
Carbon Smart[®] Award

Carbon footprint and findings
for the Carbon Smart[®] Blue
award

Connection Crew
March 2011



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Connection Crew: Carbon Footprint and Findings

1 Introduction and background

The Carbon Smart award recognises and promotes organisations of all types and sizes that have taken clear practical action to reduce their impact on the environment. Achieving the award will help Connection Crew to take comprehensive, effective action to reduce its carbon footprint, integrate carbon and energy management into the organisation and communicate this positive work to staff and stakeholders.

The report provides the following information:

- Quantification of your carbon footprint and identification of the major sources of emissions
- Visualisation of your carbon footprint and potential cost savings from taking action
- Overview of potential carbon reduction actions
- Carbon footprint methodology

The report is a supporting document for the Carbon Smart workshop. At the workshop you will work with Carbon Smart to:

- Identify carbon reduction actions and produce an action plan
- Develop and update an environmental policy

After the workshop, Carbon Smart will review your action plan and environmental policy and upon approval your organisation will be certified as Carbon Smart Blue.

Organisation name	Connection Crew
Organisation address	1 Gainsford Street, Southwark, London. SE1 2NE
Number of staff	2
Total treated floor area (m²)	152

Table 1: Organisation details

2 Carbon Smart award features

Carbon Smart certification recognises the practical actions and decisions that an organisation has taken to reduce its impact on the environment. Carbon Smart certified organisations have a strong clear message to communicate – they have taken the right steps to tackle their carbon footprint. There are three levels to Carbon Smart certification: Carbon Smart® Blue, Carbon Smart® Silver, and Carbon Smart® Gold. Each level has differing levels of commitment and action. The table below summarises the features of each award level:



			
Features	Commitment to act	Show carbon savings	Exceptional carbon performance
Internationally compliant carbon footprint	✓	✓	✓
Carbon Smart workshop to develop an action plan and expand green marketing knowledge	✓	✓	✓
Carbon Smart completion pack with certificate, artwork and communication guidance	✓	✓	✓
Entry on the online Carbon Smart register and use of the Carbon Smart kitemark on marketing materials	✓	✓	✓
Robust environmental policy to use in tenders and present to clients and staff	✓	✓	✓
Drive environmental policy down into other management policies (fleet, procurement, training etc.)		✓	✓
Technological and staff engagement support to achieve year-on-year carbon savings in line with your target		✓	✓
Support and guidance in engaging stakeholders externally			✓
Assistance in developing exceptional environmental actions (e.g. priority investment opportunities, data management, EMS)			✓

Table 2: Carbon Smart award features

3 Carbon footprint findings

The carbon footprint for Connection Crew was calculated as 6.4 tonnes CO₂e. Table 3 shows the total emissions broken down by activity and included in the calculation is a data quality rating based on the accuracy of the data supplied. The rating system works on a three tiered traffic light system with green representing good quality data, orange representing average quality data and red representing bad quality data. The quality of data is very important as you cannot manage what you cannot properly measure. We encourage all our clients to improve their data quality as they work towards the Carbon Smart award as this provides a more accurate carbon footprint. Table 2 shows the data quality rating system.

	Good quality data Primary data sources have been used. Data completeness and accuracy is high
	Average data quality Mixed primary and secondary data sources. Limited extrapolation with average completeness and accuracy
	Bad data quality High levels of estimation and benchmarking. Poor completeness and accuracy

Table 3: Data quality rating system

	Activity	Tonnes CO ₂ e	% of total	Data quality
Scope 1	Natural gas	1.1	17.1	
	Fleet	3.3	52.3	
Scope 2	Electricity	0.9	14.0	
Scope 3	Waste	0.1	0.8	
	National Rail	0.6	9.6	
	Taxis	0.1	1.5	
	Water	<0.1	0.2	
	Paper	0.3	4.5	
	Total	6.4	100%	

Table 4: Total emissions broken down by activity

3.1 Carbon footprint by activity

It is a useful exercise to assess which activities are the most relevant and chart 1 shows the CO₂e emissions by activity. Connection Crew should focus their effort on the largest segments of the pie.

Year 1: 6.4 CO₂e emissions (tonnes) by activity

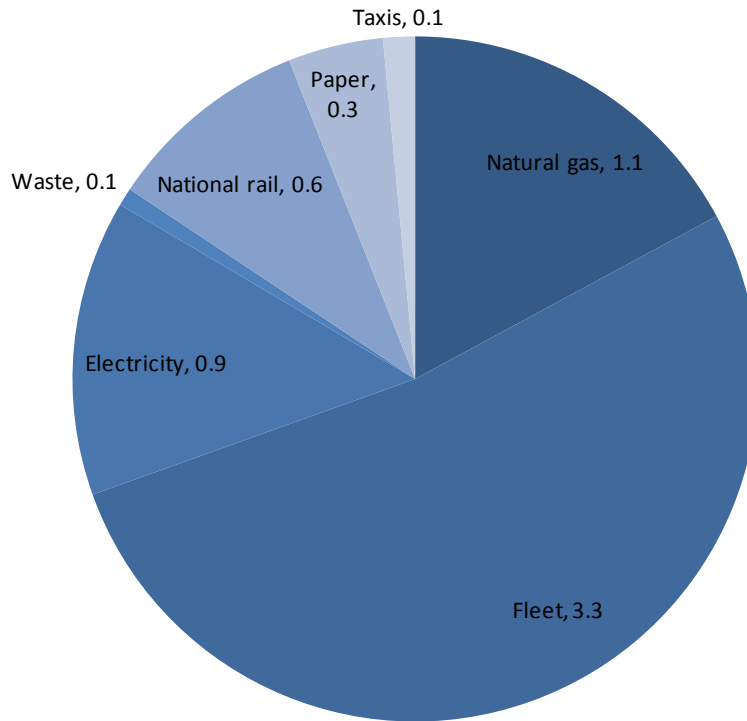


Chart 1: CO₂e emissions (tonnes) by activity

3.2 Carbon footprint facts

Below are some facts and figures from your carbon footprint calculation.





