RMI FRANCHISED DEALERS

CARBON TRUST

SMMT DRIVING THE MOTOR INDUSTRY

DEALER ENERGY EFFICIENCY GUIDE

Saving energy, reducing costs

THE SOCIETY OF MOTOR MANUFACTURERS AND TRADERS LIMITED

Contents

Why you should read this Guide

Improving energy efficiency will reduce your costs, lower CO_2 emissions and also help ensure your business becomes more sustainable.

Energy savings of 10% are possible from zero cost activities where little has been done in the past to manage energy use. Savings of 25% per annum are possible with modest investment.

This equates to savings of up to £10,000, given gas and electricity costs in an average-sized dealership typically total £40,000 per annum.

These savings will directly contribute to your profit.

Such savings are the equivalent of selling a significant number of vehicles and/ or parts. The savings could be used to invest further in energy efficiency measures or to grow the business.

As energy costs are widely expected to increase over time, action now will deliver increased benefits in the future.

The measures outlined in this Guide often only require modest effort to deliver significant savings.

Every extra £ saved is a £ on the bottom line.

How do you achieve it?

This Guide tells you how…….

Please see www.smmt.co.uk/dealerenergyefficiency for updates and further information.

Penny Saver says…...

Reducing the temperature setting by just 1°C will reduce space heating energy consumption by 8%

Your peers are already demonstrating savings can be made - Case Study: Isaac Agnew Group

In early 2008 the Isaac Agnew Group in Northern Ireland set about applying an energy action plan with the aim of reducing electricity consumption and costs. They are now saving on average £170,000 per annum across 18 sites on their electricity costs. That is on average £9,400 savings per site per year. Check out how they achieved this in Case Study on page 30.

FOREWORD

The UK motor industry is at the forefront of the transition to a low carbon economy and has the ambition further to reduce CO_2 emissions to deliver European and global emission reduction targets. The motor industry recognises that its environmental responsibilities exist at every stage of the process, from design and engineering, right through to production and point of sale.

By working closely with the RMI and the Carbon Trust, SMMT has committed to adopt a collaborative approach towards improving the automotive retail sector's carbon footprint. The '*Dealer Energy Efficiency Guide'* has been published to provide automotive retailers with real cost saving solutions that will to help achieve improved energy efficiency through the implementation of zero or low cost measures. Savings made as a result of cutting energy use can be similar to selling a significant number of vehicles or parts and could be used to invest further in energy efficiency measures or to grow the business.

The rising price of energy means that efficiency is increasingly being highlighted as an economic and environmental issue. Improving consumption presents an opportunity to sustain businesses through increased profitability. This Guide provides details of a range of simple measures with no cost, low cost and investment tips for energy efficiency improvement, using case studies to demonstrate how savings are already being made in dealerships across the UK.

Its purpose is to prompt longer term action and SMMT will continue to work with the RMI and the Carbon Trust to provide dealers with ongoing advice and guidance on cutting energy.

Paul Everitt
Chief Executive, SMMT

Sue Robinson
Director, RMI National Franchised Dealer Association

SMMT DRIVING THE MOTOR INDUSTRY

RMI FRANCHISED DEALERS

KEY ACTIONS

The key recommendation of the Guide is follow the seven step action plan detailed below. This involves an undertaking to take action and address energy use.

Undertake the seven step action plan

Step 1	**Appoint an Energy Champion**. Appoint an appropriate person to drive energy management and provide management support.
Step 2	**Develop an Energy Policy.** Produce a written energy policy for the Group or site which is signed and approved by the most senior manager and communicated to all employees.
Step 3	**Identify Meters and Invoices.** Identify the location of all utility meters and gain regular access to all utility invoices.
Step 4	**Monitor and Target Energy Use.** Read meters regularly, plot consumption, check usage against targets, identify waste and take corrective action.
Step 5	**Conduct Regular Energy Walkabouts.** Conduct regular energy walkabouts identifying and recording energy waste, maintenance issues and opportunities for no cost, low cost and investment measures.
Step 6	**Implement Energy Saving Measures.** Produce a clear written plan in each area with priorities for action against identified measures, with timescales, costs, savings and those responsible for action.
Step 7	**Engage Employees and the Public.** Regularly raise staff awareness, gain support/ideas, train key people and provide regular feedback on progress toward targets. Communicate objectives and successes with the public.

A number of dealers have already embarked on energy efficiency campaigns, but the anecdotal evidence from the site surveys conducted showed there is significant energy saving potential.

Five key areas we would strongly recommend you look at detailed below.

Top five recommendations on saving energy

1	**Lighting**. When lamps/fluorescent tubes fail replace with more efficient equivalents, including upgrading to LED or Compact Fluorescents (CFL). Consider replacing high wattage discharge lamps with low wattage.
2	**Heating/Hot Water.** Replace hot air heaters with radiant heating in workshops and parts. Insulate pipework, calorifiers, valves and flanges. Keep fabric in good repair.
3	**Monitoring and Targeting.** Collect and monitor energy and other data. Set realistic targets for reduction. Detect and resolve anomalies in energy consumption. Be sure to act on findings.
4	**Controls.** Ensure controls are set correctly for time, temperature, fan speed and other factors. This applies to heating, hot water, lighting, electrical equipment and compressors.
5	**Compressed Air.** Ensure air compressors are switched off overnight and regularly maintained. Repair leaks and ensure air intake is from outside.

Saving energy is easier than you think.
You don't need lots of technical knowledge. If you do need technical advice it can be easily accessed. Energy management is essentially good management of a measurable resource and makes business sense. That is why the best run companies in the UK are the most energy efficient. It is in no-one's interest to waste energy and everyone benefits, and so does business performance.
Tom Delay, Chief Executive, The Carbon Trust

INTRODUCTION

Aim of this Guide

This Guide has been written to help dealer principals and managers to save energy, reduce costs and cut CO_2 emissions.

A key step in managing energy is to appoint an Energy Champion and it is important for this person to read this document as it will help equip them in their task.

The energy saving opportunities in this Guide were identified from 30 energy surveys of dealerships in England and Scotland, funded by the Carbon Trust. In addition this Guide features a series of case studies from dealerships who have already implemented practical measures. They have demonstrated how savings can be replicated by dealerships throughout the UK.

Use of this Guide

This Guide assumes no previous knowledge of energy management. It describes simple but effective approaches for driving down costs and reducing carbon emissions.

The energy savings opportunities fall into three categories:

- **No Cost Actions** which can be made immediately and bring immediate savings.
- **Low Cost Measures** which require small investments up to £1,500.
- **Investment Measures** that require financial investment of over £1,500.

Benefits of saving energy

Energy is a large controllable cost and savings go directly to bottom line profitability.

In many dealerships simple **no cost** actions can be made immediately to reduce bills by 10%. Typically a further 15% savings can be made by **low cost** and **investment** measures.

For a medium sized dealership with annual energy costs of £40,000 this means £4,000 of savings per year are achievable by **no cost actions** and an additional £6,000 of savings per year by **investment measures**.

Improved energy efficiency is one of the most effective means of reducing carbon emissions and driving down costs.

The benefits of saving energy are:

- **Reduced costs** contributing directly to bottom line profitability. Every £ saved is £ of extra profit. Also making savings now protects against future rises in electricity and gas prices and price volatility in global energy markets.
- **Reduced CO_2 emissions** with less impact on the environment.
- **Reduced use of a finite resource -** where the energy is from a non-renewable source, preserving resources for future generations.
- **Reduced risks** from legislation/regulation non-compliance.
- **Better working environment -** more comfort for staff and customers.
- **Reduced maintenance costs** and equipment replacement costs because of improved operating efficiency.
- **Reputation** - a greener image showing customers and staff that the environment matters to your dealership.

Dealers qualifying for the Carbon Reduction Commitment Energy Efficiency Scheme (CRC) , or those who are part of large dealer groups where there is increasing management pressure to reduce emissions and costs, should find this report of special use in reducing emissions and demonstrating green credentials.

INTRODUCTION

Financial support

The Carbon Trust is a not-for-profit organisation created by the UK government to assist businesses and public sector organisations to reduce their carbon emissions. The Carbon Trust's mission is "to accelerate the move to a low carbon economy, by working with organisations to reduce carbon emissions now and develop commercial low carbon technologies for the future".

The Carbon Trust offers a range of services to help organisations reduce their energy consumption and carbon emissions. It provides consultancy support and access to affordable funding to small and medium sized businesses.

For more information, visit its website www.carbontrust.co.uk or call 0800 085 2005.

Enhanced Capital Allowance (ECA)

Enhanced Capital Allowance (ECA) is a simple way for a business to manage cash flow through tax breaks. The ECA scheme supports businesses that invest in energy saving technology included on the Energy Technology List (ETL), by offering 100% relief of first year tax on qualifying capital expenditure. ECAs are managed by the Carbon Trust on behalf of government. The website http://www.eca.gov.uk provides a list of technologies that qualify.

For further details see Appendix 1.

SUMMARY

Action plan

In 2010 NIFES Consulting Group conducted 30 energy surveys of dealerships in England and Scotland on behalf of SMMT and RMI. Out of the 30 sites visited **only four sites** had taken some of the **seven key steps** in energy management. This indicates a good energy saving potential across UK dealerships.

The seven key steps are detailed in Section 3, from page 12, but a summary is:

Step 1	**Appoint an Energy Champion**. Appoint an appropriate person to drive energy management and provide management support.
Step 2	**Develop an Energy Policy.** Produce a written energy policy for the Group or site which is signed and approved by the most senior manager and communicated to all employees.
Step 3	**Identify Meters and Invoices.** Identify location of all utility meters and gain regular access to all utility invoices.
Step 4	**Monitor and Target Energy Use.** Read meters regularly, plot consumption, check usage against targets, identify waste and take corrective action.
Step 5	**Conduct Regular Energy Walkabouts.** Conduct regular energy walkabouts identifying and recording energy waste, maintenance issues and opportunities for no cost, low cost and investment measures.
Step 6	**Implement Energy Saving Measures.** Produce a clear written plan in each area with priorities for action against identified measures, with timescales, costs, savings and those responsible for action.
Step 7	**Engage Employees and the Public.** Regularly raise staff awareness, gain support/ideas, train key people and provide regular feedback on progress toward targets. Communicate objectives and successes with the public.

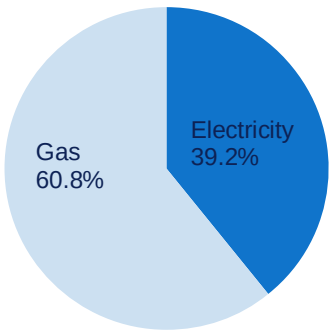
Typical energy use in a dealership

This table shows the average energy use across the surveys of 30 dealerships in the UK.

