going to be 182 tonnes of CO₂. This was targeted by educating and encouraging staff to produce less than 3.5 tonnes a week. Their progress was monitored on the Green Board using a thermometer diagram and direct measurements from the meters converted into tonnes of CO₂. In addition, the company had also produced 1.5 tonnes of waste for each employee from June 2007 to June 2008 and only recycled 27%. By making the recycling message and method consistent throughout the company, this can easily be increased to 50%.

Rebecca produced a 'Green Plan' to ensure sustainability recommendations and potential commercial and environmental benefits for changes for the future. HPL can follow the plan using the Timeline and the Checklist, and should achieve a 'Gold Award' by Autumn 2009 and beyond.

Andrew Woof

Hillcrest Housing Association

Andrew was placed with Hillcrest Housing Association to reduce their transport costs and carbon footprint.

The main objectives were:

- To assess current business and commuting mileage
- To assess staff attitudes towards switching to more sustainable modes of transport
- To assess ways to reduce business and commuting mileage and associated environmental costs
- To design a travel plan and recommend ways for its implementation

In order to achieve these aims, a travel questionnaire was designed. The company was particularly interested in the top 38 car users who account for 90% of car business expense. It was decided therefore, to make the questionnaire compulsory for these employees to fill in. The other 112 employees were considered "non essential" and therefore could only be encouraged to fill it in. Response rates amongst both categories were good, with an overall 71% response rate – 95% of "essential" car users and 65% of "non essential" car users responded.

When the results of the questionnaire were analysed, a number of interesting statistics were apparent. HHA spent £100,638 on the 242,090 miles driven on business last year, which accounts for 26% of their carbon emissions.

In terms of options to help reduce both business and commuting mileage, there are a number of low cost, high impacting solutions which can be introduced. The Dundee liftshare scheme is free to join and would be a great opportunity to reduce commuting and business mileage. By liftsharing 1 day a week, 20% of commuting mileage would be reduced. This would mean a reduction of commuting mileage by 436 miles. If one business journey a month of 50 miles was substituted by each of the top 38 users, this would account for a reduction of 1900 business miles per month, saving the company £760 per month. This could be encouraged through lift share, pool bikes or purchase of a '10 journey saver'. With a myriad of options, a reduction in commuting and business travel is easily attainable.

Hollie Taylor**Leys Estate**

Hollie was placed with Leys Estate near Aberdeen to investigate the carbon footprint associated with farming, forestry, business and housing and to set recommendations to reduce carbon emissions across the estate. She started by collecting data and calculating the carbon footprint of the different areas within the estate. She also looked at the feasibility of converting to bio-diesel, the use of anaerobic digesters, and the installation of wood pellet heating systems in residential properties. The results of the project identified a potential reduction in carbon emissions within agriculture of 858 tonnes CO₂/ year through altering cattle feeds to reduce enteric fermentation. Furthermore, Hollie identified that by switching to bio-diesel the estate could save £65,000 annually within the agricultural and business sectors resulting in a carbon saving of 112 tonnes CO₂/ year. The conversion of the 100 residential properties on the estate from heating oil to wood fuel was shown to potentially save a total of £112,000 per year and reduce the CO₂ emissions by a further 650 tonnes per year. The project also identified that more than 81,000 tonnes of CO₂ is currently stored in carbon sinks on the estate, in the form of a large lowland raised peat bog and forestry. This could be increased through improved land management practices.

Emile Martinot**Link Group**

Link Group is a registered Social Landlord who requested a Carbon Footprint of four of their offices, accompanied by recommendations and estimated savings. The overall footprint was approximately 342 tonnes of CO₂ each year. The offices, with the exception of one, were all new-build and were generally speaking well equipped with efficient heating systems and appliances, and generally extensive recycling was already in place. Despite this, there were savings to be made on closer inspection of utility usage. As there were few, if any, structural changes to be made, most savings were dependent on changes in behaviour. One notable exception to this was water usage, which had potential in two offices for reductions by retrofitting proximity sensors for urinals, and installing dual flush toilets where not in use. Furthermore, installation of aerated taps brought to total estimated savings to 244,000 litres in a year.

Electricity had a lot of savings potential as it was discovered that, despite efficient appliances, lights, computers and monitors were, to varying extents, left on when not needed. Having monitors and computers set to turn off or go on standby when not in use, as well as reducing lighting where not needed and a few office-specific changes, the overall savings were estimated at £12,371, or about 38 tonnes in CO₂ emissions.

