Science & Technology Facilities Council

in brief

Welcome to this special edition of in.brief dedicated to Environmental matters, quite appropriate for a paperless e-bulletin!

The purpose of this edition is to raise staff awareness of the many ways in which STFC is actively delivering improvements to our environmental footprint, and, most importantly, to inspire you to make YOUR contribution.

"This newsletter gives just a taste of the many projects that have improved the environmental impact of the STFC in recent years. Improving our environmental performance is, and will increasingly be, an important goal for the STFC and one that I would encourage all staff, and those that work with us, to embrace. Environmental improvements often carry equally important financial savings and in the present economic climate we should take any opportunity to reduce waste – it is costly to buy materials in the first place let alone paying for their disposal - and to reduce our use of utilities such as electricity, gas and water costs means that there is more money for our science and technology. Over the coming months we will be launching an STFC environmental improvement plan which will target the key areas where we need to make progress. Think about what could be achieved in your area and talk to your management about implementing it – the best ideas are yours."
Gordon Stewart, Executive Director Corporate Services.

If you are inspired by the information contained here why not make an environmental improvement suggestion now! This is one of the few areas where we can all contribute and make an impact no matter how small.

Notice board

Essential information

Your environmental essentials

A simple guide outlining essential environmental information you need to follow.

Biodiversity

Orchids at RAL

In February this year, there were more than 3,000 Bee orchids in inside the RAL security fence and over 800 of these flowered.

Management and sustainability

STFC Carbon Management Plan

STFC, with the help of the Carbon Trust, is developing a plan to manage its carbon footprint in order to achieve sustained carbon and cost savings from our estate and operations.

STFC and sustainability

The word 'sustainability' is taking on increasing significance across the public sector. STFC monitors and reports on its energy (including business transport) and water consumption and waste production.

Energy efficiency

Energy saving at UK ATC

The Royal Observatory Edinburgh, the home of the UK ATC, continues to improve the energy efficiency of its estate; this year photovoltaic panels were installed on one of its flat roofs.

Waste management

What do I do with my waste?

Got something you don't need and don't know what to do with it? Find out how to get rid of the many types of waste we generate.

Food waste

In June, RAL introduced a food waste collection service for Ridgeway House, Little Stars Nursery, The Cosener's House and R22 Restaurant. Find out what happens to the collected waste.

DL infrastructure improvements

A number of buildings at Daresbury have been refurbished to improve their energy efficiency, mainly through improving insulation and replacing old single glazed windows with double-glazing.

Environmental news from Swindon

STFC staff based at Swindon have been taking part in a number of environmental initiatives at Polaris House this year including: biodiversity, energy saving and recycling.

Energy saving projects at RAL

Although small compared with the overall STFC energy usage, the projects underway at RAL show that improvements can be made in less obvious areas while continuing to carry out research.

Operating efficiency in R89

CICT Computer Operations have implemented a number of energy saving initiatives in the R89 server room at RAL in order to reduce their energy consumption.

Energy saving at UK ATC

05 November 2012

The Royal Observatory Edinburgh (ROE), the home of the UK Astronomy Technology Centre (UK ATC), continues to improve the energy efficiency of its estate. Improvements this year included installing photovoltaics on one of its flat roofs.

One of the objectives of the Estates Group at the ROE is to reduce the use of raw materials and to make savings on utility charges. The main project over the last 12 month was the installation of a 28 kW Solar PV Photovoltaic System on top of flat roof space within the Estate. The system consists of 113 PV panels and inverters which were installed at the beginning of 2012.

Although we had a poor and wet summer the first six months generated 11,000 kWh of energy which goes back into the network to offset our usage.

Energy saving technology has been used in the recent refurbishment of the 1967 Building. Changes to the heating structure, installation of triple glazing, heat recovery systems and movement sensor lighting will all contribute to reducing our environmental footprint. The shutting down and removal of the VISTA hut later this year will also add to the overall objective of reducing the use of raw energy resources.

Operating efficiency in R89

05 November 2012

CICT Computer Operations have implemented a number of energy saving initiatives in the R89 server room at RAL in order to reduce their energy consumption.