Utility	Annual energy consumption		Annual energy costs		Annual CO_2 emissions	
	kWh	%	£	%	tCO_2	%
Electricity	291,065	39.2	25,937	65.2	158.7	65.5
Gas	452,144	60.8	13,862	34.8	83.6	34.5
Total	**743,209**	**100.0**	**39,799**	**100.0**	**242.3**	**100.0**

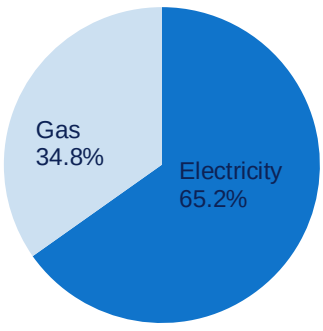
The amount of electricity used is measured at the meter in kilowatt hours (kWh). This is the standard energy unit used in this Guide. The rate at which power is used is kilowatts (kW). So a fan rated at 2kW switched on for one hour would use 2kW x 1 hr = 2kWh. If left on for two hours it would be 4kWh. For advice on how to convert gas and oil consumption into kWh see Appendix 3.

Consumption



Electricity is less than 40% total consumption, but more than 65% of costs.

Cost



Typical energy use in a dealership

The average unit cost of electricity across dealerships was is 8.9p/kWh and for gas is 3.1p/kWh (including VAT and standing charges).

For the average dealership, electricity is 39.2% of total energy consumption but, because of its relatively high unit cost compared to gas, is 65.2% of total cost.

More CO_2 is emitted per kWh to produce and distribute electricity compared to gas and electricity is 65.5% of total annual CO_2 emissions. For advice on how to calculate CO_2 emissions see Appendix 3.

So the message is clear: for any dealership the key first priority is to reduce electricity consumption. Electricity has the highest unit cost and the highest CO_2 emissions per kWh. Also a large proportion of electricity use is within the control of end users. This explains why Isaac Agnew Group made electricity reduction its first priority before moving to gas and oil consumption (see Case Study page 30).

Energy used will vary from one dealership to another depending on facilities installed, building type, size, level of control and hours of operation. Also there is normally no sub-metering of electricity use on most sites so an estimate needs to be made.

The average energy cost across the sites surveyed was £40,000 per annum. The site shown below has a total energy spend of some £33,000 and represents a typical medium-sized dealership. The breakdown of energy use is also typical of the 30 sites surveyed.

Electricity User	**Annual (kWh)**	**%**	**Annual Cost (£)**
Showroom lighting	26,199	12.6	2,651
Workshop lighting	14,108	6.8	1,434
Office lighting	17,892	8.6	1,810
Parts lighting	2,444	1.2	252
External lighting	21,900	10.5	2,210
Air compressor	25,245	12.0	2,525
Ramps and lifts	20,790	10.0	2,104
IT workstations	6,071	2.9	610
Air conditioning/ventilation	2,840	1.4	295
Other: pumps, fans, power tools, office	71,213	34.0	7,155
Total	**208,702**	**100.0**	**21,046**

This breakdown is useful as it helps to assess the savings by taking an action. For example, if the workshop lighting is left on 24/7 and is now only switched on during operational hours the savings would be 67%. The unit cost of electricity is 10.1 p/kWh for this site. So the annual cost savings would be:

0.67 x 14,108 x 0.101 = £955 per annum savings.

Similarly gas usage is estimated as:

Gas User	**Annual (kWh)**	**%**	**Annual Cost (£)**
Showroom and office heating	217,260	52.8	6,341
Workshop heating	80,402	19.5	2,341
Parts heating	57,081	13.9	1,669
Domestic hot water	56,661	13.8	1,657
Total	**411,404**	**100.0**	**12,008**

Understanding how electricity and gas is used within the dealership helps to target, quantify and prioritise areas for action.

No cost measures from surveys

The table below shows typical examples of no cost opportunities identified in the 30 dealership energy surveys. The savings are calculated and based on actual site energy data. Individual savings opportunities range from £56 to over £8,000 per annum.

	Annual Savings (£)
Air Conditioning Controls	
Reset AC settings: offices	221
Reset AC settings: site	6,001
Reset AC settings: showroom	1,600
AC settings server room	114
AC settings offices	1,537
Reduce fan speed on AHU	5,387
Heating Controls	
Reset heating controls showrooms/offices	304
Space heating controls settings	541
Parts: space heating controls	177
Main workshop heating controller	557
Reset heating programmes	1,547
Reset heating controller showroom boiler	8,059
Use destratification fans	185
Lighting	
Reduce lighting levels showroom	775
Reduce lighting levels offices	56
Reduce lighting on sales canopy	629
Air Compressor	
Use time controls on air compressor	100

AC - air conditioning, AHU - air handling units

No cost measures, by definition, require no capital investment and the savings are immediate. In energy management initiatives it is a key priority to implement these measures first to control costs and then focus on low cost measures and those requiring more investment. In some cases the savings by no cost actions can be used to invest in low cost and investment opportunities.

Typical investment measures from surveys

The following are typical low and investment measures identified during the site surveys.

Opportunity	Typical energy cost savings per annum (£)	Typical Implementation Cost (£)	Typical Payback (years)
Lighting Replace workshop lighting.	4,888	11,880	2.4
Upgrade T12/T8 fluorescents to T5.	1,101	1,705	1.5
Replace tungsten halogen lamps with LED equivalents	1,084	2,440	2.3
Replace metal halide or other discharge lamps with lower wattage equivalents and new control gear.	2,560	2,500	1.0
Rewire circuits so lights parallel to windows can be switched off.	1,017	1,000	1.0
Replace external metal halide lamps with compact fluorescents.	1,500	2,980	2.0
Heating/Hot Water Replace warm air with gas radiant heating.	794	650	0.8
Upgrade showroom roof insulation.	307	1,050	3.4
Upgrade pipework insulation on heating distribution	370	275	0.7
Upgrade calorifier insulation	33	200	6.1
Repair door seals/door closers	302	500	1.7
Seal external louvres	969	3,000	3.1
Reduce hot water temperature	1,113	450	0.4
Workshop doors linked to heating controls	223	750	3.4
Reconfigure heating system	206	650	3.1
Boiler replacement	3,477	20,000	5.8
Fit TRVs to radiators	1,165	2,565	2.2
Fit spray taps in toilets	206	750	3.6
Install workshop heating controls	2,627	5,250	2.0
Reconfigure showroom/office heating controls	1,691	110	0.1
Monitoring and Targeting including sub-meters	1,792	2,210	1.2
Controls Timers on car park lights	3,100	40	0.01
Install presence detectors on lighting	850	2,000	2.3
Timers on office equipment	50	20	0.4
Computer powerdown software	350	35	0.1
Install building energy management system	4,000	16,400	4.1
Install timers on beverage machines	372	20	0.05
Compressed Air Compressed air system maintenance/ leaks	850	500	0.6
Compressed air system intake/discharge modification	403	1,750	4.3
Compressed air heat recovery	559	1,750	3.1
Replace air compressors	1,209	12,000	9.9
Renewables Install wind turbine	748	3,000	4.0
Install ground source heat pump	14,661	120,000	8.2

DETAILS OF ACTION PLAN

Step 1 - Appoint an Energy Champion

To achieve ongoing energy savings in dealerships someone should be appointed to the role of Energy Champion. To have influence this person should have a degree of responsibility and the full support of the Dealer Principal or the most senior manager. The Champion must want to take on the challenge and ideally have some interest in energy/environmental issues and the desire to drive down costs. The Energy Champion would be a Manager, Supervisor, Accountant or the Principal Dealer.

The responsibilities of the Energy Champion would include:

- Locate and read meters regularly.
- Develop an Energy Policy and communicate to all employees.
- Gain regular access to energy invoices and half-hourly electricity data.
- Monitor energy consumption and look for waste.
- Conduct regular walkabouts – some out-of-hours.
- Identify and list energy saving measures.
- Secure investment for low cost/investment measures.
- Train key staff.
- Raise employee awareness and provide feedback.
- Integrate energy management into standard procedures.
- Communicate the Energy Policy and progress with energy savings to the public.

Step 2 - Develop an Energy Policy

It is important to have a clear and concise Energy Policy to explain to all stakeholders the company's intentions and approach to using energy and reducing environmental impact.

The Energy Champion should draft a policy. An example is shown in Appendix 4. The Policy should be discussed by senior management to gain support and incorporate their comments.

Once approved, the policy should be signed by an appropriate senior manager and communicated to all employees with copies displayed in the showroom as well as on the company intranet and website. At team meetings the policy should be distributed and discussed along with the plan to implement the policy including the appointment of an Energy Champion.

The policy should be reviewed at least every two years and amendments made as required.

Step 3 - Indentify meter and invoices

If you cannot measure energy you cannot manage it. But energy is a measured resource and therefore can be managed. Two key sources of information are **meters** and **energy invoices**.

Meters

It is vital for the Energy Champion to locate the electricity and gas meters. Sites not on mains gas are likely to burn oil and/or LPG with their own metering. To convert oil, gas and LPG into kWh units see conversion factors in Appendix 3.

Some meters will be easy to access but others may be in a locked plant room. Water meters are sometimes under a manhole cover outside the building. It is recommended these meters are photographed and put in a log book with an explanation of how they can be accessed so that someone in addition to the Energy Champion knows their location.

Different types of meters

The benefits of reading the meters are:

- It imposes a discipline which focuses attention on energy use.
- It helps future budget planning by having up-to-date accurate data.
- It provides a check on energy invoices.
- It avoids invoices based on estimated readings by the utility company.
- It provides the basis for an energy monitoring and targeting system (see Step 4).

Meter reading

The utility meters should be read on a weekly basis. This enables anomalies to be quickly identified and remedial action taken. Establish a routine so that meters are read on the same day of the week and where possible at approximately the same time. Make up and photocopy a logsheet for each meter, with a box for each reading to be taken with a space for date, time and each digit on the meter window. Here is an example for an oil meter reading sheet:

Meter no 12345
Location: Rear of store
Function: Oil for workshop space heater.
Units: litres

Date	Time							Red
09/11/11	10:04	0	0	2	9	3	2	.5
16/11/11	10:12	0	0	2	9	8	7	.7
23/11/11	09:58	0	0	3	0	1	3	.6

Step 3 - Indentify meter and invoices

Different meters will have different configurations: make up a logsheet to suit each one.

This allows the current reading to be quickly compared with the previous reading, reducing errors. This data can also be put on a spreadsheet. Also ensure that more than one person knows where the meters are and how to read them to allow for holidays and sickness.

The Carbon Trust has an excellent on-line training tool for businesses to help them log and analyse energy data. It is called “Cut Carbon, Cut Costs”. See Appendix 2 for details.