The single biggest contributor to Link Group's footprint was business travel, which was well documented for accounting purposes. At around 440,000 miles per year, this accounted for 46% of carbon emissions. Any significant improvements here also benefited from extensive cost savings, a 10% reduction in travel, for example, would save £17,000 on reimbursements, and an estimated 15.5 tonnes of CO₂. The newly implemented bike-scheme as well as other initiatives implemented by Link should be able to realise this target.

Overall, Link Group has the potential to save a considerable amount with a minimum of investment, requiring only staff participation to satisfy most savings, and relatively small upfront costs for savings to do with water consumption.

Scott McKirdy**Mathiesons**

Scott was placed at Mathiesons Bakery in Forth Valley to investigate solutions to reduce the company's waste costs.

He started by determining the total waste output from the site and what types of waste produced. It was shown that as much of 95% of the waste produced could potentially be recycled with the remainder consisting of primarily low weight non-recyclable siliconised papers.

Scott also looked at reducing the food waste going to landfill; the two options he +looked at: composting and reprocessing to animal feed. When the two options were evaluated it was shown that reprocessing waste into animal feed not only made good environmental sense it was economically sound releasing value from the food waste and contributing towards lower raw material costs in the long term. By selling food waste to a local reprocessing company it is hoped to reduce costs for in site waste disposal by £7000 per annum by 2009 and yield revenues of at least £2000 per annum.

Scott also looked at how a compacting baler could significantly reduce costs by removing the need to rent and pay for disposal of cardboard bins. The baled cardboard was also saleable, initial savings of £3000 per annum were identified and payback of around £4000 per year on baled cardboard materials can be expected. Staff were also encouraged to find alternatives to using goods packaged in disposable containers or to try to minimise the amount of packing needed for materials.

Between these steps above and a number of other smaller measures it is hoped to save Mathiesons Bakeries around £33,000 per year by 2009 if all implemented measures are maintained and proposals implemented.

Thomas Kurka

Matrix International

Thomas was placed with Matrix International in Brechin. His placement was to carry out the Policy and Planning stages of the company's Environmental Management System to allow for accreditation to ISO 14001 by spring 2009. The development of an ISO 14001 environmental management system is important for Matrix to satisfy supply chain pressures. He started by gathering information of the current state and produced a GAP analysis, which served as a roadmap to certification. His next step was to systematically identify all environmental aspects and impacts related to the company's operations. These aspects were quantified where possible and recorded using an environmental aspects register. After identifying relevant environmental legislation related with the aspects, a 'Green Team' containing members across the company's departments evaluated the significance of the aspects. Once, significant aspects had been identified, prioritised and sorted by categories, Thomas developed an Environmental Policy, which served as a framework for Action Plans with objectives, targets, time scales, responsibilities and expected costs. These Action Plans will build the basis for developing more detailed Management Programmes to manage and control the significant environmental aspects. During his work, Thomas and the 'Green Team' identified several potential areas for both, cost savings and environmental benefits. The company can now continue Thomas' work and carry out the remaining stages of the ISO 14001 standard.

Nicholas Cowan

Monymusk

Nicholas Cowan was placed at Monymusk Land Company to investigate the feasibility of producing biodiesel derived from waste oil for use in company vehicles to replace diesel derived from fossil fuel. The aim of the project was to determine the financial viability and practicalities involved in sourcing waste oil, and installing and running a small scale biodiesel plant at Monymusk Estate. The project involved desktop research to gather information on biodiesel production, equipment, legal and planning requirements, potential suppliers and installers, available financial assistance; face to face meetings, emails and telephone communications were made to obtain supplier quotes and locate sources of waste oil; and completion of an application to register as a waste carrier with SEPA.

Nicholas found that it would be financial viable and practically feasible to establish a small scale biodiesel plant at Monymusk Estate and has also identified a potential source of waste oil sufficient to meet proposed production requirements. It was estimated that installing a biodiesel plant to generate fuel for use by Estate vehicles would reduce fuel costs by approximately £18,800 per year with an estimated payback period of 1 year. The CO₂ savings associated with this were estimated to be 26,624 tonnes per year.

Subsequently, Nicholas is making arrangements for the installation of a small scale biodiesel plant.