Background:

By their nature Data Centres consume large amounts of electricity directly, and often use as much power for cooling, power supply and other 'overhead' activities to run large clusters or high performance systems. This is increasingly expensive and creates growing emissions of CO_2.

The strategic view R89 CICT Computer Operations are taking is to reduce energy consumption, costs and emissions by providing more efficient precision cooling, better air management; 'free-cooling' and virtual server management. All aspects of the computer room are monitored from top level temperature through to under floor airflow and water detection.

Server, rack and row orientation

The management of the servers, racks and row orientation is important in providing the correct environment for the servers and also ensuring that better energy efficiency is achieved. This is done by implementing a system of hot and cold aisles. This system provides servers with the best environment for performance and energy efficiency. This is done by the placement of the servers within racks allowing cool air to be directed into the front of the servers, this is then released from the back as hot air and re-cooled via the air conditioning system.

To minimise the mixing of hot and cold air, simple devices such as blanking panels, air dams and brush grommets are all in use to maximise cool air directed to the racks, hence increasing efficiency and avoid any air leakages.

Enclosed cold aisle containment and in-row cooling

Early this year one of the R89 Computer rooms was upgraded to enclosed cold aisle containment with precision cooling. The containment approach separates the hot and cold airstreams to help to maximise cooling to the racks, so that energy is not wasted, forcing cold air across long distance under vented floor. To supplement high performance clusters that required >15 kW of cooling the containment is fitted with precision cooling units to ensure cooling to provided where needed.

'Free-cooling' chillers

Two of the four external chillers have a 'free-cooling' feature which means that in cold weather they use the ambient air temperature to supplement the cooling to the computer rooms. The chillers only operate when the ambient temperature is 5°C below the setpoint which is between 6°C – 11°C The chilled water ring main is to set to 11°C , so free-cooling operates at an ambient temperature of 6°C and below.

Efficiency gains inside the datacentre

- PIR fitted Lighting – Occupancy sensors fitted by turning lights on when the physical space is occupied.
- Chilled water pumps set to variable speed to meet cooling demand.
- Extensive monitoring of computers and the environment (power, temperature, airflow).

Environmental Essentials

05 November 2012

SHE Group have produced a simple guide which outlines essential environmental information you need to follow.

This is a short and simple guide on Environmental matters for all managers and staff – *what you need to know about environmental management in the STFC*. It also applies to contractors, agency or other individuals that work on STFC sites with us. SHE codes contain additional detail and guidance and can be found on the SHE Group website.

Code	Summary
Environmental Management - what you can do	Through its Environment Policy, STFC is committed to ensuring high standards of environmental management and the minimisation of its environmental impact. You can help to achieve this by considering the waste hierarchy: Eliminate, Reduce, Re-Use and Recycle when using any resource. For example: • **Reducing** energy consumption by turning off lights, computer monitors and printers, or turning the thermostat on your radiator down a little. • **Reducing** the amount of waste we send to landfill by **Recycling** items such as printer cartridges and paper etc. • Using video conferencing facilities to **Eliminate** the need to travel.
Disposing of waste. (Controlled and Hazardous waste code)	STFC has a duty to store its waste securely and dispose of its waste safely and legally: • Use the correct disposal route for wastes such as hazardous chemicals, broken glass, electronic equipment etc. • Store any waste securely prior to disposal. If you store any liquid waste outside a building it should be in a bund ('tray'). • Disposal of radioactive waste should be discussed with your site Radioactive Waste Advisor before disposal. • If you need to move waste around or between STFC sites obtain advice from the SHE group.
Controlling Pollution to Air, Land and Water	STFC is required to control what we discharge to local sewers, local waterways or the atmosphere. If you need to discharge significant volumes of any chemical down a sink or drain or to atmosphere you should check with the local SHE Group that we have authorisation to do this.
Environmental Risk Management	Environmental issues and hazards should be included and considered alongside general Health and Safety hazards in undertaking a SHE Risk Assessment. Additional environmental issues which should be

Code	Summary
	considered in any assessment include: • What to do in the event of a spill; • Check for relevant discharge authorisations (see above) if you need to vent gases to air or discharge any liquid to a drain; • Maintain equipment to minimise any of these discharges; and • Should stored liquids be bunded?

