GUIDE TO IMPROVING ELECTRICITY USE IN YOUR BUSINESS

DEMAND-SIDE MANAGEMENT SOLUTIONS

CLEAN ENERGY COUNCIL

ARENA

Australian Government
Australian Renewable Energy Agency

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ABOUT THE FPDI PROJECT

The Clean Energy Council is the peak body for the clean energy industry in Australia. We represent and work with hundreds of leading businesses operating in solar, wind, energy efficiency, hydro, bioenergy, energy storage, geothermal and marine along with more than 4000 solar installers.

The Clean Energy Council is committed to accelerating the transformation of Australia's energy system to one that is smarter and cleaner.

This guide was produced as part of the Future Proofing in Australia's Electricity Distribution Industry (FPDI) project, a collaborative project involving the Clean Energy Council and its members, the Australian Renewable Energy Agency (ARENA), and other key stakeholders.

This project aims to enhance the flexibility and resilience of Australia's electricity distribution systems for the future.

With the objective of enhancing the flexibility and resilience of Australia's electricity distribution systems and the installations connected to them, the FPDI project will analyse existing and emerging issues.

Ultimately the project seeks to build the foundations to facilitate the effective and efficient integration of renewable energy systems for Australia's electricity distribution industry. A subsequent goal is to ensure that the benefits of the transformation of this key industry toward a renewable energy future are accessible by the sector's various stakeholders.

The project's detailed scope of work includes technical, economic and regulatory analysis, forums, knowledge gathering and dissemination of the project outcomes. This approach is intended to create the environment for well-rounded stakeholder engagement throughout the project that will reinforce project outputs and target specific beneficial outcomes from each aspect of the project.

Further details of the project, its scope, governance and objectives can be found at cleanenergycouncil.org.au/fpdi

ACKNOWLEDGEMENTS

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ARENA
Australian Government
Australian Renewable Energy Agency

The Clean Energy Council thanks Entura and the Moreland Energy Foundation Limited for their efforts in preparing this report.

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The Clean Energy Council also thanks the FPDI project Steering Committee for their time and effort in providing crucial guidance and review of this work. These stakeholders include ARENA, Alternative Technology Association, Australian Energy Regulator, CSIRO, Department of Industry, Energex, Energy Networks Association, Energy Retailers Association of Australia, Marchment Hill Consulting, Pacific Hydro Pty Ltd, AusNet Services and University of Technology Sydney.

MESSAGE FROM THE CLEAN ENERGY COUNCIL

KANE THORNTON

Chief Executive

Australia's electricity supply is in a state of transition. For small to medium-sized businesses, this transition brings risks, but also opportunities – to lower operating costs, get an edge on your competition and differentiate your business by using new technologies.

Using technologies like solar PV, battery storage, load shifting and integrated energy management systems can be a sensible step to reduce your electricity bills. However, one of the biggest challenges when it comes to reducing your energy use or your bills is finding clear and easy to understand information on what the opportunities are, and what might work for your business.

The objective of this guide is to help SME business owners to understand the options for managing their electricity consumption. This guide is a how-to reference designed to help you better understand how you use electricity, and from there investigate the types of 'demand-side management' options that will help you reduce your operating costs.

The Clean Energy Council hopes this guide will help the SME sector to discover the many opportunities available when it comes to saving electricity (and money). At the same time, by providing the information businesses need to make an informed decision, we hope this guide will help protect companies from the risks associated with the transition in our electricity supply.

Australia's energy system looks very different to what it did 20, 50 or 100 years ago – and we're certain it will look very different again in the future. We want to see SMEs embrace that change, and be at the forefront of adopting new technologies that will hold Australia in good stead to embrace a lower-carbon future – and maintain our impressive economic position.


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CONTENTS

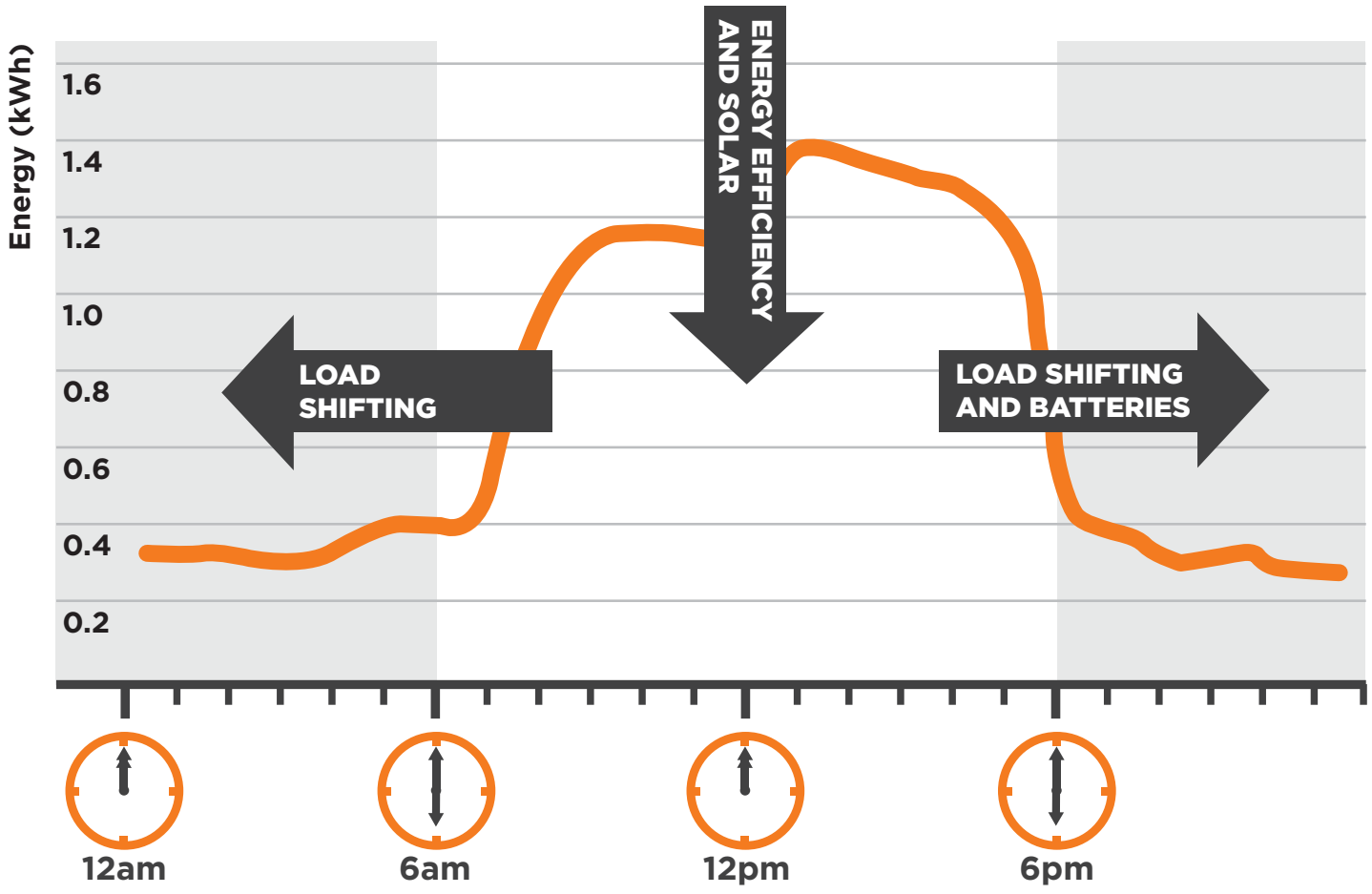
DEMAND-SIDE MANAGEMENT SOLUTIONS AND YOUR BUSINESS

With electricity prices on the rise, energy bills are becoming a more important consideration for small to medium-sized enterprises (SMEs). Improving the way your business uses energy with some simple solutions can be an easy way to help reduce operating costs.

'DEMAND-SIDE MANAGEMENT' (DSM) SOLUTIONS CAN HELP YOU MANAGE YOUR ENERGY COSTS.

Some examples of DSM solutions are:

- energy efficiency
- on-site renewable energy (embedded generation)
- energy storage (for e.g. batteries)
- load shifting (which allows you to move your energy consumption to a cheaper time of day)



WHAT ARE DEMAND-SIDE MANAGEMENT SOLUTIONS?

Demand-side management (DSM) solutions are available to energy customers to reduce their energy use, produce their own energy on-site, store their own energy for later use or shift their electricity consumption to different times of day. Each solution has its own financial and environmental benefits. Which solution is right for your business is dependent on your consumption (what you use energy for and what time of day you use it), what type of electricity tariff you're on and other factors such as your business premises.

WHY ARE DEMAND-SIDE ENERGY SOLUTIONS IMPORTANT?

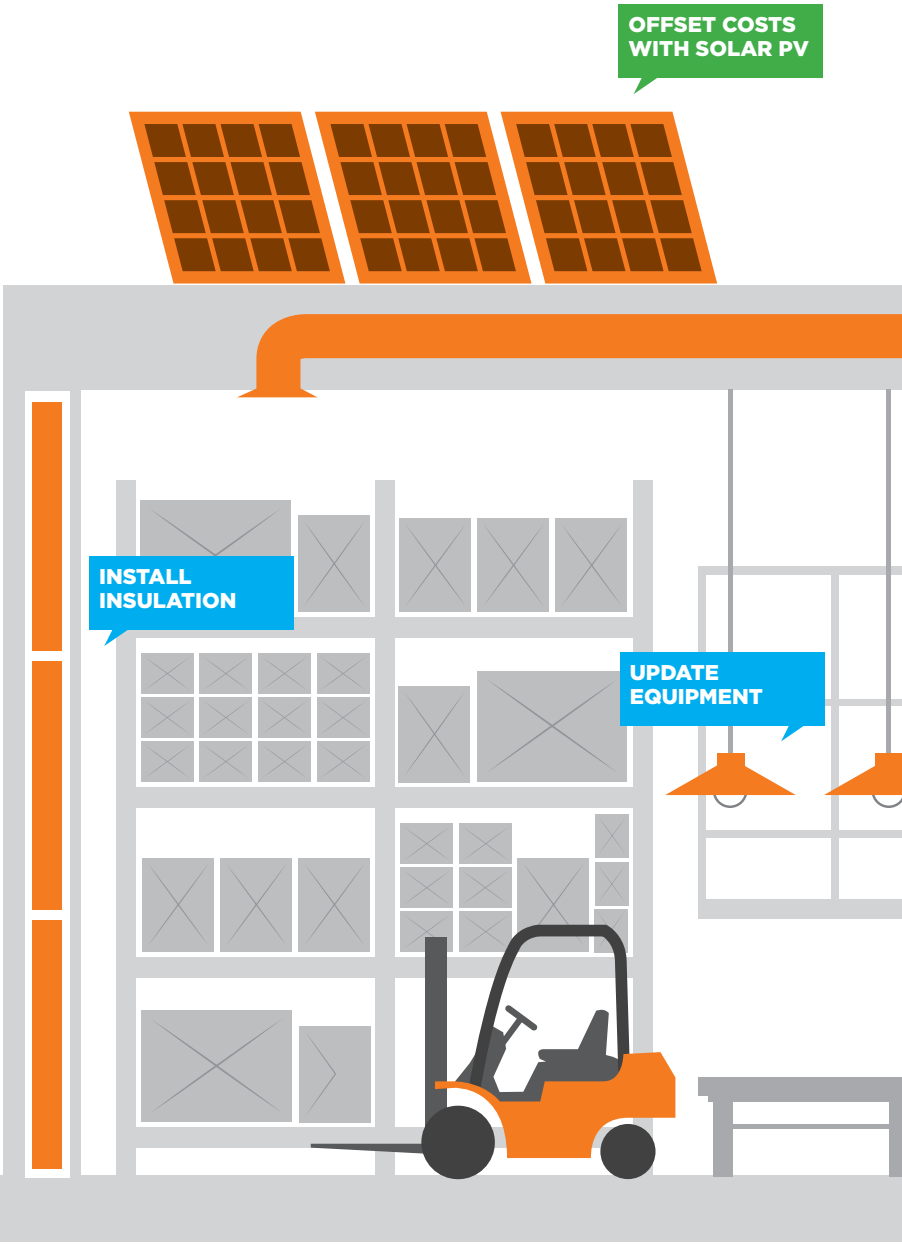
The electricity network is built with enough capacity to supply a maximum output of electricity (peak electricity demand). This is generally at its height in the early evening and is particularly high on hot evenings in summer when a lot of air-conditioning is being used by businesses and households. DSM solutions can help reduce peak electricity demand by 'smoothing' out electricity consumption, or moving or reducing consumption in peak times. At a community level this can help reduce the fixed component of electricity bills and at an SME level this can deliver significantly lower operational costs through smarter on-site use of electricity. Reducing this peak network electricity demand means that further investment in the electricity network may be avoided.