Charlotte Lane**Monymusk**

Charlotte Lane was placed at Monymusk Land Company (MLC) to determine the feasibility of using wood chip biomass to heat the House of Monymusk and two adjoining buildings in a mini-district heating system. The aim of the project was to investigate the financial viability of converting the existing heating system from a fossil-fuel LPG fired system to a wood chip fuelled biomass boiler. The project involved carrying out online research to gather information on biomass boilers, district heating systems, potential suppliers and installers, available financial assistance and planning requirements; face to face meetings, emails and telephone communications were made; and site visits were arranged to view similar projects in the local area.

Charlotte found that it would be financial viable and practically feasible to convert the existing heating system to a biomass boiler with mini-district heating system. It was also found that current MLC forestry production would be sufficient to supply the wood chip requirement in 2 years time. It was estimated that installing a biomass boiler would reduce heating costs at MLC by approximately £17,430 per year with an estimated payback period of 5-6 years. The CO₂ savings associated with this were estimated to be 44 tonnes per year.

Charlotte subsequently arranged for the installation of the biomass boiler and for production of wood chip on the Estate.

Lawrence Craig**New Caledonian Woodlands**

Lawrence was placed with New Caledonian Woodlands (NCW) in Edinburgh in order to improve the public's knowledge of the company, as well as to improve the quality of information received by its existing clients.

Lawrence researched and used marketing techniques such as Search Engine Optimisation (SEO), Social Marketing Optimisation (SMO) and Direct Email Marketing (DEM) as these were the deemed most suitable for the company being inexpensive yet highly effective.

Lawrence helped NCW create a database of contacts which could be used to target previous clients and useful organisations. He also increased the amount of traffic to the website and was able to attract new clients as a consequence of this. In June 2008, there were 117 visits to the website. In July 2008, 1767 people visited the website and in August 2008, 798 people have visited the website so far. He also set up a group on social networking site Facebook – and attracted 40 interested people in 2 weeks alone. Website traffic has improved greatly.

In the company's Biodiversity weekend, the 'Gartmore Project' saw a 60% increase in attendance compared to previous months and was the largest attendance ever experienced by New Caledonian Woodlands. The director has stated he believes this is a result of the increased marketing.

Lawrence's project increased the scale of business activity and so increased company turnover and profits.

Jennifer McIntosh**Pentlands Science Park**

Jennifer was placed at Pentlands Science Park in Midlothian to carry out an energy and water audit. She started by using lighting and portable appliance test results to provide information in order to highlight the aspects of the park that consume the most electricity.

Jennifer discovered that the steam generators on the Park consumed large volumes of gas and water and that they run continuously, despite there being no demand for steam at the weekend. Jennifer then calculated the potential savings that could be realized if the generators were switched off at weekends. The calculations showed that if the generators were switched off every weekend for a working year (50 weeks) savings of approximately £9,000pa could be made and 89 less tons of carbon dioxide would be emitted.

She recommended the company install a water recycle system to the sterilising autoclave; the cost of this was £4,000 for two systems to be installed. Two water recycle systems would result in annual water and effluent savings of roughly £1,200 and would prevent approximately 1000m³ water pa from being wasted.

The project also required an increased level of staff involvement. Jennifer gave a staff presentation detailing why reducing energy consumption is important and the role that staff members can play in this task. The presentation was coupled with posters and stickers from The Carbon Trust that were displayed around the Park to remind staff of their responsibility. Both of these initiatives were well received and changes in behaviour regarding energy saving were witnessed immediately.

Scott Kerr

Pregis

Scott Kerr undertook a project with Pregis Rigid Packaging a company based in Livingston that manufactures plastic food packaging for major supermarkets in the UK. Scott identified that 80% of the waste is plastic with the rest consisting of wood, paper and metal amongst others. Scott suggested dividing the waste stream onsite and selling the constituent materials to different clients. This then released the value of the material especially the plastic waste. Scott's project identified potential cost savings of £78,500 per annum.

Scott also identified a potential saving with the open top skip. He again assessed the contents and found that the materials could be divided among the new onsite waste segregation policies. The removal of this skip saved £21,268 per annum and diverted 226 tonnes from landfill putting Pregis in a better position for rising Landfill tax.

Tracey Elrick

PSN

Tracey Elrick was placed at PSN to investigate waste management and transport and to set recommendations for improved staff engagement in waste minimisation; to design a system for monitoring business travel; and to gain an insight into staff commuting and opportunities for reduced car use.

Her first task was to conduct an audit of recycling facilities to identify compliance; paper use, printing and waste disposal.