Electricity meters

There are many different types of electricity meter, most of which are quite easy to read, however, some of the modern electronic meters require a little knowledge to obtain the readings. Typical of these meters is the Siemens Elster A1700 Code 5 Meter shown here.

On the front panel is a button (yellow or blue). This button is for cycling of the register display which can be viewed at any time. Each time the button is pressed the display will show for 30 seconds and then revert back to the active register for that time of day.

There are many parameters available on such meters. For meter reading purposes keep pressing the button until Rate 1 kWh is shown and record the display. If you have a dual rate tariff such as Economy 7 or even a three rate tariff, then press the button again until Rate 2 kWh and Rate 3 kWh are shown. If in any doubt contact your utility supply company.

Gas meters

Gas meters are easier to read as they generally will only have one register.

Record the index reading up to any decimal point, but include any fixed dials. The meter to the left reads **1 0 5 5 8 8 4 0**

Make a note of the meter units, in this case cubic feet, newer meters are calibrated in cubic metres. This information is necessary for converting the reading into kWh. See Appendix 3 for conversion factors.

On the utility invoice the last zero may well be ignored, but the resulting bills will be based on this number multiplied by 10 when calculating the actual kWh used.

Water meters

There is usually one meter to read. On the example shown only the digits in black need to be recorded and the digits in white on black background are decimal places. This meter measures in gallons and needs to be converted to cubic meters (m^3) for invoice purposes. Most meters record in m^3 and will say so on the face of the meter.

Step 3 - Indentify meter and invoices

Energy invoices

Some dealerships will receive paper or electronic invoices. They should be kept and filed so they can be easily retrieved. If the dealership is part of a group the invoices may well be sent to HQ. But the invoices will be somewhere and it is important for the Energy Champion to locate invoices for the last 12 months and ensure there is ongoing access to this information in the future.

One basic check is to ensure the meter number on the invoice corresponds with that on the meter. Otherwise you may be paying for someone else's energy and vice versa.

Electricity invoices are useful in determining contract or tariff arrangements and provide useful information on the ratio of the day to night units and other information. Night units are usually charged at a lower rate between 00:30 and 07:30. It is also useful to see if a meter readings are estimates (E) or actual (A). If estimates, it is best to phone/e-mail actual readings so invoices are accurate.

Half-Hourly Data

For larger sites with half hourly electricity (and some gas) readings are sent to the utility company by a modem or radio link. This data is particularly useful. Examples of half hourly data can be seen in the case studies for Toyota sites at Oxford and Hedge End which have been used to demonstrate savings by reducing base loads (see page 33).

Consider Switching Energy Supplier

There are two ways to reduce energy costs:

- Purchase energy as cheaply as possible.
- Maximise efficiency of use.

If as a dealership you purchase directly from gas and electricity suppliers it is worth going on-line to check if you are getting a good deal. You can switch supplier and buy more cheaply. There are a number of comparison websites which deal with small businesses. A good place to start is the energy watchdog, Consumer Focus. Have your energy data in annual kWh or costs, name of current supplier and payment method. See www.consumerfocus.org.uk

If you are part of a larger group this option is not likely to be open to you as utilities will be purchased in a group contract.

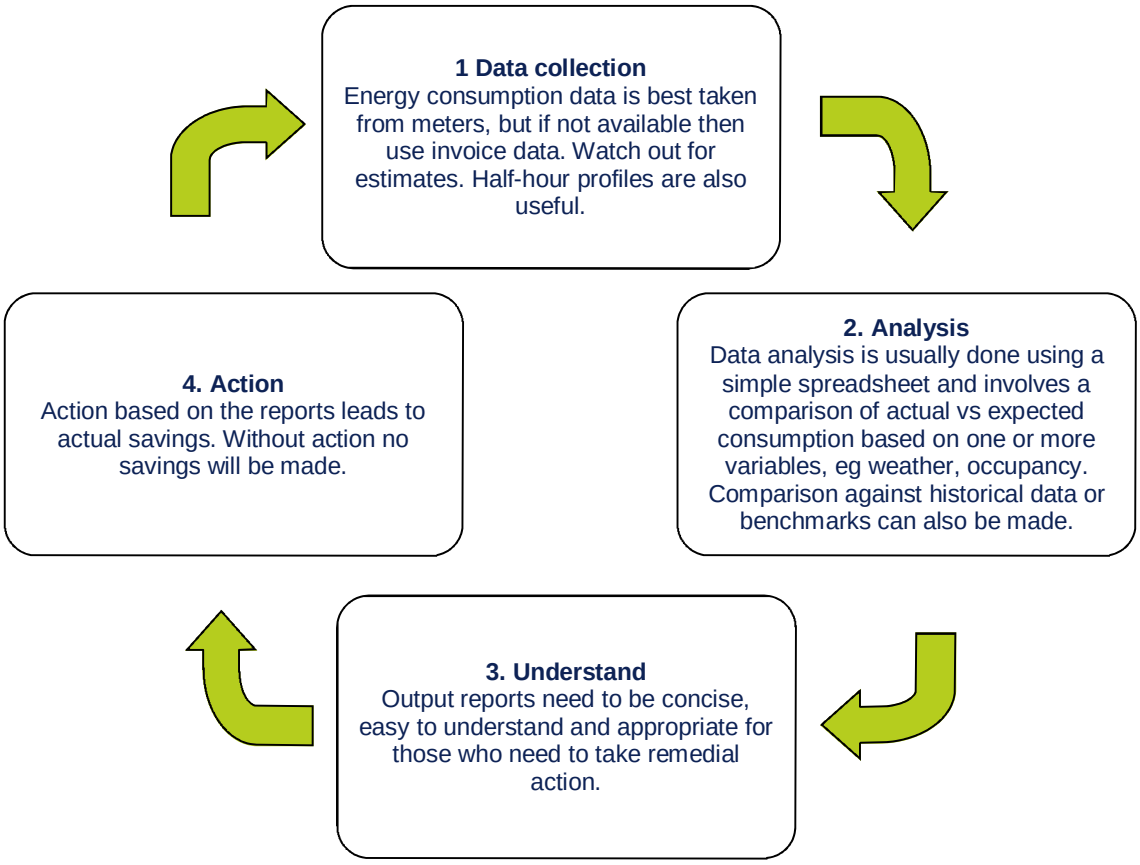
Step 4 - Monitor and target energy use

What is Monitoring and Targeting (M&T)?

Monitoring and Targeting (M&T) is the systematic collection of energy and other data to detect and resolve anomalies in consumption. Using this information Energy Champions become aware of problems, investigate waste and take corrective action. An example could be that showroom air conditioning could be running 24/7 because the controls are manually set to 'on'. This may not be obvious to staff as the waste occurs out-of-hours but the M&T system will highlight the change in consumption. An example of this is shown in the Toyota Hedge End case study on page 33.

M&T can be used for budgeting, forecasting, benchmarking and verifying energy savings. It can also be used to form the basis of the competitive energy procurement. As a result, M&T underpins every aspect of energy management.

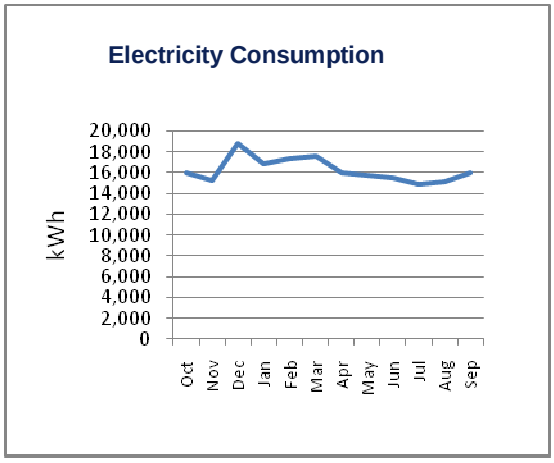
M&T is an interactive and iterative process of continual measurement, comparison and improvement. The four main elements are:

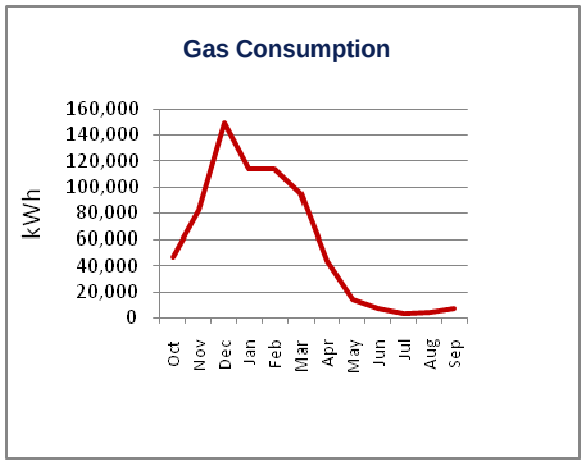


Step 4 - Monitor and target energy use

Monitoring consumption

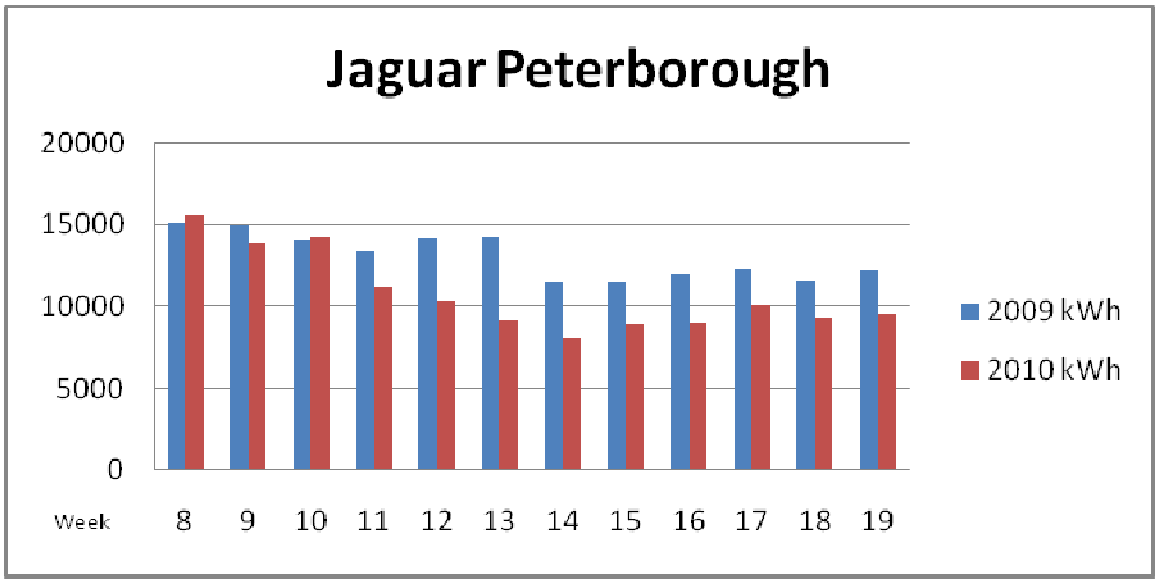
In Step 3 the importance of identifying meters and reading them weekly was stressed. Some dealers do read meters but do not analyse the data. It helps to plot weekly or monthly consumption in a graph. An example for a dealership is shown below for monthly electricity and gas.





