Energy Management
Guide for Tenants

NABERS

Contents

Acknowledgments

Quick start guide

If you are new to energy efficiency and want to start saving energy right away, follow the steps in this Quick start guide. This outlines the key steps for you to start your energy efficiency journey as quickly as possible. It also provides references to the relevant sections of the *Energy Management Guide for Tenants* to help you find the detailed information easily.

Which scenario fits your situation?

The actions you can take will depend on which stage of the leasing cycle you are in. To start saving energy, choose a scenario that best fits your situation from the table below.

Scenario A	Your current lease has some time to run.
Scenario B	You are about to renegotiate your current lease or you are negotiating a new lease.
Scenario C	You are looking for new premises.
Scenario D	You are undertaking a new fitout or planning to upgrade/refit your office.

Scenario A: Your current lease has some time to run	
Immediate actions and simple improvements	For more detail refer to:
Use the energy management checklist at the end of this guide to identify energy-saving opportunities in your tenancy.	p. 81 'Energy management checklist'
Set up and maintain a simple system to record your energy use monthly. Graph your energy consumption over time. Look for patterns and spikes in energy consumption.	p. 47 'Benchmarking and measuring energy use'
Use the NABERS online calculator at www.nabers.gov.au to estimate your NABERS Energy tenancy rating. This will help you gauge your operational energy efficiency relative to other tenancies across Australia.	p. 48 'NABERS ratings for offices'
Obtain an official accredited NABERS Energy tenancy rating to promote your energy rating officially.	p. 48 'NABERS ratings for offices'
Perform an energy audit to determine how you can make and prioritise improvements to your current energy use.	p. 50 'Auditing your energy use'

Scenario A: Your current lease has some time to run	
Immediate actions and simple improvements	**For more detail refer to:**
Write a simple energy management policy, and appoint an energy manager or 'energy champion' to be responsible for implementing the policy.	p. 17 'Developing a business case for energy management'
Motivate and educate your staff to improve energy efficiency in the office.	p. 24 'EmPOWERing your people'
Review your lease to ensure you are aware of any energy performance clauses and any requirements for the building management to meet specific energy performance targets.	p. 32 'Energy efficiency and lease structure'
Meet with the building's energy manager to discuss optimising the operation of the building to improve energy efficiency.	p. 29 'Base building: make it part of your campaign'
Enable ENERGY STAR on relevant office equipment.	p. 65 'ENERGY STAR'
Make the most of your lighting system such as cleaning the light fittings, removing tubes or bulbs in over-lit areas, turning off lights when not needed and making best use of available daylight.	p. 59 'Lighting'
Ensure supplementary air conditioning units are fitted with timers to turn them on only when required. Ensure that the temperature in computer rooms and server rooms is not set too low.	p. 69 'Supplementary air conditioning' and p. 73 'Data centres, communication and server rooms'
Consider signing up to the CitySwitch program which works with tenants to achieve improved office energy efficiency.	p. 30 'CitySwitch'
Further actions and longer term strategies	
Include energy efficiency in your procurement policy – make informed purchasing decisions about energy-efficient and environmentally friendly equipment.	p. 58 'Sustainable purchasing'
Consider upgrading office or kitchen equipment that is not energy efficient.	p. 65 'Office equipment' and p. 67 'Kitchen equipment'
Engage a lighting or energy consultant to assess your lighting system and make recommendations on how it might be improved, such as upgrading your lighting technology, or implementing lighting zoning.	p. 59 'Lighting'
Sign up to a GreenPower tariff in your energy supply contract to reduce your tenancy's greenhouse gas emissions.	p. 53 'Negotiating an energy supply contract'
When the end of your lease approaches, see Scenario B. If you plan to upgrade your office fittings, see Scenario D.	