Transport objectives included identifying the location of existing travel monitoring data; designing a system for monitoring business travel to include mileage, CO² emissions; liaise with Dyce Transport Management Organisation (TMO) to establish opportunities for alternative modes of transport and to draw up company specific questions to feed into the forthcoming Dyce TMO biennial survey.

Tracey succeeded in assisting in the company's continued progress towards ISO 14001 certification and assisting the company's environmental performance in line with the HS&E improvement plan. Future benefits to the company include increasing staff awareness; increased recycling and improving compliance in waste segregation resulting in a reduced amount of waste sent to landfill; increased awareness of the CO² emissions associated with business travel.

Pauline Pirie

Quaker Oats

Pauline Pirie was placed with Quaker Oats to complete the stages of implementation of the Environmental Management System ISO14001.

A Baseline Assessment and Gap Analysis had already been carried out, so the first thing Pauline did was to prioritise the resulting recommendations into a weekly planner. These tasks were to be completed before Stage 1 ISO14001 audit. Some of the main tasks Pauline completed were as follows:

- Creating an Environmental Management System manual
- Environmental Working Practices
- Emergency evacuation procedures
- Spill procedures & spill kits provided

- Audit team and audit schedule formed
- Drainage survey
- Duty of Care
- Environmental purchasing policy

Pauline successfully put in place an Environmental Management. This should hopefully lead to the successful accreditation to ISO14001 by the end of 2008.

Aisling Connolly

Quaker Oats

Aisling was placed at Quaker Oats Ltd. Aisling was tasked with implementing a Travel Plan for the site. Prior to the placement, the Energy Savings Trust had carried out a travel audit and produced a report with recommendations for implementing a travel plan. It was these recommendations, which Aisling used as the basis for the travel plan. A site map was created for visitors, to highlight bus and rail routes to Quaker Oats, alternative travel options were highlighted through posters, PowerPoint slides and bus timetables being made available, Fife Council carried out an initial survey looking at the potential for a bus stop at the site entrance, a staff travel survey was distributed and also employees who are interested in participating in a Travel Steering Group have been identified. Aisling calculated the Carbon Footprint of staff commuting to work; approximately 209 tonnes of CO₂ per annum. It is this figure that will be used as a baseline to establish carbon reduction targets for the next year.

Secondly, Aisling had to analyse current water usage for the site and implement a water reduction plan. In order to do this she carried out a water use survey and developed a domestic water use inventory. Hippo water saving devices were installed in all toilets, saving 1.6m³ of water and £1,148 in charges annually. Further recommendations of, 'low-flush' urinals could save 1.3 m³ and £1,356.00 in charges annually. Using a rainwater harvesting system to provide water for the Jones Vacuum pump will potentially save £8365.00 in charges annually.

Jennifer Woodhead

Radisson SAS

Jennifer was placed at the Radisson SAS Hotel in Edinburgh to carry out a comprehensive waste audit. Jennifer started by analysing the data and with it she was able to break down the departmental waste and make comparisons between the different departments.

Jennifer identified potential savings through waste minimisation and further recycling. These included the introduction of a plastic bottle recycling system, using coloured plastic bags to divide up waste on the housekeeper's trolley and providing the conference and banqueting department with a paper recycling bin. She also identified items that are currently thrown away and questioned as to whether they are eligible for any recycling. These include paper shopping bags, tissue boxes and hotel slippers. It was also suggested that all staff bring in to work their own mugs instead of using multiple polystyrene cups each day. This would significantly cut down the polystyrene going to landfill.

Background research was also carried out, investigating recycling systems. Food waste recycling was researched and two possible options were identified and the costs compared. Reducing the number of uplifts of glass was also considered by looking into purchasing a glass crushing machine. A recycling checklist was created providing staff with key information and answers to queries about recycling in order to encourage more recycling from offices.

The results of the waste audit identify that a further 33 tonnes of carbon dioxide could be saved if the recyclable materials were correctly separated. The cost savings of reducing this waste to landfill based on what is currently paid for the compactor was found to be £5061.88 per annum.

Craig Marjorybanks**Rodger Builders Ltd**

Craig was placed with Rodger Builders in Earlston this summer to investigate the use of waste vegetable oil as an alternative fuel.

Craig started by investigating production of a Biodiesel. He visited a biodiesel producer in England who also sells Biodiesel production plants. It was beneficial to see the production first hand, so much so that after this site visit, Roger Builders decided to purchase a biodiesel processor and started production at the Earlston site. Craig faced many challenges while in the preliminary stages of the production of the biodiesel. It was very time consuming as well as an extremely difficult method to follow in order to produce the fuel; the right quantities of chemicals needed to be mixed otherwise the reaction did not take place and as a result, no biodiesel was produced.