PURPOSE OF THIS GUIDE

The purpose of this guide is to equip your business with helpful information to manage your electricity use better, including how to understand your electricity tariff and your daily electricity consumption profile. The guide will also step you through the characteristics of DSM solutions and how they might be of benefit to your business. This will help you to identify and implement the DSM solutions that are right for your business.

DEMAND-SIDE MANAGEMENT SOLUTIONS

A QUICK REFERENCE GUIDE



ENERGY EFFICIENCY

Energy efficiency is about reducing the amount of overall energy required to operate your business. This can include upgrading to more energy efficient machinery, appliances or fittings, improving your business premises (for e.g. through insulation) or changing behaviour such as turning off lights or adjusting the thermostat on your air-conditioner.

EMBEDDED GENERATION

Embedded generation refers to on-site generation of electricity 'behind the meter' to be used by the business itself. This can include any small electricity generator but at the SME level the main embedded generation is solar PV. Embedded generation does not so much reduce the energy you use as offset it, meaning your energy costs are lower. There is also the potential to export electricity you don't use to the electricity grid for use by others.

GUIDE TO IMPROVING ELECTRICITY USE IN YOUR BUSINESS

1 UNDERSTAND YOUR ENERGY USE

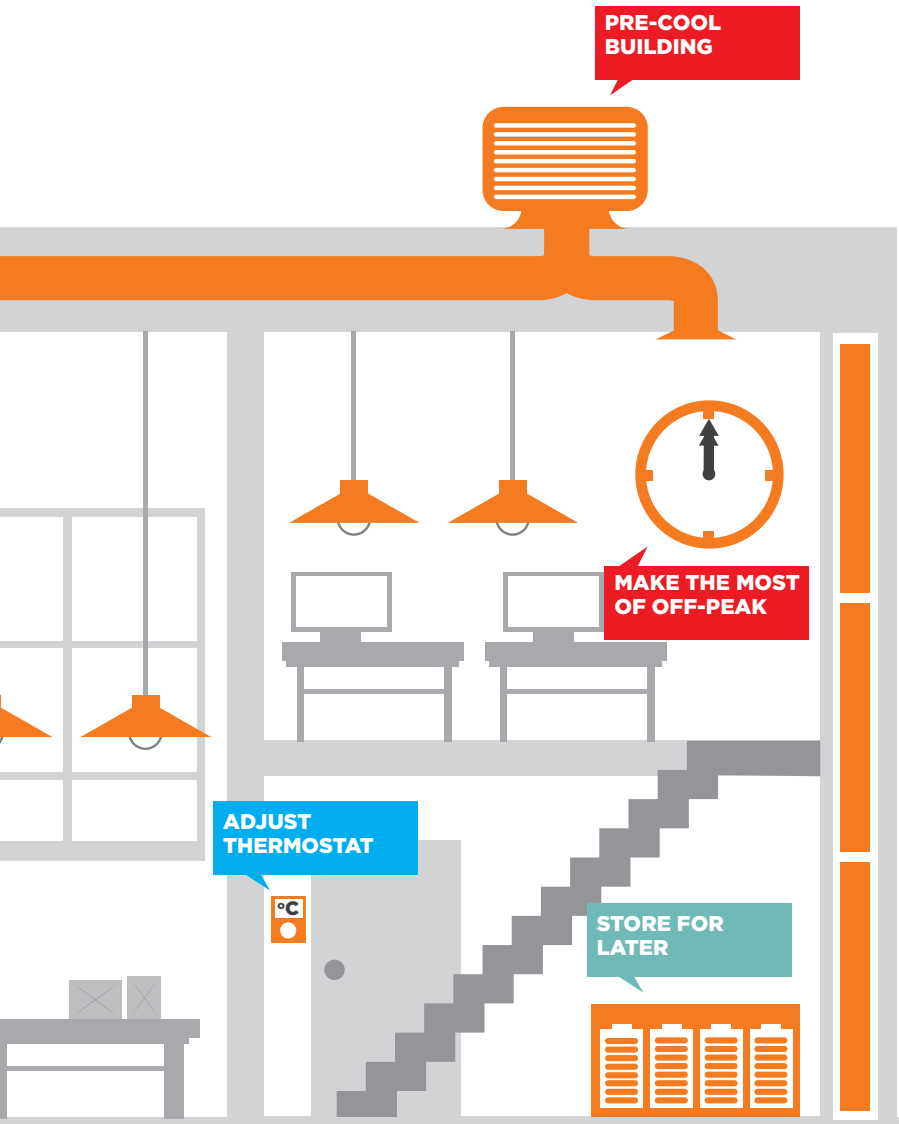
The right type of demand-side management solutions for your business will depend on what you use energy for and what time of the day you use it.

2 RESEARCH DEMAND-SIDE MANAGEMENT OPTIONS

Choosing which demand-side management solutions match your business starts with knowing a bit more about the available options.

3 WEIGH UP THE OPTIONS

Some solutions are simpler to implement than others and some have stronger returns on investment – it pays to understand these factors.



LOAD SHIFTING

Load shifting refers to solutions that allow a reduction in electricity demand at peak times when electricity is expensive to a time when electricity is cheaper. This includes turning off or scheduling non-critical appliances (for e.g. washing machines and dishwashers) out of peak times, or pre-cooling your business premises earlier in the day so that air-conditioners don't need to run at as much in the late afternoon or early evening. Load shifting measures can also be soft, for example text notifications to turn off appliances for short periods of time.

ENERGY STORAGE

Energy storage for SMEs largely refers to batteries or battery energy storage systems. What this means is that electricity from the grid or generated on-site (solar or wind) can be stored and used either as back-up or when electricity from the grid is more expensive.

4 UNDERSTAND YOUR ELECTRICITY TARIFF

Understanding your electricity tariff will make a big impact on which demand-side management solutions you can take advantage of.

5 SEEK HELP

You can't do it all on your own. Once you are armed with a little bit of knowledge, you're ready to dig deeper or get some help from others.

6 DOES THE BUSINESS CASE STACK UP?

In order to ensure a solution makes sense for your business the return on investment has to be right.

7 OVERCOME BARRIERS

There are sometimes a few non-financial hurdles to overcome before you're able to implement a solution – it pays to be aware of these.

UNDERSTAND YOUR ENERGY USE

EVERY BUSINESS IS DIFFERENT AND YOURS IS NO EXCEPTION.

The extent to which particular demand-side management (DSM) solutions will suit your business depends primarily on:

- Your daily electricity consumption profile
- What types of energy-using equipment, appliances and fittings you have in your business
- What electricity tariff you're on

Although there is some variation in the way different businesses use energy, there are similarities within individual business types.

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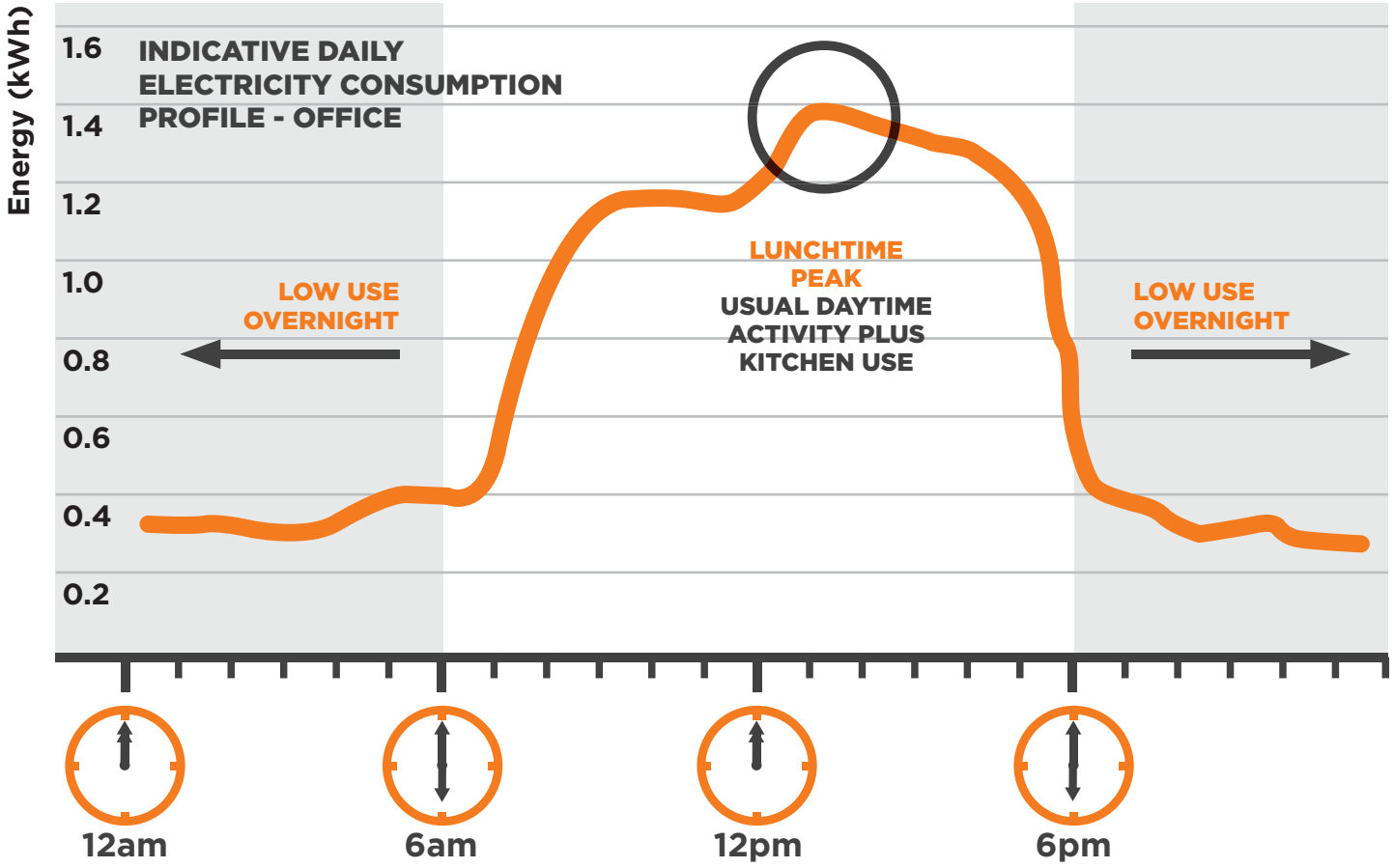
DAILY ELECTRICITY CONSUMPTION PROFILES EXPLAINED

A daily electricity consumption profile captures the amount of electricity consumed by an SME at different times of day. You might have previously noted your daily usage of electricity on a bill measured in kilowatt hours (kWh). Your daily electricity consumption profile goes a level deeper and shows you at what times of day you use the electricity.