STFC Carbon Management Plan

05 November 2012

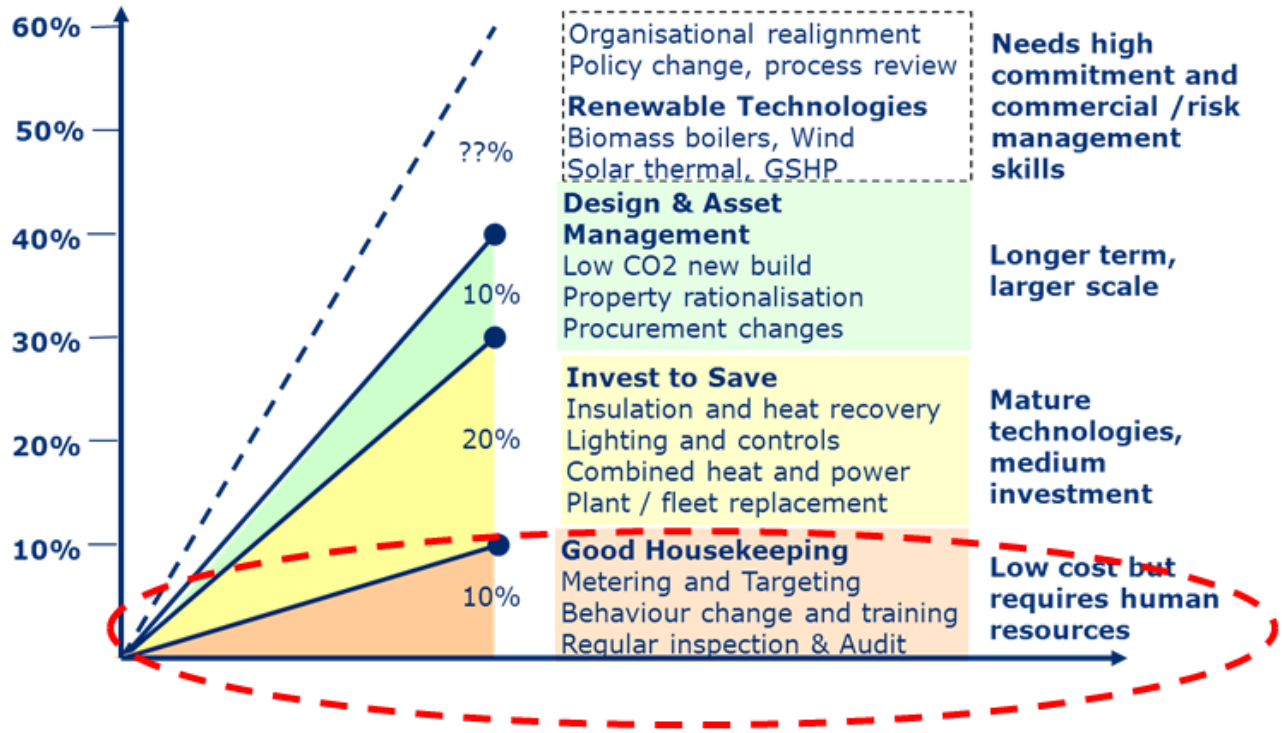
STFC, with the help of the Carbon Trust, is developing a plan to manage its carbon footprint.

The aim of this scheme is to develop a 'carbon management plan' for the STFC in order to achieve sustained carbon and cost savings from our estate and operations.

The scheme has a number of overall objectives:

- Reduce energy costs;
- Set a target for reducing energy consumption across the estates;
- Raise awareness amongst staff; and
- Improve energy management across the STFC, particularly within the office environment, but also to include where possible the major scientific facilities.

There are a number of areas where savings are possible:



The graph suggests that 'Good Housekeeping' could save up to 10%. The team have started the process by brainstorming ideas, these will be developed into plans which will be put to the STFC SHE committee in the form of a 'Carbon Management Plan' early next year.