Scenario B: You are about to renegotiate your current lease or you are negotiating a new lease

What can you do?	For more detail refer to:
Seek a commitment from your landlord to achieve and maintain a high NABERS Energy rating for the base building (e.g. 4.5 stars) within a specified timeframe (e.g. 18 to 24 months).	p. 32 'Energy efficiency and lease structure'
Use your lease negotiations to maximise opportunities for energy saving in your tenancy. Investigate opportunities to incorporate energy performance clauses into your leasing contract. These might include undertakings from the landlord to: • install energy-efficient lighting • provide individually switched lighting zones that do not exceed 100 m^2 • set the Building Management System to turn lighting off at 6pm; provide override switches connected to lighting zones • provide adequate sub-metering of tenancy energy use (i.e. tenancy lighting and office equipment) so energy use can be monitored and reported.	p. 32 'Energy efficiency and lease structure' and p. 37 'Renegotiating your existing lease'
If you will be the first tenant in a newly developed building and you are negotiating a lease before the building is completed, explore opportunities to incorporate energy-efficient initiatives simultaneously in both your tenancy and the base building.	p. 35 'Negotiating a new lease'
Seek professional advice about a make-good arrangement that will minimise your costs and waste at the end of your lease.	p. 38 'Make-good liabilities and costs at lease end – take care!'

See Scenario A if you have successfully renegotiated your current lease.
See Scenario D if you negotiated a new lease at a new premises that requires a new fitout.

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Scenario C: You are looking for new premises	
What can you do?	**For more detail refer to:**
Seek premises with a high NABERS Energy rating for the base building e.g. 4.5 stars or more. Remember that in most cases, if the space for lease is more than 2000 m^2, the lessor will be required to obtain and disclose a NABERS Energy rating under the Commercial Building Disclosure (CBD) program.	p. 35 'Negotiating a new lease'
Ensure that the building provides good levels of daylight to all areas of the floor plates. Remember that west-facing windows can cause solar heat gain and glare.	p. 35 'Negotiating a new lease'
Engage a lighting consultant to assess the efficiency of the lighting system installed in the tenancy. Things to look for include: • an energy-efficient lighting system (using 7 W/m^2 or less) • wiring that is configured to facilitate the installation of lighting zoning • timers and movement or daylight sensors • automated blinds to control solar heat gain.	p. 59 'Lighting'
Ensure that the Building Management System is maintained and recalibrated every 6 to 12 months to ensure that it is maximising energy savings.	p. 52 'Setting up a monitoring and reporting system'
Investigate opportunities to incorporate energy performance clauses into the lease. See Scenario B.	p. 32 'Energy efficiency and lease structure'
Once you have found a suitable premises, see Scenario B.	

Scenario D: You are undertaking a new fitout or planning to upgrade/refit your office	
What can you do?	**For more detail refer to:**
Include in your design brief a target NABERS Energy rating (e.g. 4.5 stars) for your fitout project. Consider taking up a NABERS Commitment Agreement to help guide the design process, increase collaboration and improve outcomes.	p. 40 'Preparing the briefing'
Appoint a team of consultants with the relevant energy-efficiency expertise to maximise energy savings in your tenancy.	p.42 'Building your team of consultants'
Ensure your consultants consider methods of saving energy in all relevant services including mechanical, electrical, hydraulic and fire control and warning systems.	p.42 'Building your team of consultants'
Seize the perfect savings opportunity and incorporate energy-saving design and technologies, including:	p. 40 'Energy-efficient design and refits'
• carefully design the furniture and equipment layout to maximise the use of daylight in the tenancy space and reduce the need for artificial lighting	p. 44 'Design, development, specification and documentation'
• install appropriate sub-metering to monitor the energy use in your tenancy and other energy-intensive areas (e.g. server rooms or data centres)	p. 59 'Sub-metering'
• upgrade the lighting technology including the light fittings, the lighting controls, and the positions in which they are installed; zone your lighting	p. 59 'Lighting'
• choose energy-efficient office and kitchen equipment and set the equipment up to work efficiently	p. 65 'Office equipment' and p. 67 'Kitchen equipment'
• ensure that data centres, communications and server rooms are efficiently designed to minimise energy use.	p. 73 'Data centres, communication and server rooms'
Obtain an accredited NABERS Energy rating for your tenancy once you have moved in and have 12-months worth of energy use data to promote your energy rating.	p. 48 'NABERS ratings for offices'
Once you have moved in, see Scenario A.	

Quick start guide

How to use this guide

The *Energy Management Guide for Tenants* has been designed to assist tenants in office buildings to manage their energy use efficiently while having the light, warmth, cooling and power needed to support their business's operations. It explains how energy savings can be made by tenants in office buildings.

You *can* be environmentally conscientious *and* save money, while maintaining optimum working conditions.

