



GREEN BUSINESS FUND

Cutting Business Energy Costs

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The Carbon Trust

West Midlands Museum Development Conference 2019

Agenda

- 1. Introduction**
- 2. Heating and Cooling**
- 3. Lighting**
- 4. Motors and Drives**
- 5. Other Electrical Equipment**
- 6. Building Fabric**
- 7. The Green Business Fund**
- 8. Q&A**

About the Carbon Trust

We are a not for profit organisation with a mission to accelerate the move to a sustainable, low carbon economy

We are independent experts on carbon reduction and resource efficiency, who reinvest surpluses from group commercial activities into our mission

Advice

We advise businesses, governments and the public sector on their opportunities in a low carbon world

Footprinting

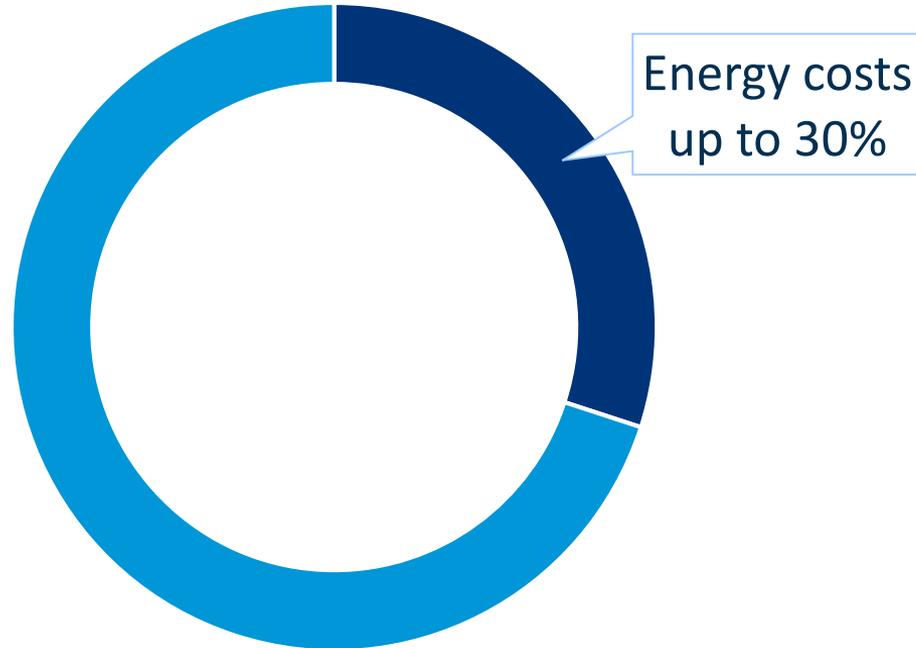
We measure and certify the environmental footprint of organisations, products and services

