

be energy smart

# Energy audits for small and medium businesses

Understanding your business' energy use and the steps you can take to manage it



# An introduction to a business energy audit

Businesses come in all shapes and sizes. They differ in sectors and purpose, and in the equipment and sites they need to operate. The way your business uses energy and how much you use is unique.

Energy is complex. An audit can help you understand your business' energy use and the steps you can take to reduce it. An audit will also provide a list of energy saving opportunities for your business to implement.

## What to expect

Depending on the type of audit you choose, an auditor may:

- inspect the business site
- talk to key staff members and supervisors
- analyse where energy is used in your business
- review your bills and energy contract options
- consider operational procedures such as maintenance schedules
- provide a report with their analysis and ways to reduce your energy use and costs
- provide information of the payback period for different investment options.

## Types of energy audits<sup>1</sup>

There are three types of audits defined in the Australian and New Zealand Standard (AS/NZS) 3598:2014. The Standard specifies the appropriate level of investigation and analysis to be undertaken.

Level	Type of audit	What it is	What it provides
Level 1	Basic energy audit	A simple, cost effective, high level audit, best utilised for small sites or when budgets are tight.	Broad estimates of energy saving opportunities so you can begin improving your energy efficiency.
Level 2	Detailed energy audit	The standard 'go-to' for a site-wide energy audit.	Specific recommendations with a medium level of accuracy – enough to underpin informed investment decisions on a range of available energy conservation measures.
Level 3	Precision sub-system audit	A specialised audit you can commission if you need to do a 'deep dive' on a particular sub-system that uses a lot of energy on your site.	Precise information on specific energy saving measures related to the sub-system being examined.

You should familiarise yourself with each type of audit and the best application of each.

More detailed information is available in the *Quick Reference Guide to Energy Auditing* from the Energy Efficiency Council website at [www.eec.org.au](http://www.eec.org.au)

1. Sourced from Energy Efficiency Council 'Your quick reference guide to energy auditing'

## Choosing the right type of audit

As a guide, look at your business' energy use measured in kilowatt hours (kWh).

If you do not know how much energy your business uses per year, you can:

1. Locate your last energy bill, find the kWh used for that period and then multiply that number to calculate a year's worth of use. For example, for a monthly bill, multiply the kWh by 12, or for quarterly billing, multiply by 4. Divide by 1000 to convert to megawatt hours (MWh).

NOTE: This approach assumes your energy use is relatively constant over the year.

2. Locate all your bills for the last year and add the kWh from each bill to calculate a year's worth of use. Divide by 1000 to convert to MWh.
3. Contact your energy retailer and ask them to provide you with this information.



### Less than 160 MWh per year

For businesses that use less than 160 MWh per annum, a basic energy audit may be suitable.

### Greater than 160 MWh per year

For businesses that use more than 160 MWh per annum, a detailed and/or precision sub-system energy audit may be more appropriate.

You should also speak to an energy audit professional about your business and confirm which audit type will suit your business.

Make sure the audit professional has the appropriate skill set in the areas where you use the most energy (i.e. air-conditioning, lighting, refrigeration, motors, industrial processes) to appropriately assess your business.

## Where to get an energy audit

There are a number of energy service companies (ESCOs) available providing energy audits for a fee.

If you are unsure where to start, the Government of South Australia has a list of pre-qualified ESCOs that may be used. This list was developed for a specific government program and therefore is not exhaustive.

More information is available on the *Energy management in government buildings* page at the Department for Energy and Mining website at [www.energymining.sa.gov.au](http://www.energymining.sa.gov.au)

The Energy Efficiency Council offers energy auditing training that gives auditors the skills and knowledge to deliver energy audits that meet AS/NZS 3598:2014. Check if the auditor has completed this training.

## Make sure your energy audit is compliant

All energy audits should comply with AS/NZS 3598:2014. The Standard defines a series of best practice processes that ensure the auditor undertakes an appropriate level of investigation and analysis, which helps ensure the quality of the audit's recommendations.

It defines clear expectations for each audit type, covering:

- what data is needed
- what analysis is required
- the necessary level of detail and accuracy in identified energy efficiency measures
- the information that needs to be presented in the report so you can make investment decisions.

These requirements are stated clearly in the Standard. Ask if your auditor follows the minimum requirements of the Standard and cross check your audit report to make sure you have received what you have asked for.