Starting and gaining momentum

There are many reasons for using energy more efficiently. The trigger might be a business requirement to meet environmental reporting criteria, or it could be your staff wanting to see the premises run more sustainably. It might be as simple as wanting to reduce your medium to long-term costs. The ingredient often missing is knowledge about where to start and how to organise your efforts – hence this guide.

Section 2 aims to help you understand which areas of your office use the most energy, and what you as a tenant are actually paying for.

How you act will depend on the size of your organisation and the level of management involved. Section 3 explains how you can build a business case to gain management support. Section 4 looks at ways to get your managers and staff onto the bandwagon.

The specific things you do will depend on the type of building you are in, the particular fitout you need and the technology available. Section 6 outlines the steps you can take to re-design your office fitout to make it more energy efficient while Section 9 discusses in detail the technologies that you can use to reduce your energy use.

The type and length of your lease will affect how much you wish to invest upfront for fitout and new technology. These issues are covered in Sections 5, 6 and 9.

Why take action?

The projected impacts of climate change – and the need to reduce greenhouse gas emissions from fossil-fuelled energy generation – have increased awareness of energy consumption and the need to reduce it. When combined with rising electricity prices, a major focus for you as a building tenant is how to reduce your demand for energy.

Energy efficiency is one of the easiest and most cost-effective ways to reduce greenhouse gas emissions, and the commercial building sector has the potential to deliver some of the lowest-cost savings in Australia.

Commercial buildings account for around 10% of the electricity consumed in this country. More than two-thirds of the energy used by office buildings is in the form of electricity – our most greenhouse-intensive energy source. Office tenancies typically have significant opportunities for low and no-cost improvements. As such, you are perfectly positioned to make your office more energy efficient and contribute to reducing greenhouse gas emissions simply by managing the way you use energy (www.climatechange.gov.au).

The measures you put in place now – whether increasing staff awareness, evaluating lease options or committing to a lighting upgrade – will reduce greenhouse gas emissions and offer financial savings. Depending on your current pattern of energy consumption, you can reduce your energy bills by as much as 60%, year after year, with savings going directly to your bottom line. The benefits of energy efficiency in your office can also extend to your corporate reputation and give your business a competitive advantage when you promote your track record in sustainability. Firms with good environmental practices often perform better at attracting and retaining staff.

By using the *Energy Management Guide for Tenants* you will become more familiar with the issues surrounding energy efficiency in the business landscape.

Relationship between greenhouse gases and energy use

Most greenhouse gas emissions come from burning fossil fuels such as coal, oil and gas for energy. The amount of greenhouse gas emitted depends on the type and amount of fuel used. For example, in NSW (which is highly dependent on coal-fired electricity), every kWh of electricity purchased in 2011 (excluding GreenPower-sourced electricity) consumed by end users resulted in 1.07 kg of greenhouse gas emissions, whereas using the same amount of energy from natural gas produces only 0.24 kg of greenhouse gas emissions (see the *National Greenhouse Accounts Factors Workbook* in 'More information' at the end of this section). Energy from electricity is therefore said to be more 'greenhouse-intensive' than natural gas.

Greenhouse gas emissions from electricity vary from state to state because different fuels are used to generate the electricity. The *National Greenhouse Accounts Factors Workbook* (published annually by the Australian Government Department of Climate Change and Energy Efficiency) provides the latest emission factors to be used for greenhouse gas accounting.

What is energy efficiency?

Energy efficiency is about getting the most 'useful work' from every unit of energy consumed, or producing a product using the least amount of energy possible, without compromising quality.

Greater efficiency will reduce CO_2

'Much of the reduction in CO_2 can be achieved through increased efficiency, which saves energy and thus money.'

Professor Penny Sackett, Chief Scientist of Australia talking to the Australian Parliament 2009
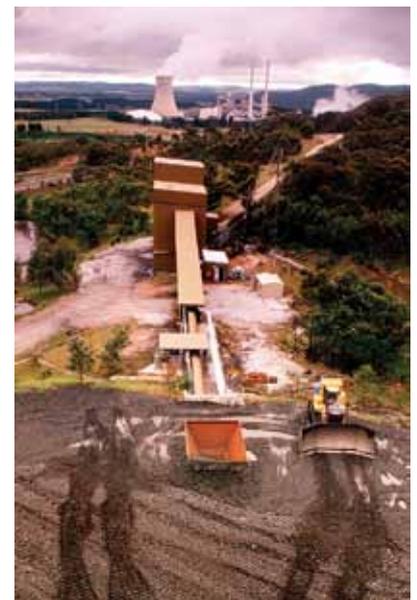
Electricity in Australia is largely generated by greenhouse-intensive coal-fired power stations.