The shape of the daily electricity consumption profile is important and differs dependent on your business type. Think of it like the ebbs and flows of your business – if you're a café there are certain peak periods of activity around lunch time. In the example below of an office, there is relatively low usage overnight (electronic equipment such as servers) with the bulk of electricity usage during office hours. The small peak at 1pm (where the office is using approximately four times as much electricity compared to overnight) shows additional lunch time activity in the office kitchen.

Whether you have a daytime bias (peak in the middle of the day) such as this SME or an evening bias such as a take-away food business or hotel will dictate what DSM solutions will work for you. In particular, technologies such as solar are more effective for SMEs with a daytime bias.



RETAIL

If you run a retail business, you're most likely to consume the most energy during the day when your shop is open. This means that if opening hours are mostly during the day, the daily electricity consumption profile is often a very good match for solar PV.

Retail businesses use energy in different ways but the majority of energy use is through heating and cooling (HVAC) and lighting. This means retail is a good fit for energy efficiency that focuses on these 'end uses'. Given the importance of customer comfort, energy efficiency solutions will need to ensure that this is maintained.

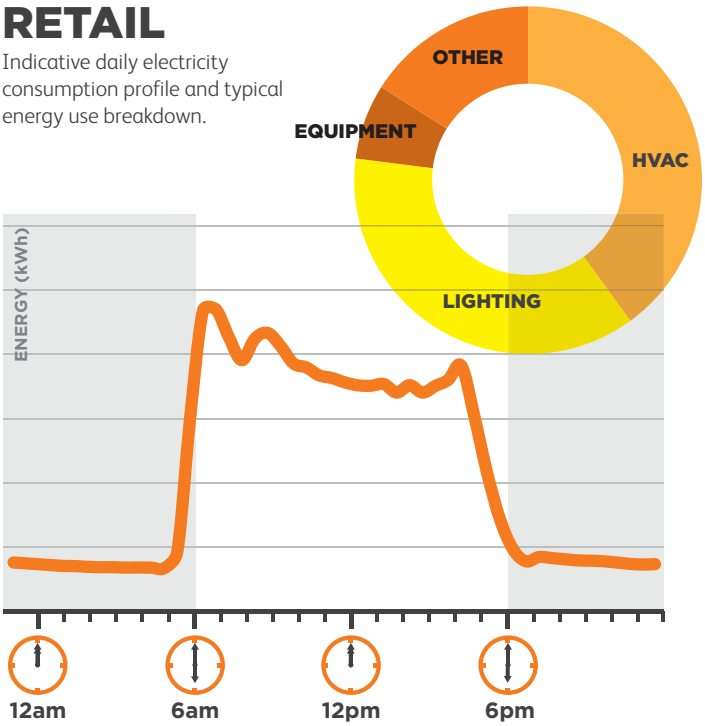
ACCOMMODATION

If you run an accommodation business it's likely you'll have a strong evening bias to your daily electricity consumption profile. This is because accommodation rooms and other on-site amenities are often used more during the evening. Businesses that operate late into the night may be able to access cheaper energy outside peak times compared to other business types.

Accommodation businesses use a lot of energy in heating and cooling the indoor environment to keep guests comfortable. Lighting is also a reasonably large component of energy use. Energy efficiency improvements should focus on these energy uses, for example improvements to the building itself like draught proofing and insulation and upgrades to heating and cooling appliances can provide good savings.

RETAIL

Indicative daily electricity consumption profile and typical energy use breakdown.



ACCOMMODATION

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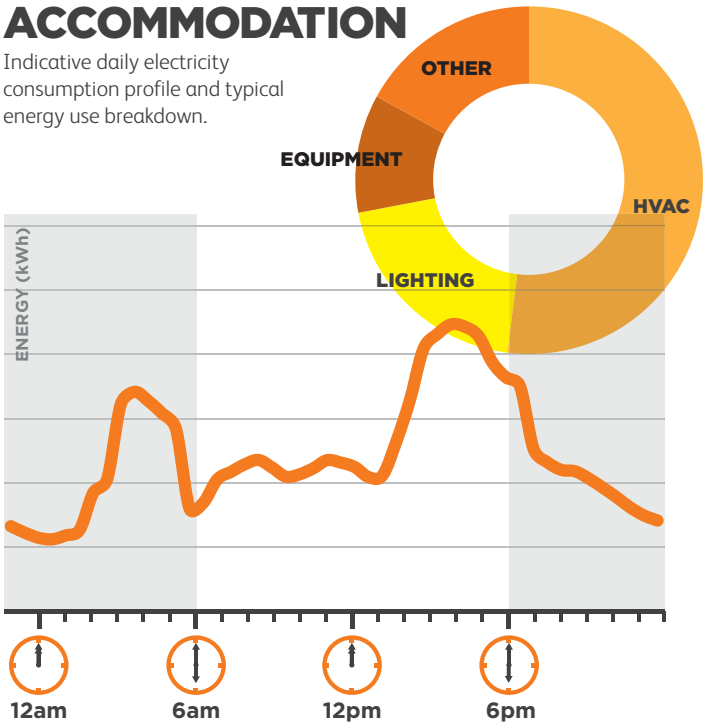


HOSPITALITY

If you run a hospitality business you will likely require specialised equipment for making, cooking and storing food and beverages. Whether you run a café, fast food business or a restaurant/bar can make a significant difference to when you use most of their energy. The key indicator is what service periods your business caters for (i.e. breakfast, lunch or dinner). Cafés, for example, have an electricity consumption profile well matched to solar, but restaurants open in the evening may not.

Hospitality equipment is often specialised and designed for function, not energy efficiency. The easy wins tend to be in heating and cooling, hot water and refrigeration. For example non-perishable drinks fridges can be put on a timer to save energy overnight.

WHOLESALE /WAREHOUSE

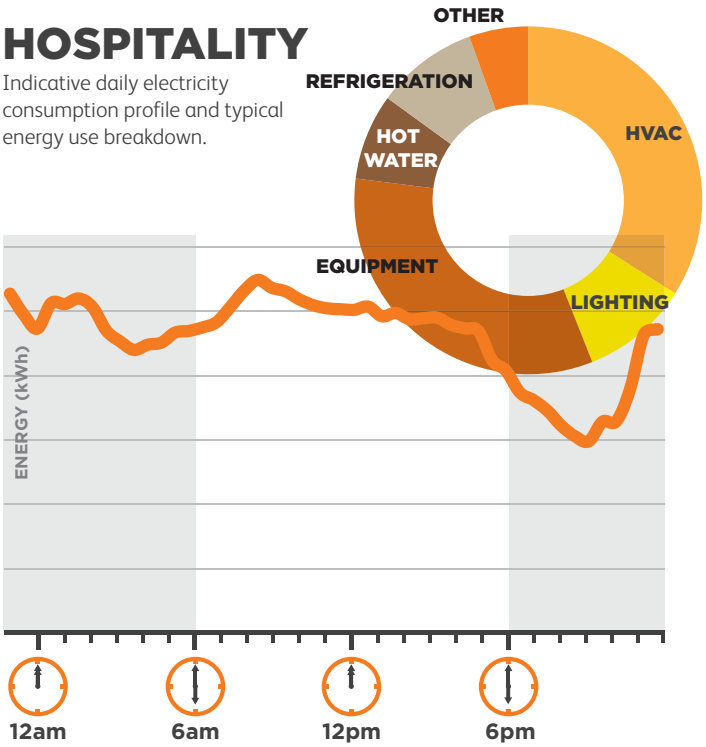
If you run a wholesale or warehouse business, when you operate depends on the types of goods you house. You might start earlier than other businesses in order to provide same day delivery service. Warehouses are normally based in poorly insulated large spaces with high ceilings, making heating and cooling ineffective and costly.

The daily electricity consumption profile is normally steady across the day with peaks when lighting and machinery is in operation. Retrofitting LED or other energy efficient lighting is normally a good option for these businesses as is installing skylights to make the most of natural light. Many warehouses or wholesalers deal mostly in refrigerated goods, which require energy throughout the day. This type of appliance can be a good energy efficiency opportunity.

Depending on the proportion of energy consumption during the day, a warehouse/wholesale business may be well matched to solar.

HOSPITALITY

Indicative daily electricity consumption profile and typical energy use breakdown.



WHOLESALE /WAREHOUSE

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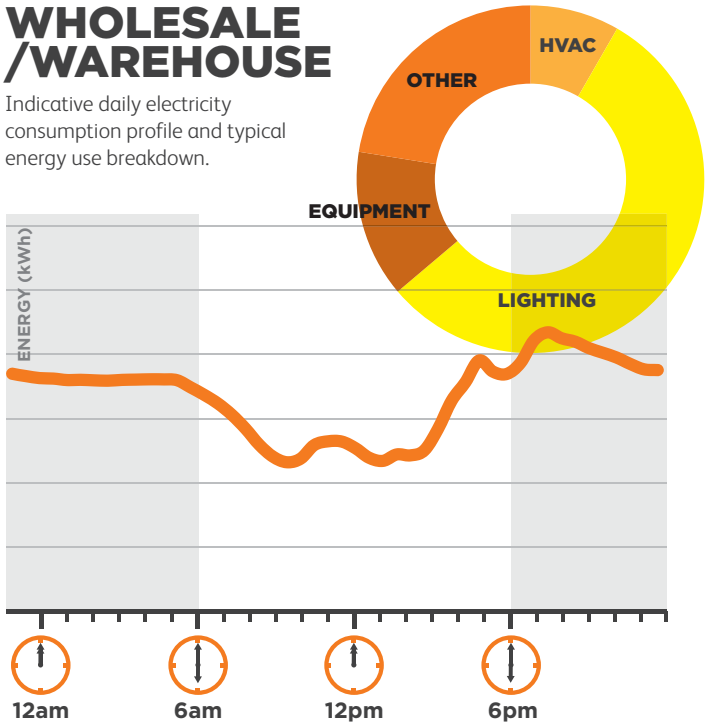


OFFICE

If you run an office, your energy use during the day will depend on hours and staffing levels. You also face the challenge of regulating the temperature in the office to suit people with different thermal comfort expectations – this can be tricky. The daily electricity consumption profile is the opposite to an average house, with most energy used during the day but only limited amounts at night. This is a good match for solar PV.

Heating and cooling use the most energy in offices, with lighting the next biggest user. Increased use of office machinery (such as servers) in recent times has increased office energy use while also increasing cooling requirements.

Energy efficiency improvements to lighting and heating, ventilation and cooling (HVAC) systems can be teamed with improvements to the building shell such as shading or insulation to reduce energy use and provide financial savings.