Carbon footprint activity	Units consumed	Equivalent measure	
Electricity	1,630 kWh consumed	100W bulb burning for 2 years	
Fleet	20,137 km travelled	Driving half way around the globe	
Waste	0.2 tonnes sent to landfill	The weight of 2 Vespas	
Paper	40 reams consumed	10,000 sheets of paper per employee	

Table 5: Some facts and figures about your carbon footprint calculations

4 Visualising your carbon footprint

It is often difficult to visualise what your environmental impact looks like, especially since a carbon footprint is expressed in tonnes of CO₂e. To help you understand your environmental impact better it is useful to think of your carbon footprint as a volume. For example, one tonne of CO₂ expressed as a volume would fill the cube illustrated below. Visualising your carbon footprint will help you target reductions - as for every tonne of CO₂ reduced one less of these cubes is added to our atmosphere.



Picture 1: One tonne of CO₂ as a volume

In terms of your carbon footprint of 6.4 tonnes, your emissions would fill a London double-deck bus 35 times per year. To reduce your carbon footprint you may want to think about reducing the number of buses you fill each year.



Picture 2: Your carbon footprint as a London bus

In addition, on average each staff member at Connection Crew contributes 3.2 tonnes of CO₂e per year to your carbon footprint. The average UK employee contributes approximately 4 tonnes of CO₂e emissions whilst at work.

5 Potential cost savings and carbon reduction target

Reducing your carbon footprint is good for the environment; however, it is also good for your organisation's bottom line. A good metric to focus on when reducing your carbon footprint is your energy consumption. Currently your energy consumption costs you approximately £442 per year. If energy prices steadily increase by 5% p.a. your expected costs over the next 5 years will represent the dark blue bars in the graph below (note: energy consumption has been held constant through time). Taking simple but effective abatement actions would, using conservative estimates, reduce your consumption by at least 2.5% p.a. This would translate to a £467 saving on energy consumption over the next 5 years. Much larger savings could be achieved depending on the level of energy inefficiencies present in your organisation and the actions taken to improve performance.

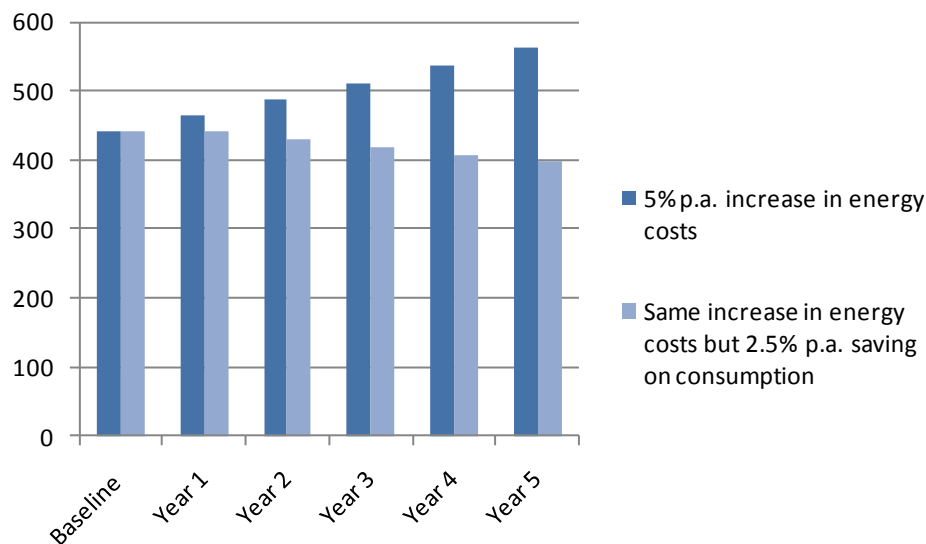


Chart 2: Potential savings in energy consumption from effective abatement actions

6 Carbon footprint reduction target

Setting a carbon reduction target is important as it will give Connection Crew something to aim for over the coming year. The target should reflect what is feasible for the organisation given financial and resource constraints. Since organisations are constantly changing depending on external factors such as economic climate and staff turnover it is likely that your carbon footprint will fluctuate. To make your target robust Carbon Smart suggests you take the following steps:

- **Use a relative measure for your carbon footprint target:** To ensure you take into account business fluctuations in economic activity and staff numbers you can divide your carbon footprint by staff numbers or revenue to get a relative figure (i.e. you may want to reduce your carbon footprint by 1 tonne per staff member or 1 tonne per £10000 turnover)
- **Choose a target that is ambitious yet achievable:** Carbon Smart benchmark targets are 5-8% in the first year, 15% by the third year based on relative figures.

7 Potential carbon reduction actions


During the site survey at your premises, Carbon Smart identified a number of energy and resource inefficiencies. Below are the priority actions that Carbon Smart would advise you to focus on based on the main activities that result in the largest components of your carbon footprint and the significance of the inefficiencies identified. Your action plan should reflect the solutions that are best suited for your organisation given your resource and financial constraints.