The electricity consumption may have seasonal variations. For example, less lighting is needed in summer but savings could be masked by higher use of air conditioning. For gas there is a seasonable variation depending on the weather.

The simplest analysis for electricity is to compare the current period this year with the same period the previous year. The example below shows savings achieved at Jaguar Peterborough by installing a Building Energy Management System.



In this example from week 11, when the system was installed, to week 19, average savings were 23.9%.

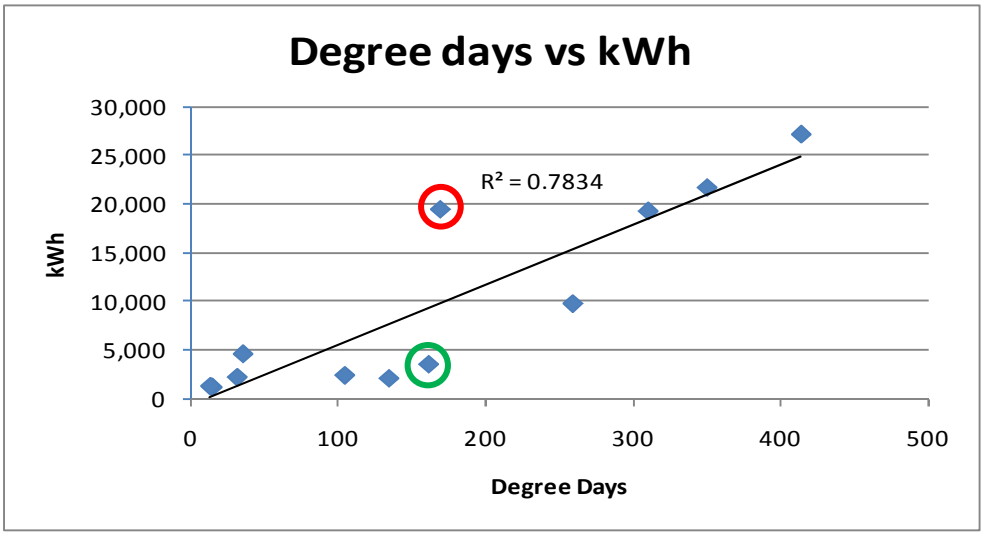
Step 4 - Monitor and target energy use

Gas consumption and weather

Most gas is used for space heating and consumption will be proportional to the difference between inside and outside temperature. This difference is measured by Degree Days which are derived by analysis of maximum/minimum temperatures and time. Put simply, the colder it is, the higher the Degree Days. The number of Degree Days in a month can be plotted on a graph against monthly gas consumption. A straight line graph indicates good control of gas in relation to weather variation. Scattered data and a non-linear relationship indicate poor control.

For a detailed explanation of Degree Days see Carbon Trust Guide CTG004 "Degree Days for energy management" at www.carbontrust.co.uk.

The graph below shows the plot of gas consumption against Degree Days for a Surrey dealership. There are 12 data points each representing a month. The lower left data points (low Degree Days/low gas use) are for summer and upper right data points (high Degree Days/high gas use) are for winter. If the space heating controls are responding well to weather variation then data points should be on the line. However, the graph shows that in spring and autumn the data points are erratic and not on the line.



For example, the data point with red circle at 20,000 kWh is clearly an exception. If the data point was on the line the energy consumption should have been 10,000 kWh and therefore 10,000 kWh of gas was wasted that month. Someone may have put the gas heating in the workshop on manual and it was running 24/7 and overriding the time and temperature control. There is also a data point with a green circle at 4,000 kWh for nearly the same number of Degree Days. So it could be argued the waste was 20,000 – 4,000 = 16,000 kWh (worth £451). Monitoring the heating and cooling controls is a key task for the Energy Champion.

Sub-Metering

On most sites there is a single electricity meter and a single gas meter. Once the energy passes through the meters it can be difficult to know how much energy each area of the site is using. Sub-metering the larger users (eg workshop or showroom) can help to gain a better understanding and control of energy use.

Some sites visited had sub-meters but usually were not read. In sites when the sub-meters were read, the data was not analysed.

In one of the surveys it was recommended that one gas sub-meter and one electricity sub-meter were installed which would enable monitoring of energy use in the workshop, showroom and paintroom. It is estimated the savings would be 3% of electricity and 5% of gas by implementing an M&T system.

Cost savings per year	£1,316
CO_2 savings tonnes per year	9.4
Energy savings kWh per year	39,865
Cost	£850
Payback years	0.6

If you can't measure it, you can't manage it. Monitoring and Targeting helps you do both.

Step 5 - Conduct regular energy walkabouts

The Energy Champion should conduct regular energy walkabouts in every area of the dealership. The Champion can do this on their own or with other managers, supervisors or employees. The idea is to walk from area to area identifying and recording opportunities to save energy including maintenance issues and possible areas for investment.

The walkabouts should be at least monthly with the findings recorded. If the walkabouts take place in normal working hours it provides an opportunity for the Energy Champion to engage with employees face-to-face on energy issues. this interaction can provide valuable insights on issues and opportunities.

Conducting energy walkabouts out-of-hours provides visible evidence of energy waste when the building is unoccupied. An example of this is in the Case Study in the Isaac Agnew Group (see page 30) where the Environment Manager visited each of the 18 sites in the Group between 23:00 and 01:00 and took photos of lights and equipment left on overnight. These photographs were shown to staff which helped to raise awareness and achieve significant good housekeeping savings.

After four or five walkabouts the Energy Champion will be in a position to develop Action Lists for each area. These Action Lists can be issued in draft to those working in the areas for comment. Once feedback has been received then the Action Lists can be finalised and put to regular use. These Action Lists will act as the basis for future walkabouts.

The walkabouts will also provide the basis for producing a list of low cost and investment measures which can then be used for applications for expenditure on a normal “spend-to-save” basis.

Step 6 - Implement energy saving measures

This Guide now sets out a list of possible opportunities for energy saving measures in the following distinct areas:

- Showrooms.
- Offices/corridors/toilets/storerooms/kitchens.
- Workshops.
- Parts.
- Plant rooms.
- External areas.

The energy savings opportunities fall into three categories:

- **No Cost Actions** which can be made immediately and bring immediate savings.
- **Low Cost Measures** which require small investments up to £1,500.
- **Investment Measures** requires financial investment of over £1,500.

Most investment measures will pay for themselves in reduced costs. Some paybacks might be in days, others longer.

Please check with the brands you represent that suggested measures are in line with their operating standards.

Close doors when heating or air conditioning is on

Replace T12 fluorescents for T5 ones

Switch off rows of light nearest to windows

Fast acting doors, like these, keep the heat in. They are activated by below-floor sensors

See how many opportunities there are on your site

Showrooms

No Cost

- Keep doors closed when heating, ventilation or air conditioning (AC) is on.
- Upgrade T12 fluorescents to T8 (replace 'fat' tubes with 'thin' more efficient tubes).
- Reset AC controls – time/temperature/fan speed.
- Reduce lighting level in showroom if sufficient natural light.
- Ensure cleaners don't leave lights on if space unoccupied.
- Make use of destratification fans to bring warm air at high level to floor area.
- Reset heating controls to boiler supplying showroom.
- Reduce thermostat settings on radiators.
- Switch off TVs/plasma screens at end of day.

Ensure settings on this seven day time control are correct for the showroom lights.

Low Cost (Below (£1,500)

- Upgrade T12/T8 fluorescents to T5 (even more efficient tubes).
- Replace tungsten lamps with CFL or LEDs.
- Fit thermostatic radiator valves (TRVs) to radiators.
- Fit timers to beverage machines/water coolers.
- Rewire lighting circuits so rows of lights parallel to glazing can be selectively switched off.

Investment (Above £1,500)

- Replace tungsten halogens with LEDs.
- Replace discharge lamps with lower wattage lamps and new control gear.
- Upgrade roof insulation.

Switch off rows of lights near windows and make use of natural light.

Case Study:
A dealer made a 56% reduction in base load capacity after realising the air conditioning plant had been mistakenly set to operate 24 hours a day.

Case Study:
See pages 31 and 32 for examples of LED lighting benefits and pay-back periods at Ford and the benefits of enhanced focus on products at a Mercedes-Benz dealer through improved lighting systems.

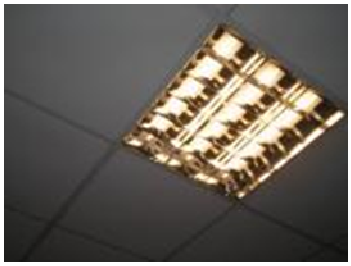
Penny Saver says……

For every 1°C the air conditioning is set below 24°C, electricity consumption and costs increase by 11%

Office/corridors/toilets/storerooms/kitchens

No Cost

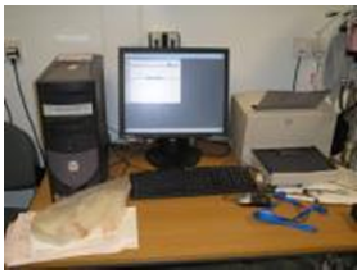
- Use water boilers in preference to kettles.
- Don't overfill kettles.
- Only use AC when really needed.
- Close all doors/windows when heating or A/C are on.
- Reset AC controls in offices.
- Reset AC controls in server room.
- Reduce thermostat settings on radiators.
- Avoid use of fan heaters.
- Reset heating controls on boilers supplying offices.
- Label light switches.
- Replace T12 fluorescents with T8.
- Reduce use of decorative lighting.
- Switch off lights if daylight sufficient (open blinds).
- Switch off lights in favour of desk lamps.
- Make sure desk lamps are CFL or LED.
- Switch off all AC, lights and equipment at end of day.
- Activate Energy Save mode on photocopiers.
- Activate powerdown on individual computers and monitors.



It is a myth to say leaving on fluorescents saves energy. Always switch off if not needed.

Low Cost (Below £1,500)

- Fit TRVs to radiators.
- Install powerdown software on network.
- Fit timers on office equipment.
- Fit timers to beverage machines/water coolers.
- Fit presence detectors on lights in intermittently used spaces with no natural light (kitchens, toilets, storerooms).
- Upgrade T12/T8 fluorescents to T5.
- Replace tungsten lamps with CFL or LEDs.
- Fit automatic door closers.
- Fit draught proofing on doors/windows.
- Improve pipework insulation.



Switch off office equipment at the end of each day.

Investment (Above £1,500)

- Replace tungsten halogens with LEDs.
- Upgrade roof insulation.
- Fit double glazing.