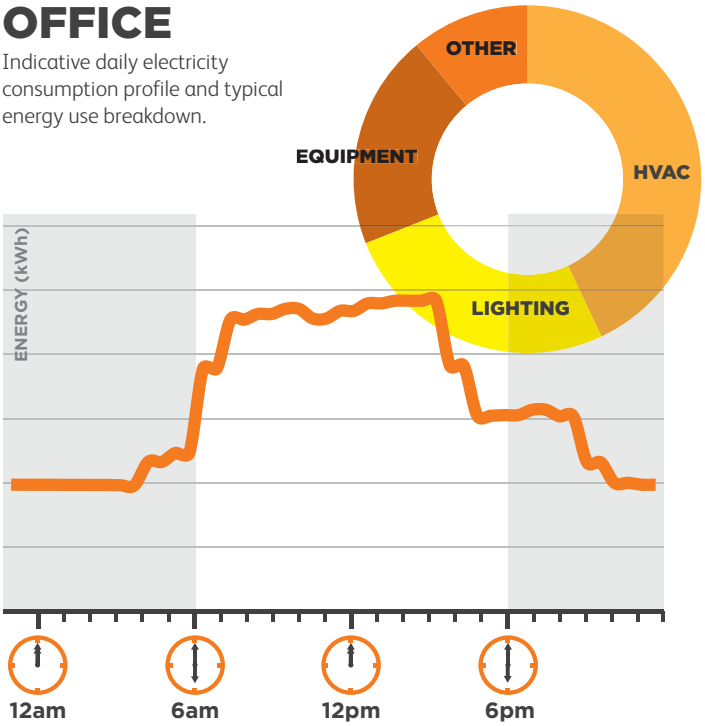
MANUFACTURING

If you run a manufacturing business, your energy use depends on what you manufacture – there is no 'typical' electricity profile. In most manufacturing businesses the machinery used to produce the product is the largest energy user in the business with lighting, cooling and office equipment also contributing to the overall energy use. Time of operation also varies with the type of production, with many SMEs (for e.g. food) operating overnight or starting early to cater for customer needs.

Many manufacturing businesses do not heat the premises as the manufacturing process provides heat as a by-product. In all manufacturing businesses the key is to maximise the efficiency of machinery, but also work on secondary energy uses (such as refrigeration) to provide savings, allowing you to keep electricity use low during downtimes. Utilising solar is an option for most manufacturing businesses and the type of premises often makes for good roof access.

OFFICE

Indicative daily electricity consumption profile and typical energy use breakdown.



MANUFACTURING

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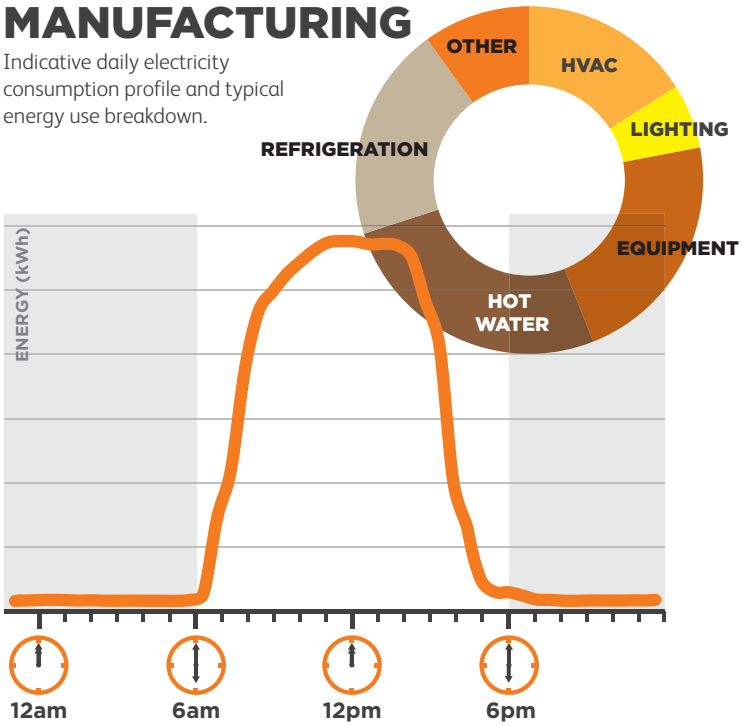

LARGER BUSINESSES

IF YOUR BUSINESS IS A LARGE CONSUMER OF ENERGY THERE ARE CERTAIN ADDITIONAL FACTORS THAT SHOULD BE TAKEN INTO ACCOUNT WHEN MANAGING YOUR ENERGY USE.

FINANCIAL PAYBACK

The financial return on DSM solutions depends on a number of factors including your tariff and your daily electricity profile. Larger businesses generally pay less per unit for electricity, meaning that the initial investment may take a bit longer to provide a return.

AVAILABLE ELECTRICITY TARIFFS

The types of electricity tariffs available to your business increase with your electricity consumption and how much your peak electricity demand is. Larger customers tend to have more choice than smaller customers in the type of tariff available.

NEGOTIATE OWN ELECTRICITY CONTRACT

All businesses are able to enter into a negotiated contract rather than use a standard market contract, but it makes better sense for larger electricity consumers. Negotiated contracts need to be explicitly entered into by the electricity customer. When using a negotiated contract a wide range of options are considered, with the terms usually determined according to the specific characteristics of the customer's requirements. If you are thinking that your business would benefit from a negotiated contract, you should get in touch with your electricity retailer directly.

NETWORK SUPPORT AGREEMENTS

Larger customers make a greater impact on the network than smaller customers and at times of network peak demand this is especially important as electricity at this time is very expensive. This can also impact the stability of the grid with the potential for blackouts or brownouts to occur. As a result there is an interest for retailers in being able to curb consumption at times of network peak demand to reduce costs and to the electricity distributors in maintaining supply. In some cases, a network support agreement might be able to be negotiated between large electricity users and the relevant network business. This type of agreement provides financial compensation to businesses that reduce their consumption at time of peak energy use.

Cogeneration plant

COGENERATION AND TRIGENERATION

Cogeneration and trigeneration are proven technologies which generate electricity and thermal energy (heating) from a single fuel source (usually natural gas). For buildings with a high thermal energy or cooling load such as hospitals or gyms with pools this technology may be worth considering, keeping in mind the future increases in gas prices and a technically complicated connection process.

POWER FACTOR CORRECTION

Some larger commercial electricity customers may be charged for apparent power (kVA) rather than real, or true, power (kW). If your business is being charged for apparent power then it could be in your interest to take steps to reduce your power factor. If you have a low power factor using a power factor correction (PFC) device could decrease your electricity costs by improving your power factor.

RESEARCH DEMAND-SIDE MANAGEMENT OPTIONS

THIS SECTION OUTLINES THE VARIOUS DEMAND-SIDE MANAGEMENT (DSM) OPTIONS AVAILABLE TO YOUR BUSINESSES IN MORE DETAIL.

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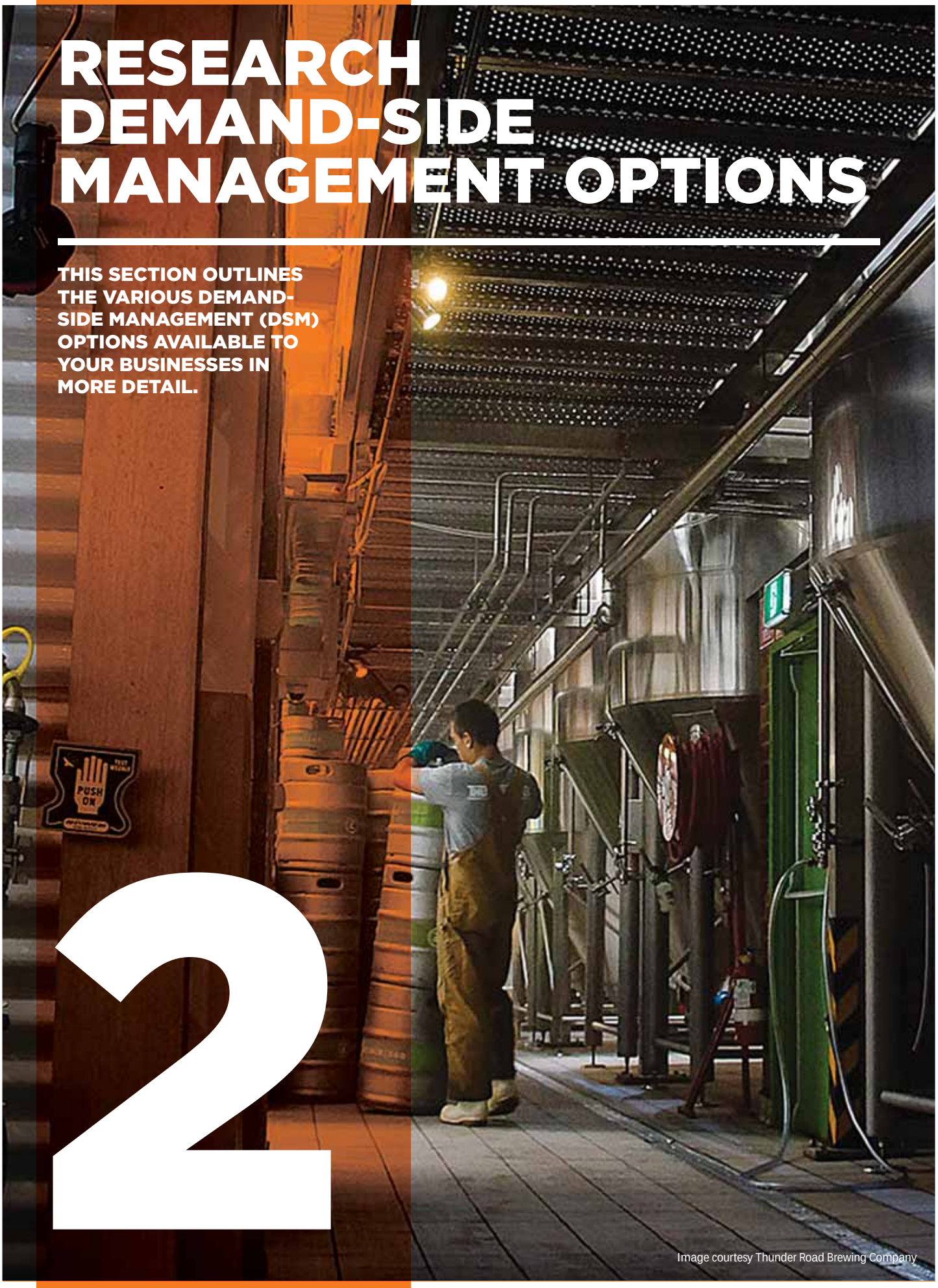


Image courtesy Thunder Road Brewing Company

ENERGY EFFICIENCY

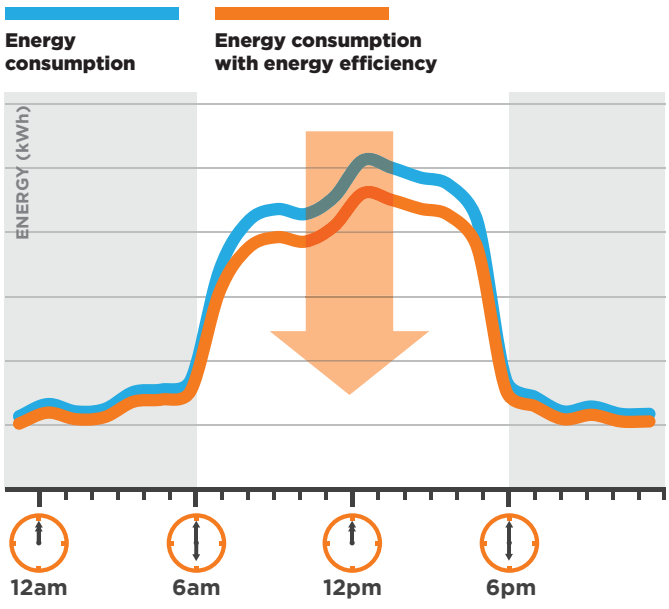
Energy efficiency acts to reduce the amount of energy required for your business to operate. Energy efficiency involves either installing equipment such as building insulation, more efficient fittings and appliances or changing behaviours.

Energy efficiency is an overall reduction in the amount of electricity used, but does not usually focus on a reduction at a particular time of day. Energy efficiency also has significant environmental benefits.

For energy efficiency the value is in the electricity not consumed. Some electricity tariffs may make the value of this energy greater or less. Importantly, the options for energy efficiency within your business relate to how you use energy (refer to business types) and the best value options depend on what you can do without affecting your business operations.