7.1 Lighting




7.1.1 Reduce the amount of light

Significance rating	Solution	What to do	When to use it	Cost	Payback / Saving
★ ★ ☆	Delamp and fit reflectors, and maximise use of natural light - Removing unnecessary light from spaces that are over lit and enhancing the use of natural light will save you money.	<ul style="list-style-type: none"> Identify areas where either: unnecessary lighting is present (e.g. Above cupboards), spaces are over lit (e.g. Lots of artificial luminance), or natural lights is consistently good (e.g. Near large south facing windows). Reduce light levels by removing a bulb or two. Fitting a reflector can boost the light output. 	Best to delamp when the aesthetics of the light fitting is not important and the space is obviously over lit. Note: delamping fluorescent tubes can cause the whole series to go out.	Capital cost is free or £20-£50 per fitting if reflectors are purchased	Up to 50% energy saving

7.1.2 Improve the lighting efficiency

Significance rating	Solution	What to do	When to use it	Cost	Payback / Saving
★ ★ ☆ 	Replace lamps with more efficient technology - removing old inefficient lights for efficient alternatives is a great way to save money and maintenance costs on your lighting.	<ul style="list-style-type: none"> Emphasis should be on replacing halogen and incandescent lights for CFLs, and large diameter fluorescents (T12) for thinner alternatives (T8 or T5) To ensure best savings only replace lights with alternatives as they blow. 	Energy efficient lights should always be the preferred option. However, in certain cases it may be more complex than a simple switch out as fittings can differ. Consult an electrician if this is the case.	CFLs cost a small premium on incandescent and halogens. Smaller diameter fluorescents are usually cheaper however a change in fitting can be costly	Most lighting changes will payback in 12-18 months with additional savings on reduced maintenance costs.

7.1.3 Reduce the period lights are on


Significance rating	Solution	What to do	When to use it	Cost	Payback / Saving
<p>★ ★ ★</p> 	<p>Run a switch off campaign to engage staff and ancillary staff</p>	<ul style="list-style-type: none"> • Design and implement posters and stickers to promote switching off • Monthly email reminders will help maintain momentum • Train and instruct cleaning or security staff to ensure lighting is switched off 	<p>Should be used in any space where staff have access to the lighting controls</p>	<p>No cost</p>	<p>Immediate saving</p>
<p>★ ★ ★</p> 	<p>Install sensors for automatic shutdown - there are many different types of light and occupancy sensors available on the market. Identifying which space would benefit from this technology is paramount</p>	<ul style="list-style-type: none"> • Consult an electrician for a free quote on where and how light or occupancy sensors can be installed 	<p>Sensors should only be used in areas where light output is higher than 50W/m².</p>	<p>£50-£80 per fitting</p>	<p>Up to 50% energy saving</p>
<p>★ ★ ★</p>	<p>Fit timer switches - timer switches can vary from simple switches to turn lights off 5 minutes after they are turned on (useful in toilets, stairwells, corridors) to comprehensive systems controlling all the lighting in a building</p>	<ul style="list-style-type: none"> • Identify areas that would benefit from timers • Contact your electrician for a quote 	<p>Building system timers are most useful in areas where lighting is required over long, consistent periods</p>	<p>Capital cost is approx. £50 per fitting. Full building switches vary depending on building size and configuration</p>	<p>The energy saving can be 50% or more depending on the current situation.</p>
<p>★ ★ ★</p> 	<p>Improve controls through labelling and if necessary zone lighting</p>	<ul style="list-style-type: none"> • Complex lighting controls (i.e. More than 4 switches on a panel) should be labeled to ensure staff do not turn on unnecessary lights • Single light switches that turn on many dispersed lights should be rewired and zoned to improve lighting control • For re-wiring contact your electrician 	<p>Complex lighting panels (more than 4 switches) Single light switches which control many lighting zones</p>	<p>Labelling will cost you nothing however rewiring and zoning can cost £100s depending on lighting configuration. Consult your electrician for a quote</p>	<p>Immediate savings from labelling. 12-18 month payback on rewiring and zoning</p>

7.2 Office equipment


7.2.1 Reduce the amount of equipment

Significance rating	Solution	What to do	When to use it	Cost	Payback / Saving
★ ★ ☆	Remove redundant equipment and centralise where possible - it is common to have too much equipment. This often occurs when new equipment has been bought and the old equipment has not been removed (particularly printers)	<ul style="list-style-type: none"> Identify where redundant equipment is being used Can other equipment be centralised so redundant equipment can be removed? In certain cases it may be economical to rent a Multi-functional device which can photocopy, print, fax and scan. 	Rule of thumb: 1x printer should be sufficient for at least 10 staff member equipment older than 5 years should be considered for replacement	No cost	Immediate savings

7.2.2 Reduce the period of power on



Significance rating	Solution	What to do	When to use it	Cost	Payback / Saving
★ ☆ ☆	Run a switch off campaign to engage staff and ancillary staff	<ul style="list-style-type: none"> Design and implement posters and stickers to promote switching off Monthly email reminders will help maintain momentum Train and instruct cleaning or security staff to ensure IT equipment (printers, monitors, PCs) is switched off 	Should always be encouraged	No cost	Immediate saving
★ ★ ☆ 	Install automatic power-down features - getting equipment to power down automatically can be done through enabling energy star features or installing power down technology.	<ul style="list-style-type: none"> As an initial measure ensure energy star power down features are enabled on PCs and printers These features can be enabled from the desktop properties of PCs or on the power save features on printers Install 7-day timers for printers and other equipment (e.g. coffee machines) If you have many PCs you may want to invest in power management technology. Examples include Bye Bye Standby (www.byebyestandby.com) which can be installed at an individual or corporate level, and Carbonwise (www.livinglifegreen.co.uk) which is ideal if you have a central server controlling IT equipment 	Energy star features should be enabled on all equipment. Bye Bye Standby should be installed if you have many pieces of local equipment (PC, printer, telephone, charger) that you want to shut-down at the touch of a button. Carbonwise should be installed if you have a central server and over 20 PCs.	Energy star is free. Bye Bye Standby is approx. £20 per fitting Carbonwise £15 per PC once off licence fee	Energy Star feature will generate savings immediately. Installed technology will payback between 6-12 months