What is the greenhouse effect?

The 'greenhouse effect' refers to a blanket of gases that traps the sun's warmth in the earth's atmosphere. Although it is a natural part of the atmosphere, recent human activity has meant that the concentration of atmospheric greenhouse gases, particularly carbon dioxide (CO_2), has increased significantly thereby making the blanket more effective at trapping heat. This is already affecting global climate, resulting in an increase in temperature and an increase in the incidence and severity of weather events. Australia has committed to reducing its emissions of greenhouse gases.

What are greenhouse gases?

The main greenhouse gases produced by human activities are carbon dioxide, methane and nitrous oxide. Each gas traps a different amount of heat. Throughout this guide, emissions of the different greenhouse gases are expressed in terms of the equivalent amount of carbon dioxide (CO_2-e).

A kilogram of carbon dioxide would fill a large family fridge and a tonne of carbon dioxide would fill an average family home.

Explaining energy management

In office tenancies, good energy management means using energy efficiently and avoiding energy waste. The skill is in minimising energy use but still providing the working environment you need to support your business's operations.

Energy management in your workplace is a combination of:

- processes – preparing the way for the changes to be made
- occupant behaviour – encouraging energy-efficiency awareness and practices in your staff, contractors and visitors
- technology – equipment and systems that achieve the same tasks using less energy.

Many tenants who have made no technical changes to improve their energy efficiency can typically reduce their energy use and costs by about 15–25% simply by modifying behaviour. This is not only significant for your organisation's bottom line but is a significant saving in greenhouse gas emissions and a big plus for the environment.

Before you can be an efficient energy manager you need to be energy aware. Energy awareness is understanding *why* energy efficiency is important to your business and the environment and *how*, by avoiding energy waste, even small changes can make a difference.

As Australia moves towards a low-carbon economy, recognising and implementing sustainable practices is becoming important for all businesses, including the property sector and its supply chain (see *Sustainable Property Guide* in 'More information'). Increasingly, company policy and good governance are being underpinned by social and environmental awareness. This is known as a 'triple bottom line' approach that balances environmental, social and economic accountability (see *Sustainable Development Guide* in 'More information').

More information

- *Sustainable Property Guide* Ch.1.1 & Ch 2.1, Office of Environment and Heritage 2009: www.environment.nsw.gov.au/sustainbus/SustainPropertyGuide.htm

- *Sustainable Development Guide*: *A Roadmap for the Commercial Property Industry*, Property Council of Australia 2001

- *Low Carbon Growth Plan for Australia*, ClimateWorks Australia 2010

- *National Greenhouse Accounts Factors Workbook*, Australian Government Department of Climate Change and Energy Efficiency 2010: www.climatechange.gov.au
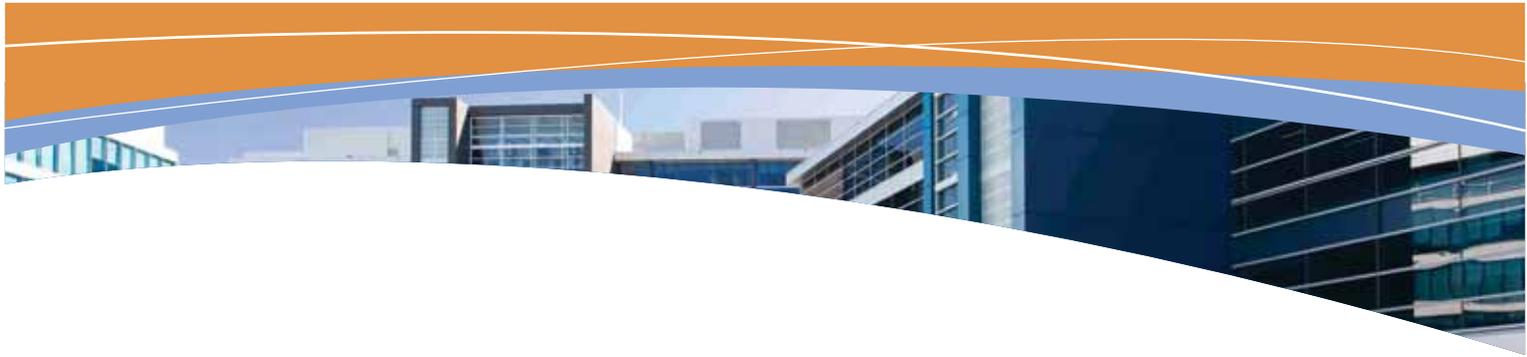
Understanding your office energy use