Technology

We help develop and deploy low carbon technologies and solutions

Importance of energy efficiency

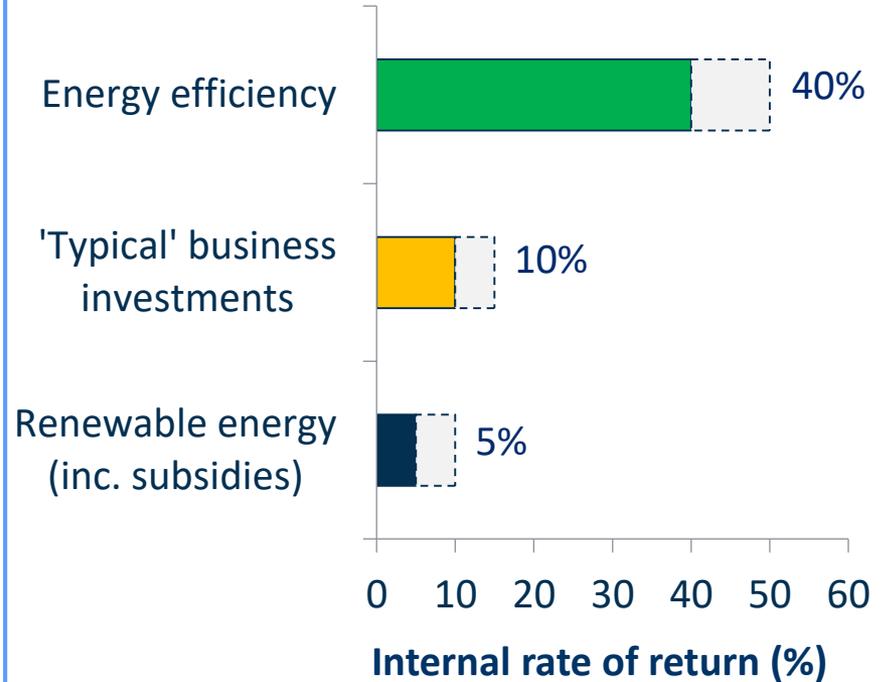
Business running costs



The business case

- 1. Generate cost savings
- 2. Lower business impact on the environment
- 3. Comply with regulations and requirements

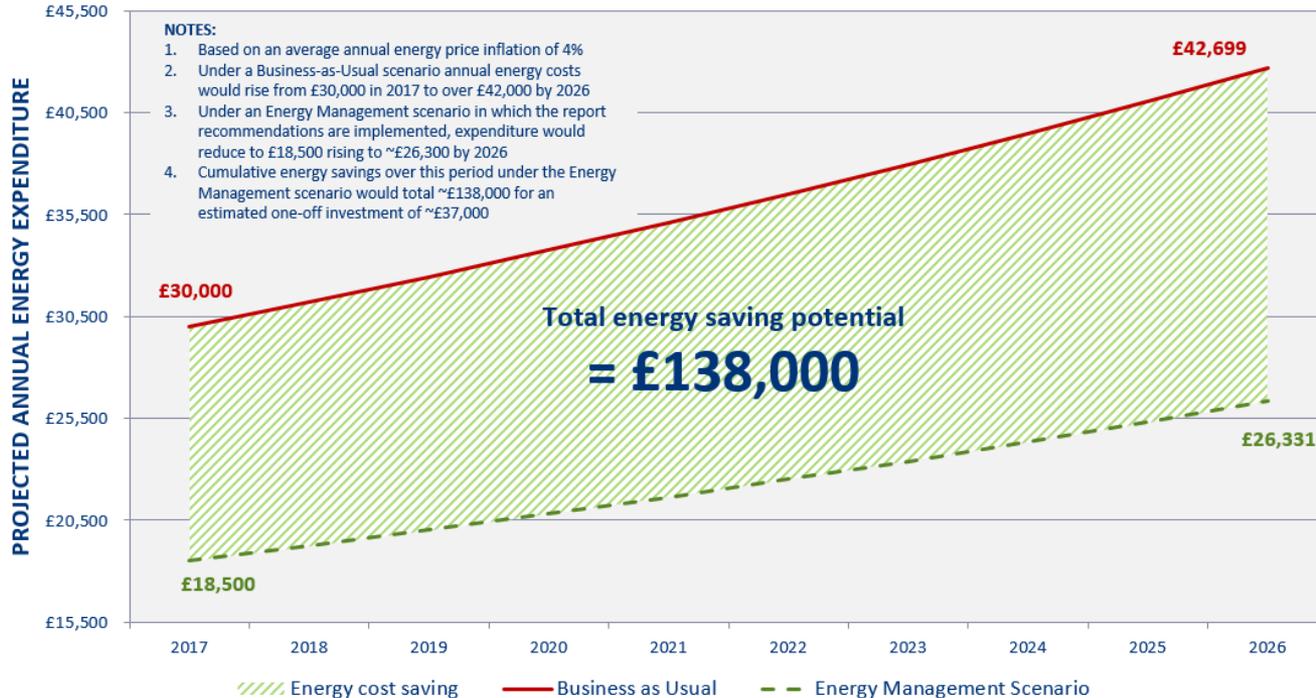
Typical investment returns



Source: Carbon Trust analysis

The business case

Business-as-Usual v Energy Management scenario



Source: Carbon Trust analysis

What are the barriers for SME's?

