SIEMENS

Saving Energy For Your Organisation

Top 10 energy saving tips

How can you increase efficiency, reduce costs and cut your carbon emissions?

The UK's Climate Change Act (2008) sets a legally-binding target of reducing greenhouse gas emissions by at least 34% by 2020 and 80% by 2050 (based on 1990 levels). Over the next few pages we will explain how you can increase efficiency, reduce costs and cut your carbon emissions.

Many companies are missing out on the simple changes that can make a big difference. Are your lights left on in the evening, or the building heated on bank holidays when no-one is there? Do you really need the air conditioning or compressed air unit on at 7am if your shop doesn't open until nine?

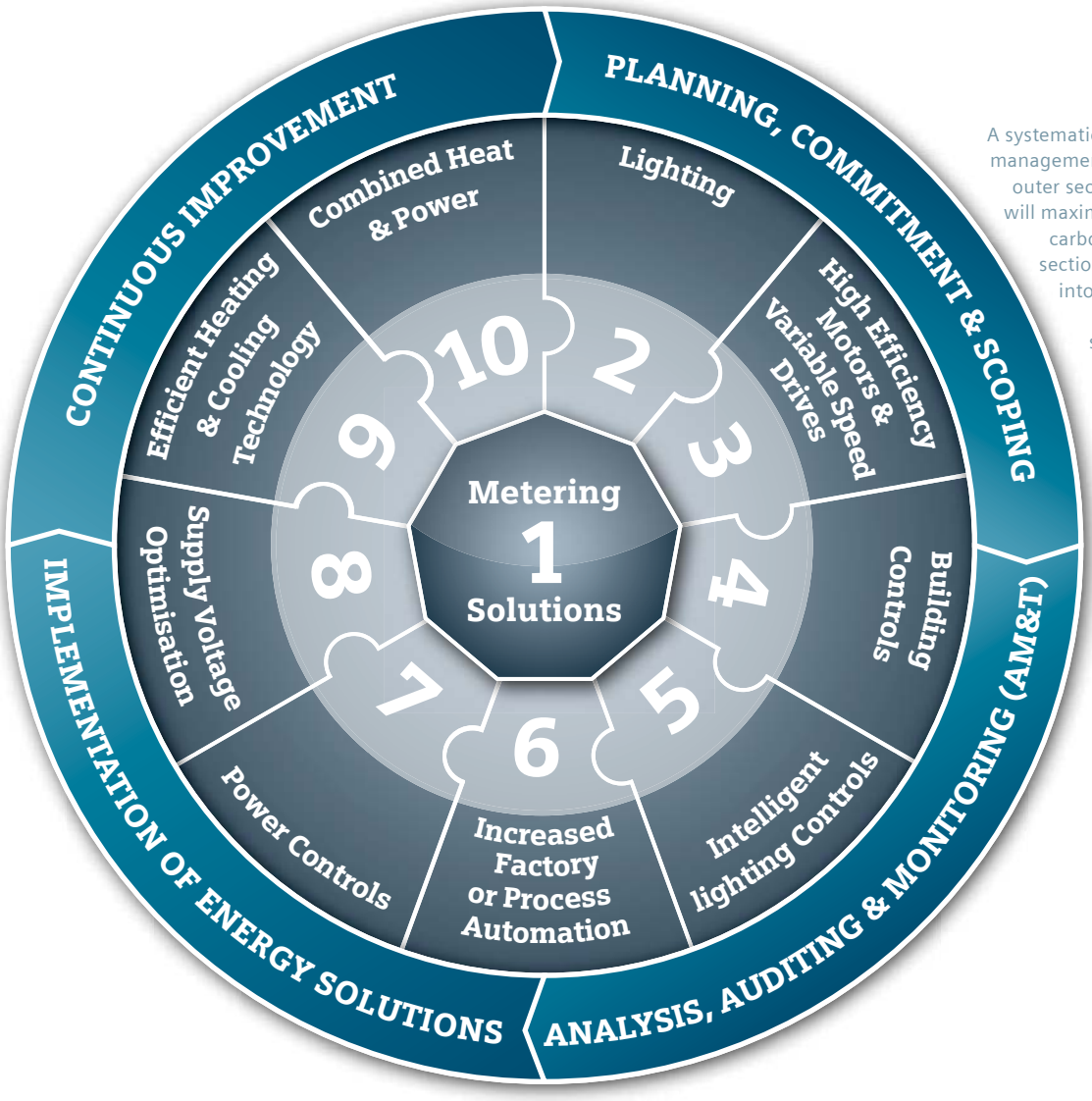
Whether you're already an expert or new to energy management, it can be useful to review the options available. Even the best performing company can find a way to make their energy budget go that little bit further.

