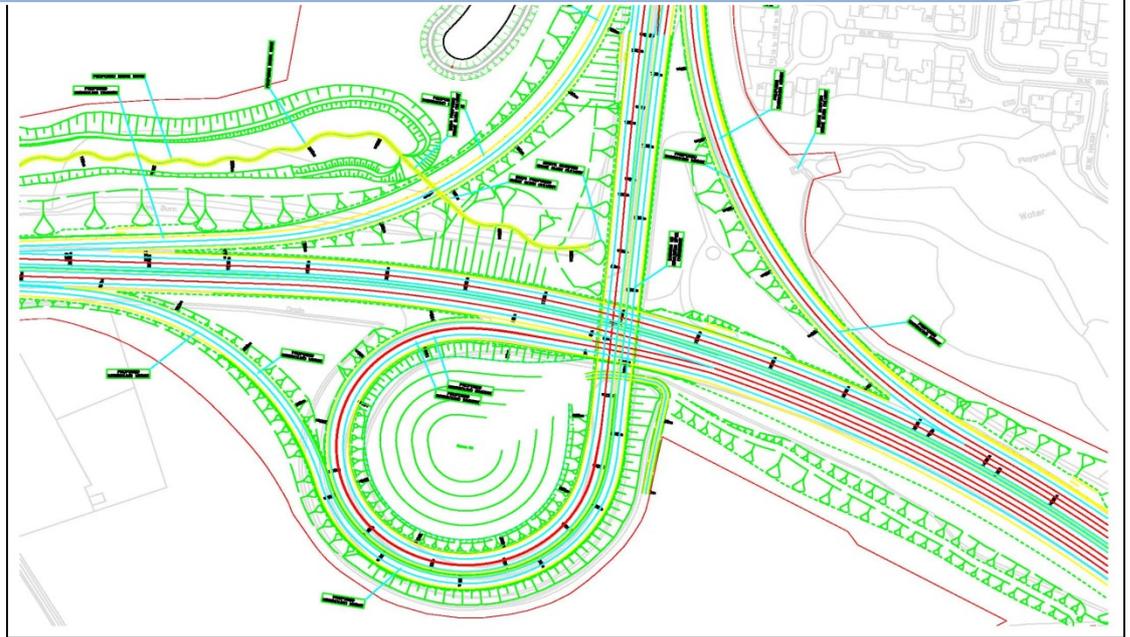




FORTH REPLACEMENT CROSSING M9 Junction 1a ENERGY MANAGEMENT PLAN



Issue 2: April 2012

FORTH REPLACEMENT CROSSING M9 Junction A1

ENERGY MANAGEMENT PLAN

CONTROLLED DOCUMENT
(Unless Printed)

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|-------------------|--------------------|----------|---------|
| Report No: EMP 02 | | | |
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| | Name | Signature | Date |
|---------------|-----------------|--|------------|
| Prepared by: | Roland Tarrant |  | April 2012 |
| Checked SRB: | Paraic McCarthy |  | April 2012 |
| SRB Approved: | Paraic McCarthy |  | April 2012 |

| Revision Record | | | | | |
|-----------------|----------|----|---|------|-------|
| Rev | Date | By | Summary of Changes | Chkd | Aprvd |
| 02 | 01-04-12 | RT | To take into account comments from the EDT in CR00233 | RT | PMc |
| | | | | | |

Forth Replacement Crossing,
Project Office,
King Malcolm Drive,
Rosyth,
KY11 2DY

ENERGY MANAGEMENT PLAN

Introduction

As detailed in CL3.8.1 Part A1 of the Employers Requirements, the purpose of this Plan is to ensure that energy usage is managed and minimised through the course of the M9J1a Project.

Energy Management – Roles

Barry O’ Riordan (SRB – Quality and Environmental Office) will act as the SRB Energy Champion to achieve the goals of the Energy Management Plan.