Energy is inevitably consumed to keep your workplace both productive and comfortable. However, the amount of energy consumed in every office is different. The relative amount of electricity used by lighting, office equipment and other sources will vary depending on the number of people you employ, your equipment requirements, working hours and the overall design of your office space, as well as any measures you have taken to improve your energy efficiency.

Typical energy use in an office

Your office energy use can typically cost up to $35 per square metre each year and result in up to 500 kg of greenhouse gas emissions per square metre each year. Supplementary air conditioning can add even more.

It is important to understand how you use energy, what you pay for directly and what you pay for indirectly in the form of base building services.

As Table 1 shows, lighting and computer equipment generally account for most of the power used by a tenant. Significant savings can be made by simply changing the way you do things. While all tenants use energy differently, these figures give an indication of the proportion of energy used by different equipment and in different areas.

Table 1: Tenancy energy use in an office building

Typical tenancy energy use	
Lighting	30–65%
Computers	20–45%
Ancillary office equipments such as printers, copiers, small power, etc.	5–20%
Kitchen equipment	5–10%

Source: OEH research.

2 Understanding energy use

After-hours air conditioning can add significantly to a tenant's power bills.

Efficient air conditioning

As a tenant you generally pay for after-hours air conditioning at an hourly rate. After-hours air conditioning can be very energy intensive if the system is not set up to cool or heat small zones or areas efficiently when required. You can work with your landlord to ensure that the air conditioning is managed to run as efficiently as possible to cater for your after-hour operations and not used when not required. If you own a supplementary air conditioning system your plant and systems should be set up and managed well. More information is provided on this in Section 9.

'You cannot manage your energy use if you do not measure it'.

Tony Cope, Head of Office, The GPT Group

What do you pay for?

Office buildings are made up of tenancies and the base building. Electricity used in the tenancies is usually a tenant cost and electricity used by the base building is a cost to the building owner. In most office buildings the energy consumption by all the tenants together is about the same as the energy used by the base building, i.e. tenants account for half the energy used in an office building.

As an office tenant, typically you pay for:

- the power consumed by your equipment, i.e. printers, copiers, multi-function devices, kitchen equipment, office computers and IT room, along with small power, which includes equipment plugged in at work stations such as mobile phone chargers, etc.
- electricity consumed by any additional air conditioning that you may have installed, or supplementary air conditioning that you have requested from the landlord
- the electricity used by the lights in your tenancy – even though, typically, the fluorescent lights in the ceiling are owned by the landlord
- a share of the electricity used by the base building including lights to common areas inside and out, lifts, heating, ventilation and air conditioning (HVAC) and the plant and equipment needed to run the building. Generally, you reimburse the landlord for your share through the outgoings (net lease), through the rent (gross lease) or a combination (semi-gross lease). See Section 5 for information about different lease structures.

Find out how your office uses energy

You need to establish whether you are using too much energy to provide the services you require, and whether you are getting good value for the money you spend on energy.

You can get a sense of the patterns of energy consumption in your office by analysing your energy bills and checking your electricity meter. See Section 9 to read about installing sub-meters in your tenancy to more accurately track your electricity use.

Option 1: Analyse your energy bills

Collect your energy bills for the past year. Graph your energy consumption over time (monthly). Look for patterns and spikes in energy consumption.

Look at the tariff or contract details to see what components of your energy consumption are most costly (e.g. peak electricity). This information will also be useful when you come to negotiate an electricity supply agreement with an energy retailer (see Section 8).