Craig decided to produce a simpler fuel. This involved mixing vegetable oil and diesel in differing percentages. This fuel was much easier to produce. The vegetable/diesel mix was trialled with some of the vehicles at Rodger Builders and a comparative study made.

The fuel is now being used by the majority of vehicles in the Rodger Builders Fleet. Use of this fuel is also beneficial as there will be no waste sent towards the landfill as there is no by product produced.

Craig's placement has reduced CO₂ emissions by 60%, reduced fuel costs, and has helped create environmentally friendly image for Rodger Builders.

Louise McCafferty**Schoeller Bleckmann Darron Ltd**

Louise McCafferty was placed at Schoeller-Bleckmann Darron Ltd (SBDL) to investigate waste management and minimisation issues. The main objectives of the placement were:

- Establish a waste monitoring system;
- Introduce enhanced recycling and waste facilities;
- Increase awareness amongst staff on waste and other environmental issues;
- Improve legal compliance and best practise.

Louise started by contacting waste management companies for quotes and putting contracts together for storage, collection and disposal of recyclable waste and special waste. An environmental folder was put together to hold waste management and waste carrier licences as well as the Waste Transfer Notes and Consignment Notes.

She helped increase staff environmental awareness through various initiatives, which included a staff attitude survey on waste and energy, and an Awareness Day which featured exhibits from local environmental organisations, and a drop-in session to gather information and ask questions.

The two waste monitoring systems were established and will be carried out by the cleaners and finance staff. The cleaners will report any contamination between the bins, and the finance staff will record invoice data.

Waste audits were carried out in the office and workshop areas. These showed that with the exception of scrap metal, the company disposed of all general wastes to landfill. It was estimated that 0.8 tonnes could be diverted from landfill by introducing a recycling system onsite.

Recycling facilities for paper/cardboard, printer cartridges, plastic cups, paper cups, aluminium drink and aerosol cans were introduced throughout the organisation. Louise was estimated that these measures will reduce waste costs by £600 per annum.

Allan Love**Schuh Ltd**

Allan was placed with the footwear retailer Schuh, to measuring the carbon footprint of the head office, 3 Schuh retail stores and associated company activities. He was also tasked with creating a methodology to allow

the exercise to be repeated across the whole organisation; and to identify further opportunities to improve environmental practice.

Measuring Schuh's carbon footprint involved collecting information on utilities consumption and travel records. The review involved observing company practice across a number of Schuh sites, before identifying changes in practice. Final results were then presented in a written report to the company directors.

Allan successfully completed the three objectives helping Schuh to implement consistent monitoring of all emissions sources. He also, identified estimated savings of 335 tCO₂, with associated utility cost savings of £32,250. In addition, he identified savings of up to 127 tonnes of cardboard (£60,000) by thinking up a new corrugated plastic carton to directly replace a proportion of Schuh's current cardboard carton use.

Rowan Muir

Scotrenewables

Scotrenewables Marine Power Ltd are currently developing a horizontal axis marine current turbine named the Scotrenewables Tidal Turbine (SRTT). Work over the 9 week period was predominantly focussed on two different projects; power take-off for a 5th scale SRTT model and an airfoil investigation, focussing on airfoil design for the full scale prototype rotor.

Rowan's first project involved designing the hydraulic transmission and purchasing the necessary components to allow initial bench testing of the set up; a set up which will later be developed for application and full system testing within the 5th scale model. The aim of the project was to allow a greater understanding of the working hydraulic system, and by getting a local fabricator to assemble the bought in components, the project's total cost was significantly cheaper than if it were to have been done through a contractor. For the bench testing, a motor was used to simulate the turbine to drive the hydraulic pump, which in turn drove a hydraulic motor and then a generator. The testing phase, which commenced only in the last week of the placement, should allow Scotrenewables to better their understanding of the hydraulic components as well as make an assessment of the efficiency of the system; crucial to understanding the generating capabilities of the SRTT.