Although not the focus of this guide, behavioural change can also be a simple and cost effective solution to reduce the volume and timing of consumption to achieve the desired DSM outcomes. A number of organisations can assist with training for staff on more efficient use of energy.

IMPACT OF ENERGY EFFICIENCY ON CONSUMPTION



EXAMPLES OF ENERGY EFFICIENCY TECHNOLOGIES:

Efficient lighting

- Technologies such as LED lighting or lighting control ensure light is efficient and only provided when necessary such as times when building is occupied.

Heating Ventilation Air Conditioning (HVAC)

- Insulation and building design
- Installation or retrofit of more efficient HVAC units
- Changes to thermostats to allow for a greater range of internal temperatures

Energy efficient appliances

- Upgrading or expansion of appliances from domestic appliances through to process equipment to reduce the amount of energy used

Halogen replacement with LED

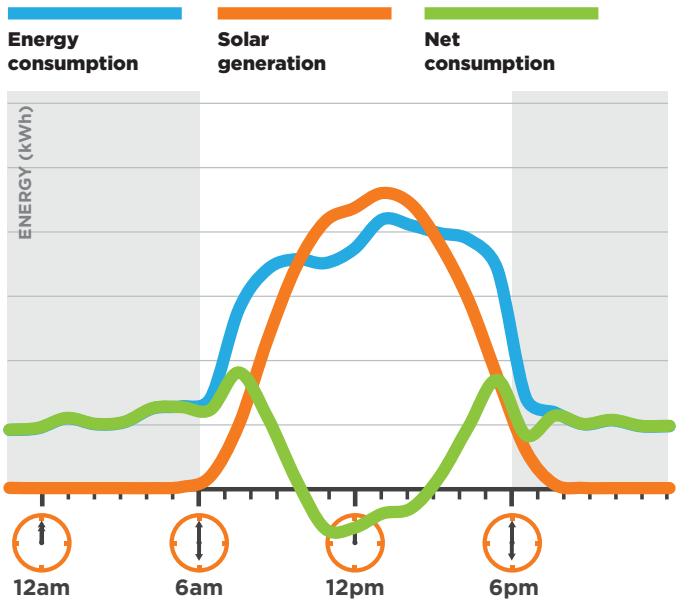
EMBEDDED GENERATION

Centralised generation such as coal-fired power stations have historically dominated electricity generation in Australia.

The alternative is on-site (or embedded) generation of electricity to be used 'behind the meter', such as by your business itself. This offsets the energy you consume and in most circumstances allows you to export surplus energy back to the grid. The rate at which businesses get paid, or the feed-in tariff, for the exported electricity varies between states.

Embedded generation reduces the amount of energy you pay for, but not how much energy you actually use. Most embedded generation is renewable and therefore has a significant environmental benefit.

TYPICAL SME PROFILE WITH SOLAR IMPACT



SOLAR PHOTOVOLTAIC (PV) GENERATION

Solar photovoltaic (PV) generation is the most common type of embedded generation in Australia. Solar PV is suitable for both urban and rural environments and a range of sizes can be cost effectively installed for an SME.

North-facing roof space is the preferred orientation, however viable systems can be designed for east and west-facing roofs. Depending on your hours of operation this may actually improve the financial return on investment as time-of-use tariffs (explained later) may mean that your electricity is more expensive in the late afternoon/evening when a west-facing solar installation is still producing.

In general the sizing of the PV system should be matched against the demand for energy, minimising the export of energy, due to the low feed-in tariff received in most regions of Australia.

For further information on installing solar PV refer to the Clean Energy Council's **'Guide to installing solar PV for business and industry'** solaraccreditation.com.au/solarforbusiness

SMALL WIND TURBINE GENERATORS

Small wind turbine generators convert wind energy into electrical energy. Wind turbine projects at a smaller scale can suffer from high planning and installation costs and are often uncompetitive with solar PV. But in a rural setting with a good wind resource, their viability improves considerably meaning they may match solar PV for financial return.

OTHER OPTIONS

A number of other embedded generation opportunities are available for SMEs, such as fuel cells and cogeneration, but these are generally viable only in quite specific circumstances and often contribute to fossil fuel pollution.

Cogeneration in particular may be suited to SMEs with high heating loads (accommodation with swimming pools or large industrial processes).

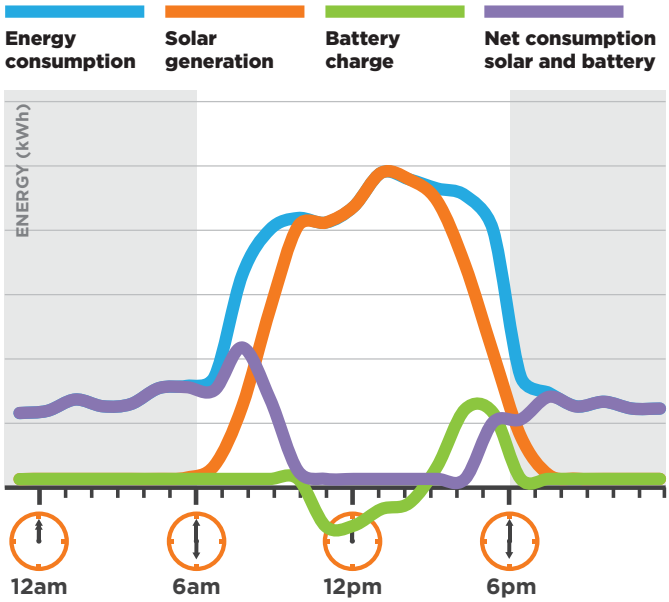
ENERGY STORAGE

Energy storage can take a variety of forms, but battery storage is the most practical option for SMEs. Battery arrays have a long history of being used in off-grid applications to make more use of power generated by solar PV. Recently businesses have started to investigate their potential for on-grid situations. When combined with solar, they can be used to move electricity from a period with excess generation to one without.

Historically, because of their high cost, SMEs that have grid connections have only used battery storage to back up critical systems (such as computer servers) for short periods of time. To be used daily a much larger amount of storage is required.

If used on a daily basis, batteries will generally have shorter lifespans and the replacement costs impact the financial return of these solutions. Although costs for battery systems are declining rapidly it is important to consider the operational lifespan of any battery options that you investigate to make sure your expected payback is realistic. Additionally, strict recycling and disposal practices are required to avoid environmental impacts.

TYPICAL SME PROFILE WITH SOLAR AND STORAGE IMPACT



LOAD SHIFTING

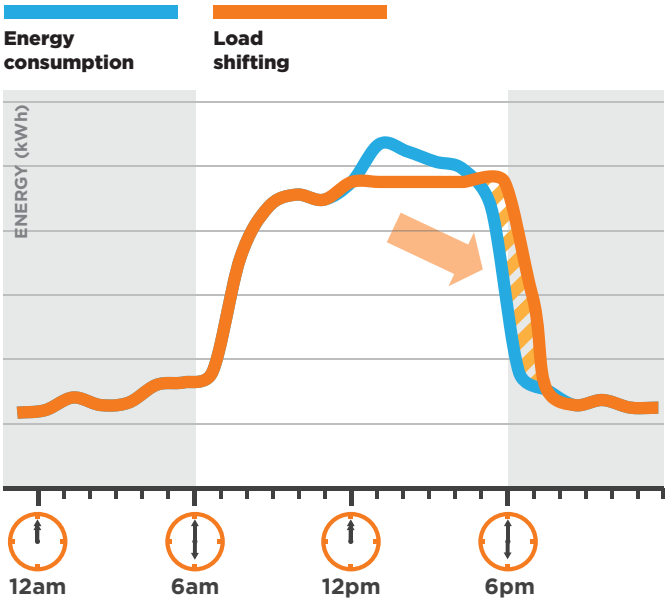
Load shifting refers to moving an electricity load from one period of time to another. It differs from other strategies such as energy efficiency because the total amount of energy being consumed doesn't change. Load shifting is generally done to:

- Move energy consumption from a high cost tariff period to a low one (such as moving from peak to off-peak)
- Reduce consumption in a period of network peak demand (expensive energy) by spreading out the consumption over a longer period

At its simplest, load shifting is using the timer on your appliances (for e.g. dishwashers and washing machines) to run during low cost tariff periods in the early morning, or changing your work schedule. At the more complex end, it includes having Demand Response Enabling Devices (DREDs) installed on equipment such as air-conditioning, refrigeration systems, pumps and PV systems. This allows the equipment to be turned off (with your permission) for short periods of time by an energy supplier. A good time to consider this is when this type of equipment is being upgraded.

For load shifting to be of benefit, you need to have tariffs which reward reductions at certain time of day – load shifting will have no effect if you are on a flat rate. Also, load shifting will not be practical if you do not have substantial electricity loads that can be shifted, or if those electricity loads already operate at off-peak times.

TYPICAL SME PROFILE WITH LOAD SHIFTING



WEIGH UP THE OPTIONS

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WEIGH UP THE OPTIONS

The table opposite outlines a number of demand-side management (DSM) solutions and the relative strengths and weaknesses of each approach for SMEs. There are a number of performance indicators which you should keep in mind when investigating DSM solutions:

SIMPLICITY

Some solutions are more complex than others, for example solar PV is quite straightforward once installed but other technologies may take longer to investigate or are commercially complex to navigate.

SITE INDEPENDENCE

Some solutions work on almost any site and others need a specific resource in order to be viable (for e.g. wind). Others may not be applicable to the scale that your business operates at.

AVAILABILITY

Is the product commercially available in a competitive market? For example while batteries are available the domestic market is still maturing.

PAYBACK PERIOD

Rates of return for DSM solutions are varied and SMEs often expect a short payback to have the confidence to invest.

COMMERCIAL CERTAINTY

DSM solutions are often emerging and can have varying results. However solutions such as lighting retrofits have a very high degree of commercial certainty.

ENVIRONMENTAL IMPACT

Some DSM solutions have a positive environmental impact through reductions in greenhouse pollution, others simply represent a cost saving.

APPLICABILITY

Some solutions are a good fit for your business but may not be for others. Your daily electricity consumption profile is the key indicator here.

The two DSM options that currently provide consistently average or better outcomes for most SMEs are energy efficiency and solar PV. However there are many factors that will affect the results.

TECHNOLOGY BY PERFORMANCE INDICATOR

LEGEND

STRONG

Indicates that the DSM solution has a relative strength in this indicator, for e.g. it is comparatively easy to implement or readily available

NEUTRAL

Neither a strength or weakness of the option.

WEAK

Indicates that the DSM solution has a relative weakness in this indicator, like long payback periods or site-dependent benefits.

IT'S WORTH NOTING:

- Different energy efficiency strategies have different degrees of complexity and vastly different payback periods.
- Payback periods for solar are largely dependent on what time of day you use energy, the cost of your electricity and what type of electricity tariff you are on.
- Changing energy behaviour can be an effective way of reducing energy, but the impact can often be increased when supported by a technological DSM solution.

	SIMPLICITY	SITE INDEPENDENT	AVAILABILITY	PAYBACK PERIOD	COMMERCIAL CERTAINTY	ENVIRONMENTAL IMPACT	APPLICABILITY TO YOUR BUSINESS
ENERGY EFFICIENCY							
EMBEDDED GENERATION							
SOLAR PV							Premises with high daytime demand e.g. retail, office, daytime hospitality, manufacturing, daytime wholesale/warehouse. Solar payback periods are also exposed to future tariff changes
WIND							Rural SMEs
COGENERATION/ TRIGENERATION							Larger SMEs with high thermal heating or cooling
BATTERY ENERGY STORAGE SYSTEMS							
LOAD CONTROL - DEMAND SHIFTING\INTERRUPTION							
BUILDING ENERGY MANAGEMENT SYSTEMS							
LOAD CONTROL							SMEs which can shift significant loads to other times of day

UNDERSTAND YOUR ELECTRICITY TARIFF

UNDERSTANDING THE TARIFF THAT YOU PAY FOR ELECTRICITY IS IMPORTANT IN DETERMINING WHICH DEMAND-SIDE MANAGEMENT (DSM) SOLUTIONS MAKE SENSE FOR YOUR BUSINESS. UNDER CERTAIN TARIFFS, IT IS NOT POSSIBLE TO REALISE A BENEFIT FROM ALL DSM SOLUTIONS.