Often it is simple things that can make the difference. Have a look at this document from Warwickshire County Council and see where you might be able to make a difference in your workplace!

What do I do with my waste?

05 November 2012

Got something you don't need and don't know what to do with it? Read on...

We often have items gathering dust in offices or laboratories which would be better recycled or disposed of. If you things like this tucked away in a corner, its likely we already have a disposal route you could use. To find out how to get rid of the many types of waste we generate see the STFC SHE Website.

How to dispose of some of the more common wastes

Computers and other asseted equipment - complete a Property Disposal Authority and forward to:

DL - Jimmy McCabe (x3750/3160)
RAL - Trevor Pannell (x6349)
ROE - Estates group
Swindon - use SSC/ISS

(any other waste electrical or electronic equipment - use the same contact points as above)

Waste chemicals or contaminated containers

DL - Jimmy McCabe (x3750/3160)
RAL, ISIS - Steve Roberts (x6033)
RAL, CLF - Tony Parker (x5109)
RAL, Other - Steve Robertson (x5537)

Laptop batteries and wet cell batteries

DL - Jimmy McCabe (x3750/3160)
RAL - Steve Robertson (x5537)
ROE - Estates Group

A full list can be found on the SHE Group website.

RAL food waste

05 November 2012

From the 18 June 2012, RAL introduced a food waste collection service for Ridgeway House, Little Stars Nursery, The Cosener's House and R22 Restaurant (including any food waste from vending and hospitality).

In R22 the waste is any food which does not go through the on-site composter due to the limits of the machine. Food waste includes: meat, bones, fish, fruit, vegetables, cereals, leftovers, tea, coffee, diary, baking and fats.

From 18 June to 30 September 2012 the following totals were collected:

Bins Collected	Weight collected (KG)	CO_2 equivalent savings (kg)
87	4385	3968*

* 4,000kg of CO_2 (carbon dioxide) is equivalent to about 10,000 miles in a typical petrol car.

What happens to the Food Waste?

The waste is collected by BiocoRecycling and disposed of by Anaerobic Digestion; the most environmentally friendly process.

This is a natural biological process that occurs in the absence of oxygen. Naturally occurring micro-organisms are used to break down organic matter into a valuable fertiliser whilst producing biogas. The electricity and heat is used to power the plant and any surplus electricity is fed back into the grid.

The waste goes to an on-farm Anaerobic Digester Plant which ensures that the fertiliser does not undergo any more transportation - instead it is used on the land surrounding the plant. The food waste from RAL goes to the local Agrivert plant at Cassington, Witney along with other food waste from the Oxfordshire area.

DL infrastructure improvements

05 November 2012

A number of buildings on the Daresbury site have been refurbished to improve their energy efficiency.

Over the past year or so, several buildings on the DL site have had been refurbished.

The main project involved removal of the old single glazed windows and replacement with double glazed units in the main A Block building (which houses the Scientific Computing Department and the new Hartree Visualisation Suite) and over-cladding and insulation of the exterior of the building.

New windows and cladding have also been fitted to the Coffee Lounge and Lecture Theatre areas, with new roofs to the kitchen and dining room areas and the Waterside Cafe annex. In addition, all of the windows in the Tower Block offices and Laboratory areas have been upgraded to double glazed units, along with the remaining single glazed windows in C and F Blocks.

Infrastructure works in C Block associated with the computer hall upgrade for the Blue Gene supercomputer included the addition of a new pitched roof.

These measures will significantly improve the thermal insulation properties of these buildings.

These infrastructure improvements are part of an ongoing drive to improve the energy efficiency of the DL estate and to reduce energy consumption. In recognition of this, Daresbury Laboratory was awarded the Carbon Saver Gold Standard for energy reduction over a three year period.

Environmental news from Swindon

05 November 2012

The Swindon Office STFC staff, together with colleagues in Polaris House, have been taking part in a number of environmental initatives.

Biodiversity

Improving biodiversity across the STFC estate is one of the targets set by central government through its 'Greening Government Commitments'. Polaris House site now have a clump of the endangered species Snake's Head Frutilliaries (see picture above) simiarly on the RAL site they have been encouraging the spread of a number of orchid species.

