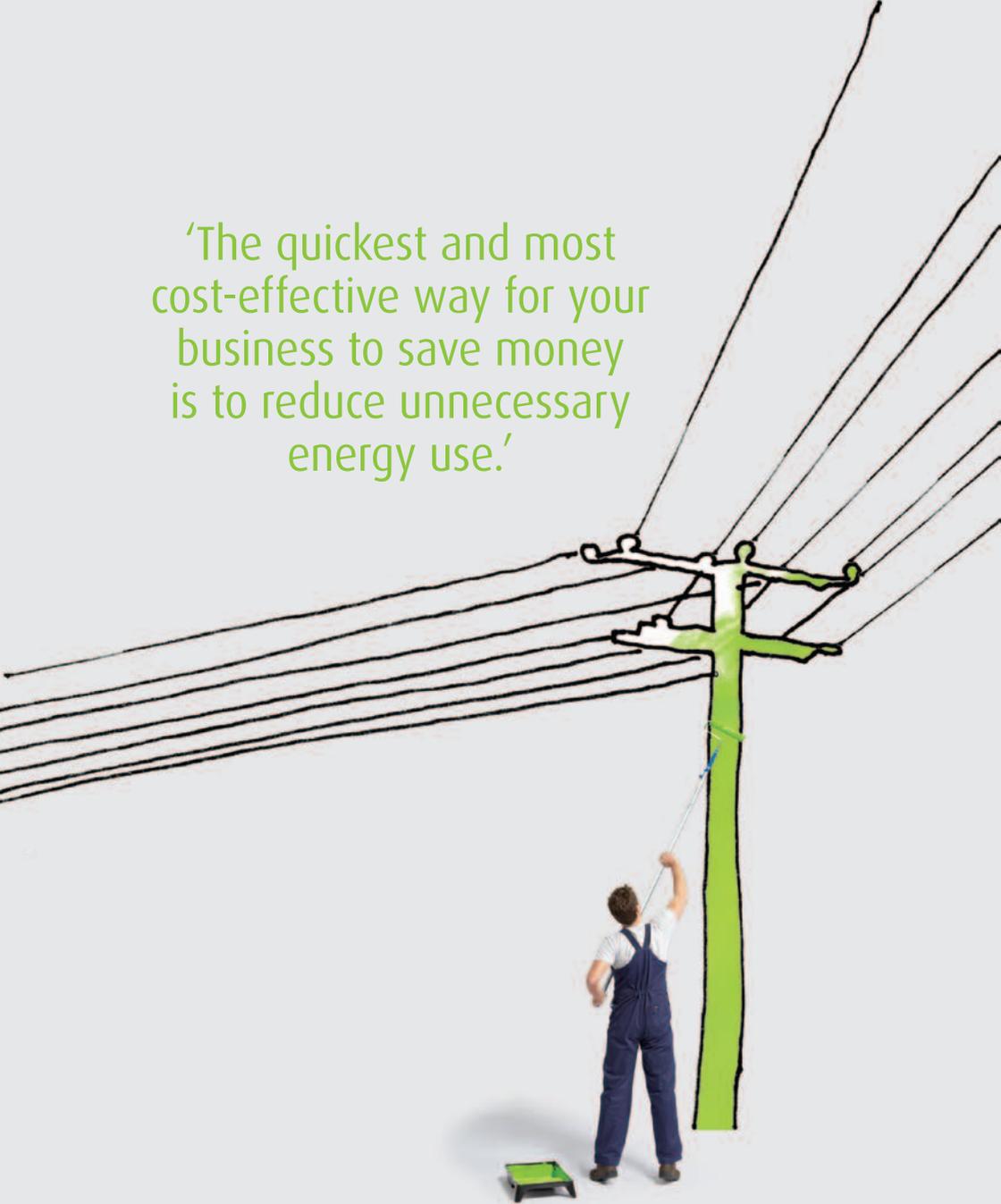


'The quickest and most cost-effective way for your business to save money is to reduce unnecessary energy use.'



Seeing the light: energy choices that save money and the environment

If you were going to read only one chapter in this book, then this would be the one.

Whatever type of business you operate, the one thing you have in common with other SMEs is that you use energy. Every time you turn on a plug or switch on a light, it doesn't just cost you money, the power you use creates greenhouse gas emissions.

When it comes to saving money and reducing those emissions, the quickest and most cost-effective solution for your business is to reduce unnecessary energy use. Yet despite energy efficiency being 'low-hanging fruit' that's ripe for the picking, it often goes unnoticed until it drops and hits someone on the head.

Why is this?

Consider the humble incandescent light bulb. An invention of the 19th century, it was made commercially practical by Thomas Edison in 1879. Very little cutting-edge technology from that time is still with us: the only place you'll find a phonograph or telegraph machine is in a museum. Yet the incandescent bulb blazed on as the most widely used form of lighting despite it being incredibly inefficient – it wastes up to 90-95 per cent of the energy that it uses (they give out more energy in the form of heat rather than light). You might even still be using some in your business or home.

So why should SMEs care? Apart from environmental considerations, the bottom line is that electricity isn't going to get any cheaper in the foreseeable future...

So why did they last so long? Well, incandescent bulbs sold well because they were cheap – so long as you ignored how much energy they used and how short a life they had.