4

IS YOUR TARIFF APPROPRIATE?

A BRIEF ENERGY LESSON

Energy is power multiplied by time, so a low power device used for longer may use the same amount of energy as a high power device used for a shorter period of time. Your energy (in this case electricity) is measured in kilowatt hours (kWh). The kilowatt is the power and the hours is the time period over which you use it.

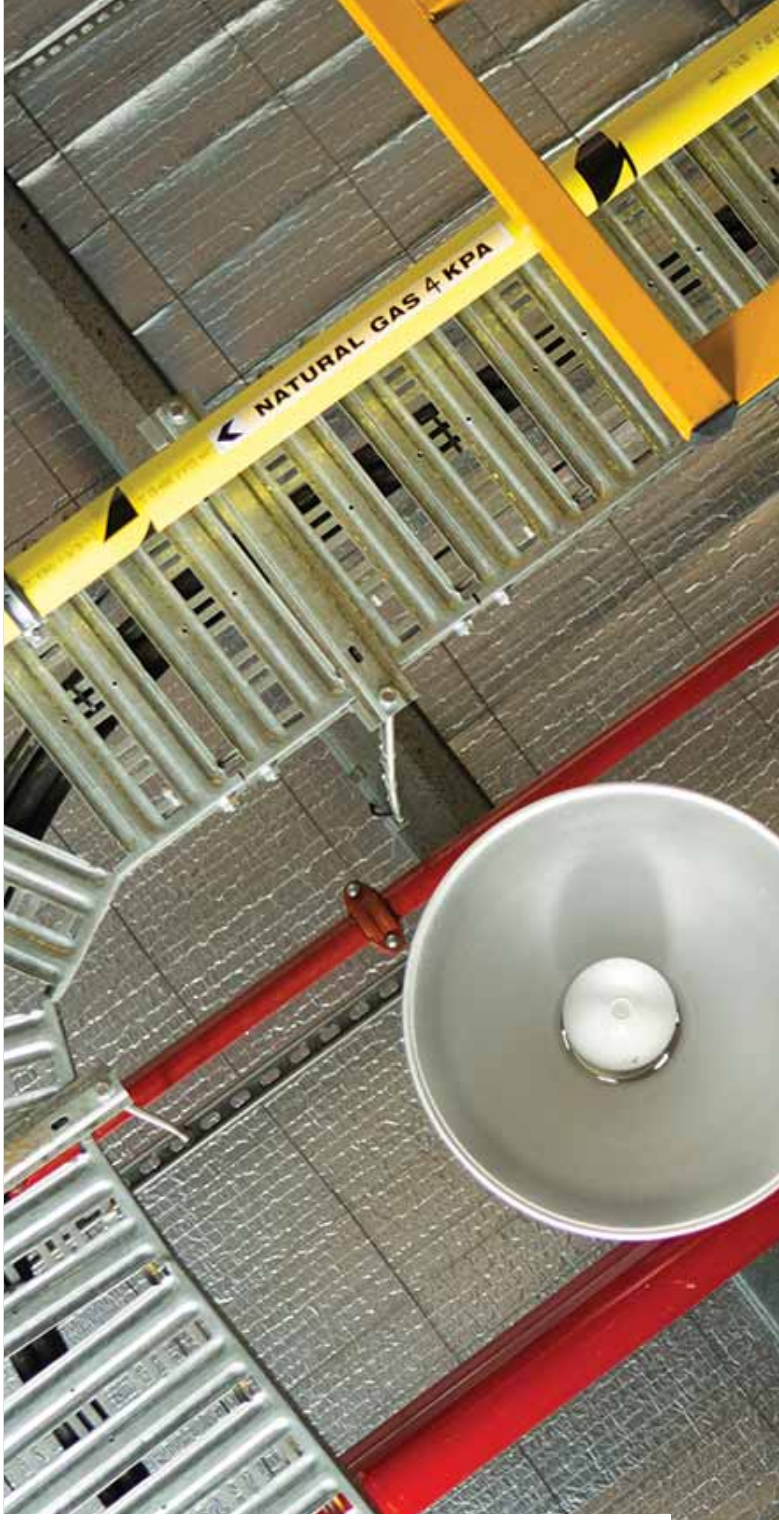
When looking at what you pay for electricity you should note that your bill has several components, which may vary depending on the type of contract you are on. For SMEs you will generally be on a standard offer, which is published by energy retailers on their website. If you have an individually negotiated tariff then your specific situation may differ from those explained below.

Regardless of whether you are investigating DSM solutions, understanding your electricity tariff is an important part of business energy literacy. There may be savings immediately available by switching tariffs irrespective of a DSM solution, but this is really dependent on the daily electricity profile of your business.
For standard offers you may find some combination of the following:

1. **A SUPPLY CHARGE**
2. **A CONSUMPTION CHARGE**
3. **A CAPACITY CHARGE**
   (also known as demand or volume charges)
4. **ADDITIONAL CHARGES**
   or premiums like GreenPower

1 SUPPLY CHARGE

Also known as the ‘service charge’ or ‘fixed charge’, this is a charge that applies for supplying electricity and is independent of how much electricity you use. It is generally charged by the day. Supply charges cannot be impacted by DSM solutions, so if you have large supply charges you may want to look at changing tariffs to maximise the benefit.



SUPPLY COMPONENT OF ELECTRICITY BILL

Details Everyday Saver	Total Usage	Charge/ Rate	$ Ex GST	$ Inc GST
23/05/2014 - 20/08/2014 - 90 Days				
Energy Charges				
23/05/2014 - 30/06/2014 - 39 Days				
* Everyday Saver Peak Consumption (19.81823 kWh/day)^	772.911 kWh	$0.2706 per kWh	$209.15	
* Everyday Saver Supply Charge	39 days	$1.008 per day	$39.31	
01/07/2014 - 20/08/2014 - 51 Days				
* Everyday Saver Peak Consumption (24.15776 kWh/day)^	1,232.046 kWh	$0.2706 per kWh	$333.39	
* Everyday Saver Supply Charge	51 days	$1.008 per day	$51.41	
Other				
* Everyday Saver Discount - 3%			$19.00Cr	
Current Charges			**$614.26**	
Total Current Charges including GST				**$675.69**

An * indicates a GST applicable supply. Please refer to all pages of this invoice. Please note that the total Service Charges may include non-GST applicable items.

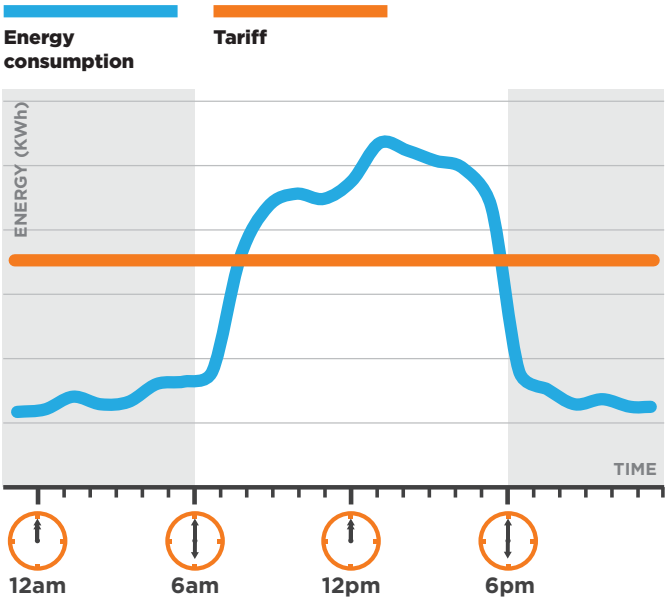
2 CONSUMPTION CHARGES

Different types of tariffs and the DSM solutions that are best matched to that type are outlined below. You should keep in mind that there may be benefits in moving to another tariff type to reduce your current costs or to maximise the financial benefit associated with a DSM solution.

FLAT RATE

Consumption charges (kWh) are charged at the same rate, regardless of time of day, year, or total consumption level.

Flat rate consumption charge



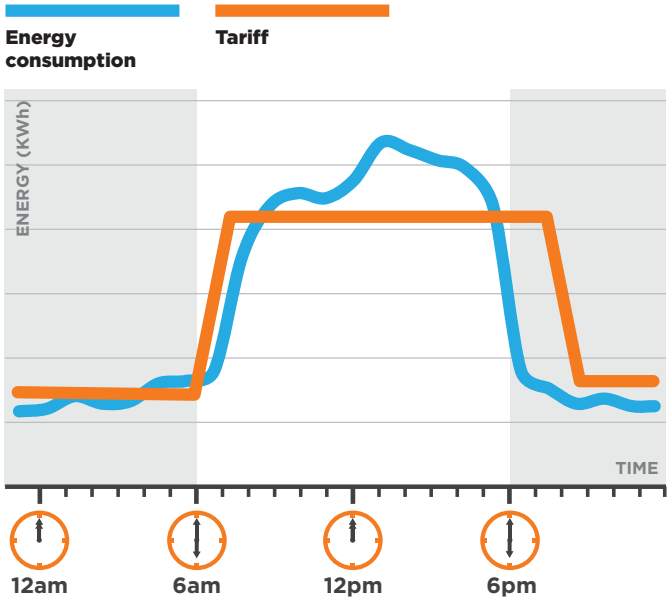
APPLICABLE DSM SOLUTIONS

- **ENERGY EFFICIENCY**
- **SOLAR**
  (note that a time-of-use tariff may maximise a solar benefit)

TIME-OF-USE/FLEXIBLE PRICING

Generally two or three different rates (for e.g. peak, off-peak and shoulder) that are applied according to the time of day, meaning there is an advantage in using energy at particular times of day over others. All time-of-use tariffs are cheaper during the night. Note that this type of charge should not be confused with a 'controlled load', which is also commonly referred to an off-peak tariff. Controlled loads are specific devices (such as water heaters) that are usually wired separately to the rest of the building, while an off-peak tariff here would apply to the whole facility.

Time-of-use consumption charge



APPLICABLE DSM SOLUTIONS

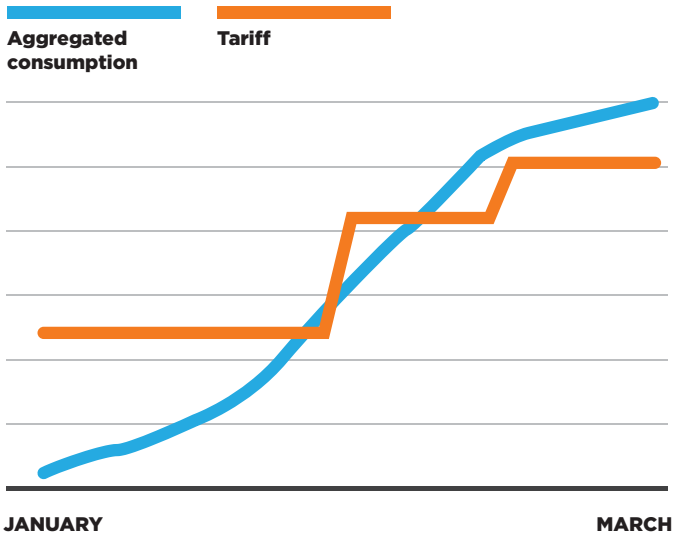
- **ENERGY EFFICIENCY**
- **SOLAR PV**
- **LOAD SHIFTING**
  (from a peak time to a shoulder or off-peak time)

2 CONSUMPTION CHARGES

ASCENDING BLOCKS

This tariff structure is like a flat rate in that it is not dependent on the time of day, but when your consumption hits a certain point it steps up in unit cost. Basically, the more you consume, the more expensive electricity gets. Undertaking solutions that limit the overall amount of energy you consume are effective and may keep you on the lower tariff rates.