*Time to
commit
to savings*

*We don't have
the money to
implement
changes*

**Expertise to
know what's
best to focus
on**

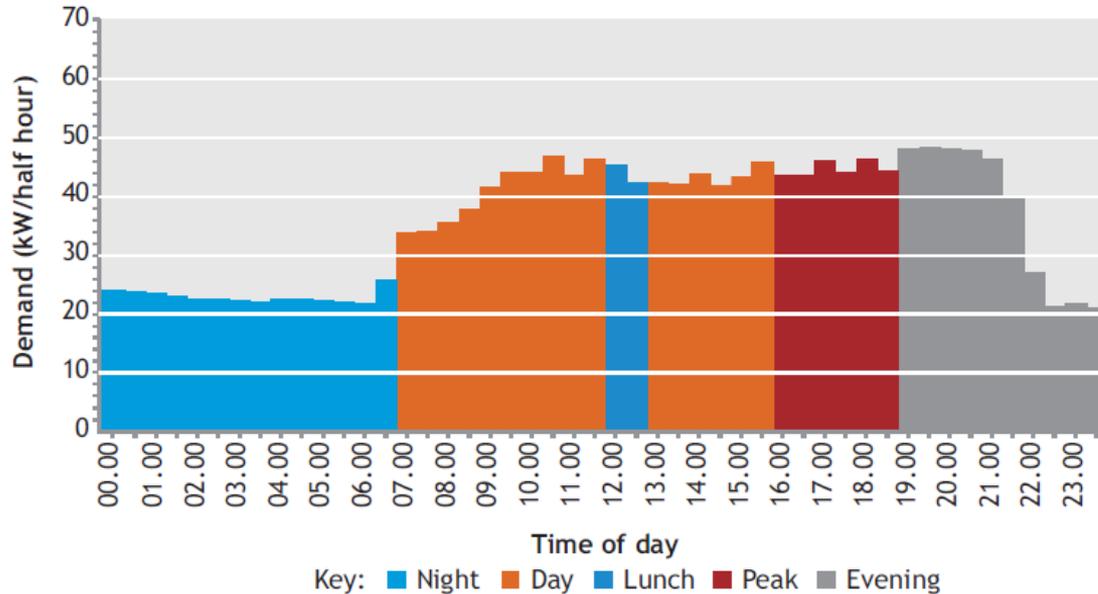
**Control
over
Building as a
tenant**

?

**Disinterested
staff**

Smart Meters

- Government mandated installation by energy suppliers of smart energy meters in all domestic and smaller non-domestic premises by 2020
- Contact your supplier for more details



Heating/Cooling

Basic Understanding

- **Somebody** will need to understand
 - Where all your business' boilers/heaters/coolers are located
 - Which areas of the building are served by each system
 - Which areas can be controlled separately
 - Times
 - Temperature
 - Who can change these settings?



Check times

It is rare to find a heating system which always delivers heating at the right time

- Define requirements
 - Produce schedule
 - Recognise opportunities (e.g. cleaning, intermittent room use)
- Who can change these settings?



Check temperatures

- Are thermostats accurate?
- Measure actual temperatures
- Recognise potential issues:
 - Are windows open?
 - Fan heaters on?
 - Is equipment blocking heaters?
 - Are thermostats positioned poorly?
- Make adjustments
 - Room thermostats/TRVs/fans
 - Overheating by 3 to 4° C is not unknown