Until recently, many SMEs looked at energy-saving light globes and incandescent bulbs and did their sums as to which type they'd buy. The cheapest, at first glance, appeared to be the incandescent bulb, but they weren't. Compared with an incandescent, an energy-saving globe can save up to \$30 or more in energy and avoided costs over its lifetime. Although the energy-saving globes used only one-fifth of the energy and lasted eight to ten times longer, they looked less attractive because the upfront cost to buy them was significantly more.

The Australian Government phased out the sale of traditional incandescent globes at the beginning of November 2009. It is also progressively phasing out specialist incandescent globes as other viable replacement options become available.⁷³ It is estimated this ban will save the nation an estimated 30 terawatt hours of electricity and 28 million tonnes of greenhouse gas emissions between now and 2020 – equivalent to decommissioning a small coal-fired power station or taking half a million cars off the road. More importantly for the SME bottom-line, it is expected to save Australian individuals and businesses around \$380 million a year by 2020 in reduced energy costs.⁷⁴

73 See www.energyrating.gov.au

74 See www.environment.gov.au

After the US and Canada, Australia has the third most energy-intensive industrial sectors in the developed world. One reason is our high level of energy-intensive raw material production and mineral processing. Another is our relatively low energy prices – which means people don't worry too much about wasting energy.

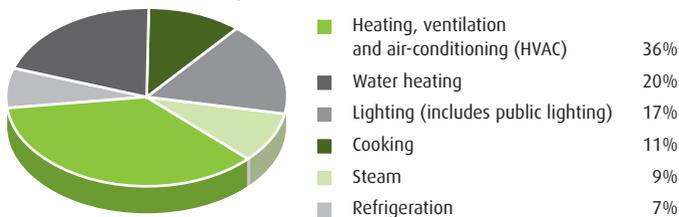
Yet another – and perhaps the most entrenched problem – is that, like bulb-buying consumers, appreciating the most cost-effective options in your business requires you to gather information, do your sums and be committed enough to sweat the small stuff now for longer-term gain.

The bottom line

So why should SMEs care? Apart from environmental considerations, the bottom line is that electricity isn't going to get any cheaper in the foreseeable future, and commercial energy consumption is growing rapidly – by about 3.7 per cent a year.⁷⁵

Inefficient energy use is probably costing you far more than you realise. Lighting and office machines, for example, don't just add to your energy bills directly but also indirectly through higher air-conditioning costs (where there is light there is heat, as the saying goes). Saving energy in one area can therefore deliver savings in another.

Commercial sector energy services 2004-05



Source: *Victorian Energy Efficiency Action Statement*⁷⁶

This chart shows the major areas of energy consumption (excluding transport) for the commercial sector. How things stack up for your workplace will, of course, depend entirely on the nature and location of your business: if you're running a café or restaurant, the kitchen will be your energy hot spot; if a deli, then probably refrigeration; if a design studio, computers and printers will feature more prominently.

75 See www.sustainability.vic.gov.au

76 Department of Sustainability and Environment, 2006. See www.sustainability.vic.gov.au

Tracking your use

Knowing where and how you're using and paying for energy within your business right now is your first step. You can then prioritise the actions you can take to cut energy use and save money. This may require research to find the best options for your business over the medium to longer term:

1. Review your energy bills (ideally over the past 24 months or so) to get an idea of how much you're using and paying. This will enable you to see how much your costs vary between summer and winter, and whether you are paying a high tariff for peak demand. If you're having difficulty working out how your bill is calculated, call your energy provider for assistance.
2. Record your energy use and cost in a spreadsheet. You can download a free software application developed by Sustainability Victoria called the Energy Smart Tracker.⁷⁷ This will assist you in monitoring your energy demand and associated greenhouse gases.
3. Buy a power meter to better understand the amount of electricity being used by your individual machines and appliances. These handy devices, usually costing around \$100, plug in between the power point and the appliance and give a read-out of how much power is being drawn. By inputting the price of your electricity you can tell exactly how much an appliance is costing to run, in addition to the amount of greenhouse gases produced.
4. Calculate the carbon footprint of your business. A SME's carbon footprint is calculated when it measures the amount of greenhouse gas emissions emitted by its overall operations. You can input the different impacts of your business and get your carbon footprint by going to <http://calculator.futureclimate.com.au> and using the SME carbon calculator.

77 See www.sustainability.vic.gov.au

The key to energy efficiency is choosing options that you or others don't have to think too much about once they are implemented. The biggest difference you can make on this score is at the purchasing stage. As such, it pays to undertake a complete cost assessment of your appliances and fittings that accounts for their energy consumption and maintenance requirements.

Energy saving and your bottom line

Energy costs are one of the easiest things to reduce. With minimal expenditure and effort, many companies can reduce their energy bills by up to 20 per cent. This example from the UK Carbon Trust shows how a 20 per cent saving on your energy bill is equivalent to a five per cent increase in overall profits.

Turnover	\$1,000,000
Profits before energy saving	\$100,000
Cost of gas and electricity	\$25,000
Potential energy saving (20 per cent of \$25,000)	\$5,000
Profit after energy saving	\$105,000

Representing a 5 per cent increase in profits⁷⁸

Keeping it simple

Creating a culture that promotes saving energy in your business is important, because employees tend to go with the flow of whatever is accepted practice. Signs, emails and leading by example can make a difference to keeping energy conservation 'in sight' and thus 'in mind'.