Option 2: Analyse your pattern of consumption

Use your electricity/smart meter data to analyse the pattern of consumption during the day. Your electricity supplier or building manager can help you find the meter and can explain how to read it. Most large office buildings will also be equipped with a Building Management System (BMS). A BMS will have data recorded that you can use to analyse your patterns of consumption. Ask your building manager about this.

Over a period of time (say, a week), read the meter at set times each day – the start of working hours (say 8am), start and end of lunchtime (say 12.30 and 2pm) and end of working day (say 6pm).

Then calculate the average power use per square metre (in W/m^2) during working hours, at lunchtime and outside working hours. Use the formula:

Power use (W/m^2)
= (kWh x 1000)/(time interval in hours x floor area)

For example, if consumption is 7.5 kWh over a 1.5-hour lunch period for a 200 m^2 office, power use per square metre = (7.5 x 1000)/(1.5 x 200) = 25 W/m^2.

Power use should be significantly lower outside working hours than it is during office hours. If it isn't, a lot of equipment or lighting is being left on and there is large potential for savings through better equipment management.

Option 3: Calculate your NABERS Energy rating

It may help for you to know how you are tracking compared to other tenants. You can do this by using the NABERS Energy ratings. See Section 7 for more detail.

You can assess the energy performance of your office using the NABERS Rating calculator on www.nabers.gov.au (use of the calculator is free). The guidelines that provide more information, *NABERS Energy and Water for Offices: Rules for collecting and using data*, are also available (free of charge) on the NABERS website.

To work out your NABERS Energy rating, you will need:

- the area of your office premises (in m^2) (also referred to as the Net Lettable Area or NLA)
- hours of occupancy (in hours per week)
- postcode
- number of computers in your office
- energy use for the tenancy over the past 12 months.

Enter this data into the online calculator, which will estimate a star rating on a scale from 0 to 6. A rating of 6 stars indicates that your premises has market-leading energy efficiency and 0 stars suggests that your premises are very inefficient in the use of energy.

👍 **Tip**

Aim to make your off-peak use one-fifth of your peak electricity use. If possible, ensure that lighting and equipment gets turned off using timers, and use a manual-on/auto-off default.

The Roads and Maritime Services office in North Sydney has earned a 5 star NABERS Energy rating, following a 4 star Green Star-rated fitout. Photo: Transport for NSW.
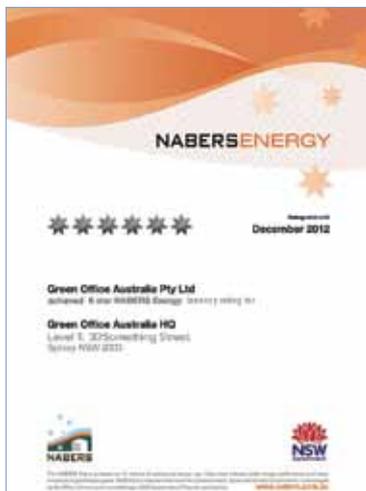
NABERS Energy rating certificate

NABERS ratings for tenants

NABERS is the National Australian Built Environment Rating System. It is a performance-based rating system for existing buildings. NABERS rates a building on the basis of its measured operational impacts on the environment, and provides a simple indication of how well you are managing these environmental impacts compared with your peers and neighbours.

As a tenant you can use NABERS to rate your energy consumption, waste generation and the indoor environment quality of your premises.

In this guide, when we refer to NABERS we will generally be referring to the NABERS Energy rating for office tenancies.

See more on NABERS Energy ratings for office tenancies in Section 7.

You must obtain an official accredited rating through a NABERS Accredited Assessor if you wish to promote your rating and use the NABERS trademark. For more information about using NABERS see Section 7.

A 'walk-through' inspection of your office by an engineer or a NABERS Accredited Assessor experienced in office energy efficiency can help identify opportunities for improvement. Organisations that consume a lot of energy may need to conduct a more comprehensive energy audit periodically, to identify where energy use could be reduced (see Section 7 for more information).

However, some improvements, such as capital outlay on new lights, come at a cost. The following Sections 3 and 4 will help you work through the business case for energy efficiency, and suggest ways to save energy around your office, both through technology and behavioural change.