One dealer fitted a perspex lockable cover over the AC controls so only he could adjust it.

Penny Saver says……

Reducing temperature set point by 1°C will reduce space heating energy consumption by 8%

Workshops

No Cost

- Clean skylights to use more natural light.
- Replace T12 fluorescents to T8.
- Keep doors closed when heating is on.
- Reset heating controls on warm air heaters.
- Check black bulb temperature sensor operates radiant heating.
- Use destratification fans if fitted.
- Switch off all ramps/lifts at end of day.
- Make use of natural light to reduce artificial light levels.
- Switch off lights if not required.

This gas fired radiant heater heats people and not the air and is useful in workshops where the doors are regularly open. These types of heaters are suitable in high bay buildings.

Low Cost (Below £1,500)

- Upgrade T12/T8 fluorescents to T5.
- Repair door seals/door closers.
- Replace tungsten lamps with CFL or LEDs.
- Link workshop doors to heating controls.
- Install basic workshop heating controls.
- Repair compressed air leaks.

Investment (Above £1,500)

- Replace discharge lamps with lower wattage lamps/new control gear.
- Replace warm air electric radiant heating with cheaper gas radiant heating.
- Upgrade roof insulation.

Switch off some lighting to make use of natural light.

Case Study: Bristol Street Motors, Ford dealer.
Reduced gas in space heating by over 30% by installing an energy management system on heating in their workshops and body shop.

Penny Saver says……

Compressed air leaking from a 3mm hole can cost up to £700 a year in wasted electricity

Parts

No Cost

- Consider reducing temperature of heating system.
- Replace T12 fluorescents with T8.
- Reduce TRV settings on radiators.
- Don't use fan heaters.
- Switch off all heating at end of day.
- Clean roof lights to let in natural light.

Low Cost (Below £1,500)

- Fit occupancy sensors to light fittings.
- Upgrade T12/T8 fluorescents to T5.
- Improve pipework insulation.
- Replace tungsten lamps with CFL or LEDs.
- Fit TRVs to radiators.

Investment (Above £1,500)

- Replace tungsten halogens with LEDs.
- Upgrade roof insulation.

For intermittently visited areas presence controls on lights can bring good savings.

This black bulb sensor is a special device to control radiant heating systems and requires an unrestricted view to control effectively.

Penny Saver says……

Replacing a 50W tungsten halogen spotlight with LED saves 80% on energy and it lasts 40 times longer

Plant rooms

No Cost

- Reduce fan speeds on air handling units.
- Enable time control on air compressors.
- Switch off air compressor when not in use.
- Upgrade T12 fluorescents to T8.
- Switch off lights if space is unoccupied.

Low Cost (Below £1,500)

- Fit presence detectors to lights.
- Repair compressed air leaks.
- Upgrade T12/T8 fluorescents to T5.
- Improve pipework, flange, valve insulation.
- Upgrade calorifier insulation.
- Reduce domestic hot water temperature.
- Maintenance of fans, filters and ducts.

Investment (Above £1,500)

- Install condensing boiler.
- Replace plant room lighting.
- Upgrade roof insulation.
- Replace air compressors.
- Compressed air intake/discharge modifications.
- Compressor heat recovery.

This is a well insulted water calorifier…….

….but the insulation jacket on this one is inadequate and needs fixing.

To the left of the air compressor is a grille to allow cold air to enter the compressor. Cold air takes less energy to compress and therefore improves performance.

Penny Saver says……

Every 4°C rise in inlet air temperature to a compressor causes a 1% increase in power consumption.

External areas

No Cost

- Switch off external canopy lighting in daylight.
- Ensure wall or floor mounted condensers for A/C are free of dust, dirt and leaves.

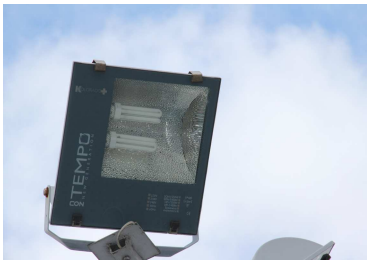
Low Cost (Below £1,500)

- Install photocell/time switch on:
  - fascia lighting/signage
  - external canopy lighting
  - car park lighting
  - external floods to light building front
- Snap shut controls on water hoses in valeting.

Investment (Above £1,500)

- Replace tungsten halogen floods with CFL or LED.
- Replace discharge lamps with CFL equivalents.
- Seal external louvres.
- Consider other renewable sources:
  - install air source heat pump, especially if you using oil/LPG
  - install wind turbine
  - install ground source heat pump

Discharge lamps, as above, can be replaced with CFL, as on right, or LED.



Penny Saver says……

Most tungsten halogen flood lights can now be replaced with CFL or LED, saving up to 80% on electricity consumption

Step 7 - Engage employees and the public

Employee Engagement

It is important for the Energy Champion to raise staff awareness on energy consumption and costs and the opportunities for savings by no cost measures.

Step 2 covered the energy policy, which needs to be communicated to all employees clearly in meetings, on notice boards and on the intranet.

Employees can also make suggestions for saving energy and this should be encouraged with ideas recorded and acknowledged.

It's Better OFF

Communication methods can include:

- Briefings at existing meetings.
- Special training seminars
- Face-to-face discussions particularly during energy walkabouts.
- Regular newsletters.
- Notice boards and intranet.
- Advice on home energy savings.
- Posters, stickers, e-messages.
- Feedback from energy monitoring and targeting on progress.
- Posting photographs of energy waste and good practice examples.
- Case studies on how other dealerships have achieved savings..

At the Isaac Agnew Group all site managers and supervisors attended an Energy Management workshop run by the Carbon Trust which proved very useful and they brought the message back to colleagues at their site. See Case Study on page 30.

Communicating with the public

It is also important to communicate with the public on energy saving initiatives. The energy policy can be put on the website along with a profile of the Energy Champion and examples of savings achieved along with graphs and facts and figures. Short features are best such, as the Toyota case studies as shown on page 28.

The Carbon Trust Standard

The Carbon Trust Standard was launched in 2008 to encourage good practice in carbon measurement, management and reduction by businesses and other organisations.

It is designed to be a robust, objective and consistent methodology for assessing carbon performance. The Standard specifies requirements in three key areas:

- Carbon footprint measurement.
- Carbon management.
- Carbon reduction performance.

CARBON TRUST

For small sites with energy bills less than £50,000 per annum an on-line assessment can be made.

For further details see: www.carbontruststandard.com

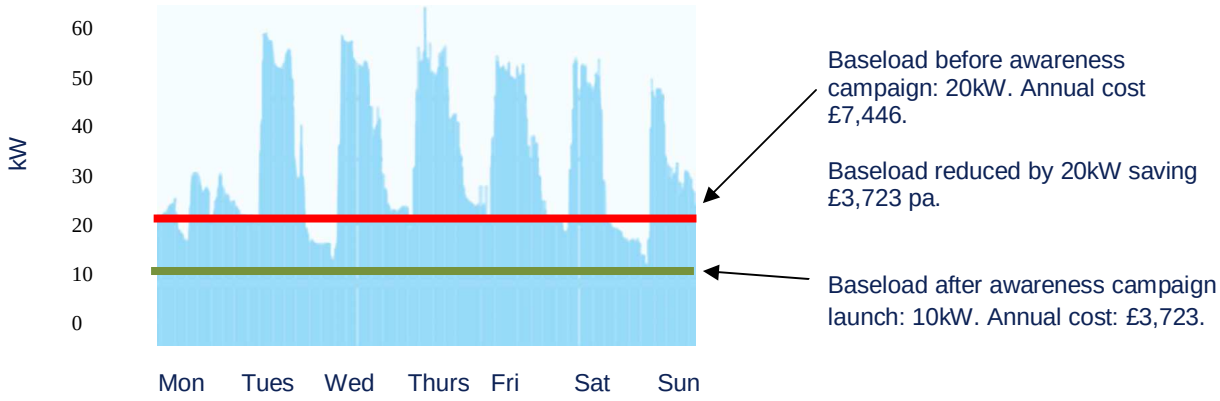
Step 7 - Engage employees and the public

Awareness training at Inchcape (Oxford) Toyota

An energy awareness campaign was launched that focused on a one day energy awareness training workshop. It was offered to all staff and employees providing practical advice on energy reduction.

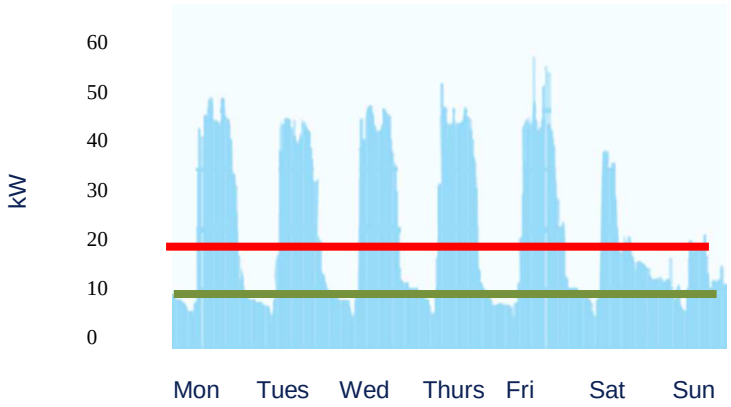
Sample weekly electricity consumption **before** energy awareness campaign launch.

Weekly Electricity Consumption 24-30/11/2008



Sample weekly electricity consumption **after** campaign launch.

Weekly Electricity Consumption 23-29/11/2009



Savings

The campaign produced 26% reduction in electricity saving £4,803 per year.

Actions taken

- Awareness workshop.
- Reset timers on external lights.
- E-mail alerts to staff.
- Cleaners briefed to switch off lights.
- Switched off PCs and monitors at night.
- Switched off immersion heater.
- Set up powerdown facility on PCs and monitors.
- Switched off two projectors.
- Timers on coffee/water dispensers.