But human nature is hard to overcome. Any plan to reduce energy use that depends on constant vigilance, such as having people manually switch things off after use, is likely to fail – particularly if the onus is on people who don't see it as making all that much difference. This is also the case when the extra costs don't come out of their own pocket. This is one key reason why it makes sense to encourage your employees to also reduce their energy use at home. Habits undertaken to save money at home will, over time, be brought into the workplace in a way that can save your business money.

78 Adapted from the UK Carbon Trust. See www.carbontrust.co.uk

Energy performance contracts

Looking for a simple, low-risk way to maximise your energy-efficiency without the high up-front capital cost? Then an energy performance contract (EPC) might be the ideal solution for your business.

Energy performance contracting is well-established in the US, Canada and Europe and is increasingly being used in Australia. It involves contracting an energy service company (known as an ESCO) to provide a complete energy-efficiency service to your business.

The contractor starts by conducting an expert analysis of the potential energy-saving measures that can be made throughout your operations. They then make a proposal to your business to install, tune and maintain a range of cost-saving energy-efficiency measures.

The contractor guarantees you will achieve your energy and cost saving targets. This means the energy savings will pay back your initial investment, typically over a period of three to eight years, and improve the profitability of your business. The contractor is paid out of the energy savings, and if the project doesn't yield the promised energy or cost savings, the contractor pays the shortfall, not your business.

While your business may want to finance the energy-efficiency measures itself or through your bank, some energy service companies even arrange finance so that you don't have to outlay any capital. The savings from EPCs can be substantial.

All sounds too good to be true? Fortunately it isn't. The website of the Energy Efficiency Council has a free best practice guide on how to choose an ESCO, how to define the scope of the project and how to negotiate and implement an EPC. This guide is a must-read for any SME wishing to enter into an arrangement with an ESCO. The Energy Efficiency Council can also provide template EPC contract documents.

Go to the Energy Efficiency Council website at www.eec.org.au for more information about energy performance contracts, including whether or not an energy performance contract is suitable for your business.

Case study: Penrith City Council

Penrith City Council appointed Siemens for its energy performance contract. Siemens then delivered per year up to 167 per cent of guaranteed electricity savings and 171 per cent of guaranteed greenhouse gas reduction.

Over a three year period, Penrith City Council paid back its internal loan and saved more than \$640,000 in electricity and water charges. In the process it also reduced its carbon emissions by more than 4000 tonnes – equivalent to supplying enough power for 850 energy-efficient houses.

Case study: State Library of NSW

With an energy performance contract that focused on lighting controls, heating, ventilation and air-conditioning upgrades and water savings, the State Library of NSW contracted with Energy Conservation Systems to achieve guaranteed savings of \$104,000 per annum, total savings of \$229,000 per annum and a reduction in CO₂ emissions of 988 tonnes per annum.

According to Jim Sinclair, Energy Manager for the State Library of NSW, “The Energy Performance Contract has allowed us to implement a range of improvements which will benefit the library and its users as well as save on energy bills. And the guaranteed savings mean there’s no risk to Treasury, who provided the financing.”⁷⁹

79 See www.eec.org.au

Case study: De Bortoli Wines – smart use of resources

The NSW DECC's 'Sustainability Advantage' program has generated significant savings for hundreds of its corporate members, clubs and government bodies.

One member, De Bortoli Wines, managed to save money at its Bilbul winery in the Riverina by recycling all wastewater and significantly reducing energy use.

By removing sodium from all cleaning and production processes, the winery's wastewater is able to be used for irrigation. De Bortoli Wines now has a farm dedicated to the cropping of wastewater from which they generate grain and straw for sale.

By simplifying wastewater treatment through the introduction of a new low energy aeration system, the amount of energy used to treat wastewater was reduced by 90 per cent. This was equivalent to more than \$180,000 in annual energy costs.

Taking advantage of the DECC Sustainability Advantage – Staff Engagement modules and the introduction of Lean and Visual Manufacturing Principles, De Bortoli Wines has also made major improvements to its manufacturing processes.

Examples of other savings include:

- production-line efficiency improvements varying between 15% and 37%
- reduction in non-conforming processes of 35%
- customer complaints reduced by 40%.

The business' Operations Manager says these initiatives have a net benefit of more than \$500,000 per annum and the programs deferred capital spending of \$350,000 for large power supplies.⁸⁰

80 See www.debortoli.com.au

What you need to know about heating, ventilation and air-conditioning

Heating, ventilation and air-conditioning (HVAC) accounts for about 70 per cent of energy use in the average Australian commercial building. HVAC was found to be the most significant cause of greenhouse gas emissions at approximately 63 per cent of total emissions.⁸¹ Every degree of heating and cooling can increase energy consumption by up to 10 per cent. As such, increasing HVAC efficiencies has great potential to bring about significant financial savings for your business.