7.2.3 Improve the equipment efficiency




Significance rating	Solution	What to do	When to use it	Cost	Payback / Saving
★ ★ ☆ 	Remove old equipment and replace with efficient alternatives - modern equipment is significantly more energy efficient than older equipment. Switching out will result in a reduction in operating costs as well as an increase in operation productivity	<ul style="list-style-type: none"> Key equipment to replace are old CRT monitors for LCDs and old printers for efficient devices Ensure old equipment is recycled correctly under the WEEE Directive Check energy rating of new equipment to ensure that it is energy efficient 	Equipment older than 5 years should be considered for replacement	Capital costs for LCD monitors are approx. £80-£100. Other capital costs for equipment are usually with £100s.costly	Paybacks within 18-24 months

7.3 Waste

7.3.1 Improve recycling rate


Significance rating	Solution	When to use it	What to do	Cost	Payback / Saving
<p>★ ☆ ☆</p> 	<p>Expand recycling scheme to include a wider variety of recyclable goods</p>	<p>Recycling opportunities should be explored at all times</p>	<ul style="list-style-type: none"> Identify which additional waste products can be recycled (examples include: cans, tins, glass, plastic bottles, batteries, fluorescent tubes, toners, CDs, cardboard, newspaper, paper, furniture, electrical equipment, food waste, composting) Contact your local council for more information and guidance If you are based in London, Paper Round (www.paper-round.co.uk) provide full recycling services 	<p>Costs vary depending on the type of waste products being recycled</p>	<p>Savings in reduced landfill costs should payback within 2 years. The intangible benefits of a good recycling scheme are difficult to quantify</p>
<p>★ ★ ☆</p> 	<p>Improve recycling scheme by removing personal bins and centralising waste and recycling bins. Improve labelling of recycling bins</p>	<p>Should be used in offices with more than 10 staff</p>	<ul style="list-style-type: none"> Investigate if staff would support the removal of personal bins - be sure to explain the benefits and the alternative centralised waste and recycling structure that will be put in place Purchase high visibility waste and recycling bins - label bins clearly with information directing staff members of the relevant purposes Remove personal bins - it is usually good to measure and feedback results to show the success of the system 	<p>Good waste and recycling bins can be purchased for approx. £15</p>	<p>Savings in reduced landfill costs should payback within one year.</p> <p>The intangible benefits of a good recycling scheme are difficult to quantify</p>

7.3.2 Minimise the amount of waste generated


Significance rating	Solution	When to use it	What to do	Cost	Payback / Saving
<p>★ ☆ ☆</p> 	<p>Procure products when only necessary</p>	<p>Potential to reduce waste should always be considered</p>	<ul style="list-style-type: none"> • Ensure responsible member of staff takes a monthly stock check for business goods 	<p>No cost</p>	<p>Savings in unnecessary procurement expenditure and subsequent landfill tax will be immediately achieved</p>
<p>★ ☆ ☆</p> 	<p>Engage suppliers to reduce packaging requirements</p>	<p>Potential to reduce waste should always be considered</p>	<ul style="list-style-type: none"> • Engage suppliers to check if unnecessary packaging can be removed - in some instances it may be possible to return packaging to the supplier in question or reuse the packaging for internal purposes • Develop green procurement policy 	<p>No cost</p>	<p>Savings in unnecessary procurement expenditure and subsequent landfill tax will be immediately achieved</p>
<p>★ ★ ★</p> 	<p>Adopt a zero-to-landfill policy - waste-to-energy is a great way to negate landfill tax as well as helps generate energy from your waste products</p>	<p>When you're producing at least a 1100L bin of waste a week</p>	<ul style="list-style-type: none"> • Investigate if you have a waste provider in your area that specialises in Waste-to-Energy services • If you are based inside the M25, London recycling company Paper Round (www.paper-round.co.uk) provides a full waste management service 	<p>Sending waste to an energy generation plant is more expensive than directing it to landfill; however, with rising landfill tax costs this premiums is fast disappearing</p>	<p>No savings will be made with this policy; however it is a great environmental story to tell suppliers and customers that as a business you don't send waste to landfill</p>

7.4 Paper

7.4.1 Reduce the amount of use





Significance rating	Solution	When to use it	What to do	Cost	Payback / Saving
<p>★ ★ ☆</p> 	<p>Improve printer management habits - a number of good print habits can help you cut your paper consumption by up to 30%</p>	<p>Efforts to improve printer management should be constantly explored</p>	<ul style="list-style-type: none"> • The following good printer management habits should be in place: • All printers should be set to default double-side print (if your printer does not have this option you may want to invest in a duplexing tray) • Set-up a scrap paper printer or tray for internal printer and scrap paper boxes on all desks for note taking • Remind staff to not print unnecessary documents • Investigate if printed documents could be switched for electronic versions (e.g. paper invoices, catalogues etc.) • If you have lots of staff printing significant amounts then you may want to invest in follow me printing technology 	<p>In most cases good printer management will not cost anything. Investing in a duplex tray will cost approx. £80</p>	<p>Payback in paper stationery costs as well as reduced toner requirements will provide immediate savings</p>

7.4.2 Improve type of paper


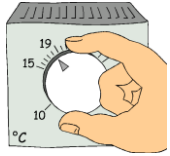
Significance rating	Solution	When to use it	What to do	Cost	Payback / Saving
<p>★ ★ ☆</p> 	<p>Switch non-recycled or part recycled paper to 100% recycled content paper - 100% recycled paper is less energy intensive to produce and does not deplete virgin wood stock</p>	<p>Some printers may not operate efficiently with 100% recycled paper - contact the manufacturer if this is the case</p>	<ul style="list-style-type: none"> • Investigate choices of 100% recycled paper that will meet current needs for a cost competitive price. 	<p>Certain 100% recycled paper cost a premium however prices are fast becoming competitive against FSC alternatives</p>	<p>In most cases this is a pure switch out without additional costs - recycled paper sends the correct message to staff, suppliers and customers that you are taking your environmental impact serious</p>