Energy Saving

JBOS have been very busy fitting various devices, changing the lighting and lots of other things to bring down our energy bills and reduce our carbon footprint.

Below are just a few of the things that they have been busy changing around the building:

- Three voltage optimisation units have been fitted at Polaris House dropping the voltage down to 230 volts!
- Light bulbs are being replaced with energy efficient light-emitting diode (LED) bulbs at both Polaris House and North Star House.
- PIR activated lights have been fitted in the lobby, toilets and car park, and will be fitted into MRC block soon.
- Solar Films have been fitted to some windows to reduce radiation in NERC Block 2,
- Condensing boilers fitted in boiler room.
- Electric van used to transport large items between the buildings and wholesalers,
- Timers fitted to fridges in the shop, and water boilers,

Recycling

Across the Polaris House site there have also been a number of recycling initiatives:

- RCUK has stopped a total of 18 tonnes of waste going to landfill through your efforts. This would have used up to approximately 54 cubic metres.
- Up to 30,000 litres of water are used when one tonne of paper is produced from virgin pulp. Therefore, by recycling one tonne of waste paper you could save up to 30,000 litres of water!
- Last month 13.45 tonnes of card and paper were recycled; this saved around 53.795 kilowatt hours of energy.
- By recycling 13.45 tonnes of card and paper RCUK has saved approximately 202 trees.
- By recycling 0.34 tonnes of glass RCUK has saved approximately 45.52 litres of oil and 0.4 tonnes of virgin raw material.
- By recycling 1.25 tonnes of aluminium cans RCUK has saved approximately seven tonnes of Bauxite Ore and five tonnes of chemical products.

STFC and Sustainability

05 November 2012

STFC now collects data and reports on its energy (electricity, gas and business transport) and water usage as well as its various forms of waste.

Sustainability

The word 'Sustainability' is taking on increasing significance across the public sector as government leads by example in driving down the environmental impact of central government Departments. For central government also read Non Departmental Public Bodies such as the Research Councils and STFC who are also being asked to show similar leadership and diligence in managing and reducing our environmental foot print. Notwithstanding, the environmental imperatives for sustainability reducing energy and water use and reducing the amount of waste we dispose of also makes good financial sense – saving money that can be put to better uses.

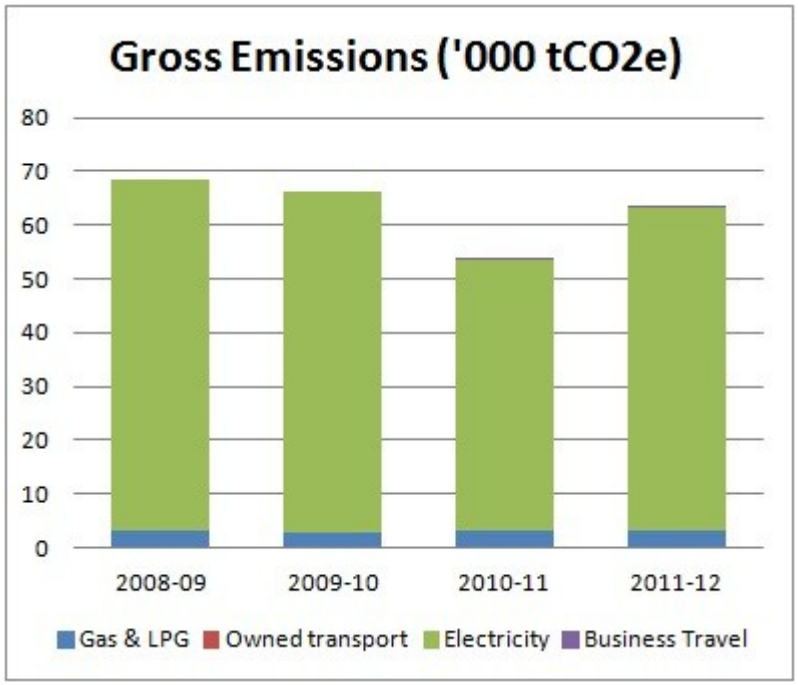
Adding impetus to this process the government has established the 'Greening government Commitments' which include specific sustainability targets to be achieved by 2015. These include:

1. Reduce greenhouse gas emissions by 25% from a 2009/10 baseline from the whole [office] estate and business related transport;
2. Reduce the amount of [office] waste generated by 25% from a 2009/10 baseline;
3. Reduce [office] water consumption from a 2009/10 baseline;
4. Ensure government buys more sustainable and efficient products; and
5. Taking action on biodiversity and sustainable construction.