How much you can reduce your heating, cooling and ventilation costs depends on your building, its location and, of course, whether you own or lease your premises. In our chapter on building performance (chapter 9) we'll look at the bigger structural issues to do with HVAC. In this section, we'll focus on the simpler actions that can improve the performance of your existing systems. Things your business can do today include:

1. Adjust the temperature according to the season. Many workplaces set systems to a constant 20–24 degrees regardless of the weather and what people are wearing. Set the temperature a little higher during summer (24–27° Celsius) and lower (18–20° Celsius) in winter.
2. Turn off systems overnight and on weekends when the building is not occupied. If a few people are working during those times, consider having efficient portable heaters or air coolers available to keep the temperature comfortable.
3. Install Energy Star compliant programmable thermostats. These can cost between \$25 to \$100 but can cut HVAC costs by as much as 30%⁸² by running your heating and cooling according to both temperature and whether the building is occupied. Set them to turn on your system just before people arrive to work and off just before they leave.
4. Don't waste energy by heating and cooling little-used areas. Block vents in areas that are unoccupied, and consider doing the same in areas that are used only for a short time, such as toilets and storerooms.
5. Use fans to increase the efficiency of central air-conditioning. The evaporative effect of air movement can mean people feel just as cool with the thermostat set 3–5° Celsius higher.
6. Open doors and windows can easily double heating and cooling energy costs. Keep them closed where possible and consider installing hydraulic door closers or thermal strip curtains in high-traffic areas.

81 *Australian Commercial Building Greenhouse Gas Emissions 1990–2010*, Australian Greenhouse Office 1999

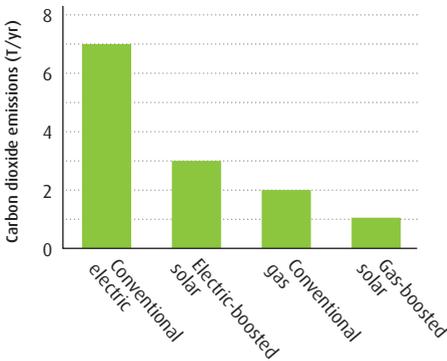
82 Origin Energy, Energy Efficiency Fact Sheet: Heating, Ventilation and Air Conditioning

7. Poorly maintained HVAC equipment can add up to 10% to your energy bill.⁸³ Ensure it is regularly serviced in line with the manufacturer’s recommendations and have condenser coils, evaporators and filters cleaned; valves and refrigerant levels checked, and leaks fixed.
8. Avoid peak demand periods. By adjusting workplace schedules and reducing energy use during peak demand periods, savings can be made on air-conditioning, lighting and other electricity use.

Water heating

Water heating is an energy-intensive process, whether it’s running a laundry or doing something simple like boiling water for cups of tea.

Relative carbon dioxide emissions from different water heater types



The graph shows the difference in greenhouse emissions produced by the main types of hot water systems. Although taken from a residential study, it’s worth noting that higher emissions mean higher running costs. But your choice of hot water systems will often depend on whether you own your premises, so let’s focus here on some more immediate strategies to improve water-heating efficiency:

1. According to UK magazine *Which?*,⁸⁴ on average it takes as much energy to boil a litre of water as it does to run a standard fridge for seven hours. Employees don’t link the energy they use with the cost impact it has on your bottom line. The solution is to put up signs near your kettles that remind people to only boil

83 Origin Energy, Energy Efficiency Fact Sheet: Heating, Ventilation and Air Conditioning

84 See www.which.co.uk

the water they need. It's also worth reminding people to watch out for dripping hot water taps. Get input from employees on what other reminders could be put near your other hot water devices.

2. Hot water systems often overheat water and in doing so cost you money that you shouldn't be paying. If your system has an adjustable thermostat, set the temperature lower: while storage hot water systems should be set to at least 60° Celsius (to prevent the growth of micro-organisms that cause Legionnaires Disease) there is no need to go any higher than 65° Celsius; instantaneous hot water systems can be set at 50°Celsius.⁸⁵

On average it takes as much energy to boil a litre of water as it does to run a standard fridge for seven hours.

3. Systems located a long distance from outlets waste energy through the transferral of heat to pipes. Even if you don't have any control over the location of your main hot water supply, you can insulate the hot water pipes to minimise heat loss. Insulating your storage tanks also helps to reduce heat loss.
4. Consider installing local instantaneous booster systems or urns in high-use areas like kitchens. These can be switched off when not in use, such as overnight.
5. If your business doesn't require hot water around the clock, turn off systems and pumps when they won't be used for an extended period, such as holiday seasons or even over long weekends.
6. Choose water-efficient fittings and appliances. Even an inexpensive device like a flow-stem valve can help to halve water use. Check the water-rating label that is mandatory on water fittings. When buying new appliances, like washing machines and dishwashers, you should also check the energy-rating label.
7. Choose units that meet the demand you place on them. A water heater with a high energy-efficiency rating that's too big for your needs could use more energy than a smaller unit with a lower rating.

85 Energy Efficiency Information Sheet: Hot Water, Australian Government Department of the Environment, Water, Heritage and the Arts

8. If you have shower facilities for employees, install water-efficient showerheads. The 3 star water-efficient showerheads can significantly reduce your use of water and save up to \$100–\$150 a year in water and heating costs. Given these showerheads cost anything from \$30–\$90, it's a sensible investment. Better still, a good 3 star rated showerhead can give your employees a shower that's just as good as the old water-guzzling type.
9. Ensure hot water heaters are properly maintained. Have them serviced according to the manufacturer's instructions to ensure they're running at optimum efficiency.