7.5 Heating

7.5.1 Improve the use of personal heaters



Significance rating	Solution	When to use it	What to do	Cost	Payback / Saving
 	Minimise the use of personal heaters - individual heaters are typically quite costly to run	Whenever too many personal heaters are being used on an individual basis	<ul style="list-style-type: none"> Remove unnecessary individual heaters Emphasis should be on improving the efficiency of the central heating system, making individual heaters redundant 	Capital costs vary depending on the type of heater (e.g. fan heater, oil radiator, etc)	Removing one 2kW fan heater can save up to £50 per year
 	Maximise their efficiency when used - individual heaters are an inefficient way of heating an area	As a last resort or when zoned areas are not centrally heated sufficiently	<ul style="list-style-type: none"> Whenever used, ensure that individual heaters are not left on unnecessarily – adjust the temperature thermostat and timers accordingly Position individual heaters to benefit several people at a time 	No cost	Variable savings


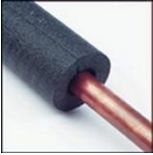
7.5.2 Avoid over heating (temperature or time)

Significance rating	Solution	When to use it	What to do	Cost	Payback / Saving
 	Maintain optimum temperature and timing settings	Should be adopted in all temperature controlled areas Some zoned spaces may require different temperature and timing settings depending on occupancy	<ul style="list-style-type: none"> Temperature control: make sure your heating system does not operate above 20C Avoid simultaneous heating and cooling - ensure there is a sufficient gap between the heating and cooling temperature settings of at least 4C Avoid heating the space when unoccupied (e.g. during evenings and weekends) Set simple time controls – don't over complicate things. Allow adequate pre-heat time to let the building reach temperature just before occupancy 	No cost	Turning down your thermometer by 1C can save around 5% in energy costs

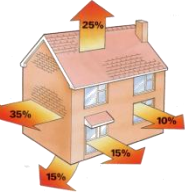
			<ul style="list-style-type: none"> • Use seven day timers to allow for variable occupancy levels throughout the week • Site thermostats carefully – ensure they are situated away from draughts, direct sunlight and heat sources such as radiators and office equipment 		
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7.5.3 Improve the efficiency of the heating system



Significance rating	Solution	When to use it	What to do	Cost	Payback / Saving
<p>★ ★ ★</p>  	<p>Maintain gas boilers - heating can account for up to 60% of a building's energy costs</p>	<p>All boilers should be serviced once a year</p>	<ul style="list-style-type: none"> • Consider replacing old boilers (>12 yrs old) with condensing boilers • Ensure boilers are properly maintained and serviced by a qualified engineer at least once a year – a poorly maintained boiler can use over 10% more energy than a boiler in good condition • Conventional radiators – excess air stops radiators from warming up. Bleed them once a year to expel excess air. Fit Thermostatic Radiator Valves (TRVs) – useful for maintaining consistent comfortable temperatures in areas suffering from under or over-heating. (Note: they should not be used as on-off switches. Avoid using the max-min settings) • Convector radiators – clean internal filters and external grilles bi-monthly to ensure a good air flow. Bleed air from heater element. 	<p>Boiler service: variable cost depends on size and type of boiler, contractor costs, etc</p> <p>New condensing boiler: £800+ Pipe insulation: from £10+</p>	<p>Replacing a G-rated boiler with an A-rated condensing boiler saves up to 1/4 of heating bills</p> <p>Pipe insulation has a payback period of about 1 year</p> <p>Well maintained boiler: 10% energy saving</p> <p>Improving the efficiency of a 100kW boiler (typical size for small office building) through good maintenance could save over £800 per year.</p>
<p>★ ★ ★</p>	<p>Utilise more efficient technology</p>	<p>Optimum start control systems are generally recommended for heating systems of over 30kW capacity but energy savings can be made for any size system. Suitable for wet radiator and electric storage heaters.</p>	<ul style="list-style-type: none"> • Install Optimum Start controls- these automatically adjust heating start up times based on outside air temperatures • Install an air source heat pump – these 	<p>Optimum start control system: £50+</p>	<p>Optimum Start Controls: 10-15% energy saving</p>

		<p>An air source heat pump is compact in size. Ideal for replacing or supplementing an electricity heat system such as storage heaters but can also heat water to feed directly into your central heating.</p>	<p>absorb heat from the outside air. This heat can then be used to warm water for radiators or under floor heating systems, or to warm the air in your home.</p>	<p>Air source heat pump capital costs: £5000+ for a small office</p>	<p>Air source heat pump: savings for a small office typically up to 5 tonnes of CO2 and £700 per year for a system that replaces an electric heating system.</p>
<p>★ ★ ★</p> 	<p>Ensure adequate insulation exists</p>	<p>All un-lagged pipes should be insulated to minimise heat loss</p>	<ul style="list-style-type: none"> • Ensure all pipes and connectors are adequately insulated. 	<p>Low cost</p>	<p>Approx. 10-15% saving from insulating un-lagged pipes</p>