More information on the Standard is available at [www.standards.org.au](http://www.standards.org.au)

## Common energy saving measures

An audit will provide a list of energy saving measures that your business can implement. Some of the measures may include:



### Demand-side management

Methods to lower your energy bill such as reducing your energy use, producing your own energy on-site, storing your own energy for later use or shifting your electricity use to different times.



### Heating, ventilation and air conditioning (HVAC) system optimisation

Focuses on improving the efficiency and performance of existing HVAC systems, resulting in operational savings.



### Shading

Clever use of shading can prevent sunlight from warming buildings during summer while allowing sunlight to naturally warm buildings during winter.



### Battery storage system (energy cost saving)

Allows you to store electricity from a relatively inexpensive source (e.g. solar or off-peak grid energy). You can then consume the stored energy at a time when electricity is more expensive, unavailable or during peak demand periods.



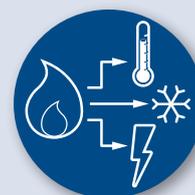
### Embedded generation

On-site electricity generation that can be used by your business to help reduce energy use from the grid.



### Heat recovery

Achieved by passing hot exhaust or liquid through a heat exchanger where it can then be reused in another process (e.g. by driving pumps or fans).



### Tri-generation (also see co-generation)

An extension of co-generation that involves the simultaneous production of electricity, heating and cooling.



### Building management systems

A network of digital controls and measurement systems that communicate and report to a computer, often referred to as a head-end, supervisor or operator workstation.



### Co-generation (also see tri-generation)

The simultaneous production of electricity and heat from a single fuel source – commonly, natural gas. Also known as combined heat and power.



### Energy conservation

Ways to reduce energy wastage such as turning off unnecessary lights.



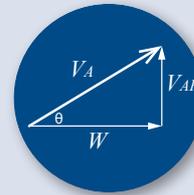
### Energy efficient lighting

Lighting that uses less energy without compromising on brightness and quality (e.g. LED lights).



### Insulation and seals

Any material that reduces the amount of heat transferred in to or out of your business through the ceiling, walls, windows, doors and floor. Insulation is measured by its R-value.



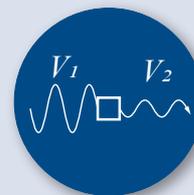
### Power factor correction

Helps synchronise the voltage and current supplied to a load. Power factor correction can help to improve energy efficiency, reduce energy use and help you get better value for money.



### Variable speed drives

Mechanisms that adjust the motor speed of a drive system, such as a compressor or pump, to better match the demand at that time, reducing energy use.



### Voltage optimisation

Helps maximise efficiency and the life of equipment by using technology to adjust the voltage supplied to the site to better meet the requirements of certain equipment and lights.

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## Additional terms

Here are some terms you may come across during an energy audit:

### Ballast

An electrical device that regulates the power delivered to fluorescent lights.

### Chiller

A packaged refrigeration system that generally includes a compressor, evaporator and condenser heat exchangers, and control system.

### Compressed air systems

A machine that compresses a volume of air and uses that pressurised air as a power source.

### Controlled load (also known as ancillary or off-peak load)

A lower cost tariff that is only available for certain appliances. Power for these appliances is supplied at specific times, when overall demand on the electricity network is lower (e.g. overnight) or when electricity supply is high (e.g. either side of the solar noon when solar photovoltaic system output supplied to the grid is at its highest).

### Demand charge (also known as capacity, peak capacity, volume charge)

A cost-reflective charge where the price you pay for the network component of your electricity services is more closely aligned to the network cost to supply that electricity to you. The cost is largely determined by the maximum level of electricity that you use in the peak usage times for that metering period (e.g. a month).

In South Australia there are two types of demand charges:

#### Agreed

(previously called Stepped Demand Tariff)

Based on either the agreed demand or recorded demand, whichever is higher, during the 'annual' or 'anytime demand period' (see below).

Where your recorded demand exceeds the agreed demand over any half hour period, your agreed demand will be automatically raised to the higher level. You will need to talk to SA Power Networks to have it reduced.

- Annual demand period: any half hour period between noon and 9pm Monday to Friday between November and March.
- Anytime demand period: any half hour period outside of the annual demand period.

#### Actual

Based on your maximum actual recorded demand during either the peak or shoulder periods since your last meter read.

At the end of each meter reading period, the maximum demand will be reset to zero.

### Heat exchanger

A device that is used to transfer heat between two fluids (a liquid or gas).