Combining energy-saving lighting with simple use-reduction strategies can potentially cut your lighting costs by half.

Lighting

Lighting accounts for just over 17 per cent of energy use and just over 20 per cent of greenhouse emissions from commercial buildings. The Australian Greenhouse Office estimated that simple measures could reduce those figures by 50–70 per cent.⁸⁶

It is a common misconception that energy-efficient lights just aren't up to the job: "they're not as bright," "give off a 'cold' light," and "don't come in the same range of fittings and sizes as incandescent globes." While this was true a few years ago, it's no longer the case today. Energy-saving lights can now meet every purpose and every brightness level, lasting far longer and using a lot less electricity than old-fashioned globes.

For SMEs starting out on their eco-efficiency journey, combining energy-saving lighting with simple use-reduction strategies can potentially cut your lighting costs by half. Follow these tips to save money and the environment:

1. Make the most of natural light. Keep windows clean and clear of shading, and position workspaces to make the most of available light sources.
2. Choose light colours that reflect light for walls, ceilings and bench tops.
3. Replace inefficient incandescent and halogen lights with energy-efficient lighting. This can be a combination of fluorescent, compact fluorescent or LED. Beacon Lighting estimate that this could reduce lighting power use by up to 80 – 90 per cent. If your business already has fluorescent lighting, significant savings can also be made by utilising newer technologies. The common T8 linear fluorescent that's

86 *Australian Commercial Building Greenhouse Gas Emissions 1990–2010*, Australian Greenhouse Office 1999

used in huge quantities in offices and showrooms can now be swapped over to more efficient T5 models. This will save around 30 per cent in running costs. Improvements in reflector designs in fluorescent fittings mean that a one or two tube product could replace your current two or four tube product with no effect on lighting output.

4. Task lighting a small area such as a desk is far more efficient than lighting a whole area. Task lights can be combined with dimmable space lighting (dimmable, energy-saving CFLs are now available). This allows you to adjust the lighting in a room so that it meets everyone's needs, achieving the best outcome in terms of occupational health and safety, as well as maximising energy efficiency and cost savings.
5. Be green and clean. Keep fixtures clean and free of dust as that diminishes lighting effectiveness.
6. Turn lights off that aren't needed and place reminders near light switches.
7. Install movement activated sensors that will turn lights off automatically when no one is around. It makes sense to put these sensors in places like meeting rooms and toilets where the lights don't need to remain on all the time. The technology has now developed to the point where you can also use them throughout the whole office. In addition to this, there are daylight (photoelectric) sensors which can be connected to light fittings. If it's a bright day, the daylight sensor will dim the lighting to maintain a consistent light level. This light dimming results in power savings.
8. Businesses wanting to minimise their lighting bills should keep a close eye on developments surrounding LED lighting. This ultra-efficient lighting is a fast-moving sector where many new technologies and products are being brought to market.

Cooking

Cooking-related energy use obviously doesn't apply to every business. But even if you're not running a café or restaurant the general principles that apply to energy efficiency in the kitchen are really no different to any other work environment: it's all about using the right tools for the job, being smart about your work practices and keeping equipment well maintained so it operates at peak performance.

The benefit to your business is not just lower energy bills but also better performance. It's also about extending the lifespan of often very expensive equipment. Besides, you've got a kitchen at home, right? So these tips will help save energy there too:

1. Make the most of the energy you use. Limit the opening of oven doors. Keep lids on your pots and pans as much as you can. Use flat-bottom saucepans that match the size of hotplates to maximise heat transfer. Ensure energy isn't wasted by flames licking around the sides of pots.
2. Combine jobs. Use a saucepan with a stacking steamer to make the most of a single hotplate. Plan ahead to use a heated oven that can cook several dishes.
3. Use the most efficient implements. Smaller appliances can help to meet peak needs where large appliances, taking longer to heat up, would be underused. A microwave oven is far more efficient (and faster) than an oven, so use it to thaw frozen food.
4. Adopt energy-conscious cooking styles. Reducing heat after initial searing then cooking at moderate temperatures will preserve food quality and save energy. An oven can usually be turned off several minutes before food is fully cooked because the residual heat will complete the process.

Case study: La Porchetta – investing in new equipment and saving money

La Porchetta has more than 80 Italian restaurants around Australia. Each restaurant spends between \$8000 and \$15,000 per year on gas supplies. They have now identified a new gas powered oven that reduces this gas usage by a third. Better still, it cooks food faster.

Using this oven will save money, reduce gas-related emissions and get the food out quicker to hungry customers. This is the kind of win-win environmental development that all companies should be on the lookout for.

5. Clean, well-maintained equipment will work at peak efficiency. Ovens and other thermostat-controlled devices should be recalibrated about twice a year. Check that your oven and fridge seals are in good order, and hotplates and range hoods are free of grease and baked-in residue.
6. Move your fridge away from the wall and make sure there is at least an 80mm space on all sides of your fridge to allow air to circulate around the rear coils. Locate your fridge in a cool spot, ideally out of direct sunlight and away from the oven.
7. Always check the star rating labels and try to purchase the most efficient appliances with the highest ratings, to meet your needs.
8. Most important of all, understand the capabilities of your equipment and communicate energy-efficiency principles to your employees. Be patient, because ingrained habits take time to unlearn.