Smart metering can provide the necessary detailed information on energy usage to highlight where you can make behavioural and technology changes and can measure the benefits.

By taking a holistic approach, looking at all areas of your building and business operations, you can see where savings can be made quickly and easily – and then work towards improving the less straightforward areas.

The best approach is to use a systematic evaluation to establish your site specific 'top 10' priorities – the following items provide a general guide to common technology solutions.

Energy Management – a systematic approach



A systematic approach to energy management as indicated in the outer sections of this graphic, will maximise energy, cost and carbon savings. The inner sections provide an insight into what we believe are the top ten energy saving opportunities.

Combined Heat and Power

If sized correctly, CHP can significantly reduce energy costs, consumption and CO_2 emissions

Combined Heat and Power (CHP) is the simultaneous generation of usable heat and electrical power in a single process.

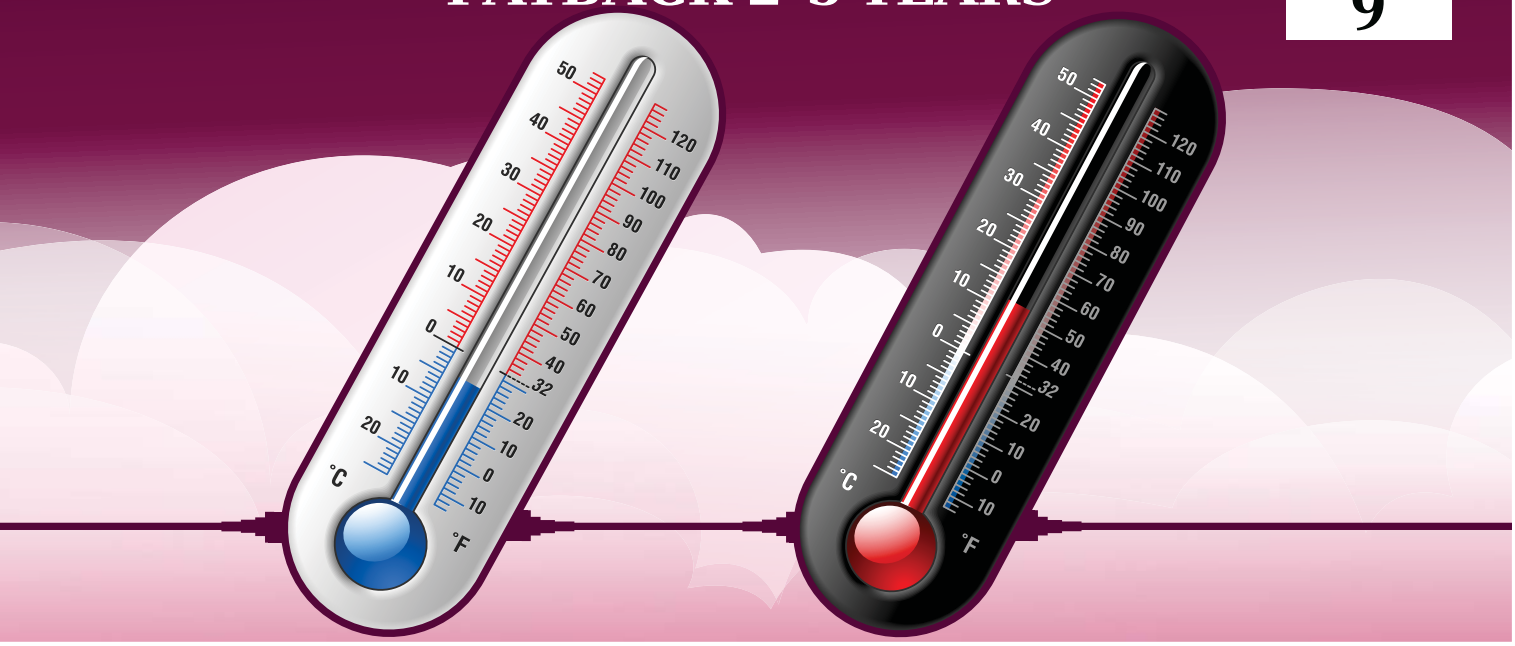
CHP offers a relatively long payback period, but can be well worth considering if you have a good use for the heat generated. If sized correctly, it can significantly reduce energy costs, consumption and CO_2 emissions.