7.5.4 Avoid the need for surplus heating


Significance rating	Solution	When to use it	What to do	Cost	Payback / Saving
<p>★ ★ ☆</p> 	<p>Reduce heat loss through poorly draught-proofed doors and windows – around 25% of a building's heat is typically lost through windows and doors</p>	<p>Consistently during cold weather periods</p>	<ul style="list-style-type: none"> • Draught proof all gaps around doors and windows • Ensure all doors between zoned heating areas are kept closed • Ensure windows are kept closed during cold weather • Install trickle vents in the window frame for background ventilation if required 	<p>Inexpensive, available from all DIY stores: foams, brushes, sealant strips. Should conform to BS7386 standards - materials can last up to 20 years</p>	<p>Payback around 4-6 years</p>

7.5.5 Improve the distribution of heat (including zoning)




Significance rating	Solution	When to use it	What to do	Cost	Payback / Saving
<p>★ ★ ★</p> 	<p>Ensure zoned areas are set up to satisfy individual heating requirements</p>	<p>Zoning required when a space is broken into different areas with different usage requirements</p>	<ul style="list-style-type: none"> • Reconfigure the placement of all heating units within each zone • Improve heating controls within each zone area • Ensure heat settings meet the requirements of each zone's occupancy profiles • Conduct a survey of temperature profiles in different zones to better understand the requirements • Place thermometers in each zone to monitor whether preferred temperatures are being maintained 		
<p>★ ★ ★</p> 	<p>Maximise heat distribution within each zone</p>	<p>Radiator Heat Distributors (with telescopic design) can be easily adjusted to fit on most conventional radiators. (adjustable length: 430-730mm)</p>	<ul style="list-style-type: none"> • Fit radiator heat distributors (RHD) – a device that maximizes heat output by speeding up heat distribution, minimizing heat loss through walls 	<p>RHD: capital cost approx. £20 each. Because the radiator booster is only working when your radiator is warm, the energy consumption should be no more than 1p per week, or about 30p a year</p>	

7.6 Cooling



7.6.1 Improve the efficiency of the cooling system

Significance rating	Solution	When to use it	What to do	Cost	Payback / Saving
<p>★ ★ ★</p> 	<p>Regularly maintain air conditioning units - air conditioning can increase a building's energy consumption and associated carbon emissions by up to 100%</p>	<p>Air conditioning units should be serviced at least once a year.</p>	<ul style="list-style-type: none"> • Ensure regular maintenance of your air conditioning system by an accredited Energy Assessor. Poorly maintained systems can use up to 60% more energy. (Note: there is a statutory obligation that all air-conditioning systems with an effective rated output of more than 12kw must be regularly inspected by an Energy Assessor. The inspections must be a maximum of five years apart) 	<p>Variable</p>	
<p>★ ★ ★</p>	<p>Enhance the air cooling system with more efficient technology - air conditioning can increase a building's energy consumption and associated carbon emissions by up to 100%</p>	<p>When a space/building is not fully occupied the volume of air provided by the air handling unit can be reduced by using a VSD.</p> <p>Free cooling systems can be used when there is a mechanical cooling system in place.</p>	<ul style="list-style-type: none"> • Fit a Variable Speed Drive (VSD) - these can vary the output of your air conditioning system to meet your needs throughout the day. • Fit a 'free cooling' coil system - allows the cooling of spaces using the outside air when the external air temperature is colder than the internal air temperatures. Free cooling will predominate in the winter and the mechanical cooling in the summer 		<p>A Variable Speed Drive can reduce energy consumption by up to 60%. Payback typically between 12-24 months</p> <p>Free cooling system payback: 12-18 months. With the UK's temperate climate free cooling coils can produce big savings.</p>

7.6.2 Improve the use of personal coolers

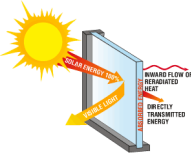
Significance rating	Solution	When to use it	What to do	Cost	Payback / Saving
  	<p>Minimise the use of personal coolers - individual coolers such as portable air conditioning units consume lots of energy</p>	As a last resort or when zoned areas are not centrally cooled sufficiently	<ul style="list-style-type: none"> Remove unnecessary individual coolers Emphasis should be on improving the central cooling system, making individual coolers redundant 	Capital costs vary depending on the type and size of fan	<p>Removing one 2kW fan cooler can save up to £100 per year</p> <p>Removing one 4kW portable air conditioning unit can save up to £60 per month</p>
	<p>Maximise their efficiency when used - individual coolers such as portable air conditioning units consume lots of energy</p>		<ul style="list-style-type: none"> Maximise the use of natural ventilation via a through-draft (applicable when a central cooling system is not operating) Whenever used, ensure that individual coolers are not left on unnecessarily – particularly in unoccupied spaces Position individual coolers to benefit several people at a time 		

7.6.3 Improve the distribution of cooling (including zoning)

Significance rating	Solution	When to use it	What to do	Cost	Payback / Saving
 	<p>Ensure zoned areas are set up to satisfy individual cooling requirements and maximise cooling distribution within each zone</p>	Zoning required when a space is broken into different areas with different usage requirements	<ul style="list-style-type: none"> Reconfigure the placement of all cooling units within each zone Improve cooling controls within each zone area Ensure cooling settings meet the requirements of each zone's occupancy profiles Conduct a survey of temperature profiles in different zones to better understand the requirements Place thermometers in each zone to 	Variable	Variable

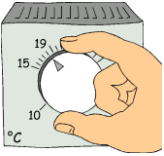
			monitor whether preferred temperatures are being maintained <ul style="list-style-type: none"> Consider ceiling fans to help spread the cooled air more effectively through your office without greatly increasing your power use. 		
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7.6.4 Avoid the need for surplus cooling