Rowan's second project was more of a research project and had several aims. Her first task was to gain an understanding and working knowledge of the fluid flow analysis tool Xfoil, allowing the examination of existing airfoils shapes that had been suggested for use on the SRTT blades. A period was then spent investigating the suitability of the tool for use in this application, i.e. for designing and analysing airfoils in high Reynolds number water flow rather than low Reynolds number air flow, for which it was designed. A comparison was made of Xfoil results against wind tunnel results for several airfoils developed specifically for use on wind turbines rather than aeroplane wings, facilitating an understanding of both the airfoil family examined and Xfoil as an analysis tool. A further investigation was made into existing marine current turbine projects and some design elements. Research was also undertaken into the designing of airfoil shapes, and information was recorded on a variety of areas (such as methods employed to reduce the risk of cavitation and airfoil shapes used for projects similar to the SRTT) that may be of interest during the final airfoil design process. Rowan compiled a report combining all relevant information found on the subject, aiming to provide a starting point for subsequent design work.

David Clouston

Scotrenewables

Scotrenewables is a renewable energy development company based in the Orkney Islands. They are currently looking at developing a floating tidal turbine named the SRTT. As a floating structure in a strong tidal flow, huge forces are expected on the mooring lines; therefore a strong and sturdy anchorage system must be designed.

As a starting point to the placement, David carried out a review of all previous investigations and reports into anchoring systems, and produced a brief review of requirements and pricing of possible anchoring systems. Further to a review of possible anchoring solutions, anchoring via the use of rockbolts was investigated and a literature review of rock bolt usage, specifically in shear loading, was produced. Several forms of rock bolting

methods were investigated, using stress analysis calculations to quantify the structural requirements of each rock bolting method, and to calculate indicative costs of each method. A spreadsheet was created allowing the user to input the required load acting on the anchorage system, and the number of rock bolts required to cope with the input will then be given. Optimised configurations were found and priced, and found to be much cheaper in materials than previous 'more conventional' anchoring solutions.

The next part of the project involved designing a custom built installation rig which could operate in a tidal flow, in order to install the anchorage system. Several initial designs became apparent. A patent for the main design was submitted. The design was continually updated, changing several key components, until the most recent version which solves several of the initial problems with the original design. The installation rig was fully drawn up in CAD software, allowing further modifications and alterations to be made in the future, easily. Some of the key components were sourced for future reference. Another aspect of the design stage was to design a suitable base plate that would withstand the required load. Finite Element Analysis was used to calculate stress values and areas of concentrations in order to refine the design.

The project has supplied a good starting point to the solution of an anchorage system; but there is a lot of further design work to be done before a full working system could be made.

Julie Nicholson

Scottish Government

Julie was placed at the Scottish Government in Edinburgh. Her placement aim was to increase staff awareness of biodiversity conservation, and secondly to research ways in which biodiversity can be enhanced on government sites.

She increased staff awareness by putting together biodiversity information on the intranet pages and in internal news articles. She also set up a Biodiversity Action Group that would carry on the work after her placement finished. Julie also successfully planned and carried out volunteer days and provided recommendations for future activities for volunteers.

One of Julie's projects involved planting native hedging. The benefits of planting native species include providing maximum food, shelter and nest sites for wildlife. Completing this hedging as a volunteer activity day will result in a more thorough wildlife corridor.

The benefits of increased biodiversity are economic and social as well as environmental. As a result of Julie's placement at the Government, the benefits include staff in being involved in the process of volunteering, working outdoors, building relationships and taking ownership of their environment. Also, the grounds are more attractive to staff and neighbours providing a social benefit.

Jamie Auld Smith

Scottish Government

Jamie was placed at the Scottish Government in Edinburgh to help reduce the site's waste to landfill. He researched introduced an environmentally friendly, attractive and cost-effective reusable coffee cup option to replace the disposable paper cup option currently being used in the staff restaurants. He also introduced fully compostable food containers and cutlery to replace the non-biodegradable options currently being used. He also developed a comprehensive off-site composting service for all food and wet waste generated by the 5 government sites with staff restaurants/coffee bars. Jamie also increased awareness of waste issues among government staff and visitors through visible changes to the catering service and he succeeded in yearly savings made to the government through a lower catering subsidy and waste disposal costs. The implemented measures will also result in savings of 494.4 tonnes of CO₂ each year.

Luke Robertson

Senergy

Luke's placement at Senergy looked at environmental management at the company's headquarters in Aberdeen. This included energy and water efficiency, reducing carbon emissions from transport, maximising recycling and minimising waste disposal, improving staff awareness of these issues and also introducing and researching a monitoring system implemented.