Given that STFC's core activity is running large energy intensive scientific facilities, these targets are impractical across the whole of the STFC and we are seeking exemption from these for our scientific facilities. However as part of our involvement in the Public Sector Carbon Management scheme, STFC will be putting together a plan to establish a 5% year on year target reduction in greenhouse gas emissions and waste to 2015 for its office based activities where data for this can be separately captured.

Collection of environmental data has improved over the past few years and STFC is now able to report on a wide range of data in its annual report. The following charts were part of last years' STFC Annual Report which now includes a formal 'Sustainability Report' – a new Treasury requirement.

Greenhouse Gas Emissions (thousands of tonnes of CO_2)

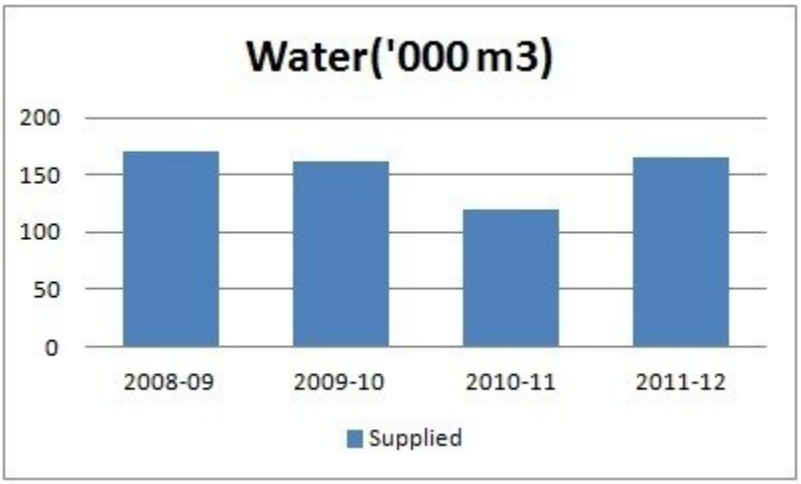


CO_2 emission data for 2011/12 (tonnes)

Electricity	63,750
Gas	2,880
STFC Owned vehicles	53
Business travel	
Hire cars/travel in own cars	171
Domestic flights	106
UK Rail travel	34
Total	66,994*

* 70,000 tonnes of CO_2 is equivalent to the annual CO_2 emissions of about 7,000 houses.

Water consumption



The reduction in both energy and water usage in 2010/11 can be largely attributed to a reduction in the number of ISIS user days.

Waste Management

The variability in the waste figures is due to varying amounts of metal recycling. One interesting fact about the 2011/12 waste data is that if we exclude the hazardous waste STFC made more money from the recycling than it cost to dispose of its general site waste!

Energy saving projects at RAL

05 November 2012

Although small compared with the overall STFC energy usage, these projects show that improvements can be made in less obvious areas while continuing to carry out research.

A few facts about the RAL's wind turbine

The turbine was erected at the Technology Department's Energy Research Unit (ERU) Test Site in 1990, having been purchased as a small commercial machine from Windharvester Ltd. Other Windharvester turbines were installed at the Earth Balance Centre in Northumberland, and on remote communities such as Fair Isle in the Orkneys, and Foula in the Shetlands and Benbecula in the Western Isles.

By modern standards the RAL Windharvester turbine is small being rated at 45 kW (the largest commercially available turbine is rated at 7,000 kW and has 80m long blades), and having a hub height of 15.5 metres. The turbine has three blades (made of GRP (glass fibre reinforced polymer) which are fixed pitch (i.e. the blade angle is not varied during operation) and installed upwind of the tower – the blade diameter is 17 metres. The machine is turned (yawed) into the wind by a simple drive system using fantails.