Overheating by 1°C can increase consumption by 8%

Recommended temperatures – make sure they’re in line with activity level

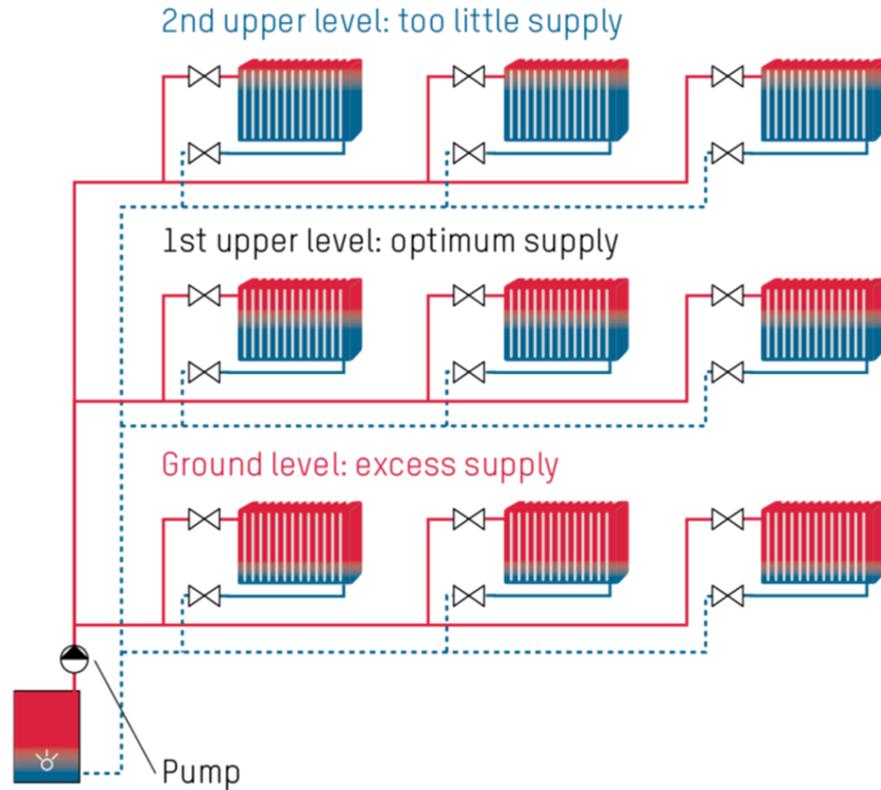
Sector	Building/room type	Temp
Offices/service companies	Computer rooms	19-21
	Banks, building societies, post offices	19-21
	Offices	21-23
Hospitality	Restaurant/dining rooms	22-24
	Bars	20-22
	Hotels	19-21
Industrial/Factories	Heavy work	11-14
	Light work	16-19
	Sedentary Work	19-21
Retail	Retail buildings	19-24
Sports and leisure	Changing rooms	20-25
	Sports halls	15
	Pool halls	28-30

Server room: Over-cooling

- Most modern servers can handle temperatures of up to 30°C (source ASHRAE)
- Typically optimal up to 28°C
- Often however they are cooled down to 21°C or lower
- This is typically borne of paranoia/lack of understanding
 - Check manufacturer guidelines
 - Challenge IT department



Balancing your heating system



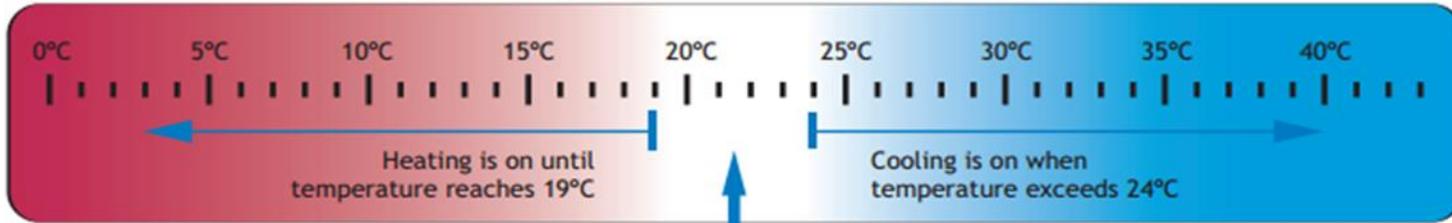
Hot water systems

- Often neglected
- Key problems:
 - System runs continuously
 - Temperature set too high
- Key aims:
 - Hot water runs out at the end of the day
 - Temperature set to 60°C
- Do you need a massive hot water cylinder heating 200 litres?:
 - Smaller tank
 - Decentralised, instantaneous



The dead band

- Introduce a dead band between heating and cooling
- Vital to prevent 'fighting' between heating and cooling systems
- Dead band between:
 - Lowest possible temperature before heating kicks in
 - Highest possible temperature before cooling kicks in