Office equipment

Energy-efficient machines and energy-saving practices can cut the cost and emissions associated with office equipment. Significant savings can be derived by switching these machines off outside of normal office hours.

Think about this: there are 168 hours in a week, but most offices are only used for 50 to 60 of those hours. That leaves 118 hours when the office is unoccupied. Anything left on at this time could consume up to twice the energy it would during occupied hours.

We'll consider the environmental impact of information technology later in the book (chapter 11) but for now here are some starting tips on how to save energy:

1. Leaving machines on, contrary to one strange urban myth, does not save more power than switching them off then on again. Apart from devices that need to be on, like fax machines, photocopiers and computer servers, most other machines likely to be unused within the half hour can be switched off.
2. In business hours, set computers to go into sleep mode when left idle for 10 minutes or more. A sleeping computer will use as little as 5% of full power. Sleep mode also saves screens from phosphor burn-in far more economically than screen savers, which save the screen but no energy.

3. Flat LED screens consume less energy than LCD screens, which in turn consume less power than bulky CRT monitors.
 4. Laptop computers consume less electricity than desktop and tower CPUs. If your employees take work home or are often out of the office, think about equipping them with a laptop.
 5. When buying new machines look for the Energy Star label, the international standard for energy-efficient electronic equipment. Energy Star-compliant machines can save significant amounts of energy when idle – which in the case of printers and fax machines is up to 95% of the time. When you purchase Energy Star-compliant equipment, make sure all the settings are turned on when you first set up the machine.
-

Placing posters around the office encouraging everyone to switch off unused equipment is a surprisingly easy way to save money.

6. A larger printer or photocopier shared by many people is generally more energy-efficient than several smaller machines used by a few. A larger machine is also more likely to have better features such as double-sided printing (the greatest source of carbon emissions from office machines is the embedded energy of consumables like paper and ink). But bigger isn't always better: ink-jet printers, for instance, can use up to 90% less energy than a small laser printer. Choose what meets your needs.
7. Many electronic devices are never truly off but in standby mode, drawing power 24 hours a day even though they might be used for a few hours, or even a few minutes (think of how long you might use a microwave oven, for instance). Install accessible power boards that can easily switch off such equipment at the power source. Placing posters around the office encouraging everyone to switch off unused equipment is a surprisingly easy way to save money.
8. Use computer system preferences, software or external timers on a power point to ensure that all designated machines will automatically be switched off at a set time. Be sure to provide instructions on overriding the software or timer when employees need to work out of normal hours.

9. Mobile phone rechargers and other transformers can be drawing electricity even when not connected to the devices they power. Encourage employees to plug them into a socket only when they need to. People can also save energy by recharging their mobile phones when driving.
10. Encourage employees to think about energy use and ways to do things more efficiently. It can be as simple as taking responsibility to turn off their computer and check other machines when they step out for lunch or go home. Or planning to do their printing job in one batch, since most energy in photocopiers and printers is used to heat the components that fuse the toner to paper. Getting team 'buy-in' to saving energy is crucial if you are to achieve optimum results.

Case study: Melbourne Airport – reducing environmental impact in the bathroom

If you've ever flown through Melbourne Airport, then you're one of the 25 million passengers who use the airport every year.⁸⁷

Among the busiest places in the airport are the bathroom facilities. As part of its recent upgrade, a decision was made to install hand dryers.

The Dyson Airblade™ hand dryer was chosen because of the energy saving and environmental benefits offered by the unit. It dries your hands in 10 seconds instead of the 28 second average for normal dryers and it only uses 1 watt on standby instead of 3 watts. Over the lifetime of the dryers, the cost saving is estimated to be more than 85 per cent. In addition to saving trees and reducing the number of paper towels going to landfill, the dryers will potentially save 186,761 kg of CO₂ emissions and use 76.8 per cent less energy.⁸⁸

87 See www.melbourneairport.com.au

88 *Green Purchasing in Australia*, by NetBalance Foundation for ecoBuy, 2009

Refrigeration

If you're in food processing, running a deli or managing a bar, refrigeration costs can be a big part of your energy bills. Even if you're an office-based business, simple low-cost practices can easily reduce refrigeration expenses by 15 per cent or more:

1. Check to make sure your cold-storage units aren't needlessly too cold. Refrigerators can optimally run at 3 to 4° Celsius and freezers at -15 to -18° Celsius. Use a thermometer to ensure your thermostats are working properly.⁸⁹
2. Keep freezers frost-free because any ice build up greater than about 5mm in thickness will act an insulator, increasing energy consumption. Also periodically clean the condenser coils, as a build-up of dust will inhibit their operation.
3. Ensure equipment is properly maintained. Check that seals, hinges and catches are working to keep the units airtight. If motors are running continuously or making a strange noise, then call in a refrigeration mechanic.
4. While overfilling can decrease efficiency by inhibiting air circulation, so too can under-filling. A refrigerator works best when at least two-thirds full and a freezer when at least three-quarters full. The more empty space, the more energy goes into cooling air, which spills out when the door is opened. If you've got a half-empty fridge, fill it up with airtight containers of water. Distribute contents evenly for maximum cooling efficiency. You can fill the gaps in your freezers with scrunched up paper.
5. Position units out of direct sunlight and away from heat-producing equipment. Leave sufficient clearance space (generally at least 80mm) between the back and the wall, to allow good airflow around the condenser coils; insufficient ventilation reduces heat dispersal and can reduce energy efficiency by up to 15%.
6. If refrigeration is a big part of your business, it may make sense to replace old units with new energy-efficient models that can use up to half the energy and are therefore twice as cheap to run. Bear in mind the energy efficiency rating, size (smaller is cheaper) and whether the unit is self-defrosting; non-defrosting models will require a little more maintenance but will usually use less energy.

