

# Maximising Energy Savings and Carbon Reductions

How ECA building services contractors can help to achieve cost savings in commercial and public buildings



Representing the best in electrical engineering and building services

# Maximising Energy Savings and Carbon Reductions

## How ECA building services contractors can help to achieve cost savings in commercial and public buildings

This brochure is produced by the Electrical Contractors' Association (ECA) to advise industrial, commercial and public organisations how ECA building services contractors can help with the selection, design and installation of energy and carbon saving measures.

In the medium to-long term, there is wide expectation that the cost of energy will continue to rise. In addition, many energy users need to respond to legal, fiscal or stakeholder requirements to reduce their carbon footprint. Addressing these challenges often reveals opportunities for making considerable operational savings.

Many energy saving measures, such as effective monitoring and control, or modern lighting systems, can deliver significant carbon reductions, often with short payback times. Involving a competent building services contractor early on in your energy management programme can help you to make cost-effective choices and maximise long-term savings.

### Who needs to read this brochure?

- Operational Directors
- Procurement managers
- Facilities and Energy Managers
- Environmental Managers

Building services contractors, notably those who are familiar with electrical and related design and installation, specialise in a range of energy saving technologies. They can help you to consider the feasibility and scope of the various energy saving options and the best way to implement them, particularly in combination.

## Seven routes to energy savings and carbon reduction...

You may want to consider the following as part of your organisation's energy saving programme:

### 1) Lighting

- Optimal lighting configurations (e.g. reflectors, dimmer circuits)
- Energy efficient lamps and luminaires, for both internal and external lighting
- High-frequency luminaires (ballasts)

### 2) Heating and ventilation

- Adjusting thermostats (cooling, heating and hot water)
- Timers or programmable thermostats that turn off heating/cooling/hot water systems when the building is unoccupied
- ICT centre cooling (optimizing computer room air conditioning, indoor temperature control and air discharge temperature)

---

*It's well known that lowering thermostats reduces energy bills - but gaining effective control over energy use can save a lot more...*

---



Darren Burford - Andromeda

### 3) Control and monitoring

- Improved local metering, to allow staff (and energy assessors) to see how much energy is being used - and where
- Lighting controls
- Building management control systems (BMS)
- Wireless and network controls
- The latest controllers for specific equipment such as boilers, pumps and fans.

Monitoring is, of course, a first step towards identifying energy savings.

---

*Accurate metering helps to assess whether your energy bills are correct, and where to put in the most effort to reduce them further*

---

### 4) Sensors and timers

- Sensors to allow lighting (interior and exterior) to respond to daylight
- Allowing lights to operate via motion (presence) detectors in shared areas (e.g. conference suites or washrooms).
- 'Out of hours' timers on building support equipment, drinks machines etc.

### 5) Your buildings...

- Insulation (including advice on the safety of electrical services close to insulation)

- Automatic shading or blinds to reduce 'solar gain'

### 6) Your equipment

Depending on what you do, you can achieve significant energy reductions through:

- variable speed and energy efficient motors
- an effective maintenance programme
- optimising voltage
- upgrading equipment with higher-energy performance equipment
- identifying and avoiding 'energy hungry' equipment
- kinetic energy recovery (frequency inverters)
- machinery energy saving modes.

Many building operators can also take advantage of cost savings from 'power factor correction' or 'voltage optimisation'. However, the feasibility and impact of these techniques varies, and access to competent electrical advice is essential.

---

*Many carbon reduction measures deliver ongoing operational savings (which go straight to the 'bottom line') whether or not you are covered by the CRC*

---

### 7) Renewable energy technologies

It is well known that renewable (or micro-generation) technologies virtually eliminate carbon emissions by



harnessing alternative energy sources to fossil fuels. Common examples of micro-renewable energy systems include roof-mounted photovoltaic cells, wind turbines or heat pumps. The cost and feasibility of renewable technology depends on many factors, including the nature of the building and the cost of installation - for example, roof mounted solar panels may be more cost-effective on flat roofs, because the installation costs are usually lower.