SRB will consider the energy consumption of the Works during construction will demonstrate actions taken to:

- use energy efficient plant (after consideration of the use and maintenance of construction plant); and
- run an energy efficiency programme on Site (e.g. cutting out unnecessary heating, switch-off campaigns etc.).
- explore opportunities for using energy derived from renewable (i.e. low- or zero-carbon) resources during construction and where practicable implement them.
- maintain all construction plant and ancillary equipment to maximise fuel efficiency and minimise as far as practicable carbon emissions.

Energy Management Plan Objectives

Key objectives of the EMP are as follows:

| Description | Target | Achieved |
|---|---|----------|
| Average Plant less than 3 years old or less than 6,000 hours | 80% | |
| Energy Audits carried out at two monthly intervals | 100% | |
| Environmental Site Audit Score | Minimum 95% | |
| To undertake an awareness campaign to cover energy saving actions and plant selection | To have campaign undertaken by May 2012 | |

The key Objectives are modest as the area of energy efficiency in construction practices is a relatively new concept. The intention is to bed in the concept of energy management into the SRB organisation and get personnel “buy-in” in order that it can be built upon and developed further on future contracts.

Energy Saving Plan

SRB shall implement the following Energy Saving Plan:

- Lighting, including task lighting will be planned, installed and operated in such a manner as to reduce the amount required to the minimum while still providing sufficient lighting to ensure safety of operatives and the public.
- Care will be taken to ensure that lighting installed does not cause glare to passers-by and the workforce.

- All Site Lighting (including internal, compound, external and task lighting) will be inspected by the Environmental Manager and / or the Energy Management Champion on a weekly basis to ensure that it is being correctly operated and in good working order. Timeframes for the repair of defective lighting will be noted on the Weekly Inspection Sheet that is filled in after each inspection.
- Luminaires will be set so that they only reflect on the area that is being lighted
- Where required, lighting will be covered by anti-vandal protection measures.
- **Lighting Operational Statement:** Lamps will not be operational during daylight hours, unless deemed necessary for testing, for task lighting or for security purposes
- Lamps will primary be powered by the same type of bulb, where practicable, to reduce the amount of spares that require to be held.
- Lighting within the compound offices will be wired so that at night-time periods, the main corridor lights can be switched off and emergency lighting will automatically come on.
- Each night, the Environmental Manager and / or the Energy Champion will ensure that all office lights are switched off.
- Where practicable, timer switched will be provided to offices to allow personnel to pre-warm offices prior to work commencing in the morning.
- Posters at each workstation will remind personnel that heaters and lights should be turned off (or in the case of heaters – to timer) each evening when the office is vacated.
- Periodic inspections of individual site offices will be carried out in order to ensure that heaters are turned off at night.
- Energy Saving Posters will be placed in all site offices and public spaces – **Appendix A**
- Energy Saving Stickers will be placed on all appropriate pieces of plant to encourage proper use of machinery

Plant Selection Plan

Past experience has proven that regular servicing of plant and machinery will ensure that optimum energy efficiency will be maintained. To achieve this, plant will be regularly serviced and maintained. This shall primarily be through service agreements with the plant suppliers.

Plant will be selected for each task in terms of appropriateness. This will include criteria such as:

- Output and performance efficiency e.g. loads per day, bucket size, engine size
- Maintenance performance (hours between services – where appropriate)
- Age of Plant – Where practicable all plant used will be three years old or less than 6,000 hours
- Maintenance policy of supplier
- Previous performance and machinery quality from supplier
- Diesel usage

Opportunities for using energy derived from Renewable resources during construction

Plant and Machinery

At this present time, bio-diesel is an emerging sustainable form of energy. However, in regards to the powering of construction plant, it is not considered practical to use for the following reasons:

- Large quantity mixing of bio-fuels is still not commonplace in the UK, except on large permanent institutions such as bus companies, councils, power companies etc. it is not feasible to introduce this concept into our construction fleet at present
- Bio-fuels mixes are not commonly available from suppliers and consistent supply is an ongoing issue.
- There have been some problems with excessive wear of seals in some plant and machinery equipment with the result that some plant manufacturers are hesitant to stand over plant warranties where large bio-fuel mixes are used.