Ascending blocks consumption charge



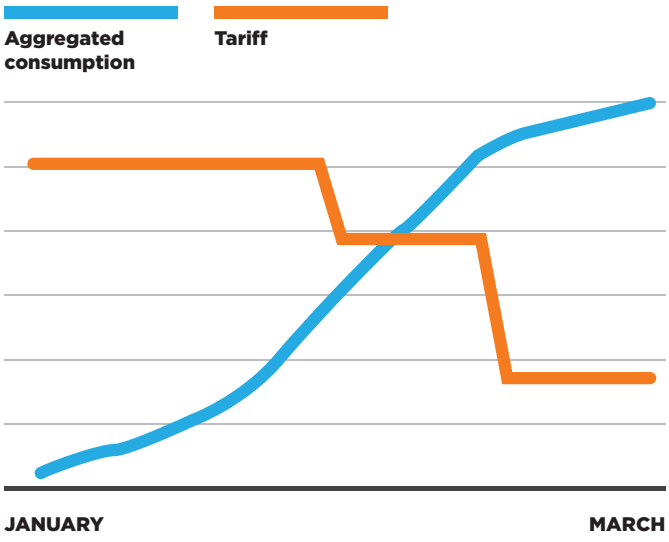
- ENERGY EFFICIENCY
- SOLAR PV

DESCENDING BLOCKS

Similar to ascending blocks, but when the thresholds are crossed the cost per unit goes down.

Solutions that limit the amount of energy you consume are still effective but paybacks are longer as the energy you save is likely to be cheaper.

Descending blocks consumption charge



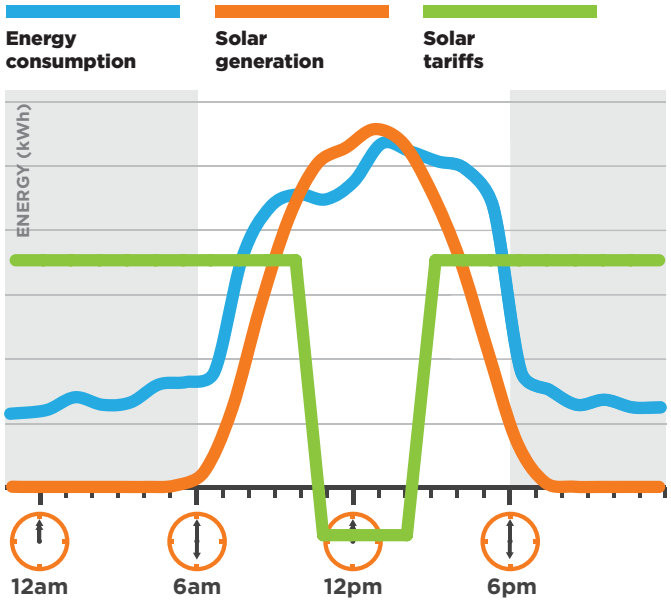
- ENERGY EFFICIENCY
- SOLAR PV

3 CAPACITY CHARGES

FEED-IN TARIFFS (FITs)

These are tariffs that are paid for electricity that is exported to the grid, as opposed to being consumed. They apply when you have on-site generation (such as a solar PV system) and the rates and availability varies between states and electricity retailers. For the most up-to-date feed-in tariff rates, check with your relevant state government department or your electricity retailer.

Feed-in tariff consumption charge

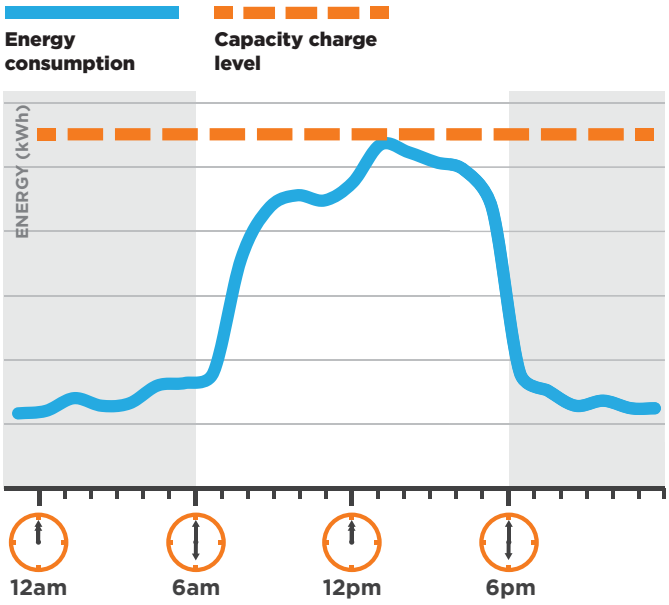


APPLICABLE DSM SOLUTIONS

- SOLAR PV
- LOAD SHIFTING

This is a charge on your peak electricity demand made during a billing period. One way of viewing capacity charges is as a fine for using too much energy at a particular time of day or year.

Capacity charge



APPLICABLE DSM SOLUTIONS

- ENERGY EFFICIENCY
- SOLAR PV
- LOAD SHIFTING
- STORAGE

OTHER CHARGES

In addition to the charges outlined above, you may have premium charges for the use of grid-supplied renewable energy (GreenPower). These are usually charged by unit.

SEEK HELP

DEPENDING ON YOUR BUSINESS SIZE, THE AMOUNT OF TIME YOU HAVE ON YOUR HANDS AND YOUR UNDERSTANDING OF ENERGY ISSUES, YOU MAY NEED ASSISTANCE FROM PROFESSIONALS IN ORDER TO ASSIST WITH DEEPER INVESTIGATION OF PARTICULAR DEMAND-SIDE MANAGEMENT (DSM) SOLUTIONS.

5

Many resources are freely available to businesses and others come at a cost. The trick is being able to obtain free or low cost trusted independent advice.

Understanding your tariff and your daily electricity profile are critical. For any DSM provider the conversation should start with how your business operates. Communicating the characteristics of your business to a solution provider will enable them to provide a clearer picture of what benefits you could expect from a particular solution.

In addition to this there are a number of criteria or questions which could be asked of DSM solution providers to help with your decision making.

THE COMPANY

- ☐ How long has the company been in operation?
- ☐ Does the company have any business customers who you could contact about their experience with a similar installation done?
- ☐ Does the company carry appropriate certifications, for e.g. do they use Clean Energy Council-accredited solar installers or are they a Clean Energy Council Approved Solar Retailer?

THE PRODUCT

- ☐ What is the expected operational life of the product?
- ☐ What are the operation and maintenance requirements on the product?
- ☐ Will there be any potential impact to my business operation?
- ☐ Do you have any specification sheets that you could provide?
- ☐ Has there been an independent cost-benefit analysis and/or technical testing done on the product?
- ☐ Does the product come with a manufacturing warranty and an installation warranty?

A detailed guide on how to install solar for your business is available in the Clean Energy Council **'Guide to installing solar PV for business and industry':** solaraccreditation.com.au/solarforbusiness

Information on other DSM solutions is available through a number of sources including the Clean Energy Council: cleanenergycouncil.org.au.

SOME OTHER KEY SOURCES ARE:

- **Energy Efficiency Exchange**
  Federal Government website which focuses on medium to large businesses eex.gov.au
- **Australian Industry Group**
  A portal for business energy efficiency with free energy audits for SMEs currently available in some states http://www.aigroup.com.au/environment
- **Alternative Technology Association**
  Information on solar and limited information on storage options ata.org.au
- **Better Building Finance**
  Help for businesses and others to understand environmental upgrade agreements (an innovative financing model which links repayments to a rates mechanism) betterbuildingfinance.com.au
- **Positive Charge**
  Positive Charge is a community service, backed by local councils run as a social enterprise by the Moreland Energy Foundation and provides energy efficiency and renewable energy advice positivecharge.com.au

DOES THE BUSINESS CASE STACK UP?

THE MOST IMPORTANT PART OF THE BUSINESS CASE IS THE PAYBACK PERIOD OF THE DEMAND-SIDE MANAGEMENT (DSM) SOLUTION. THIS IS A FUNCTION OF THE CAPITAL, OPERATIONAL AND MAINTENANCE COSTS OF THE SOLUTION AND THE ENERGY SAVINGS.

Businesses are often time poor and the idea of investing time in a solution that will provide only a small benefit (even if the capital cost outlay is very low) may mean other priorities are more important.

6

FINANCE OPTIONS

Finance options are available to reduce the upfront cost of capital equipment. Generally speaking, if the savings from a DSM solution are ongoing and greater than the cost of repaying the loan, then the benefit to your business is immediate. The key is having certainty over the outcome of the solution.

A number of innovative financing models are available to SMEs, particularly for solar PV and energy efficiency. A number of these are discussed in the Clean Energy Council 'Guide to installing solar PV for business and industry': solaraccreditation.com.au/solarforbusiness

One of these is a solar power purchase agreement (PPA). Under a solar PPA, a third party developer owns, operates, and maintains the solar PV system, and a host customer agrees to site the system on its roof and purchase the energy generated.

An alternative is an environmental upgrade agreement (EUA). This is a relatively new type of finance for upgrading commercial and other buildings, reducing operating costs, increasing renewable energy and improving energy, waste, water or energy efficiency. It allows for upgrades to be paid back through council rates, providing greater certainty for lenders and reducing risks to your business if, for example, you expand and move premises. EUAs may not be available in all council areas. Environmental upgrade finance options for businesses are explained in more detail at: betterbuildingfinance.com.au

INCENTIVES AND REBATES

Incentives and rebates are widely available through various national and state-based schemes. These are subject to periodic change and you should take care if basing your business case on a short term rebate or incentive. For a comprehensive list of available rebates to SMEs by state and territory visit the 'Your energy savings' website: yourenergysavings.gov.au/rebates

WHAT IMPROVES OR DETRACTS FROM THE BUSINESS CASE?

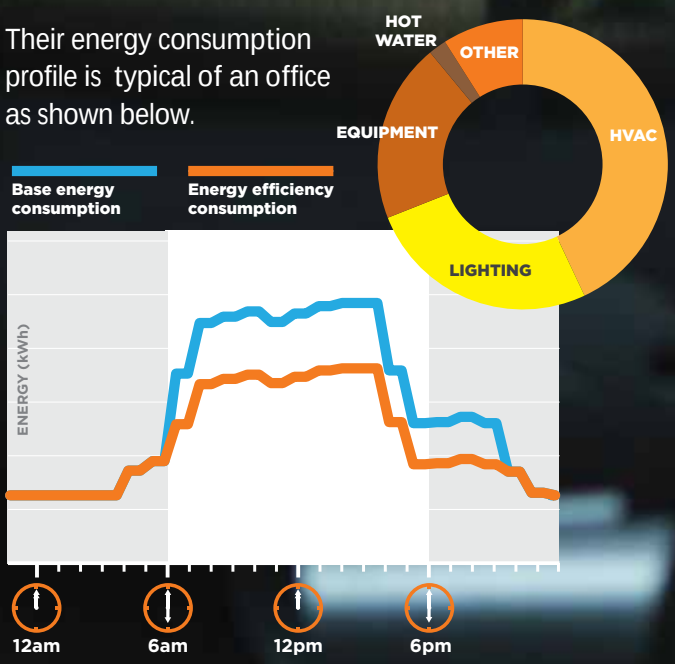
There are a number of factors which improve the business case for different DSM solutions. For example:

- If you are paying a higher electricity tariff then the payback on solutions will be shorter.
- If you are in a climate with high solar radiation then your solar payback is shorter.
- If you are on a time-of-use tariff and your energy efficiency upgrade relates to an appliance that is only used when your business is in operation (for e.g. lighting versus drinks refrigerator) then your payback will be shorter.