89 Energy Efficiency Fact Sheet: Refrigeration, Origin Energy

Steam systems

When we think of steam, many of us think of steam trains and a by-gone era. But steam systems are still prevalent, used for everything from driving turbines, heating, climate control, cooking and cleaning, and account for nine per cent of total energy use in the commercial sector.⁹⁰ Here are some tips for getting the best out of your steam system:

1. Have a qualified tradesperson regularly measure the temperature and pressure of your feed water and steam output, flow rate and fuel consumption to ensure your boiler is operating at maximum performance.
2. Boiler blowdown – to control solids in the boiler water, protecting surfaces from scaling or corrosion problems – is an important part of boiler maintenance. If done too infrequently you risk damage to the boiler but if done too frequently you waste energy. Get an expert assessment to determine what is optimum, based on the energy use and cost of blowdown compared with options to improve feed-in water quality.
3. Leaks in pipe sections, connections and steam traps that drain condensate can be a big cause of energy loss from steam systems. While big leaks may be easily seen and heard, ultrasonic leak detection by a trained technician will identify smaller leaks.
4. A key tip is to be resourceful with how you use your system. Questions to ask include:
 - a) Could you use a smaller boiler?
 - b) Could you lower the temperature of your steam supply?
 - c) Is the efficiency of the system being maximised by locating the boiler as close as possible to where the steam is used?
 - d) Is there any inappropriate use of the system, such as heating water?
 - e) Could you use a more efficient fuel source such as natural gas or, better yet, waste heat from another piece of equipment?

⁹⁰ Sustainability Victoria: *ResourceSmart Energy Efficiency Best Practice Guide: Steam, Hot Water and Process Heating*

Compressed air

Compressed air is often described as the fourth utility, after water, electricity and gas, powering everything from pneumatic hammers to drills and paint sprayers.

It is also the most expensive, accounting for about 10 per cent of all electrical energy consumed by business. With 73 per cent of the cost of a compressor due to energy use, significant cost savings can be made by improving energy efficiency.⁹¹

There are many easy and low-cost ways to improve energy efficiency: by fixing leaks, reducing intake air temperature, optimising pressure, optimising compressor operation and avoiding inappropriate use.

What is renewable energy and why should SMEs care?

Renewable energy is the term given to power that's generated from naturally renewing sources such as wind, sunlight, flowing water, 'hot rocks' and energy derived from plants and animal waste (generally called biomass).

When you sign up to use accredited renewable energy the electricity company looks at how much energy you use and then sources the equivalent amount from a renewable power generator. This renewable energy is not fed directly to your home or business, it is fed into the power grid, reducing overall greenhouse emissions.

After reducing your energy use (electricity, gas, petrol, diesel etc), one of the simplest things SMEs can do to be more sustainable is to use accredited renewable energy – called GreenPower.⁹²

Case study: The ecoswitch®

Australian inventor Rod Sheppard came to the realisation that many computers and printers are left on because it's too difficult to turn them off at the plug. So he came up with the ecoswitch®. It's an extension switch that makes it far easier to turn off appliances at the plug. Leaving such devices in standby mode wastes electricity and money so the \$20 device will pay for itself in a short period of time. Visit www.ecoswitch.com.au for more information.

91 See www.resourcesmart.vic.gov.au

92 The Australian Government has an official program called GreenPower that accredits genuine renewable energy providers. See www.greenpower.gov.au

Like to know more?

For more detailed advice about practical ways to improve energy-efficiency, check out these great online resources:

Energy and greenhouse management toolkit

Developed by Sustainability Victoria and EPA Victoria, this toolkit provides tools, case studies and very detailed guides on how to improve eco-efficiency and cut energy costs. Go to www.sustainability.vic.gov.au to find out more.

Energy ratings

A joint initiative of Commonwealth, State, and Territory government agencies, this site is a comprehensive guide to choosing energy-efficient appliances, including details on the standards that must be met by all products that carry an energy label or are regulated under the Minimum Energy Performance Standards protocol. Go to www.energyrating.gov.au to find out more.

The Energy Efficiency Council

The Energy Efficiency Council was formed in 2009 in order to bring energy-efficiency providers and clients together and to grow the market for energy-efficient products and services.

The EEC is well-known for its ability to provide advice and help on energy-efficiency services and products. Its members also provide a wide range of energy-efficiency products and services that include the identification and implementation of energy-efficiency projects at buildings and sites.

For more information, email info@eec.org.au, visit www.eec.org.au or call 03 8327 8422.

Like some other sustainability initiatives, purchasing GreenPower can cost more upfront than non-renewable energy but it delivers other benefits. For the nation and for the environment it reduces greenhouse emissions; for you it can assist in meeting environmental goals and gaining third-party accreditation; and for your customers and suppliers it shows you're serious about being more sustainable.