Compound Power

Note: At time of writing, the compound is awaiting a fixed power connection from Scottish Power.

For the compound power, SRB will endeavour to contract this out to the greenest tariff available on the market after commercial analysis. This will be developed further as the contract progresses.

Relationship with the Project Quality Plan and the Construction Environmental Management Plan (CEMP)

The Energy Management Plan will sit within the Project Quality Plan: Volume 4 CEMP and will use the common Quality Management Systems as appropriate.

Audits

Weekly inspections will take place of plant to ensure that they are in proper and efficient working order and set times will be established for repairs and rectifications to be carried out.

Monthly Environmental Inspections will be carried out by the SRB Environmental Manager or external party and these will incorporate checks into the efficient operation of plant and machinery

An energy audit will be carried out at two monthly intervals, where the energy usage in the compound inspected and evaluated. A template of this energy audit is included in **Appendix B**.

Review of Energy Management Plan

The Energy Management Plan will be reviewed every six months or sooner, depending on results from site audits and reviews.

References

Transport Scotland Guidance Note – Controlling Light Pollution and Reducing Lighting Energy Consumption

Energy Saving Scotland Website

Energy Trust Website

Appendix A – Energy Saving Posters

Appendix B – Energy Audit Template

Appendix A – Energy Saving Posters



SRB ENERGY SAVING POLICY

PLEASE TURN OFF ALL LIGHTS, HEATERS AND
PLUG OUT ALL UNNECESSARY EQUIPMENT AT
THE END OF EACH SHIFT



SRB PAPER AND TONER SAVING POLICY

- ONLY PRINT WHERE ABSOLUTELY NECESSARY
- PRINT DOUBLE SIDED OR TWO PER PAGE
- SELECT PRINT BLACK AND WHITE BY DEFAULT
- **REUSE** WASTE SHEETS AS WORKSHEETS
- **RECYCLE** WASTE PAPER IN THE BINS PROVIDED
- HAND IN WASTE BATTERIES AND TONER

CARTRIDGES TO THE SRB ENVIRONMENTAL OFFICE



SRB PAPER RECYCLING POLICY

PLEASE RECYCLE ALL CARDBOARD, PAPER, PLASTIC BOTTLES AND DRINKS CANS IN THE BINS PROVIDED IN EACH OFFICE.

THESE WILL BE COLLECTED EACH DAY AND PLACED IN THE MIXED RECYCLING SKIP.



Lighting an office
overnight wastes
enough energy to
heat water for
1000 cups of tea

Switch to saving

Tel 0800 58 57 94
www.actionenergy.org.uk



Lighting an office
overnight wastes
enough energy to
heat water for
1000 cups of tea

Switch to saving

Tel 0800 58 57 94
www.actionenergy.org.uk

**A photocopier left
on standby overnight
wastes enough energy
to make 30 cups of tea.**

**Switch it off and you'll
make all the difference.**

For more ways to help combat
climate change at work visit
www.carbontrust.co.uk



Photocopier standby = 0.042kW x 14 hours = 0.588kWh. Average cup of tea = 0.25 litres = 0.25kg. Energy used to make cup of tea = 0.25kg x heat capacity of water (4200j/kg/°C) x temperature rise (90°C - 20°C) = 73,500 joules = 0.02kWh. 0.588kWh/0.02kWh = 29.4 cups of tea. For full calculation see www.carbontrust.co.uk/postercalculations

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A 2°C increase in office temperature creates enough CO₂ in a year to fill a hot air balloon.

Reduce it and you'll make all the difference.