Units are commercially available to straddle the range of large industrial generation applications through to small domestic units.

PAYBACK 2-5 YEARS

PAYBACK 2-5 YEARS

TIP 9



Efficient Heating & Cooling Technology

Between them, heating and cooling typically use around 20% to 40% of a building's energy.

Boilers and chillers are often old and inefficient. Replacing them with modern versions can help to substantially reduce the overall energy use of the building.

A new condensing boiler can operate at highly improved efficiency, whereas a conventional boiler will have an efficiency of only 80%. To put it another way: that's a fourfold improvement.

A modern variable speed chiller will typically have a coefficient performance (COP) of around 6, compared to a standard chiller's COP of 4. A higher COP figure means less energy is required – thus reducing costs.

A new condensing boiler can operate at an efficiency of 95%

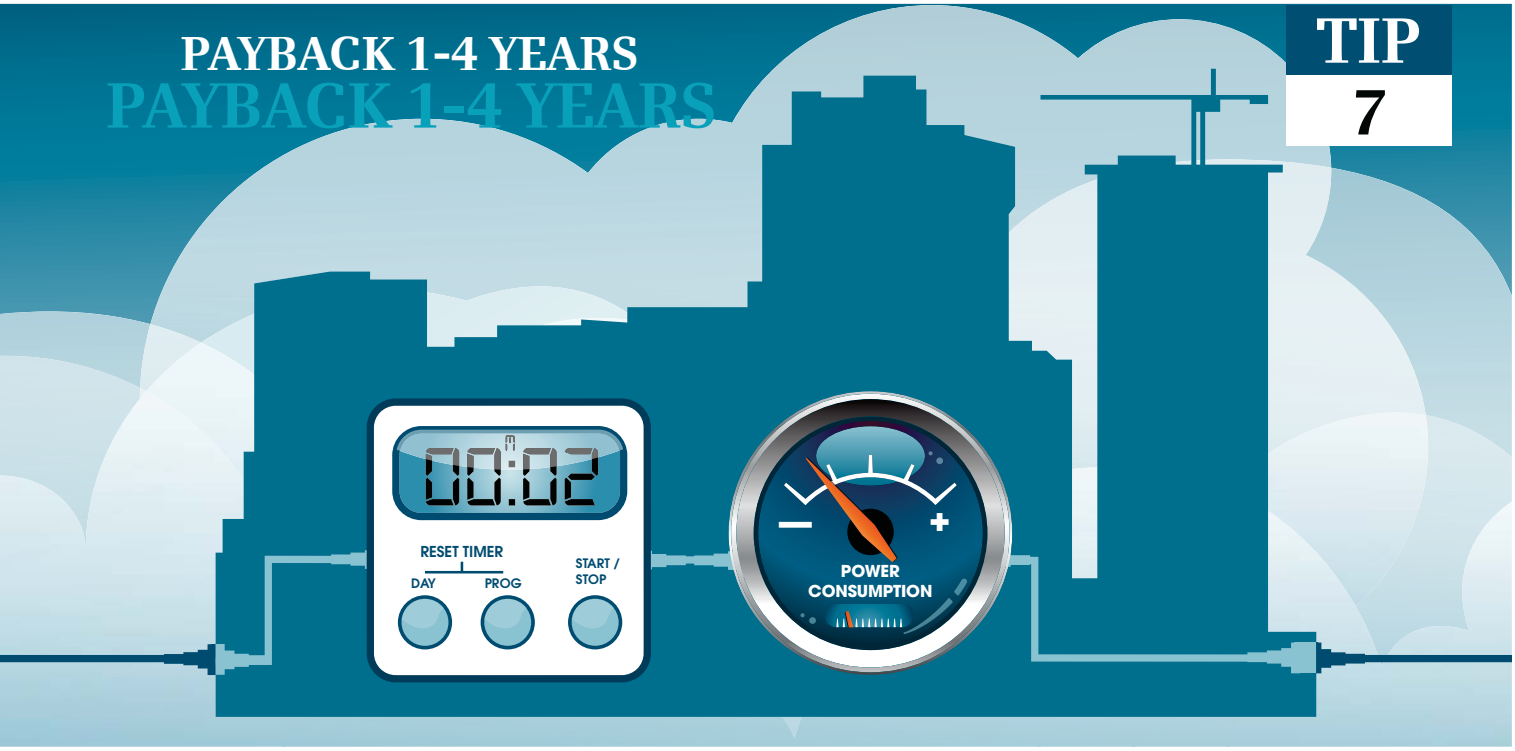
Supply Voltage Optimisation

There may also be lower, but still valuable, benefits to be achieved by low and no cost improvements, by tapping down transformers

Most modern equipment is designed to work at a voltage of 400/230V – but the UK electricity supply averages over 420/242V, or higher in many cases.

Optimising your supply voltage to 225V or 220V can save up to 5-15% in electricity consumption – the actual saving depends on the equipment being powered.

There may also be lower, but still valuable, benefits to be achieved by low and no cost improvements, by tapping down transformers or replacing old transformers where the electricity supply enters a building.



Power Controls

There are several power control solutions that can help reduce costs and energy usage.

Power factor correction can improve the usable power available to equipment, and thus maximise its efficiency.

Active harmonic control removes harmonics and other noise from power lines, which saves energy and also reduces wear and tear on electrical equipment.

By scheduling production to off-peak times, and managing the electricity tariffs, you can use energy when it is cheaper, therefore reducing costs. You can also avoid penalties which may be incurred for taking electricity at peak times.

Another way to save money is real-time demand response, i.e. reducing load by stopping equipment or turning on a generator when the National Grid sees peak demand coming.