### High-bay and low-bay lighting

Traditionally used in large open spaces such as warehouses and workshops.

- Low bay lights have wide light distribution and are usually installed at lower mounting heights.
- High bay lights have a narrower light distribution and are usually installed at higher mounting heights.

### Industrial refrigeration and process cooling plants

Used to provide cooling and heat removal for large-scale processes and environments.

## Lamps, lamp-holders and luminaires

The light source is called a lamp. The fitting/fixture for the lamp is the lamp-holder. A lamp and lamp-holder combined is called a luminaire.

## Lumen

The measure of the amount of light a lamp produces.

## Metering Installation Registration Number (MIRN)

A unique number assigned to your business' gas delivery point.

## National Metering Identifier (NMI)

A unique number used to identify your business' electricity connection point to the network.

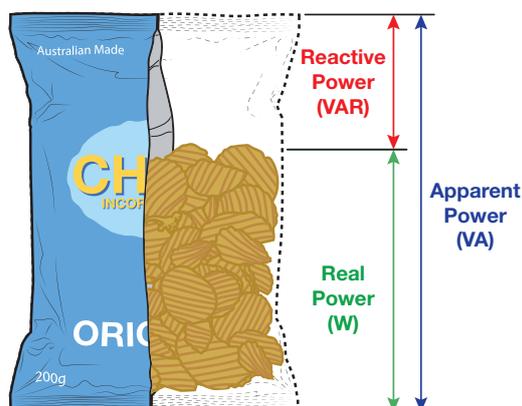
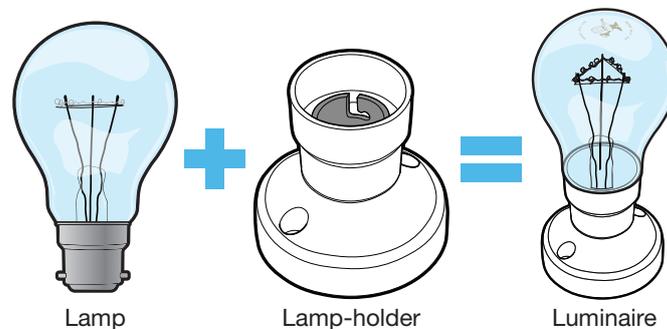
## Payback period

The amount of time needed to recover the cost of an energy efficiency measure through the savings it makes.

## Power factor

The energy you use and pay for is called apparent power and is measured in Volt-Amps (VA). Apparent power is made up of real power, measured in watts (W), and reactive power measured in Volt-Amps Reactive (VAR).

Power factor is the ratio of real power to apparent power. The closer the ratio is to 1, the less reactive (wasted) energy your business is using and paying for.



## Smart meter

A meter that records your electricity use at regular intervals, which means you can see how much electricity you are using and when you are using it. Smart meters also send your meter readings to your electricity retailer which means entry to the site is not required to read the meter.

## Sub-meter

An additional meter that allows electricity use for a specific purpose (e.g. tenant or machinery) to be recorded individually, while your main meter records your total consumption.

## Time of use tariff

A tariff that charges you different rates for electricity depending on when in the day it is being used. The different times are often called: peak, shoulder, off-peak.

## Units of energy

### Measures of electricity use

- watt (W), kilowatt (kW), megawatt (MW)  
The instantaneous rate of energy use.
- watt-hour (Wh), kilowatt-hour (kWh), megawatt-hour (MWh)  
The amount of energy used over a period of time.  
*For example: A 2000 W heater running for 3 hours would use 2000 W x 3 hours = 6000 Wh (6 kWh).*

### Measures of gas use

- cubic meters (m<sup>3</sup>)  
The volume of gas used (measured by the gas meter).
- joules per hour (J/h), megajoules per hour (MJ/h)  
The instantaneous rate of energy use.
- joule (J), megajoule (MJ), gigajoule (GJ)  
The amount of energy used over a period of time.  
*For example: A burner which uses 21 J/h running for 2 hours would use 21 J/h x 2 hours = 42 J.*

**Contact the Energy Advisory Service for free energy saving advice**

**Online:** [sa.gov.au/energy](http://sa.gov.au/energy)

**Email:** [energyadvice@sa.gov.au](mailto:energyadvice@sa.gov.au)

**Phone:** 8204 1888 or 1800 671 907 (free call from fixed lines)



**Government of  
South Australia**