Developing a business case for energy management

The drive to make your organisation more energy efficient can originate from many places. It might be initiated by a motivated employee who wants to work in a more sustainable workplace, or it may start with management wanting to achieve a smaller carbon footprint. Wherever it starts, building an effective business case for energy efficiency improvements, and securing the support of senior management, are essential to achieving energy savings, reduced greenhouse gas emissions and lower bills. Establishing a business case for energy management is crucial, and demonstrates that your organisation is committed to embracing change.

Organisational support for energy management

When starting an energy management program it is important to identify people on your staff who can play a key role in the program. They should be able to assist in devising and organising investment in projects, overseeing and reporting on energy-efficient practices in the office and also in securing internal support for the program.

In large organisations, energy management is often the direct responsibility of an appointed energy manager or sustainability manager. However, for smaller businesses, a formal position usually does not exist and therefore responsibility generally falls on the owner, office manager or accountant.

If no energy manager exists in your organisation, nominate a key employee as an 'energy champion' to be responsible for initiatives, purchasing policies and management related to energy in your office.

In larger businesses, the energy manager or team should ideally:

- be in a position and at a level that closely aligns with the organisation's conventional management structure
- possess project management, innovative problem-solving, financial and communication skills, along with a working knowledge of technology and energy issues
- be able to coordinate energy efficiency matters across the organisation.

An important step is to seek the commitment of senior management for the energy management program. Their continual support – in terms of endorsement, cooperation and resourcing – is crucial for its ongoing success.

3 Developing a business case

Change is a two-way process

Your organisation's decision-makers need to endorse the commitment of resources, both in time and money. But that's not the end of it. They need to encourage the exchange of ideas that will generate energy-saving initiatives across your organisation. An informal way to generate the exchange of ideas is to start a suggestion box. Sometimes a quick idea that doesn't need to be presented in detail will generate some great initiatives.

A small change within one department can lead to bigger things across your organisation.

Writing a simple energy management policy

A simple energy management policy can provide a framework for energy programs and help you to achieve your performance targets. It should include:

- a declaration of commitment from senior management
- a recording of the starting energy use baseline
- performance targets
- an action plan
- recording procedure
- reporting format and timing
- review procedures – a monitoring and reporting system
- budgetary considerations.

Having a policy is a great idea because it:

- sets a simple process in place
- demonstrates company commitment
- helps guide and focus efforts for improving office energy efficiency
- communicates your commitment to saving energy inside and outside your organisation
- motivates management and staff
- provides direction for a whole-of-organisation approach to energy management
- sets targets against which performance can be judged.

Widespread consultation is the key to a successful energy policy. Make sure that all your staff are given the opportunity to contribute and participate in the development process. In this way you are more likely to gain their acceptance of the policy and foster their involvement in the proposed actions.

Finding your energy champions

Identify and recognise the champions within your organisation and encourage them to contribute ideas and target opportunities in the development of your energy management policy and saving initiatives. Provide them with visible support, and adopt and communicate energy-saving practices yourself.

Energy champions should represent all departments and include decision-makers such as senior managers, alongside staff from all levels.

Include a base building representative, such as the facilities manager. This will assist you in understanding how the building works and what opportunities may exist to further finetune your tenancy's energy efficiency. An energy cost to the base building will ultimately become a leasing cost to tenancies.

Gaining senior management support

Good energy management in your workplace is not just about identifying opportunities, investigating initiatives and getting funding approval. The success of your energy management program also relies on senior management involvement. Opportunities to engage staff and colleagues may be identified at any level in your organisation, but they must carry the endorsement of senior management to have any chance of ongoing success.

Some investment, either human or financial, must be associated with your initiatives. Senior management endorsement will enable you to invest time in planning, monitoring, evaluating and reporting back to all stakeholders.

Calculating your savings

A **financial savings calculator** can be found on the website at www.nabers.gov.au/downloadFile.aspx?file_id=411.

This calculator can be used to create a financial report and summary for energy efficiency projects or initiatives as part of your business case proposal. The calculator produces a summary report that sets out the project details with capital costs, energy savings, rates of return and greenhouse implications that would be useful for presenting to decision-makers.

Getting funds approved

Knowing where to save energy is only half the solution. Submitting a good financial case and getting it approved makes the difference.