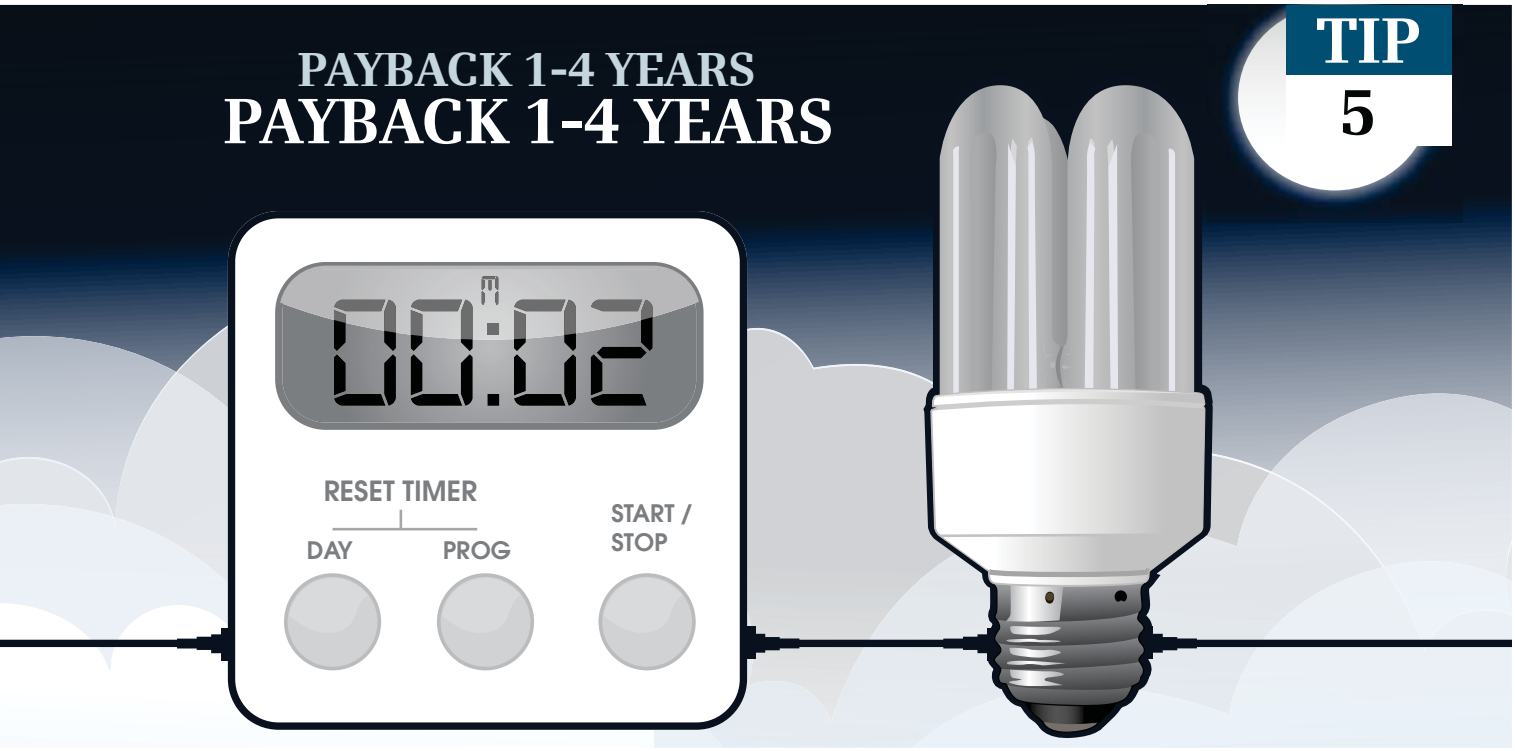
Power factor correction can improve the usable power available to equipment, and thus maximise its efficiency

Increased Factory or Process Automation

All branches of industry can benefit from optimised automation systems

Up to 80% of potential savings in a plant come from improved automation. Done correctly, automation can improve productivity, reduce downtime and minimise maintenance requirements – whilst simultaneously reducing energy consumption.

All branches of industry can benefit from optimised automation systems. These can also be used as the backbone for data collection for the metering and instrumentation required for the energy management system. The automation system may include specialist energy management functions.



Intelligent Lighting Controls

Implementing intelligent lighting systems can save over 40% of energy used in lighting.

Light fittings can be individually controlled to turn them off or even dim the output as required. Used in conjunction with light level sensors and presence detection, controls can be optimised to take full advantage of daylight savings and maximum off periods.

Significant additional savings can be made due to reduced maintenance requirements – more easily scheduled with predictive failure analysis.

Once installed, lighting controls provide excellent flexibility and an improved user environment as the light conditions are optimised at all times. With individual control of fittings, it is very easy to reconfigure lights into different groups for new office layouts or other required changes.

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Building Controls

Some of the easiest energy savings can be made through effectively managing BEMS time clock schedules

The three basic functions of a Building Energy Management System (BEMS) are improving plant control, monitoring energy usage and optimising plant operating times.