Some other technologies (such as 'air source' heat pumps) still rely to an extent on grid electricity, but some are so efficient that they can also qualify as 'micro-generation'.

Where renewables are fitted to premises with low energy demand, there is even potential to export the renewable energy to the grid, rather than using it on-site.

Feed-in Tariffs or Renewable Obligation Certificates may be available to support the installation of renewables, but take expert advice on whether you can benefit from these schemes. In addition, for organisations that fall under the CRC, the Government aims to publish information about energy generated on site alongside a CRC 'performance league table'. This may provide a further 'stakeholder' incentive to consider renewable energy...

## Enhanced Capital Allowances

Note too that the 'Enhanced Capital Allowance' scheme may allow you to take advantage of 100% tax relief on the capital cost of a range of listed energy saving or 'low to no carbon' equipment. For more information go to: [www.eca.gov.uk](http://www.eca.gov.uk)

## Refurbishment offers major opportunities

Altering or extending buildings, or maintenance shutdowns, are a particularly good time to implement carbon reduction measures. Otherwise, the cost of access and disruption can outweigh the cost of the energy saving measures being retrofitted. If you are planning to do the work anyway, consider how to maximise the impact of carbon reduction measures. ECA building services contractors can help you to approach this in an integrated and efficient way.

# What is the Carbon Reduction Commitment?

The Carbon Reduction Commitment - Energy Efficiency Scheme (CRC) is part of the Government's ambitious legal target to reduce UK greenhouse gas emissions by 80% by 2050. The CRC will prompt thousands of large energy users to make significant carbon savings. It introduces 'carbon allowances' and other measures aimed at reducing an organisation's 'carbon footprint'.

The CRC applies to large *non-energy intensive* public and private sector organisations (those not covered by the EU Emissions Trading Scheme).

Organisations that use at least 6,000-megawatt hours of electricity p.a. (roughly, a £500,000 p.a. plus electricity bill at 2010 prices) have to fully participate in a 'carbon allowance' scheme. The CRC applies to thousands of organizations such as manufacturing and other industrial sites, offices, banks, supermarkets, major retail chains, local authorities and Government premises. Additionally, thousands of other organisations have to monitor and report on energy use, if they had at least one half-hourly meter settled during 2008.

## What does the CRC require?

Depending on the level of participation in the CRC, organisations may have to:

- measure and report energy use (produce a 'carbon footprint' report)
- appear in an annual Government '*league table*' of organisations' energy performance
- purchase carbon allowances (starting at £12 per tonne of CO<sub>2</sub>) to cover the calculated carbon footprint - the amount that is recycled back from the scheme to participants depends on the carbon savings they achieve
- eventually take part in a capped carbon allowance scheme (with a variable carbon price)
- produce carbon financial budgets and CRC strategies.

- meet the requirements of the Environment Agency (EA) - the administrators and enforcers of the CRC. There are fixed penalties for non-compliance.

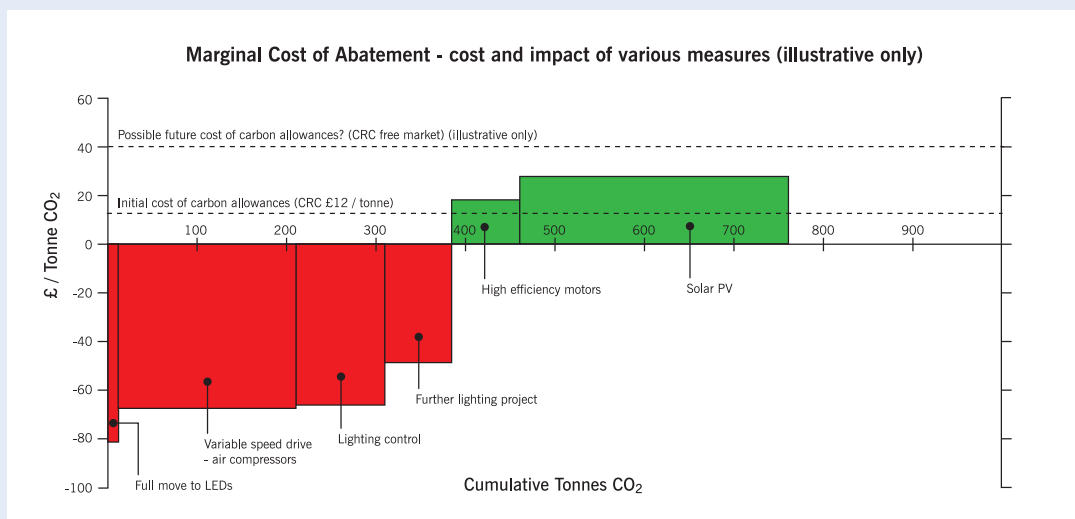
In addition, those that make the biggest reductions in carbon demand will benefit from a CRC scheme rebate, while those that don't perform as well will have to pay extra. As with the overall price of energy, the price of carbon allowances is widely expected to rise in the medium to long-term.