For more ways to help combat climate change at work visit www.carbontrust.co.uk



Based on typical office floor area = 1500m² and benchmark of 113.25 kWh heating/m², average office uses 169,875kWh per year to heat to 20°C. Increase from 20°C to 22°C requires extra 15.38% = 26,134.62kWh/per year x 0.191KgCO₂/kWh = 4991.71KgCO₂/year. Divide by 1.98m³/kg = 2521.07m³CO₂/year. Average volume of a hot air balloon is 2500m³. For full calculation see www.carbontrust.co.uk/postercalculations

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PFL307



Office lights left on
overnight use enough
energy in a year to
heat a home for
almost 5 months.

Switch them off and you'll
make all the difference.

For more ways to help combat
climate change at work visit
www.carbontrust.co.uk



Based on typical small office floor area of 100m² using 18 x 70W (6ft T8 fluorescent tubes) x 14 hours x 365 days = 6438.6kWh.
Average annual energy use to heat a three bed semi-detached home = 16308kWh/12 months x 5 months = 6795kWh. For full
calculation see <http://www.carbontrust.co.uk/postercalculations>.

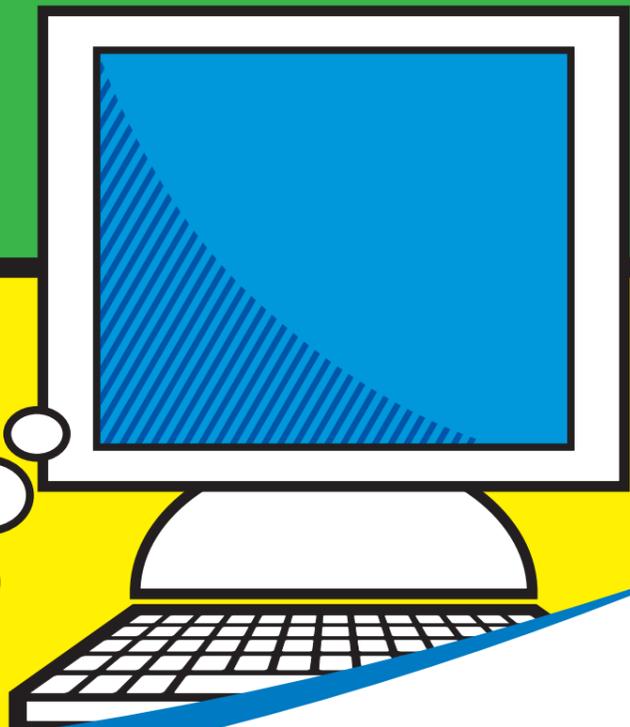
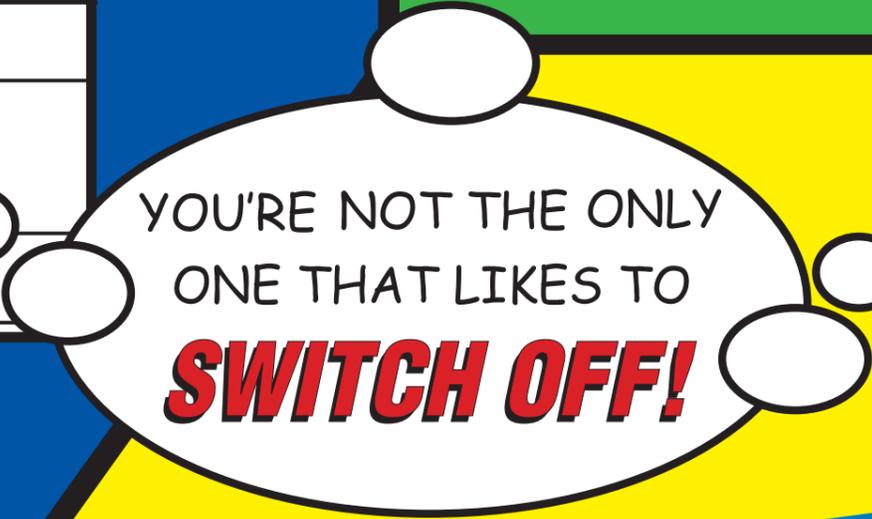
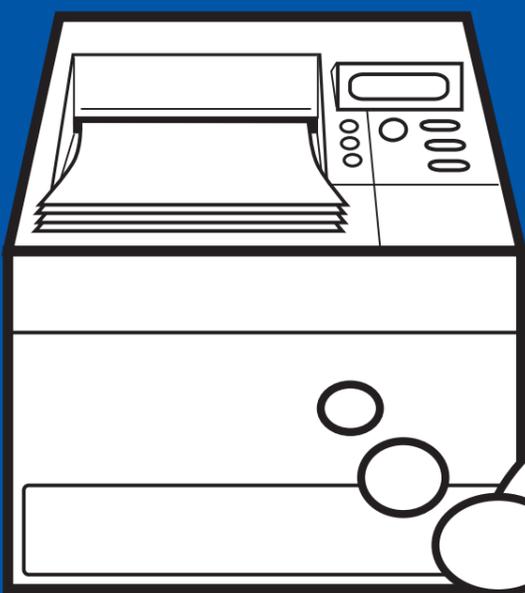
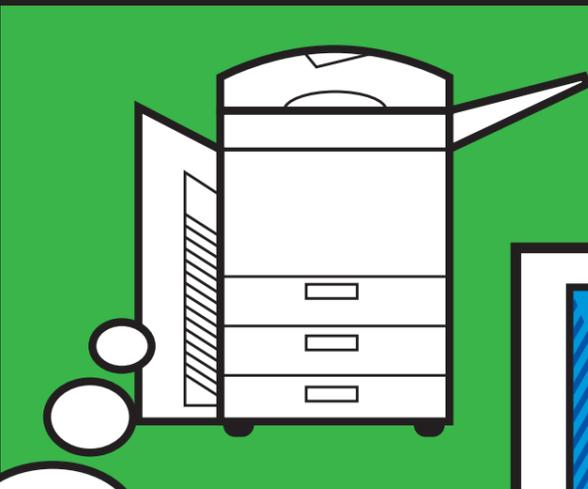
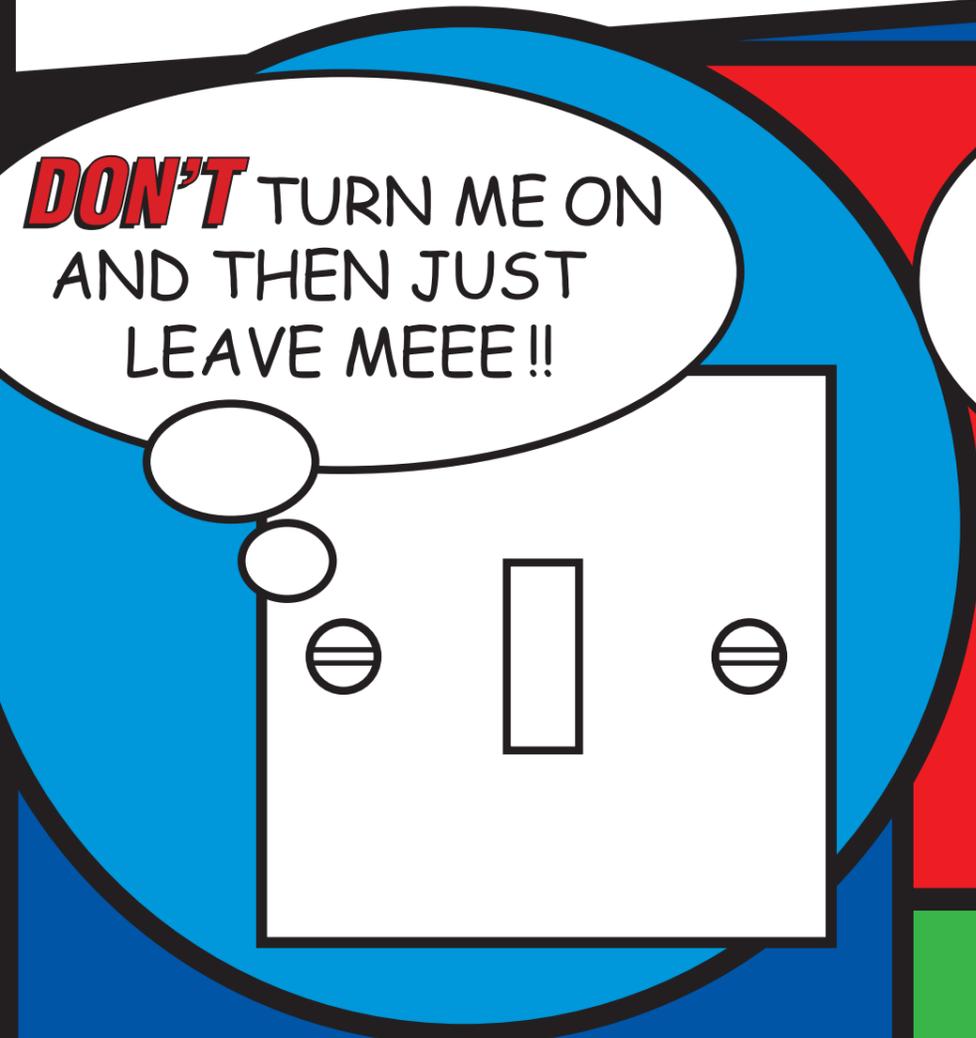