BUSINESS CASE EXAMPLE

This office of 40 people has an annual electricity consumption of 88,000 kWh per year, with a cost of $21,328.

Their energy consumption profile is typical of an office as shown below.



Given this profile it makes sense to concentrate efforts initially on energy efficient lighting and a HVAC (heating and cooling) control upgrade.

The upgrade had:

Total capital cost of

$9,800

Savings of 10,500 kWh or

$2,450 per year

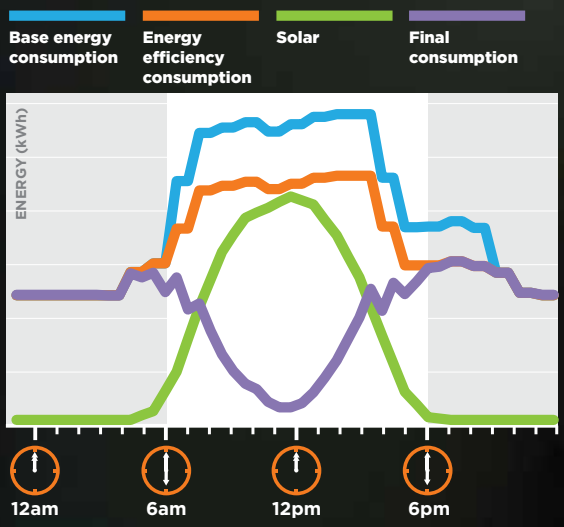
A payback of

4 years

This represents approximately 20% savings during office hours.

The daily electricity profile still had a strong peak during office hours as shown below.

Because this reduction occurred during a period of peak (during the daytime office hours), the office owner considered switching tariffs to take advantage of this.



By moving from a flat rate to a time-of-use (ToU) tariff the business was able to save an additional $380 per year.

Flat rate: 23.5c/kWh

ToU tariff: 31.3/ 21.0/ 15.6c/kWh

After this, they considered installing solar, given the good match of their daily electricity consumption profile to solar generation.

By installing a 24 kW system they saved a further

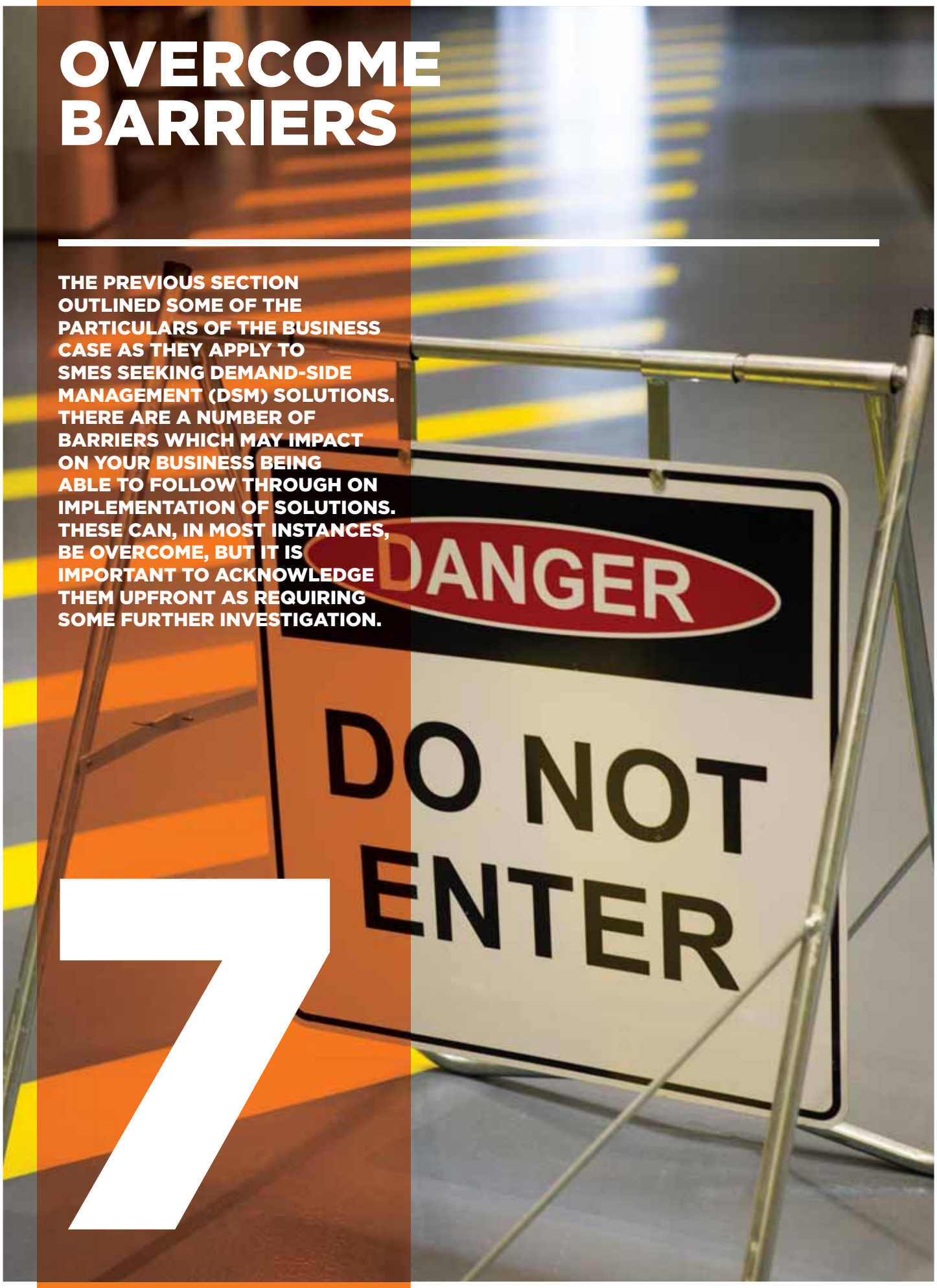
$8,050

per year on their electricity bills.

Installing this system **cost them just over $50,000,** but they expect to see a **payback on this in approximately 6 years.**

OVERCOME BARRIERS

THE PREVIOUS SECTION OUTLINED SOME OF THE PARTICULARS OF THE BUSINESS CASE AS THEY APPLY TO SMES SEEKING DEMAND-SIDE MANAGEMENT (DSM) SOLUTIONS. THERE ARE A NUMBER OF BARRIERS WHICH MAY IMPACT ON YOUR BUSINESS BEING ABLE TO FOLLOW THROUGH ON IMPLEMENTATION OF SOLUTIONS. THESE CAN, IN MOST INSTANCES, BE OVERCOME, BUT IT IS IMPORTANT TO ACKNOWLEDGE THEM UPFRONT AS REQUIRING SOME FURTHER INVESTIGATION.



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BARRIER	DESCRIPTION	APPLICABILITY – BUSINESS TYPE	APPLICABILITY – DEMAND-SIDE SOLUTION	DOES THIS BARRIER APPLY TO YOUR BUSINESS?
Are mechanical services out of your control (i.e. are owned and/or operated by the building owner)?	Depending on the tenancy arrangement SMEs may not own and/or operate the mechanical services. In this case a special arrangement between landlord and tenant may be required for some DSM options e.g. agreement for higher rent to offset landlord purchase.	Particularly retail, office and hospitality, but potentially other sectors.	Load shifting, some energy efficiency initiatives.	
Do you rent your premises and not have control of the roof space?	Depending on ownership of the building there may be restrictions in installing some rooftop plant. Some financing options e.g. environmental upgrade agreement, solar leasing, may reduce this barrier.	Particularly retail, office and hospitality, but potentially other sectors.	Solar, some energy efficiency initiatives.	
Is your electricity use sub-metered or apportioned?	Depending on the state and circumstances, there may not be a direct benefit of employing demand-side technologies e.g. your electricity cost may be apportioned based on your business size or you may need to install a new meter to access solar benefits.	All	All	
Are you likely to move business location before the cost of the DSM solution has been paid back through lower energy costs?	Due to expansion/uncertainty over lease and other factors there may be no certainty of operating in the same location. For DSM solutions with longer paybacks some certainty of business location is required. Financing options which 'run with the land' such as Environmental Upgrade Agreements (EUAs) may overcome this barrier.	All	Any permanent infrastructure unable to be transported to future premises (e.g HVAC system)	
Is your current tariff arrangement short term?	Tariffs are subject to change and SMEs need to have a level of confidence that a tariff change will not significantly impact the business case.	All	All	

WHAT'S NEXT FOR DEMAND-SIDE MANAGEMENT SOLUTIONS?

IN THE SHORT TERM SOLAR PV AND ENERGY EFFICIENCY WILL REMAIN THE MOST VIABLE OPTIONS FOR SMES, BUT FUTURE DECLINING COSTS, TARIFF CHANGES AND FURTHER COMMERCIALISATION OF TECHNOLOGIES ARE LIKELY TO IMPROVE THE BUSINESS CASE FOR BATTERIES AND LOAD SHIFTING IN THE MEDIUM TERM.

There is no crystal ball, but some of the likely changes in demand-side management (DSM) solutions are:

- **Utility prices** – although electricity price increases are likely to flatten compared with the significant rises of the last five years, gas prices are forecast rise significantly over the next several years. This means SMEs should consider whether gas appliances should be replaced like for like, or whether there an electric alternative available.
- **Declining cost of battery storage combined with increased operation lifetime** – we are likely to see significant reductions in the cost of battery storage over the next five years. One of the major hurdles in Australia is simply the maturing of the distribution chain. This will improve the business case for solar PV/battery combinations.
- **New and more cost-reflective tariffs** – tariffs are subject to change and one of the likely changes in the short term is more widespread cost-reflective tariffs. If adopted, these provide much greater financial incentives for businesses to avoid consumption during times of network peak demand – effectively through retailers charging significantly more for electricity at these times and less for energy throughout the rest of the day. Some of these opportunities are already available to larger businesses and are likely to be available to SMEs in the future.
- **Changes to the fixed electricity charges** – as electricity demand continues to fall, the cost of maintaining the electricity network as a proportion of the overall cost of electricity will likely increase, meaning that there may be increases in your fixed (daily) electricity charge.
- **'Soft' load shifting solutions** – the customer/retailer relationship is likely to change with new business models being explored. For example, it is likely that in the short to medium term measures such as text notifications and remotely controlled appliances to curb electricity use at network peak times in exchange for reductions on your bill will become commonplace.

GLOSSARY AND DEFINITIONS

c/kWh	Cents per kilowatt-hour
CEC	Clean Energy Council
DSM	Demand-side management
FiT	Feed-in tariff (applicable to electrical energy exported to the grid)
HVAC	Heating, ventilating, and air-conditioning
kWh	Kilowatt-hour (a standard unit of electrical energy)
PPA	Power purchase agreement
PV	Photovoltaic (direct conversion of light into electricity)
SME	Small to medium-sized enterprise
SRES	Small-scale Renewable Energy Scheme
STC	Small-scale Technology Certificate
ToU	Time-of-use (tariff changes depending on time of day)


Vasilis

CLEAN ENERGY COUNCIL

ARENA

Australian Government
Australian Renewable Energy Agency