Heating and Cooling both off between 19°C and 24°C
– a 'dead band' of 5 degrees

Boiler replacement

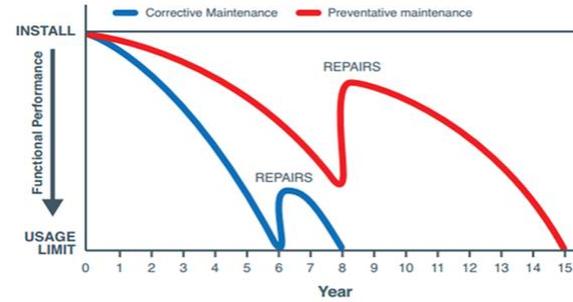
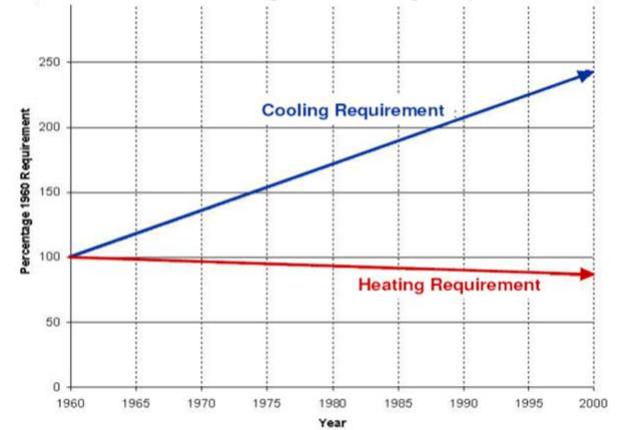
- One of the biggest single improvements
- Modern boilers 90%+ efficient
- Boilers over 15 years old will not be condensing (70%)
- Boilers over 40 years, very inefficient (45%)
- £20 - 30k for installation per 1,000m²: 6-20 years payback
- Insulate first! How much heating do you really need?



Reducing the requirement for A/C

- Open windows
- Run ventilation overnight without cooling
- Add solar films to windows

- Maintenance
 - Ensure air conditioning equipment is maintained.
 - Filters clog up with dust which forces the motor to drain excess energy to pull air into chiller.
 - Efficiency can be improved by up to 30% in older models.



Excerpt from 'Japan Society of Refrigerating and Air-Conditioning Engineers'.

Be aware of regulations concerning energy efficiency

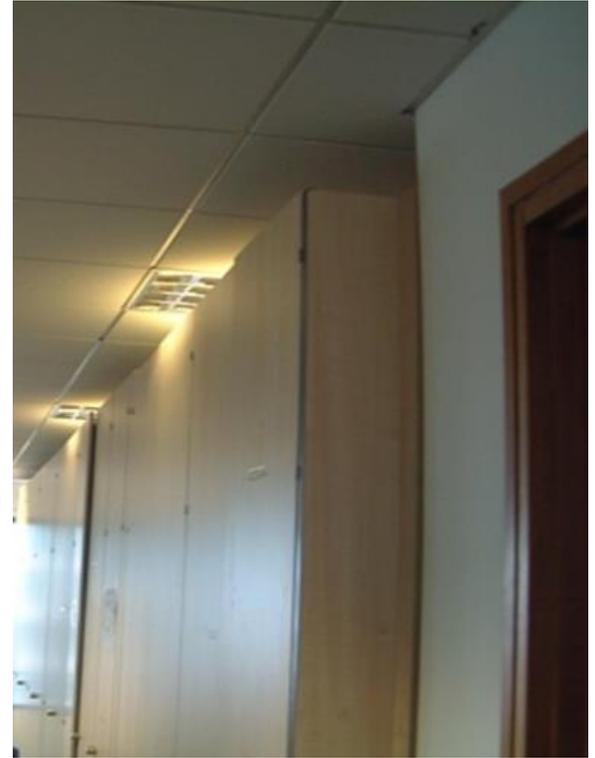
- Gas Boiler check is legal requirement. This can improve performance by 5 -30%
- Since April 2018, it has been unlawful to let residential or commercial properties with an EPC Rating of F or G (i.e. the lowest 2 grades of energy efficiency).
- F-gas regulations dictate that operators of air conditioning equipment must keep records of the entire plant, ensure leak tests are done on time and only allow certified personnel to work on their systems.



Lighting

Reduce/remove unnecessary lighting

- Make use of natural daylight
- Avoid obstructions
- Remove excess lamps and modify wiring to take control gear out of circuit¹



¹ NB: All wiring modifications must to undertaken by a competent, qualified electrician in accordance with prevailing regulations

Lighting controls

- PIR – Best for shared infrequently used areas
- One PIR costs £10 - £40 + install
payback >1 year
- Perimeter/light sensitive
 - 30% saving
 - Reacts to light levels
- Labelling



LED lighting upgrade – simplified example

20 x Twin 58W 5ft Fluorescent
Luminaires

Circuit loading 2.78 kW (inc.
20% control gear losses)

Run hours 4,200 p.a.
(assuming 12hr, 7 days, 50
weeks per year)

Energy consumption 11,693
kWh p.a.