Luke started by distributing a staff survey, then gathered the results and reviewed current practice and figures from the office. He visited the Senergy Banchory Offices to review their current environmental management system and spoke to a number of staff members who were involved with Energy Efficiency Issues. He began monitoring all utilities (Gas, Electricity and Water) and researching environmental management systems, previous awareness campaigns and products and services which could help Senergy reduce its impact on the environment.

After analysing all products currently available in the environmental and energy sector, Luke recommended, prioritised and actioned a series of initiatives which Senergy can carry out in order to improve their environmental performance. This included office efficiency improvements concerning heating gas and lighting improvements, introducing Smart Metering to the premises and putting other monitoring systems into place. Introducing IT software which significantly reduces cost and carbon emissions was another aspect of energy efficiency which was researched. With regard to transport he outlined an action plan for current staff car parking issues and recommended a series of measures which will be taken to reduce CO₂ from commuting and travelling. To improve Senergy's waste and recycling, Luke proposed a new method of office based recycling, established a list of companies who can offer recycling services and carried out several other initiatives. To increase staff awareness Luke sourced posters, stickers and leaflets and has initiated a staff awareness campaign and outlined an internal and external publicity campaign.

Luke's recommendations outlined approximate savings for Senergy of £27,400 per annum, 230,000 litres of water per year and 135.9 tonnes of CO₂.

Simon Byrne

Senergy

Simon Byrne was placed at Senergy Ltd to investigate business opportunities in the carbon offset markets and set recommendations on the cost involved and the areas best suited for investment the main placement objectives were as follows:

1. To investigate carbon offset markets – specifically focusing on opportunities relating to forestry, including consideration of
2. market size and mix
3. standards and regulations
4. costs and supply chain issues

Research has highlighted how immature the voluntary markets in particular are, and the broad spectrum of providers and projects there are on the markets.

Even so there appears that there is real potential for business development within the voluntary market; with Senergy's particular interest in UK based forestry offsets, initially viewing this as an opportunity to offset the business's own CO₂ emissions but with a view to potentially extending their involvement into a broader business development opportunity in the longer term.

There are key issue of importance to consider; the shifting market driven by public opinion, and the media reacting to poor results from forestry based project, and industries preparation for the inevitable introduction of a binding legal frame work for all businesses across all markets similar to what currently exists within the compliant (Kyoto) markets. These factors suggest that in establishing a business interest it is key to

- Establish transparent, traceable offsets
- Apply 3rd party verification
- Assure offset quality and longevity
- Ensure ethical and sustainable project development practices
- Apply compliant market standards to the projects
- Assure high quality carbon accounting on the reductions by the offsets and the clients footprint
- Tailor offsets to client as well as responsible, accurate advice and consultation to the consumer be they the individuals or businesses
- Control over every aspect of the supply chain from development to sale, registration and ultimately retirement of the offset

- Seek and encourage community involvement in any project / location
- Focus on all aspects of the project: ecological, environmental and social betterment
- Establish partnerships with benefits - in particular with environmental NGOs already well established in the forestry sector like "Trees for Life" - that offer access to an already active consumer base, knowledge and strong public good-will

Ezzaldin Ibrahim

S.G. Baker

Ezzaldin was placed with S.G. Baker in Angus. Ezzaldin was required to produce a Carbon Footprint for the company. He was required to produce a report for each of the nineteen products and design it in a suitable format to be able to send to customers. Ezzaldin also had to identify carbon management measures to reduce the carbon footprint of each product and where possible, assist with the implementation of these measures. He was also asked to produce an Energy audit report identifying potential cost savings through energy efficiency measures on site, in line with objectives and targets for ISO 14001 and where possible assist with the implementation of these measures.

To calculate the Carbon Footprint, Ezzaldin included carbon emissions produced from the production, transport and delivery of the products. He identified the supply chain and calculated the carbon emissions using Carbon Trust Methodology. This methodology is based on standard life-cycle analysis techniques (LCA) and was designed to calculate the carbon footprint of different products by analysing the energy use during the supply chain of any product or service. He designed a carbon footprint tool using Excel to achieve these calculations. This tool was designed to include the supply chain activities which contribute to carbon emissions of each product.

According to Ezzaldin's calculations, the following findings can be analysed: more than 80% of the carbon emissions are emitted during the manufacturing process and emissions from transportation and the company premises contribute the remaining amount. As a result more than 90% of the emissions come within indirect emissions (scope 3) which are not under the company's control.