If you are covered by the CRC, you will need a carbon management programme to introduce the necessary carbon reductions cost-effectively.

## A price on carbon...

Under the CRC, fully participating organisations will need to buy 'carbon allowances' from 2011 (based on their carbon footprint). Initially, this will be at £12/tonne, which suggests that measures offering a 'marginal cost of abatement'\* of under £12/tonne should be implemented as soon as possible. The good news is that there is already a range of carbon reduction measures that can offer a MACC of under £12/tonne.

*\*Marginal abatement cost curves (MACCs) show the cost per tonne of CO<sub>2</sub> and the amount of CO<sub>2</sub> saved. A MACC curve ranks projects or measures based on their whole-life Net Present Value (expressed as £/t CO<sub>2</sub> reduced). The horizontal axis represents the potential (in tonnes CO<sub>2</sub>) for carbon mitigation. MACCs are typically produced to assess the relative cost and carbon reduction implications of potential projects (in the illustration there are six projects).*



## Computer and other ICT Opportunities

Ask your ICT specialists about how to reduce the energy costs and carbon footprint of ICT equipment such as central servers, and whether they can specify energy efficient equipment.

At workstations, consider:

- The best operational settings for ICT equipment;
- Adjusting the 'sleep' settings on computers and monitors;
- Putting printer and other defaults onto 'draft' settings;
- ICT power management and monitoring.

---

*Management commitment and staff behaviour are important, but good design and setup are a much surer way of achieving carbon reductions*

---

For any building operator, planning and good design are the best way of achieving long-term energy savings - but a key challenge for building operators is making the various configurations and energy saving measures work together. There are now numerous examples of how involving building services contractors have helped building clients to maximize ongoing cost savings and carbon reductions. If you are responsible for energy savings in your premises, talking to an ECA building services contractor early on will help to ensure that your energy saving plans work in practice. Leading ECA contractors can help you with planning, design, integration, commissioning, installation and maintenance.

For more information on what ECA or its members can do to help you, contact the ECA on: 0207 313 4825 and ask for our Technical Department (technical enquiries, including Part L) or 0207 313 4854 for our Environment Department (CRC and other general enquiries).

For more information on the role of mechanical and electrical building services contractors in making sustainable carbon reductions visit: [www.mech-elec.org.uk](http://www.mech-elec.org.uk), the website for 'M&E Sustainability', the joint portal of the Electrical Contractors Association and the Heating and Ventilating Contractors' Association.

### Carbon footnotes...

In this ECA guide, 'carbon reduction' refers to reducing the demand for energy from burning fossil fuels (such as coal and gas at power stations), which generates carbon dioxide, widely acknowledged as a significant cause of global climate change.

'Building services' includes contractors who provide 'whole building' or 'integrated' approaches to the design and installation of electrical, mechanical and other building services.

## Your energy review

An energy review allows you to identify and understand where, how and what sort of energy is currently used in your organisation. A good energy review will:

- Establish the total amount of energy being used
- Identify wasteful energy use
- Identify opportunities for making carbon reductions and cost savings
- Highlight maintenance requirements, and
- Assess the scope for new technology and other energy saving measures.