Energy cost £1,520 p.a.
(assuming 13p/kWh unit rate)



20 x 60W 5ft LED Luminaires

Circuit loading 1.2 kW

Run hours 4,200 p.a.
(assuming 12hr, 7 days, 50
weeks per year)

Energy consumption 5,040 kWh
p.a.

Energy cost £655 p.a.
(assuming 13p/kWh unit rate)

Energy cost saving £865
Overall project cost ~£2,700
Simple payback ~ 3.1 years

Case Study – Collister & Glover

- Stockists of engineering products based in Deeside, North Wales
- Initially attended an energy efficiency training workshop delivered through Green Business Fund scheme
- Subsequently applied for a free remote opportunity assessment, which identified that upgrading warehouse lighting with LED would save over £3,000 annually
- Following the consultant's recommendation Collister & Glover then took advantage of the free Implementation Advice service
- Consultant supported Collister & Glover to source 5 supplier quotes to supply and install LED lighting in warehouse
- Ranked proposals in order based on pre-determined project criteria
- Collister & Glover were then able to award the project to the supplier who offered the highest quality solution and greatest energy savings
- Simple payback of project was less than 4 years



“Our experience working with the Carbon Trust was excellent. The whole process has been most beneficial, but I think the best thing we received was the guidance.”

John Collister - Managing Director, Collister & Glover

Motors and Drives

Motors and drives

- For larger AC (gyms, restaurants, pubs, industrial etc) total replacement might be prohibitive but replacing parts can still be effective
 - Pumps, motors etc all lose efficiency
- Upgrading motors and drives will save up to 30% on running costs
- Variable speed drives typically save 20%
 - Allow you to vary speed of motors
 - Approximately £200 per motor
- Does the motor's speed not need to vary throughout the day?
 - Would a soft-starter be more suitable?



Compressed air

- Understand how your compressed air system is set up
 - Single compressor? Duty/standby? Loop with drops?
- Is your compressor controlled by a VSD?
- What pressure does the equipment actually need?
- Can you hear leaks?
 - Have you had a leak survey recently?
 - Have you actually fixed the leaks?!
- The right tool for the job -
 - Use cutting tools designed for air lines
 - Go easy on cable ties!



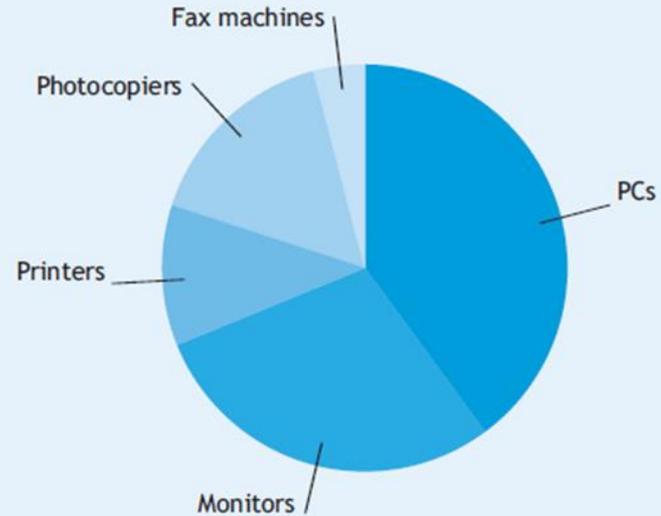
Other Electricals

Out of hours electrical use

- Potentially huge cost
- Create a check list
- Make somebody responsible
- Fit seven day timers to as much as possible

- Computers/Printers
- Vending machines
- Hidden equipment
 - Extractor fans

Energy use of business equipment in the typical office



Based on 10 PCs with monitors, plus 1 photocopier, fax machine and 1 laser printer, all with average consumption and no standby enabled.