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PFL306



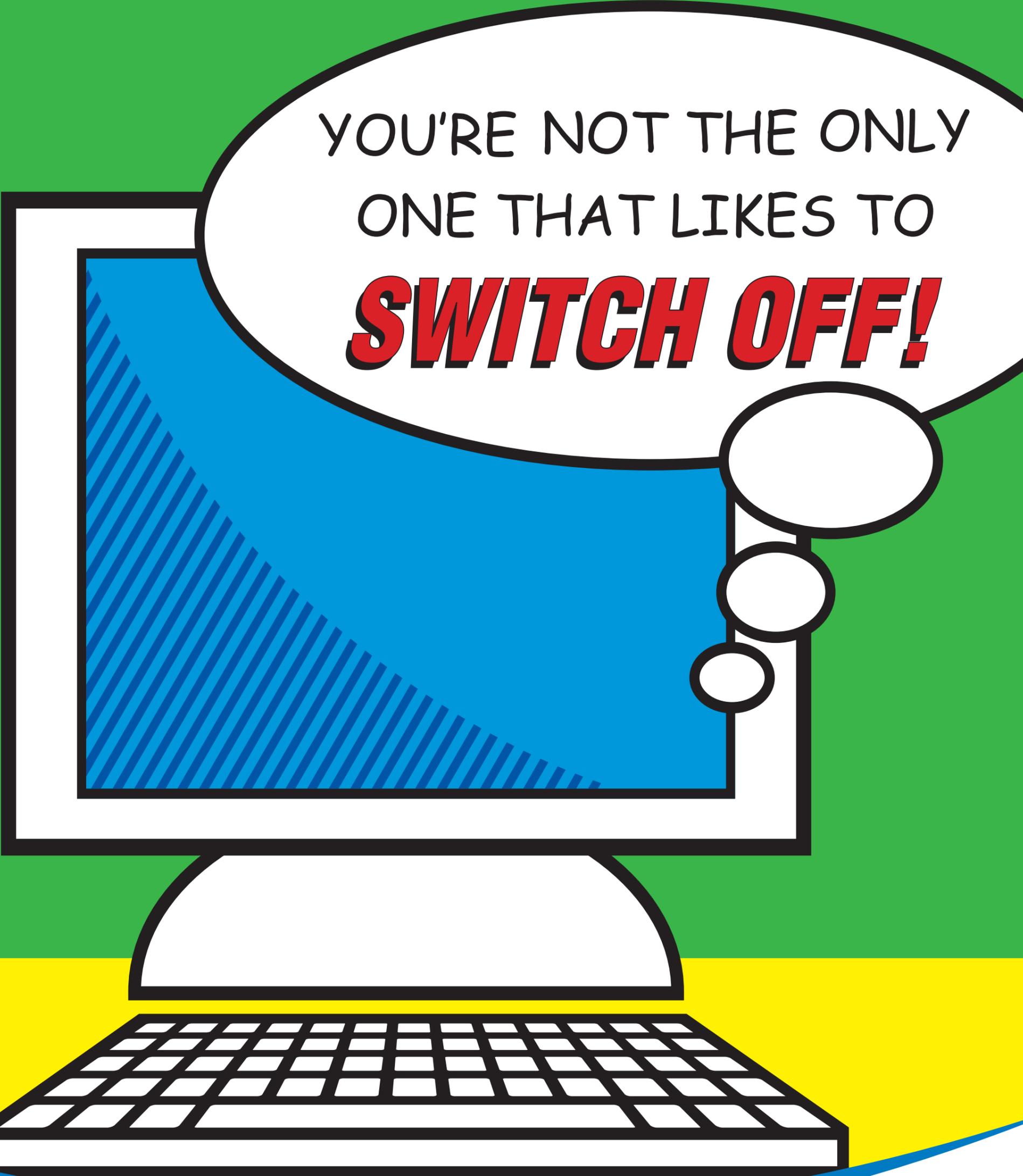
DON'T LEAVE ME THIS WAY!