## Additional measures to consider

To help achieve carbon reductions you can also consider basic - but effective - management measures such as:

## Staff Involvement

### Have you:

- Developed an office equipment policy?
- Asked staff for their energy-saving ideas (consulting staff at all levels is a powerful technique for getting ideas and 'buy in').
- Appointed so-called 'green wardens' who can take a responsible role around the building?
- Offered basic, practical advice to staff, such as:
  - Switch off lights and heating/cooling when the room is unoccupied (especially overnight/weekends);
  - Switch off computers, monitors, photocopiers at night and during holidays;
  - Keep all radiators clear and set thermostats correctly;
  - Fill water heaters with the right amount of water, etc.

As you go round a building, talk to staff to find out more about what actually happens and where energy-related issues arise. Welcome employees' suggestions and involve them in the move towards 'lower carbon' buildings.

## Government grants and loans

Various grants, schemes, and loans are available to help commercial and public sector clients reduce their carbon demand and energy bills. Current schemes - and the money available - will vary depending on Government policy and announcements, but those available in 2010 include:

- Interest free Loans from the Carbon Trust- the Carbon Trust's Energy-Efficiency Loans are unsecured and interest free, with no arrangement fees. Loans can be repaid over a period of up to four years. For more information visit: [www.carbontrust.co.uk](http://www.carbontrust.co.uk)
- Lower VAT - many energy efficiency and low/zero carbon technologies have a VAT rate of 5%. For more information, phone the Government helpline on 0845 010 9000.
- Enhanced Capital Allowances (ECAs) - allowing 100% first year tax relief on qualifying capital expenditure (allowing the organisation to write off the cost of the qualifying equipment against taxable profits in the year of purchase). For more information visit: [www.eca.gov.uk](http://www.eca.gov.uk)

## Microgeneration Certification Scheme



The Microgeneration Certification Scheme (MCS) is supported by the Department of Energy and Climate Change. It is designed to evaluate products - and those who install them - against robust criteria. The scheme is open to firms involved in the supply, design, installation, set to work and commissioning of microgeneration technologies, including:

### Cogeneration technologies

- Combined Heat and Power (CHP)
- Fuel Cells

### Electricity generation technologies

- Solar Photovoltaic (PV)
- Wind Turbines
- Micro Hydro

### Heat generation technologies

- Solar Heating
- Heat Pumps (Ground, Air or Water Source)

ELECSA - part of the ECA group of companies - is an approved provider of the Microgeneration Certification Scheme, for all the technologies above. For more information about the MCS or the ELECSA scheme, ring 0845 634 9043 or visit [www.elecsa.co.uk/](http://www.elecsa.co.uk/)



Darren Burford - Andromeda

## About the Electrical Contractors' Association

The Electrical Contractors' Association (ECA) is the UK's leading trade association representing the interests of contractors who design, install, inspect, test and maintain electrical and electronic equipment and services. 'ECA Certification' is the ECA's UKAS-accredited independent, third party certification body.

### The ECA:

- Provides a comprehensive, first-class range of tools and expert support services to our 3000+ Registered Members. ECA Registered members range from local contractors to national building services organisations with broad building services capabilities. Collectively, our members have an annual turnover of more than £5 billion, employ over 30,000 operatives and support 8,000 apprentices in training.
- Works with regulatory bodies, government and opinion formers to help build an efficient and sustainable industry, based on high standards of training and practice. Through representation and lobbying, the ECA actively leads on key issues including safety, sustainability, training, qualification and technological development.
- Has formed a number of strategic relationships with those who specify electrical and related work, to enhance the profile and promote the use of Registered Members.

This guide provides general information, but legal, financial and other developments may overtake some of the information provided. As such, this guide is not intended, and should not be used, as the basis for any commercial plans or decisions.



**IWEC International Ltd.**

Glangwendraeth Farm  
Priory Street  
Kidwelly  
SA17 4TY

Web: [www.iwecelectrical.co.uk](http://www.iwecelectrical.co.uk)  
Email: [enquiries@iwecelectrical.co.uk](mailto:enquiries@iwecelectrical.co.uk)  
Phone: 01554 707070



Representing the best in electrical  
engineering and building services