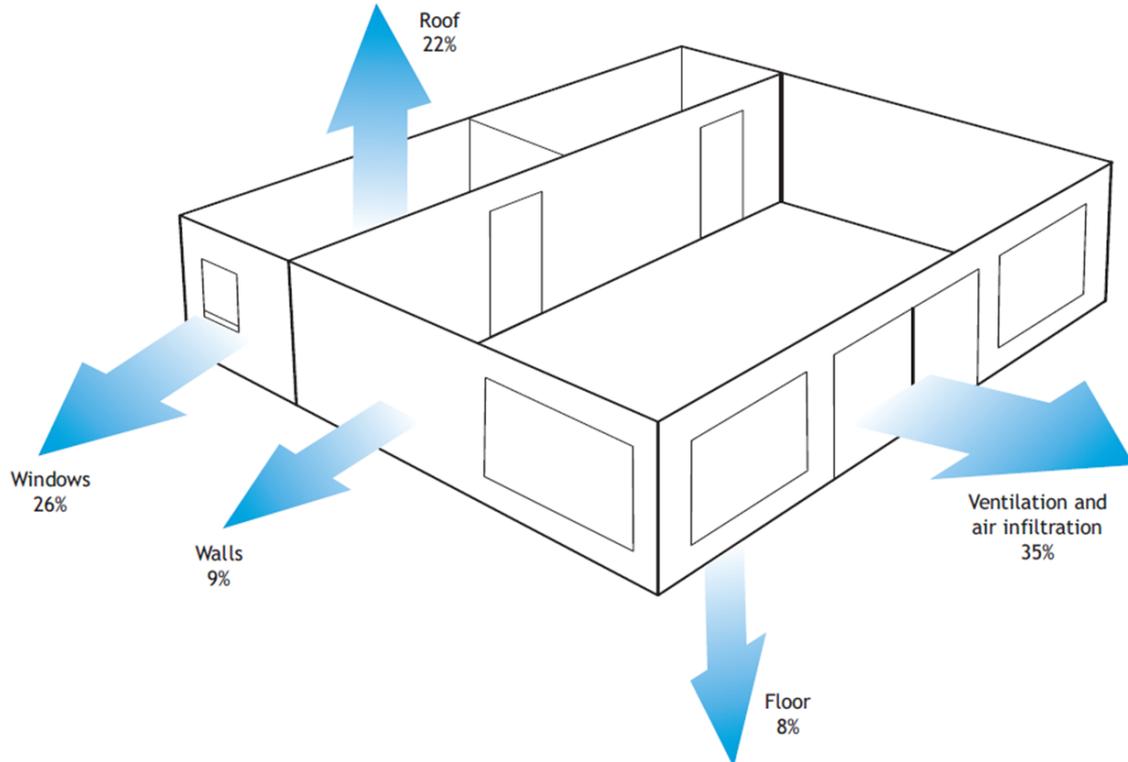
IT: Printers

- Printing is more expensive than you think
 - Cost per page is 2p – 15p
 - Savings of up to £1,000 per year
 - Double sided / 2 pages into 1 reduces 50% of paper
 - Making 1kg paper uses 1kg CO₂
 - Printing 1kg uses 1/50th kg CO₂
 - Move the printers?
- Defaults much more likely to stick
 - Auto sleep/hibernate set to 5 mins
 - Hibernate uses very little energy
 - Is this more likely for shorter periods
- Have you oversped your kit?



Building Fabric

Building fabric



Draughts and gaps

Example - a 10,000 m² warehouse building reducing air leakage from **20m³/hr/m²** to **5m³/hr/m²** reduces the energy requirements from 220,000 kWh to 55,000 kWh



Green Business Fund

Where are current GBF services available?



England, Scotland & Wales

Who is eligible for current GBF services?

Small & medium sized businesses	✓
Schools	✓
Sole traders	✓
Charities	✓
Domestic properties	✗
Public sector	✗
New builds	✗

How does the GBF define an SME?

Business which meets any **two** of the following criteria:

- No more than **250** employees;
- Annual turnover not in excess of **£25.9m**; or
- Annual balance sheet not in excess of **£12.9m**

And not more than

25%

owned by an entity which does not meet the criteria

What's available?

Green Business Fund Services

- 2 hour workshops around the country
- Hosted by a Carbon Trust partner; delivered by the Carbon Trust
- Understand energy consumption
- Identify no and low-cost measures
- Companies with <50 employees

Energy Efficiency
Training



Upcoming Workshops:

- › **Telford**
28th March
- › **Birmingham**
25th April
- › **Swansea**
8th May
- › **Northampton**
22nd May



Apply for these funded services via the Carbon Trust website:
carbontrust.com/greenbusinessfund

What's available?