You can achieve savings of anything up to 30% by installing and maintaining an effective BEMS.

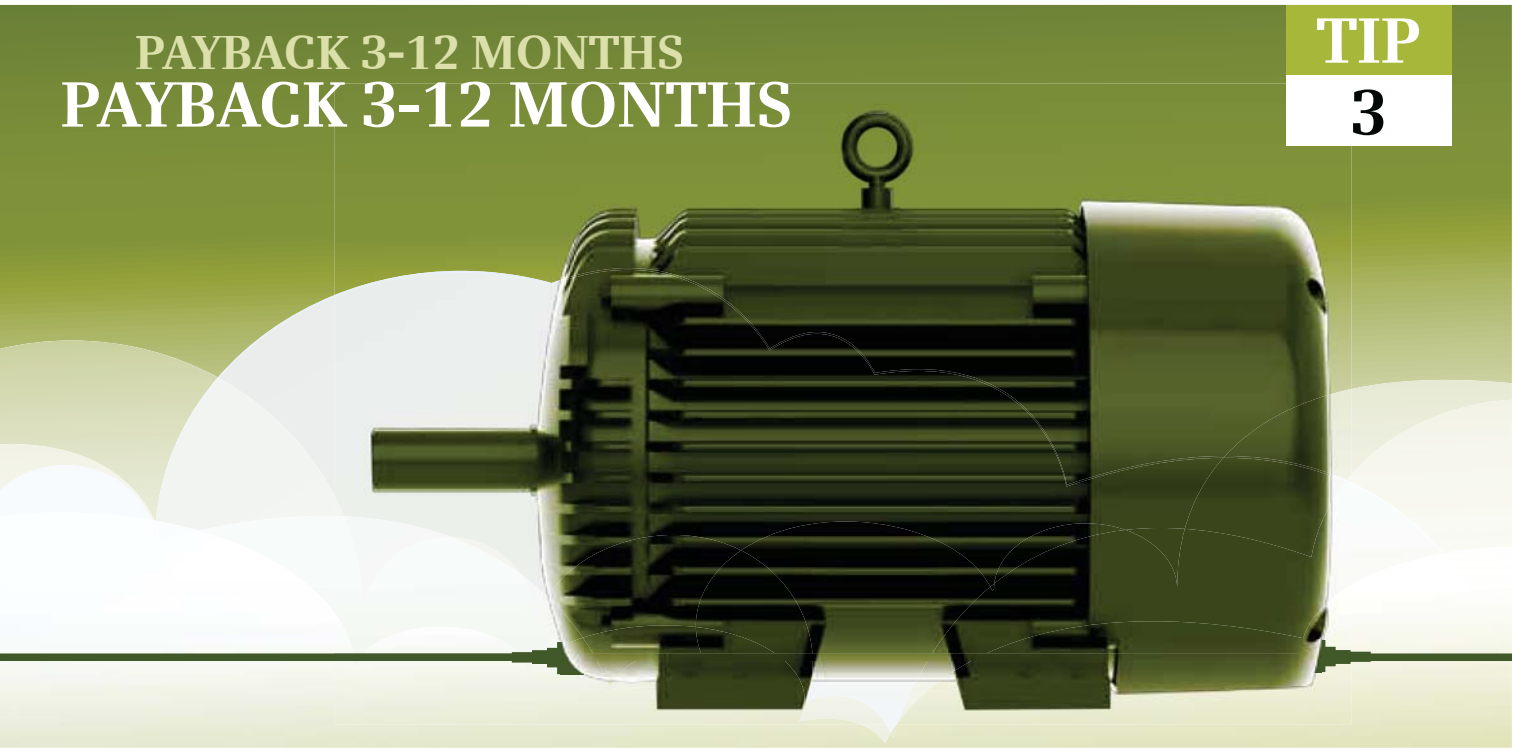
Some of the easiest energy savings can be made through effectively managing BEMS time clock schedules, to ensure plant is not running overnight, at weekends or on bank holidays, unless required.