Matthew Robertson

Turriff Contractors

Matthew was placed with Turriff Contractors Ltd to assess the energy management and usage within the company, and to provide recommendations in support of the company objective of reducing electricity and gas usage by 10%.

He assessed energy use in the company by carrying out site visits to the company offices in Dundee and Falkirk, along with surveying the Aberdeen office, where he was based. The work carried out at the various sites included taking weekly electricity meter readings, and comparing these with the monthly estimates provided by the energy companies. Matthew found that current estimates could be inconsistent, and by taking accurate readings, the company would be able to get consistent bills throughout the year, without an annual 'spike' in the bills when the energy provider compensated for any under-estimates. On the back of this, he produced a standardised company-wide form for taking the monthly electricity and gas readings on each site, and forwarding them to the head office in Aberdeen.

Various recommendations were made to the company in regards to saving electricity, such as lower wattage light fittings, or even the removal of some lights altogether, and providing timer switches on photocopiers to turn them off during the night. Cost – benefit analyses were carried out on the recommendations where possible, covering how much they would cost, the payback period, and how much money, kWh, and tonnes of CO₂ they save per annum.

During the placement, Matthew calculated the Carbon Footprint of Turriff Contractors Ltd, using the Carbon Trust's online carbon footprint calculator.

Matthew also initiated the process of application for a Green Fleet Review to be carried out by the Energy Savings Trust, as the diesel used by the company contributes towards a large majority of the company's total carbon footprint.

During the placement, he recommended measures which were calculated to potentially reduce the company's electricity and gas usage by over 20% per annum.

Michael Geoghegan**West Lothian Council**

Michael was placed with West Lothian Council to investigate waste management operations within the council buildings.

Michael started by ascertaining the frequency of waste collections and quantifying the impact of the waste policy on the environment by taking into account volumes of recyclable waste and general waste.

The waste auditing process revealed issues with regard to specific areas in which the use of waste materials can be improved. Also highlighted were the disputes that were found to exist between the collection services and council building representatives that had resulted in the use of private contractors for waste collection and, in places, a complete breakdown in the collection of recycled materials from specific council premises.

Avenues of addressing issues of waste management within council premises were then investigated. Allowing Within the council there are areas where improvement is required. The major avenue for improvement involves the education of the workforce. Providing information is paramount in enabling the workforce to gain sufficient knowledge as regards how to deal with waste. Promotional literature such as posters and interaction with waste champions are key ways of doing this.

During the project, Michael worked on promotional literatures and a dispute between 3 council buildings and the waste collection services was solved by the commitment to provide new waste skips and a Saturday morning collection service for all recyclable waste materials, with the possibility of a new site development for waste collection within the car park. These measures have the potential to save money by limiting the use of private contractors and by stimulating recycling within council premises and preventing a significant volume of waste being disposed of to landfill which has both environmental and financial benefits.

Participants Comments

Host companies

'He built up a good relationship with staff and is able to relate to all levels of employees within the business. Michal has been very enthusiastic and always keen to take on challenges. He has been focused and determined to complete the task. I have been very impressed with Michal's work and hope to employ a student of his calibre through the BEP next year'.

Victoria Colling, BAA Edinburgh

'The EPP is an excellent resource for businesses – by providing interested students and supporting them through the placement'.

Radisson SAS Edinburgh, Alexandra Hammond

'The input from BEP meant that the project truly did slot in and out – short-listing and interviewing procedures were manageable and did not require huge levels of input, while the support given to Lawrence Craig by the BEP meant that New Caledonian Woodlands was supported in its own support of the placement'.

NCW, Andy Ross

'As a first direct involvement with the EPP programme I have found it very worthwhile'.

Pentlands Science Park, George Walker

'Rebecca has worked enthusiastically on this project. She has conducted herself in a professional manner throughout and she has had to adapt quickly'.

Kirsty Hepburn, Heritage Portfolio

'The programme gives students and employers an excellent opportunity to benefit from each other. I would recommend it to any business'.

Robert Badger, Diageo

Students

'I am now focussed on a career in the environment sector and am now in the process of choosing a relevant masters course for next year'.

BAA, Michal Len

'This placement has further reinforced my interest in undertaking environmentally related work, particularly in my field of study (engineering)'.

Link Group, Emile Martinot

'I have found the placement to be of immense benefit to me as I gained valuable experience working in a highly diverse business and feel I adapted to the environment well. The experience has boosted my confidence greatly setting targets for myself, maintaining self motivation and striving to meet my goals'.

PSP Jennifer McIntosh