Seven step action plan checklist

	Action	Yes/No	Comments
Step 1	**Appoint an Energy Champion** • Has a Energy Champion been appointed? • Does he/she have senior management support?		
Step 2	**Develop an Energy Policy** • Has an Energy Policy been drafted? • Was draft discussed by management before approval? • Is it signed by a senior manager? • Has it been communicated to all employees? • Is it available to the public?		
Step 3	**Identify Meters and Invoices** • Have all utility meters been located? • Are the locations/access known to several staff? • Are meters read regularly? • Are utility invoices available? • Are invoices accessible on an ongoing basis? • Is half-hourly data available for electricity and/or gas? • Is switching supplier an option?		
Step 4	**Monitor and Target Energy Use** • Is meter reading data recorded on a spreadsheet? • Is an analysis made of consumption? • Is gas/oil consumption related to degree days? • Are targets set for each week or month? • Is there scope for sub-metering? • Are unexplained rises in consumption investigated? • Is corrective action taken?		
Step 5	**Conduct Regular Energy Walkabouts** • Do regular energy walkabouts take place? • Are the findings recorded? • Have walkabouts happened in normal opening hours? • Have walkabouts taken place out-of-hours? • Have Action Lists been developed for each area? • Have managers sometimes joined in walkabouts?		
Step 6	**Implement Energy Saving Measures** Have a list of opportunities been drawn up for the following areas: • Showrooms. • Offices etc. • Workshops. • Parts. • Plant rooms. • External areas.		
Step 7	**Engage Employees and the Public** • Has the Energy Policy been communicated to all employees? • Have managers/supervisors been trained in energy management? • Have employees been briefed on energy saving? • Are employees' suggestions sought on saving energy? • Is feedback from the monitoring system sent to employees? • Is use made of normal communication channels to raise employee awareness? • Is the Energy Policy and progress on energy issues made available to the public?		

CASE STUDIES

Driving down costs at Issac Agnew Group

Background
The Isaac Agnew Group employs 880 people across Northern Ireland in the following dealerships: Saab, Porsche, BMW, MINI, Volvo, Mercedes-Benz, Audi, VW, SEAT and Suzuki. The Group includes trade parts specialists, a bodyshop, two vehicle storages and central offices. There are a total of 18 sites, mainly in the Belfast area.

What did they do?
In late 2007 the Group Financial Director along with the Group Health, Safety and Environmental Manager decided to drive down **electricity costs** as a first priority. It was the largest energy cost. In 2008, the Group changed electricity supplier with most sites fitted with **half-hourly meters** which are remotely read and provide useful 24 hour profiles of electricity usage.

Energy walkround checklists were prepared and walkabouts were conducted by the Environmental Manager focusing on: heating, ventilation and air conditioning, lighting, equipment and compressors

Action lists were prepared for each site based on the walkabout results. **Electricity usage is monitored** using half-hourly data and 24 hour graphs were sent to each site to identify waste electricity so they could take action.

The Environment Manager also **visited each site after hours** (23:00 to 01:00) and took photos of energy waste including compressors, lights, equipment, TVs and computers left on overnight.

In September 2009 all site managers and supervisors attended an **Energy Management Workshop** run by the Carbon Trust. This focused on areas such as: energy management, raising staff awareness, understanding your energy bills, conducting an energy walkround and energy monitoring

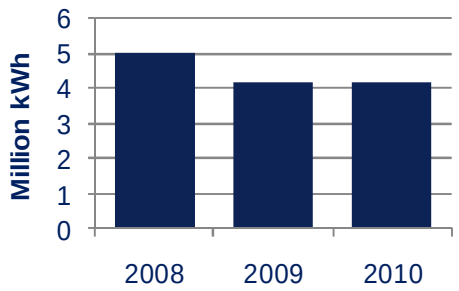
This workshop has proved to be very useful and focused all staff on energy management opportunities.

In the BMW dealership a **Smart Energy System** was installed in April 2010. This system controls energy using equipment including air-conditioning, heating, internal and external lighting. So far this has reduced energy use by 9% each month.

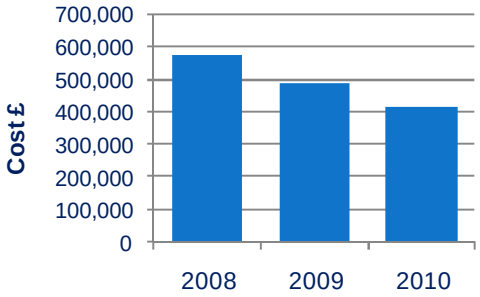
Other improvements have been made by IT to **switch off** all computers remotely in the Group at night and restart them in the morning. In addition a sub-contractor has carried out a **survey of compressors** throughout the Group.

What did they save?
In 2007 consumption was well above five million kWh and savings have been made from 2008 onwards.

Group annual electricity consumption



Group annual electricity costs



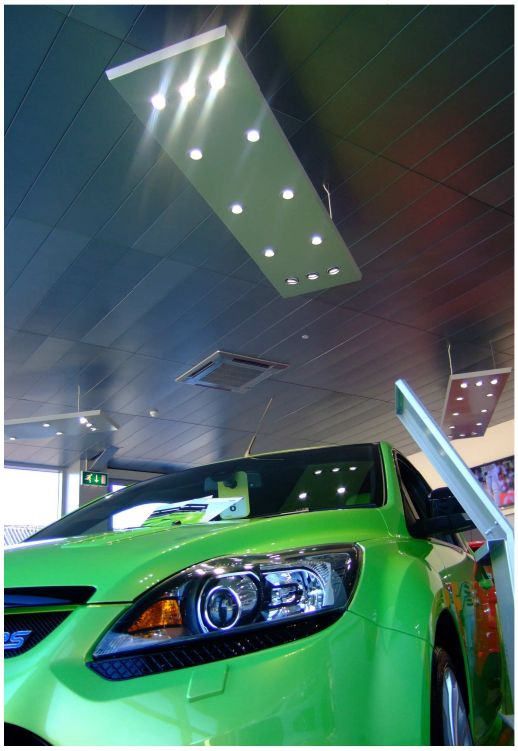
In 2007, before the initiative began, annual electricity costs exceeded £600,000. They are now nearer £430,000 per year, showing savings across the Group of £170,000 per annum. This represents average savings of over £9,400 per site per year achieved by both energy reductions and competitive purchasing of electricity.

What's next?
Having successfully brought down electricity costs the Group is now addressing gas and oil costs.

LED lighting in Ford dealerships

As part of its overall strategy to reduce energy consumption, Ford Motor Company is encouraging its dealer network to move to energy efficient LED lighting technology for both showroom and back office applications.

In consultation with lighting specialists ddd Design Ltd, Ford has developed a range of approved lighting products that whilst maintaining Ford's required 'look and style' philosophy are both cost-effective and energy efficient.



Ford has calculated that an average dealer can save several thousand pounds a year by transitioning to LED lighting technology for high usage applications.

A wide range of LED lighting products have been developed including showroom lighting rafts and external signage applications.

Utilizing the very latest 'state of the art' technology ddd Design has developed an LED lighting raft that meets all Ford showroom lighting requirements but uses significantly less energy and also requires less maintenance than the existing ceramic metal halide fittings.

The LED rafts use up to 60% less energy and have a payback period of around 1.7 years. Power consumption is reduced from 325 Watts to just 139 Watts. Over a six year period a single raft can deliver an estimated reduction of two tonnes of CO_2 emissions.

The replacement of standard 50W low voltage halogen 'down lighter' lamps, commonly found in the showroom and office environment, with 8 Watt LED units delivers immediate energy efficiency savings. LED units can be easily retrofitted. Including maintenance savings the payback period is typically just 0.7 years. Annual savings in energy use costs for a single fitting are over £20. Multiplied by the number of fittings in an average dealership and including reduced maintenance costs, overall savings can easily run to six figures.

LED sign illumination units for external applications consume just 21 Watts against traditional 150 Watt halogen flood light units with a remarkable annual energy saving in excess of 80%. These units also have significantly lower maintenance cost yet are no more expensive to fit than existing units.

The transition to LED lighting is just one of many energy efficiency initiatives that Ford dealers are increasingly adopting. Others include the use of advanced energy control systems, the application of solar reflecting glazing film to reduce energy demand and the installation of intelligent heating and cooling systems.

Mercedes-Benz Watford

New showroom lighting at Mercedes-Benz Watford helps attract passers-by to the product, rather than lighting up the entire showroom. This looks better and saves money.

Mercedes-Benz's 'Green Dealer' project at Watford focused on the key areas that could reduce costs. Actions taken were:

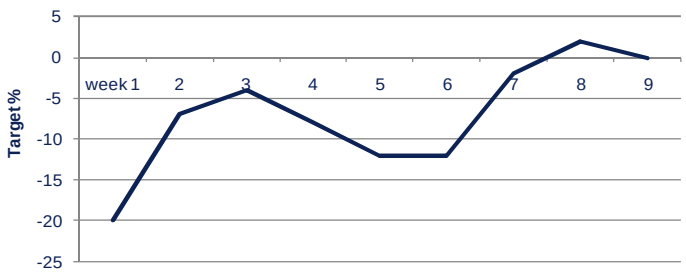
- AMR meters had been installed in a previous project, but these are vital to proving savings.
- Energy management system - the Adam International energy management system that runs the electrical systems on site was upgraded. All electrical and digital devices are controlled and monitored through one wireless solution, which is managed remotely. The HVAC and Lighting systems are controlled though temperature and light level detection respectively to allow equipment to operate within parameters set by the business. In addition to this, self-diagnosis of problems before they arise is possible through a series of feedback loops which determine the output of plant.
- De-stratification fans in showroom have been installed to draw hot air from the roof void of the showroom to ground level thus reducing the load on the AC and heating system.
- Lighting
  - Showroom and workshop lighting: new lamps installed that are reactive to available natural light and only come on when required.
  - Accent lighting to vehicles has been installed so that at night all lighting is off and only these LED lights are used to highlight the vehicle.
  - Customer area: lower cost LED lighting installed within the customer seating area.
- HVAC – inverters have been installed to smooth the power delivery to this equipment and reduce the overall power consumption.

Total cost of the system is circa £60,000 and annual savings are projected at £20,000 - giving a three year payback.

In addition to the main works, Mercedes-Benz also identified a series of small works that would improve efficiency of dealerships across the network:

- Turn off lights in infrequently used or unoccupied areas.
- Remove or strictly regulate the use of all portable space heaters. Eight heaters were found on one site meaning additional energy costs of at least £2,400 per annum.
- Check the settings on local AC units are between 20 and 22 degrees C for cooling and heating respectively. 1°C adds 10% to cooling load.
- Fit timers to uncontrolled equipment - vending machines, coffee machines and water heaters.
- Create a site close down procedure (to ensure PCs and electrical equipment are not left on over night)
- Compressed air systems - replace any leaking or damaged fittings/hoses.