Switching off all non-essential equipment in an office overnight saves enough energy to run a small car for 100 miles.

Tel 0800 085 2005
www.thecarbontrust.co.uk/energy


CARBON TRUST
Making business sense of climate change



YOU'RE NOT THE ONLY
ONE THAT LIKES TO
SWITCH OFF!

Leaving a PC monitor on all night
wastes enough energy to microwave
six dinners.

Tel 0800 085 2005
www.thecarbontrust.co.uk/energy



**CARBON
TRUST**

Making business sense
of climate change

I OPENED UP
TO YOU AND
THEN YOU
**WALKED
AWAY!!**

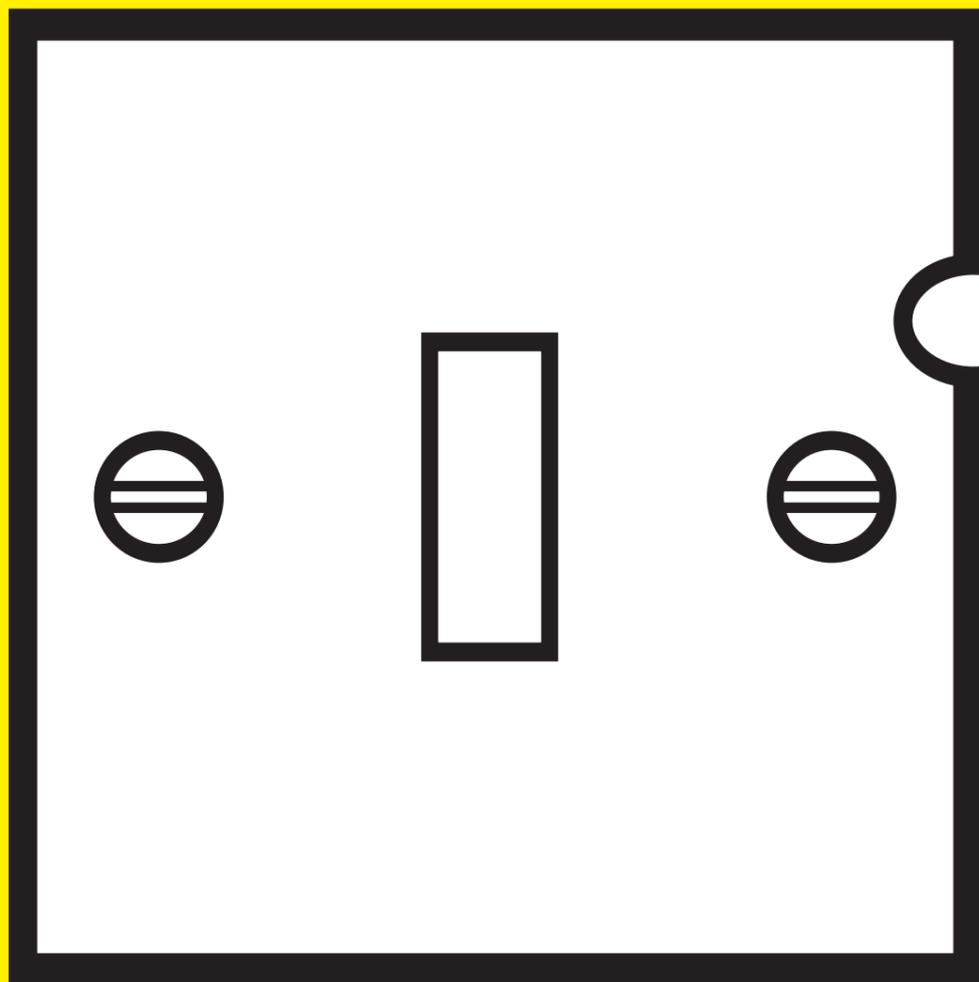
A typical window left open overnight
in winter will waste enough energy
to drive a small car over 35 miles.