Monitoring your environment controls can also help, ensuring that heating and cooling systems are not working against each other.

PAYBACK 3-12 MONTHS

PAYBACK 3-12 MONTHS

TIP 3



High Efficiency Motors / Variable speed drive

Electric motors, which are the largest single consumer of electrical energy, can be found everywhere across industry and commerce; in fans, conveyor belts, pumps, lifts and air conditioning, just to list a few examples.

The energy cost to run a motor for two months can be greater than the initial purchase price. Modern motors, to the new mandatory motor efficiency standards IE2, are substantially more efficient, paying back their purchase price within a few months.

Users who employ an effective motor management policy which includes motors, Variable Speed Drives (VSDs), gearboxes and the driven machine can release further savings.

Variable Speed Drives (VSDs) optimise the voltage and frequency supply to the motor to match the speed to the actual load demand, reducing energy consumption significantly.

Even relatively small reductions in speed can produce significant energy savings.

The energy cost to run a motor for two months can be greater than the initial purchase price

PAYBACK 1-12 MONTHS

Lighting

Savings can be made by deploying efficient lamp technologies, such as LEDs, CFL and also energy saving halogen lighting

In commercial buildings, lighting accounts for approximately 30% of total energy usage. In industry, the percentage is lower, but remains a significant part of electricity consumption.

Savings can be made by deploying efficient lamp technologies, such as LEDs, CFL and also energy saving halogen lighting. Savings of up to 80% are possible compared with traditional incandescent lamps.

Payback times are short – typically a few months – and changes can be quick and easy to implement.

Metering

Metering is the most important part of any energy management programme.

Effective metering enables sites to continuously improve their performance by monitoring energy consumption and benchmarking against metrics. Metering can help spot problems and abuses, enabling them to be resolved, and can provide the hard numbers that are required to prove a business case and justify expenditure.

There's no need to meter everything. Don't meter what you can't control, but focus your attention on the big ticket items such as heating, process equipment, air conditioning and lighting.

Get the basics right and then add more metering capabilities if you need them.

Metering can spot problems and abuses, enabling them to be resolved

What now?

Energy management is a broad area. Whatever your level of experience, an independent review can help show where you could make more savings.

Siemens is the largest independent provider of energy services in the UK. It delivers critical energy management information to over 10,000 customers including J Sainsbury, McDonald's and Royal Mail.

Siemens can help you to audit your energy usage, and recommend how you can be more efficient – whether that is with Siemens' products and services, or in areas not covered by our own technology.

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More information at www.siemens.co.uk

Top 10 energy saving tips

		PAYBACK
1	Metering	1-3 months
2	Lighting	1-12 months
3	High Efficiency Motors and Variable Speed Drives	3-12 months
4	Building Controls	3 months - 4 years
5	Intelligent Lighting Controls	1-4 years
6	Increased Factory or Process Automation	1-4 years
7	Power Controls	1-4 years
8	Supply Voltage Optimisation	1-4 years
9	Efficient Heating and Cooling Technologies	2-5 years
10	Combined Heat and Power	2-7 years

In summary, we've put together a countdown of ten solutions in this guide – and estimated the payback period for each one, so expenditure can be clearly budgeted and understood.

Additional Opportunities

In addition to the technologies above, a wide range of other options should also be considered:

- Behaviour change, training and employee engagement programmes
- Design, commissioning and maintenance
- Renewables and low carbon technologies
- Waste minimisation
- Emissions monitoring
- Effluent and water treatment
- Energy from waste
- Anaerobic digestion
- Pyrolysis
- Incineration
- Carbon footprinting – PAS2050 etc.
- Water technologies
- Low carbon transportation

A complete range of energy efficiency solutions can be installed without capital investment whilst simultaneously providing a positive cashflow contribution using innovative financing solutions from Siemens Financial Services (SFS).

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05/11, Printed in UK