Green Business Fund Services

- Remote or on-site
- Delivered by Carbon Trust engineer
- Top three costed, energy saving recommendations
- Next steps to realise savings
- Tailored appraisal of energy management approach
- Available for SMEs in qualifying geographies

Opportunity Assessments



- Up to 5 days support from a Carbon Trust Consultant
- Companies should have a business case for project(s) ready for investment, and be ready to invite quotes and to select suppliers
- Aimed at non-large companies (up to 1,000 employees), situated in qualifying geographies

Implementation Advice



Apply for these funded services via the Carbon Trust website:
carbontrust.com/greenbusinessfund

What's available?

Green Business Fund Services

- Similar to this workshop
- Looks to embed good practice and helps realise the identified savings associated with improved energy management.
- 6 structured and tailored modules which will be delivered at regular intervals over the telephone.

Virtual Energy Manager



- Learn more about energy consuming equipment and how to make savings
- Better understand the opportunity, business case, and support available
- Delivered by a Carbon Trust technical expert
- Typically 45 minutes in length

Technical Webinars



- Up to date publications to provide SMEs with info on reducing their energy consumption.
- Available for download via the Carbon Trust website
- HVAC
- Lighting
- How to be a good supplier
- Carbon Footprinting
- Renewable Energy Sources

Publications



Apply for these funded services via the Carbon Trust website:
carbontrust.com/greenbusinessfund

What's available?

Green Business Fund Services

- Just released for 2019
- Our tools give small and medium sized UK businesses the first steps to start measuring, managing and reducing carbon emissions and energy costs
- Tools include step by step instructions and guidelines
- Accessible via web browsers and smartphones

Energy Saving Tools



Step 1 - Measure your carbon footprint

The SME Carbon Footprint Calculator has been designed to help UK based SMEs measure their corporate emission footprint following GHG Protocol Guidance

Step 2 - Benchmark your energy use

The Benchmark tool helps SMEs prioritise energy reduction across energy intensive technologies and areas.

Step 3 - Build your business case for lighting upgrades

The Lighting Business Case Tool allows UK based SMEs to calculate their business case for lighting upgrades.

Available for use on the Carbon Trust website

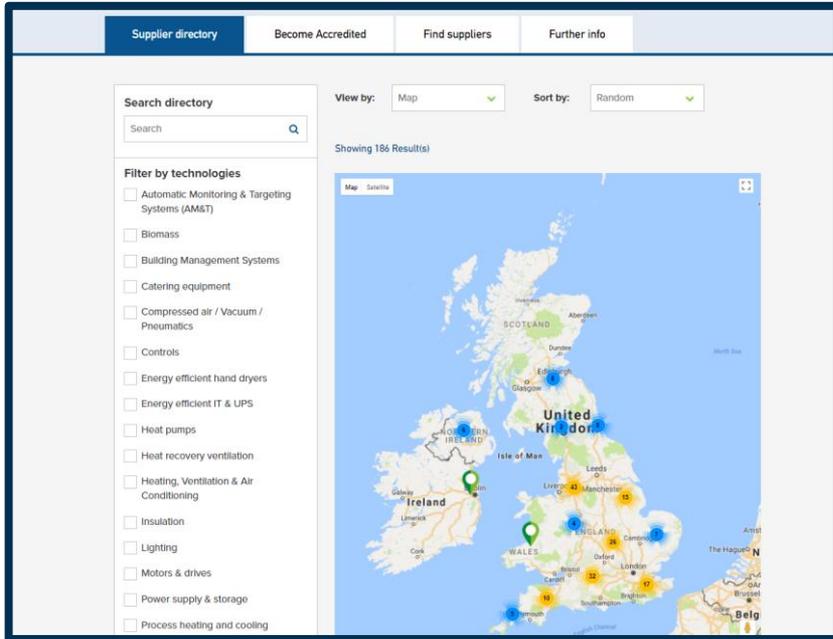
Carbon Trust Accredited Suppliers and the Green Business Directory

Carbon Trust Accredited Supplier scheme

The Carbon Trust Accredited Supplier scheme is the market-leading accreditation scheme for high quality energy efficient equipment and renewable technology suppliers. Only suppliers who meet or exceed criteria set by the Carbon Trust designed to examine their capability to deliver thoughtful, well-designed energy efficient and renewable energy systems can achieve Accredited Supplier status

Green Business Directory

The Green Business Directory is a searchable directory of Carbon Trust Accredited Suppliers, which can be used by businesses looking for suppliers and installers of energy efficient solutions and/or renewable energy systems



Available on the Carbon Trust website

Questions?





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