Tel 0800 085 2005
www.thecarbontrust.co.uk/energy



Making business sense
of climate change

DON'T TURN ME ON
AND THEN JUST
LEAVE MEEEE!!



Lighting an office overnight wastes
enough energy to heat water for
1000 cups of tea.

Tel 0800 085 2005
www.thecarbontrust.co.uk/energy


**CARBON
TRUST**

Making business sense
of climate change



A photocopier
left on overnight
uses enough
energy to produce
over 1500 copies

Switch to saving

Tel 0800 58 57 94
www.actionenergy.org.uk

Action Energy is a programme run by the Carbon Trust and funded by the Department for Environment, Food and Rural Affairs, the Scottish Executive, Invest Northern Ireland and the National Assembly for Wales.

AEP002


ACTIONenergy
From the Carbon Trust



Lighting an office
overnight wastes
enough energy to
heat water for
1000 cups of tea

Switch to saving

Tel 0800 58 57 94
www.actionenergy.org.uk

Action Energy is a programme run by the Carbon Trust and funded by the Department for Environment, Food and Rural Affairs, the Scottish Executive, Invest Northern Ireland and the National Assembly for Wales.

AEP001


ACTIONenergy
From the Carbon Trust



100
miles

Switching off
non-essential equipment
in an office overnight
saves enough energy
to run a small car
for 100 miles

Switch to saving

Tel 0800 58 57 94
www.actionenergy.org.uk

Action Energy is a programme run by the Carbon Trust and funded by the Department for Environment, Food and Rural Affairs, the Scottish Executive, Invest Northern Ireland and the National Assembly for Wales.

AEP005


ACTIONenergy
From the Carbon Trust



Leaving a PC monitor on all night wastes enough energy to microwave six dinners

Switch to saving

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www.actionenergy.org.uk

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AEP004



Appendix B – Energy Audit Template



| |
|--|
| FORTH REPLACEMENT CROSSING M9 J1a |
| ENERGY AUDIT <i>Rev: 1</i> |

| | |
|-------------------------------|------------------------------|
| Inspection By: | Date: XX_XX_XX |
| Section: Site Compound | |

| | |
|--------------------------|--|
| Office Lighting | |
| Corridor Lighting | |
| Power Supply | |
| Office Heaters | |
| Copiers, printers | |
| Task Lighting | |
| Improvements | |