After reducing your energy use (electricity, gas, petrol, diesel etc), one of the simplest things SMEs can do to be more sustainable is to use accredited renewable energy – called GreenPower.

The Electricity Supply Association of Australia estimates that more than one-fifth of Australia's electricity is used by the commercial sector. More than 80 per cent of this energy comes from the burning of coal which contributes to global warming.

The benefits of using renewable energy are:

1. Positioning your business as one that is committed to environmentally sustainable practices with employees, customers, suppliers and the wider community.
2. Directly contributing to the reduction of Australia's carbon footprint. This could help to position your business to cope more easily with environmental performance requirements imposed now or in the future by regulators, lenders, insurers or investors.
3. Bringing greater focus to your energy-saving strategies, improving your potential to lower overall electricity costs.
4. Differentiating your company from competitors and potentially increasing your appeal to consumers and increasing sales – particularly among the 821,504 households currently purchasing GreenPower. You will also be among the 38,293 commercial customers who buy GreenPower.⁹³

93 *National GreenPower Accreditation Program Status Report* Quarter 3: 1 July to 30 September 2009

GreenPower

The Australian Government runs a program called GreenPower which was launched in 1997 to provide independent accreditation of renewable energy production. The program undertakes publicly available independent auditing of energy retailers to make sure a company that sells accredited renewable energy products is investing in renewable energy.

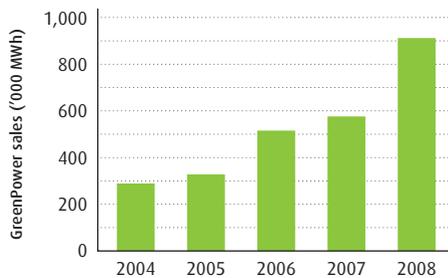
There are about 130 accredited renewable energy products for business and residential users under GreenPower. You can also use GreenPower to run events.

GreenPower is available from most licensed electricity retailers, so obtaining it for your business is as simple as picking up the phone to an electricity company.

Go to www.greenpower.gov.au to learn more about renewable energy providers and renewable energy generally.

While GreenPower represents less than one per cent of electricity sales to commercial customers, this graphic shows the high level of growth that GreenPower has experienced in the commercial sector.

GreenPower sales growth 2004-08



Source: *Green Purchasing Australia Report 2008 – ECO-Buy and Net Balance Foundation*⁹⁴

Renewable energy fact sheets

What's the difference between solar photovoltaic power and solar thermal? Confused about hydro or geothermal power? If you want more information on renewable energy, go to www.cleanenergycouncil.org.au to check out the Clean Energy Council fact sheets.

94 See www.ecobuy.com.au

Renewable energy sources

Solar PV

Photovoltaic technology uses semi-conducting solar cells to transform solar photons into direct electric current. Although there is great potential for large-scale solar PV in Australia, its main current use is for decentralised power generation that utilises rooftop space to power individual buildings. Contact your local energy utility to see if any solar feed-in tariffs are available for your business.

Ocean power

Ocean energy can be tapped from a range of sources including marine currents, thermal layering and salt gradients, but the two sources being investigated for development in Australia are tides and waves. Compared to most other renewable energy sources, ocean power is relatively straightforward, easily scalable and has the advantage of being sited close to where most of the population is – in coastal areas.

Geothermal

Geothermal energy uses underground heat to power turbines. New Zealand generates electricity by tapping its abundant volcanic geysers and the International Energy Agency estimates geothermal energy could supply 5 per cent of global electricity by 2020. A number of companies are currently developing geothermal projects in Australia.

Biomass

Biomass power is primarily generated in two ways. Burning waste vegetative material (commonly done from sugar cane plantations and paper mills) is a renewable resource as is capturing and burning methane that's created by the breakdown of organic matter in rubbish tips or sewage treatment plants. Both are able to be used to generate energy onsite at production facilities or for power generation and feed-in to the electricity grid.

Solar thermal

Solar hot water systems are the main type of solar thermal technology currently being used in Australia. This technology has been in use since 1941 and is primarily used to heat household hot water. Other low-temperature solar thermal technologies are solar ponds and, for larger-scale electricity generation, solar chimneys. Solar thermal energy is emerging as a cost-competitive source of electrical power because it can be co-located with existing energy generation infrastructure. The International Energy Agency estimates that solar thermal generation costs will be on a par with coal-fired power stations by 2030.

Wind

Wind power is a tried and true technology. Small and medium farms have used hundreds of thousands of windmills over the years. With commercial power generation, bigger, taller and better-designed turbines have helped to significantly reduce the cost of wind generation over the past 15 years. Wind power has the potential to supply a significant percentage of Australia's electricity needs. It continues to play an important role in small-scale and local off-grid systems.

Hydro

Australia has about 100 hydro-electric power stations, which generate the bulk of Australia's current renewable energy. While some new projects are planned or being built, expansion is limited by a lack of waterways to dam. This is particularly so given the state of water flows in most of our river systems and the likelihood that climate change will reduce those flows even further. There is, however, scope for widespread use of mini-hydro power systems, like the South East Water Mini Hydro Project in Victoria. This is expected to generate enough electricity to power 165 homes.