Watford - energy performance

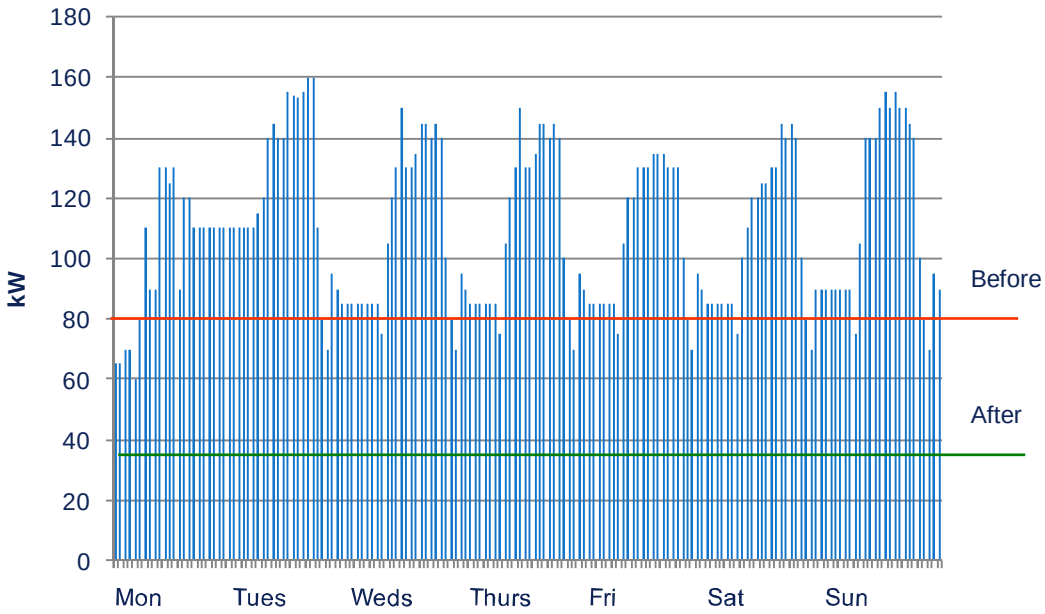


The graph opposite gives a visual result of the savings on the Watford job. At the start of the year Watford was 20% behind the performance target set for it. Where the graph levels off we can see the point at which the works were carried out and went live. Within three weeks of the project going live, Watford had exceeded its target for energy saving.

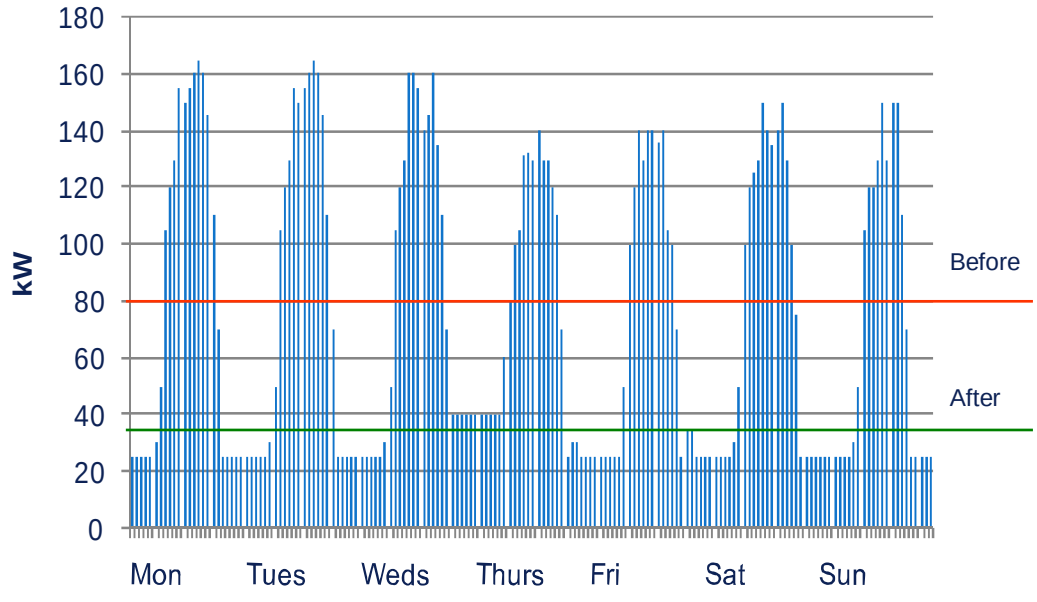
Ventilation switch off at Snows Toyota Hedge End and Lexus Hedge End

The Centre realised the air conditioning plant was operating all night after someone had set it to manual control. Resetting the controls helped substantially reduce energy use. The base load of 80kW was cut by 56% to 35kW once the situation was rectified. Use of monitoring and reporting would help pick up such a issue.

Before - sample weekly electricity consumption - Hedge End August 2007



After - sample weekly electricity consumption - Hedge End August 2008



Gas reduction - Ford, Bristol Street Motors, Birmingham

An Energy Management System was installed at Bristol Street Motors (Ford – Bristol Street, Birmingham) in mid-2006 to control gas-fired radiant tube heaters and warm air blowers in workshops and bodyshop.

Before installation

Total gas consumption September 05 to January 06: 458,032 kWh

After installation

Total gas consumption September 06 to January 07: 347,869 kWh

Savings: 110,163 kWh ie 24% saving

However, there is also a significant gas usage in the paint ovens. By examining summer gas use it was calculated that 271,800 kWh is annual gas use in paint ovens giving a monthly figure of 22,650 kWh.

By deducting this use the savings in gas for space heating can be calculated:

Before installation

458,032 kWh less 113,250 (five months' paint oven use) = 344,782 kWh

After installation

347,869 kWh less 113,250 (five months' paint oven use) = 234,619 kWh

Space heating gas savings: 110,163 kWh ie 32% savings

New build opportunities

This Guide has focused on what existing dealerships can do in the context of existing buildings. However, new sites are regularly opened and there are opportunities to design in energy efficiency to reduce consumption and costs over the life of the building. A number of these opportunities can be included economically in the design of new builds which would be less feasible to retrofit on existing sites. Planning authorities are also stressing the need for the use of renewable technologies to be built into new designs.

Case Study: Isaac Agnew Group, Belfast

In September 2010 a new Audi dealership was opened in Belfast. The Carbon Trust was involved in providing advice from the start of the project and good practice measures were implemented including:

- Double glazing with solar control glass in the showroom.
- Daylight provision linked to lighting controls in the workshop.
- A gas Variable Refrigerant Flow (VRF) system for low carbon heating and ventilation with local control using a limited band of potential set points.
- The use of heat recovery and low specific fan power fans for ventilation.
- High efficiency light fittings (T5 fluorescent lamps and metal halide).
- The omission of an arch of inaccessible T8 fluorescent lamps in the handover area.
- A 'last man out' switch for shutting down non-essential services out of normal operating hours.

In the above case study it mentions that in the design stage the inaccessible location of T8 fluorescent lamps was avoided and re-designed. This underlines the importance of avoiding high maintenance costs by ensuring lamps are easily accessible when they need replacing. One dealer reported that it can cost up to £600 to change a lamp because of the need to hire a special mobile platform and operator.

New build opportunities

Case Study: Honda, Romford
A new Honda (UK) showroom has opened in Romford, Essex that incorporates renewable technologies to comply with local government planning requirements and to achieve the stringent BREEAM design accreditation standard of 'Very Good'.

The overall model shows a carbon reduction of 12.3% and energy usage reduction of 17.9% from Ground Source Heat Pumps (GSHP) and Solar Water Heating to meet the baseline planning requirement. However, energy efficiency measures incorporated into this project such as natural ventilation mean the building as a whole may achieve an overall energy saving of 31% compared to a conventional design.

The design measures demonstrate that a showroom can experience comfortable conditions similar to that of a fully air conditioned building but using considerably less energy.

The following are the key design features:

Building Fabric
The building fabric was selected to exceed Building Regulation requirements and external solar shading was fitted to the showroom glazing facade to reduce summer solar gain.

Showroom Ventilation
Typical showrooms are air conditioned using a central air handling plant. At this site natural ventilation was used by use of low level ventilation louvres around the showroom perimeter and high level 'chimney' style ventilation terminals mounted on the roof. The aim is to use wind pressure to draw air through the showroom up through the terminals using a 'stack' effect, creating a comfortable space but using less energy associated with air conditioning. The system is fully automated with vents opening slightly during evenings in summer to pre-cool the building and opening/closing depending on internal/external temperature and air quality.

Showroom Heating
Heating is provided by a Ground Source Heat Pump (GSHP). A total of nine x 75m deep bore holes, located beneath the car park provide water via a packaged GSHP. The energy is converted to 40ºC low grade heating suitable for underfloor heating which is piped beneath the showroom, corridors and toilet areas on the ground floor. An added benefit is that the system can be used to cool the floor in summer and this assists natural ventilation in cooling the showroom.

Solar Water Heating
Solar hot water heating using evacuated tubes has been installed in the main roof circulating heat in a secondary coil of the main hot water cylinder.

Office Cooling
Where comfort cooling is necessary in offices an efficient air source heat pump system is provided.

Rainwater Harvesting
A rainwater harvesting tank is buried to the rear of the showroom which collects water from the roof for use in grey water supplies. By using UV filtration the water is also used in the car wash-down facilities.

For further details see:

http://www.building.co.uk/news/Honda-opens-green-car-showroom-images/3120230.article

http://www.modbs.co.uk/news/fullstory.php/aid/5474/Car_showroom_is_a_model_of_energy_efficiency.html

APPENDIX 1

Support for investment: Carbon Trust green finance and ECA scheme

Carbon Trust green finance

Carbon Trust will provide green finance to UK businesses and in April 2011 will move to a partnership with Siemens Financial Services. This major new deal will provide up to £550 million over three years to boost green growth and unlock business investment in the low carbon economy – key to the UK's recovery. The new dedicated low carbon finance scheme is a first and will enable UK businesses to invest in cost effective energy efficiency equipment or other low carbon technologies, such as new efficient lighting and biomass heating.

All businesses will be able to apply for new green growth finance from the scheme from 4 April 2011. Siemens Financial Services Ltd in the UK will provide the financial backing and manage the provision of funding and the Carbon Trust will use its expertise in carbon saving from energy efficient technologies to assess the carbon, energy and cost savings of any application. This will enable the financing to pay for itself through energy savings.

0% loans will continue to be available on a first come first served basis to sites in Wales and Northern Ireland beyond 28 March 2011.

To find out the latest information go to www.carbontrust.co.uk.

Enhanced Capital Allowances

The ECA scheme is a key part of the Government's programme to manage climate change, and is designed to encourage business to invest in energy-saving equipment (plant and machinery only).

There are three ECA schemes which provide enhanced tax relief for spending on equipment which has environmental benefits:

1. Energy-saving equipment.
2. Water-efficient equipment.
3. Low carbon dioxide emission cars.

The scheme provides a tax incentive to business that invests in equipment that meets published energy-saving criteria. The Energy Technology List (ETL) details the criteria for each type of technology, and lists those products in each category that meet them. It is managed by the Carbon Trust, on behalf of the government, and has two parts:

1. The Energy Technology Criteria List (ETCL), which is reviewed annually to ensure that it reflects technological progress. It sets out the qualifying energy-saving criteria for each class of technology.
2. The Energy Technology Product List (ETPL), which is updated at the start of each month on the website and lists products and technologies that are eligible for an ECA.