Significance rating	Solution	When to use it	What to do	Cost	Payback / Saving
★ ★ ★ 	Keep heat gain to a minimum and utilise lower external air temperatures	Particularly in areas affected by high solar gain	<ul style="list-style-type: none"> Reduce solar gain through the use of blinds or window film Night cooling: cool the building by forcing the cool night air through it Utilise natural ventilation when a cooling system is not operating - open doors and windows to encourage a cooling draught Shade air-conditioning units by planting trees or shrubs, but make sure you do not block the airflow. A unit operating in the shade uses up to 10% less electricity than one operating in the sun. Close shades or blinds on east, south, and west-facing windows during the hours when the sun's intensity is at its peak. Open blinds and windows during early morning and overnight hours when the air outside the home is cooler. 	Solar film: £60 per sq. metre Blinds: cost varies by window size, type of blind, etc	Solar film reduces solar gain by about 80%


7.6.5 Avoid over cooling (temperature or time)

Significance rating	Solution	When to use it	What to do	Cost	Payback / Saving
★ ★ ★	Maintain optimum temperature and timing settings - air conditioning can increase a building's energy consumption and associated carbon emissions by up to 100%	Should be adopted in all cooling controlled areas Some zoned spaces may require different temperature and timing settings depending on occupancy	<ul style="list-style-type: none"> Temperature control: make sure your air cooling system does not operate below 24C Avoid simultaneous heating and cooling - ensure there is a sufficient 	No cost	Variable


			<p>gap between the heating and cooling temperature settings of at least 4C</p> <ul style="list-style-type: none"> • Avoid cooling the space when unoccupied (e.g. during evenings and weekends) • Set simple time controls – don't over complicate things. Allow adequate pre-cooling time to let the building reach temperature just before occupancy • Use seven day timers to allow for variable occupancy levels throughout the week • Site thermostats carefully – ensure they are situated away from draughts, direct sunlight and heat sources such as radiators and office equipment • During summer months: turn the air conditioning unit off or turn it up by 1-2C and adopt a flexible summer dress code • Don't reduce your thermostat setting to a colder temperature than normal when you turn on your air conditioner. This will not cool your space any faster and could result in excessive cooling and unnecessary expense. • Set the fan speed on high, except in humid weather. When it's humid, set the fan speed on low. 		
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7.7 Fleet








7.7.1 Optimise fleet journeys

Significance rating	Solution	What to do	When to use it	Cost	Payback / Saving
★ ☆ ☆	Basic route planning - Planning your routes or deliveries can result in significant fuel savings. Zoning geographic areas and assigning these zones to particular routes is an efficient and cheap way to plan deliveries. You may want to use Google map when planning your routes.	<ul style="list-style-type: none"> • Google map has advanced options that will help you with your route planning • See: Google map (http://maps.google.co.uk/) 	Route planning should always be conducted	No cost	Approx. 2.5% saving in fuel
★ ☆ ☆ 	Invest in Sat Navigation systems for your vehicles - Satellite navigation will help prevent drivers getting lost and consuming unnecessary fuel.	<ul style="list-style-type: none"> • Decide which vehicles or routes would benefit from satellite navigation • Visit your nearest electronic retail store for prices • Online options are usually cheaper 	Sat navigation should be used when deliveries are made in geographically unfamiliar areas	Approx. £100 per unit	Should payback within the first year

7.7.2 Optimise driver efficiency


Significance rating	Solution	What to do	When to use it	Cost	Payback / Saving
★ ☆ ☆	Ensure drivers maintain vehicles regularly	<ul style="list-style-type: none"> • A rota should be drawn up to ensure drivers regularly inspect tyre pressures and tread conditions as well as carry out bonnet checks to top-up with oil/water/anti-freeze 	This should be conducted at least once a month	Very low cost	Savings should outweigh costs
★ ★ ☆	Implement green fleet management policy and ensure driver is familiar with principles - A fleet management policy should help you strategically define how you want to run your fleet from the routes you drive, the drivers you employ, the vehicles you purchase and the duty of care for both driver and vehicle	<ul style="list-style-type: none"> • See Carbon Smart 'Guide to writing environmentally focused policy documents' 	If you operate a fleet you should have a fleet management policy	No cost	N/A
★ ★ ☆ 	Conduct driver safety and efficiency training - Training drivers will reduce road safety risks, lower insurance costs and improve overall fleet performance.	<ul style="list-style-type: none"> • Emphasis should be on careful driving which avoids harsh acceleration and heavy braking and promotes better anticipation of the road ahead • See SAFED for details of how your drivers can be properly trained: http://www.safed.org.uk/ 	If you operate a fleet all drivers should have basic safety and efficiency training	A few hundred pounds	Typical savings of 10% on annual fuel and maintenance costs