The turbine, which is connected into the RAL electricity system, was used for many years in university-based R&D projects including wind/diesel systems, condition monitoring of wind turbines, electro-dynamic braking, advanced aerodynamics of wind turbine blades. It was overhauled and had many components replaced in 2001/2002. Since July 2002 it has largely been used to generate power into the RAL Grid.

Up until the end of 2011 the wind turbine has generated a total of 397,266 kWh over a 21-year period. This energy has been fed into the RAL grid, and is equivalent to the amount of electrical energy used by four typical UK households over this 21 year period.

On-line power production data (as well as weather measurements made at the ERU Test Site) can be found at http://www.elm.eru.rl.ac.uk/

ISIS Energy Saving

ISIS now estimates that a recent reconfiguration of one of the high-power radio-frequency amplifiers driving the linear accelerator will actually help reduce electricity consumption by some 200,000 kWh a year. Whilst the reconfiguration was actually initiated to overcome a technical issue stemming from the use of modern replacement triode valves, the associated improvements in energy efficiency are obviously welcome.

Ground Source Heat Pump in RC@H

Environmental issues were not forgotten in the design of the Research Complex and energy use is carefully monitored. An innovative approach to managing the internal environment was developed by the engineers. An Earth Tube 100m long is buried under a grassy mound next to the Complex. Air is drawn from the exterior through the tunnel and, because the temperature below ground is relatively stable, it cools the air by up to 5°C in summer and warms it by up to 4°C in winter. This helps reduce energy use and building's carbon footprint.

R2 RAL Kitchen

A similar system was installed recently in the RAL R2 Kitchen Plant Room. This is now serviced by an earth tube which provides an air supply to the ventilation plant at a constant 13-15 °C. This enables the ventilation plant to be run at an efficient level throughout the year, saving energy that would otherwise be used heating or cooling the incoming air.

Who's representing you?

05 November 2012

Good Safety, Health and Environmental (SHE) management relies on the support and commitment of all staff to make our site's safe places to work and reduce their environmental impact.

Behind the scenes and supporting staff a range of committees provide oversight of the implementation of the STFC's SHE Management systems.

This article aims to raise the profile of these Committees and the people who work in them – so you can find out: **how they work, who represents you, and what Trade Union Safety Representatives do**.

The STFC SHE Committee approves all new SHE codes and significant updates to them; reviews STFC SHE performance; and oversees the audit of SHE codes. The minutes, listing Committee members can be found in the STFC SHE Website.

Reporting to the STFC SHE Committee are site Health and Safety, and Environment Committees - at SO and ROE these are combined into single committees whereas at RAL and DL they are separate. Site Health and Safety Committees provide a formal route by which Trade Union Safety Representatives discuss safety with STFC management. The Committees and their Chairs are as follows:

- STFC SHE Committee - Gordon Stewart
- DL Health and Safety Committee - Susan Smith
- DL Environment Committee - Tracy Turner
- ING Safety Committee - Juerg Rey
- JAC Safety Committee - Wendy Light
- RAL Health and Safety Committee - Andrew Taylor
- RAL Environment Committee - Sean Stewart
- ROE SHE Committee - Gillian Wright
- SO SHE Committee - Angela Roythorne

The Minutes of these committees listing their attendees - representing you and your Department - are publicly available. Their Terms of Reference can be found in appendix 4 of the STFC Health and Safety Policy and appendix 2 of the STFC Environment Policy. The STFC also has a Radiation SHE Committee chaired by Graeme Finlan whose minutes listing their attendees are regularly published.

In addition, Departmental Directors have established Departmental safety committees to manage health and safety matters in their own Department. Due to their size the site and Departmental health and safety committees are combined at SO, JAC, ING and ROE.

If you are interested in becoming a Trade Union Safety Representative please contact an existing representative to see what is involved [contact details for STFC Trade Union Safety representatives can be found in the SHE Directory]. There is particular interest in additional Trade Union Safety representatives at RAL – if you would like to discuss what the role involves and the special leave available for training contact Stewart Greenall, ext. 6321.