Support for investment: Carbon Trust green finance and ECA scheme

Key features of the ECA scheme

- Open to all businesses that pay UK corporation or income tax, regardless of size, sector or location.
- Provides 100% first-year capital allowances on investment in energy saving equipment against taxable profits of the period of investment.
- All the products listed on the ETPL must meet the energy-saving criteria, published in the ETCL.
- Only spending on new and unused energy-saving equipment can qualify for ECAs.
- Capital allowances are available for spending "on the provision of" plant and machinery. This can include certain costs arising as a direct result of the installation of qualifying plant and machinery such as; transport of the equipment to the site, and some direct installation costs.

What equipment is eligible

The Energy Technology Criteria List (ETCL) is reviewed each year, to reflect technology advances and market changes. New technology groups may be added as part of the annual review, but they must have the approval of the Department of Energy and Climate Change (DECC), Her Majesty's Revenue and Customs (HMRC) and the Treasury.

The list of qualifying products within each technology is updated each month. The current list of technologies is as follows:

- Air-to-air energy recovery.
- Automatic monitoring and targeting (AMT).
- Boiler equipment.
- Combined heat and power (CHP).
- Compact heat exchangers.
- Compressed air equipment.
- Heat pumps for space heating.
- Heating ventilation and air conditioning equipment.
- Lighting.
- Motors and drives.
- Pipework insulation.
- Radiant and warm air heaters.
- Refrigeration equipment.
- Solar thermal systems.
- Uninterruptible Power Supplies (UPS).

For further details see www.eca.gov.uk

Insulate bare pipework to reduce heat loss. Insulation for pipework qualifies for an Enhanced Capital Allowance.

High efficiency motors qualify for an Enhanced Capital Allowance.

APPENDIX 2 - Further information sources

SMMT
Please see www.smmt.co.uk/dealerenergyefficiency for updates and further information or contact energyefficiency@smmt.co.uk

Carbon Trust: Online training: Cut Carbon, Cut Costs tool

http://www.carbontrust.co.uk/cut-carbon-reduce-costs/products-services/default/pages/cut-carbon-cut-costs-online-training-tool-default.aspx

The following publications are available to download from the Carbon Trust website:
www.carbontrust.co.uk/publications

CTC 623 The Times Carbon Champions: Paths to a low carbon future
CTG 001 Creating an awareness campaign
CTG 002 Heating control technology guide
CTG 004 Degree days for energy management
CTG 005 Air conditioning technology guide
CTG 006 Variable speed drives technology guide
CTG 007 Power Factor Correction technology guide

CTL 003 Assessing the energy use in your building fact sheet
CTL 023 How to implement de-stratification fans
CTL 025 How to implement electric heater controls
CTL 026 How to implement external lighting
CTL 027 How to implement office lighting refurbishment
CTL 028 How to implement T5 retrofit conversion kits
CTL 029 How to implement higher efficiency motors
CTL 031 How to implement HVAC insulation
CTL 033 How to implement automatic lighting controls
CTL 035 How to implement optimum start control
CTL 039 How to implement radiant heating
CTL 040 How to implement thermostatic radiator valves
CTL 041 How to implement compact fluorescent or LED spot lighting
CTL 042 How to implement inverter variable speed drives
CTL 043 How to implement heating zone controls
CTL 044 Walk around checklist - Retail and distribution
CTL 048 Walk around checklist - Office based businesses
CTL 049 Maintenance checklist - Motors
CTL 050 Maintenance checklist - Compressed air
CTL 051 How to recover heat from a compressed air system
CTL 053 How to implement leak detection techniques in compressed air
CTL 061 How to implement rapid roll doors
CTL 063 How to implement draught-proofing
CTL 064 How to implement roof insulation
CTL 083 Automatic meter reading fact sheet
CTX 603 Switch to saving DVD - Heating and Lighting
CTX 604 Switch to saving DVD - Motors & Drives and Compressed Air
CTX 605 Switch to saving DVD - Office equipment
ECA 272 Enhanced Capital Allowances (ECA) brochure
PFL 306 Employee awareness poster - Lighting
PFL 307 Employee awareness poster - Heating
PFL 309 Employee awareness poster - Computer
PFL 310 Employee awareness poster - Photocopier
PFL 311 Employee awareness poster - Air conditioning
PFL 312 Employee awareness poster - Compressed air
PFL 313 Employee awareness sticker sheet - Assorted sizes
PFL 331 The Carbon Trust support for SMEs
PFL 338 Employee awareness sticker sheet - Small stickers

APPENDIX 3 - Conversion factors

Energy conversion factors

Electricity is measured at the meter in kilowatt hours (kWh) and is billed in kWh.

Natural gas is measured at the meter by volume, usually cubic metres (m^3) but sometimes, on older meters, in cubic feet (ft^3), The utility bill explains how to convert from volume to kWh precisely but a figure of 11kWh/m^3 is generally used for m^3.

It is usual to convert all types of energy to kWh which is the standard unit of energy used to compare all fuels. The following conversion factors are used:

Liquid Fuel	kWh/litre
Gas Oil	10.7
Fuel Oil	11.7
Liquefied Petroleum Gas (LPG)	7.4

Gaseous Fuel	kWh/m^3
Natural Gas	11.0

If gas is a measured at the meter in ft^3 then a conversion factor is needed to calculated m^3 and from there to kWh. For example if a site uses 386,604 ft^3 of natural gas per annum, to calculate the kWh first convert to m^3: 386,604 x 0.0283 = 10,941m^3. Then convert to kWh: 10,941 x 11 = 120,350 kWh.

Carbon dioxide (CO_2) conversion factors

Burning hydrocarbon fuels of any type produces carbon dioxide emissions. Each fuel produces a different amount of CO_2 depending on its carbon content and, in the case of electricity, its method of generation. To calculate the emissions multiply the energy usage in kWh by the appropriate factor from the table below, to give the CO_2 emissions in kg.

Energy Type	CO_2 emission by fuel type for the UK	
	kg CO_2/kWh	kg CO_2/litre
Electricity	0.545	-
Natural Gas	0.185	-
Fuel Oil	0.265	2.674
Gas Oil	0.275	-
LPG	0.214	1.495
Diesel	0.253	-
Petrol	0.241	-

Due to the substantial contribution of CO_2 to the threat of global warming and the fact that most of the man-made emissions come from burning fossil fuels, an energy saving programme is a necessary part of any reduction in greenhouse gas emissions.

Electricity is by far the highest in terms of kg of CO_2 per kWh. This is because electricity is mostly generated from burning fossil fuels and losses occur in the distribution system making the overall process only about 35-40% efficient. Thus, when trying to reduce a site's environmental impact reducing electricity use should always be a priority.

So in the table on page eight, regarding typical energy use in a dealership, the CO_2 figures are derived as follows:

Electricity: 291,065 kWh x 0.545 kgCO_2/kWh = 158,714 kg CO_2 (158.7 tonnes CO_2)
Natural Gas: 452,144 kWh x 0.185 kgCO_2/kWh = 83,647 kg CO_2 (83.6 tonnes CO_2)

APPENDIX 4 - Policy Template

Energy Policy - ABC Motors

Statement

- ABC Motors is committed to the responsible management of energy and water. By efficient management of these resources the company aims to minimise expenditure and environmental impact; maintain health and safety standards and maintain an acceptable comfort level for staff and customers.
- ABC Motors understands that there is a need to improve the way we use energy, to become more energy efficient and to reduce our CO_2 emissions so that we limit our damage to the environment.
- As a responsible organisation, ABC Motors recognises that the uncontrolled consumption of energy will have a negative impact on the environment. We are therefore committed to ensuring that energy is continually managed to ensure maximum efficiency whilst employing cost-effective measures.

Objectives

We will undertake the following:

- Commit management resources to implementing this policy, by allocating responsibility for implementing this policy to our Energy Champion and establishing an Energy Action Team.
- Appoint people to ensure lights/equipment are turned off.
- Identify cost-effective energy efficiency measures and develop an action plan to implement them.
- Provide regular management reports on our consumption and its associated costs.
- Raising awareness of energy-related environmental issues.
- Provide training to employees on the efficient operation of heating, cooling, lighting, electrical equipment and compressors.
- Setting up an in-house energy monitoring and reporting system.
- Review this policy every two years to maintain our commitment to continuous improvement.

Scope

The scope of this policy covers ABC Motors' showroom and workshop at Blandyke and our vehicle storage depot at Moss End.

Date Effective

This policy is effective from 1 June 2010.

Associated Policies

Environment, Waste, Transport

This policy is due to be reviewed and updated every two years. It is available to the public.

Signed Paul Duffy **Position**: Principal Dealer **Date** 1 January 2011

GLOSSARY

AC	Air Conditioning
AHU	Air Handling Unit
AMR	Automatic Meter Reading
AMT	Automatic Monitoring and Targeting
BEMS	Building Energy Management System
BREEAM	Building Research Establishment Environmental Assessment Method
CFL	Compact Fluorescent Lamp (low energy)
CHP	Combined Heat and Power
CRC	Carbon Reduction Commitment Efficiency Scheme - a mandatory reporting scheme based on your organisation's electricity consumption in 2008.
CO_2	Carbon Dioxide
CT	The Carbon Trust
DD	Degree Days
ECA	Enhanced Capital Allowance
GSHP	Ground Source Heat Pump
HF	High Frequency
HVAC	Heating , air conditioning and ventilation
kW	kilowatt, unit of power, rate at which energy is used in thousands of Watts
kWh	kilowatt hour, unit of energy, the amount of energy used in thousands of Watt hours
kWh/m²	Energy consumption in kilowatt hours/square metre of floor area
LED	Light Emitting Diode
LPG	Liquid Petroleum Gas - such as butane or propane
M&T	Monitoring and Targeting
SME	Small to Medium Sized Enterprise
TRV	Thermostatic Radiator Valve
T12	Tubular Fluorescent Lamp 12/8" diameter running on conventional ballast
T8	Tubular Fluorescent Lamp 8/8" diameter running on either conventional or HF ballast
T5	Tubular Fluorescent Lamp 5/8" diameter running on HF ballast
tCO_2	tonne (1000kg) of CO_2
UV	Ultra Violet
VRF	Variable Refrigerant Flow
W	Watts, unit of power (1W = one Joule per second)
Wh	Watt hours, unit of energy use

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- Eastern BMW, Edinburgh
- Ewens Honda, Cornhill, Banff
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- Hendy Ford, Portsmouth
- Henrys Skoda, Glasgow
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- Poole Audi, Dorset
- Porsche, Guildford
- Specialist VW, Aberdeen
- Volvo, Colindale, London
- Volvo Trucks, Glasgow
- Vospers, Exeter

This Guide can be downloaded from
www.smmt.co.uk/dealerenergyefficiency
Updates and further information will also be posted on this website

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