7.7.3 Improve vehicle efficiency

Significance rating	Solution	What to do	When to use it	Cost	Payback / Saving
 	Invest in Telematics systems - Telematics is the use of highly sophisticated technology to transmit information to and from a vehicle. This information is then processed to enhance the vehicles performance and monitor its location	<ul style="list-style-type: none"> Decide which telematics system would be suitable for your company by contacting suppliers See UK telematics site with general information on vehicle telematics: www.uktelematicsonline.co.uk 	Should be used if operations office needs to be in touch with drivers constantly and fleet is larger than 5 vehicles	Cost vary from low-cost off the shelf basic navigational assistance to bespoke real-time tracking systems	Savings can be significant depending on the size and profile of the fleet
	Ensure vehicle is properly maintained - Service, maintenance and repair should happen at least annually. The vehicle should have an up-to-date service record. This will ensure that the vehicle is running efficiently and safely.	<ul style="list-style-type: none"> Check is all vehicle service records are up-to-date Schedule appointments for each vehicle Take corrective action to improve efficiency of vehicles 	At a minimum maintenance should be conducted on an annual basis	Approx. £250-£1500 per vehicle per year (dependent on vehicle type)	Savings will be realised in increased vehicle life
 	Improve type of fuel used - There are many different types of fuel available. If you are using diesel you should consider introducing a biodiesel mix. Alternatively in petrol vehicles you could retrofit LPG.	<ul style="list-style-type: none"> Biodiesel in the UK can be found at the following outlets: http://www.biodieselfillingstation.co.uk/outlets.htm. Alternatively, contact your local council to see if there are suppliers in your area. LPG can be retrofitted at most automobile service stations. 	Biodiesel may invalidate your vehicle guarantee (Check with your vehicle manufacturer. Also, biodiesel is best used when you have your own diesel bunker for fuel storage. LPG requires a larger space and access to filling stations	Biodiesel comes at a slight premium to conventional diesel. LPG is cheaper than petrol	Biodiesel will result in significant savings in emissions at very little extra cost. LPG will result in significant fuel cost savings
 	Improve choice of vehicle	<ul style="list-style-type: none"> When purchasing new vehicles ensure that whole-life costs including fuel are taken into account. The emissions profile, fuel consumption and engine efficiency should be considered. The Government's Vehicle Certification Agency (VCA) publishes a booklet of virtually all models on sale in the UK twice a year. It lists the official fuel consumption, emissions and pollutants of each vehicle. 	At point of purchase	Premiums may be applied for more efficient vehicles	Savings over the whole-life cost including fuel should outweigh any premiums initially invested


7.8 Water

7.8.1 Reduce the amount of water consumed

Significance rating	Solution	What to do	When to use it	Cost	Payback / Saving
★ ☆ ☆ 	Install water saving devices in toilets and taps - water saving devices are cheap and easy to install and can reduce water consumption by 50%	<ul style="list-style-type: none"> Water displacement devices should be placed in toilets that do not have a dual flush mechanism. These can be acquired free from most local councils. Flow restrictors can be purchased at your local DIY store and retrofitted to tap fittings 	Conserving water should be promoted at all times	Costs for retrofitting devices such as toilet hippos and flow restrictors are very cheap (<£50)	Investments should payback within a year

7.9 Procurement

7.9.1 Source environmentally robust products/services

Significance rating	Solution	What to do	When to use it	Cost	Payback / Saving
★ ☆ ☆ 	Development and implement green procurement policy with a supporting environmental product checklist	<ul style="list-style-type: none"> Develop and implement a green procurement policy using Carbon Smart policy guidelines Develop an environmental product checklist that considers at a minimum the following environmental attributes: design, recyclable content, reusability, disposal 	If you already have an environmental policy then a green procurement policy would be a complementary management document	No costs	N/A

8 Appendix

8.1 Carbon footprint methodology

Carbon Smart follows the Green House Gas (GHG) Protocol produced by the World Resources Institute (WRI) and the World Business Council for Sustainable Development (WBCSD). This methodology provides detailed guidance on emissions reporting.

For the purposes of GHG accounting and reporting it is important to set out organisational boundaries to define which business operations to report against. Inventory boundaries can be set based on three types of organisational control: equity, financial and operational.

This assessment was based on the 'operational boundary' principle, i.e. the emissions associated with operations directly owned or controlled by the reporting company. This allows a company to establish which direct and indirect emissions are a consequence of its operations.

The classification method used to group GHG emissions, by the level of control an organisation has over them are categorised into three main types of GHG classes:

- **Direct emissions, scope 1:** Are those which result from fossil fuels burned directly by the business, such as boiler gas, A/C refrigerant gas, or fuel in company vehicles/fleets.
- **Indirect emissions, scope 2:** These are from imported electricity i.e. power stations to run heating, lighting, electrical equipment within the building.
- **Other indirect emissions, scope 3:** Are from products and services such as the emissions from the consumption of water, waste, business travel, paper etc. The boundaries of this scope are agreed with the organisation and the general rule is to include what a business can quantify, monitor and influence.

8.2 Scope, boundary and data collected

The operational boundary¹ was set for the activities carried out at your business.

Where possible and relevant the following activities have been included:

- Scope 1: Natural gas, company cars, fleet
- Scope 2: Electricity
- Scope 3: Waste, paper stationery, national/international rail, flights, taxis

The following were excluded from the carbon footprint calculation:

- Staff commute travel
- Non paper stationery
- Off-site staff / partner events

¹ The operational boundary includes emissions controlled by the organisation and emissions arising from their operations.

8.3 Terminology

Carbon dioxide (or CO₂) - is a gas. Carbon Dioxide is just one of the greenhouse gases which impact on our climate and the weather patterns of the planet, and has been found to contribute to global warming

CO₂e - There are six main greenhouse gases which cause climate change and each one of these has a different global warming potential. For simplicity of reporting, the mass of each gas emitted is commonly translated into a carbon dioxide equivalent (CO₂e) amount so that the total impact from all sources can be summed to one figure.

Greenhouse gases - Greenhouse gases occur naturally in the Earth's atmosphere and create a layer around the earth which keeps the planet warm. However if too many gases are released, as with CO₂, concentration levels increase preventing heat loss from the planet and thus causing higher temperatures. The name for this is the greenhouse effect. Carbon is the most prevalent greenhouse gas. Other greenhouse gases include methane (which is produced from the landfill or agriculture activities), and Nitrous oxide (as a result of transport and industrial processes). Greenhouse gases are natural and without them the earth could be 15-30°C colder.

World Recourses Institute (WRI) - WRI published the Greenhouse Gas Protocol for Project Accounting in 2005. The protocol takes the approach of identifying emissions by 'scope' (setting out Scope 1, 2 and 3) and is widely accepted as the leading protocol for carbon footprint calculation. WRI is an environmental think tank that goes beyond research to find practical ways to protect the earth and improve people's lives. WRI have recognised climate change as a critical threat to people's lives and to the environment.



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