To get energy efficiency upgrades carried out, you need to first present a sound financial case to the decision-makers in your organisation to get funds approved. You need to communicate both the capital cost and the ongoing savings. Money spent on upgrades which reduce energy consumption can be paid back through savings in energy costs. And the energy savings continue to accrue. Therefore, it is important that the decision-makers in your organisation understand the long-term benefits.

Building the business case for energy management

Once you move beyond the energy-saving initiatives that are cheap or free, you will need to be able to prove that any money spent can show a return on your investment. In other words you need to be able to make a business case.

A business case is a cost-benefit analysis which looks at upfront costs and benefits as well as the costs and benefits over the life of the investment.

The first step is to define what you want to achieve: you need to be clear about your vision, mission and the lead strategies.

Remember, the business case can be applied at any scale. If you have already defined the vision and mission for your organisation's energy policy, then you can develop or apply your lead strategies at the scale appropriate for your vision and mission.

Obtaining senior management approval for the implementation of an energy management policy is essential for success.

Brief to senior management

Your brief to senior management should consider:

- What is the scope of the opportunity?
- What is the current situation and what business outcomes are likely?
- What is your timeline?
- Think about a cost–benefit analysis
- What is the cost of implementation?
- What are the direct financial benefits?
- Are there indirect benefits such as staff retention, market perception of leadership and ability to attract ethical investors?
- What is return on investment (capital outlay vs duration of lease and make-good clauses)?

See *Sustainable Property Guide* **Worksheet 2.1A, www.environment. nsw.gov.au/sustainbus/ SustainPropertyGuide.htm**

3 Developing a business case

Seven key success factors in a business case review

1: Service delivery

Will the proposed project achieve your service objectives and fulfil the identified needs? Have the scope, scale and requirements of the project been properly identified? This ties in with your mission and lead strategies.

2: Affordability and value for money

Has the proposal been defined appropriately for analysis? Are the identified benefits realistic within the remaining term of your lease? Are there sufficient resources (financial, physical and human) and will their expenditure provide value for money? Have funding options been considered?

3: Sustainability

Will the project have long-term benefits and not contribute to future harmful impacts?

4: Governance

Is the project supported by the CEO? Has responsibility been assigned for the management and reporting of benefits to be delivered by the proposal? Is the project feasible and the allocation of resources and timeline reasonable? Have processes to manage change been acknowledged?

5: Stakeholder management

Have all stakeholders been identified and their views considered?

Define your vision, mission and lead strategies

Define your vision and mission for energy sustainability and efficient energy management. If they need to be developed, start the ball rolling by initiating discussion. If your vision and mission statements are already in place, review them to check they are being followed.

Vision

This is a brief statement about your objective – for example, to aim for sustainable energy production and consumption.

Mission

This defines the pathway leading to your main objective – for example, to reduce your organisation's energy consumption, leading to financial and environmental savings.

Lead strategies

Identify the tasks needed to support your mission.

Develop lead strategies to identify the tasks needed in support of your mission. Demonstrate alignment with your organisation's vision statement, values, business goals and other policies.

Your first strategy should be to change staff behaviour, reducing energy consumption by raising energy awareness and introducing the concept of energy management. Once this is underway, then it is time to develop your second strategy – to build the business case for energy management.

Depending on the scale of your plans, your second strategy is to engage with senior management, your board, shareholders and other internal and external stakeholders, including your base building's managers. This is because gaining support at a higher level is crucial to the success of your campaign. The principle is the same – whether seeking capital expenditure on a lighting upgrade, aiming to gain staff support for turning off computers when they leave the office or developing an energy policy for your company.

The business case template

The business case describes the work to be done and what the project will deliver if funding is approved. Funding can be in the form of direct financial cost or staff deployment. The business case presents a range of options and supports the preferred option. Include estimates of the cost, the benefit and the timing.

Review procurement

Review your procurement policy and make sure it takes energy efficiency into account. Make sure you also consider the energy embodied in production, transport and disposal.

Examine energy use

Review your current energy use by looking at energy bills and tariffs to establish a baseline. Use NABERS Energy ratings or organise an energy audit of your tenancy.

Look for savings opportunities

Use the energy management checklist at the end of this guide to identify and document energy savings opportunities in your tenancy. Identify costs and savings over the life of the project and include the costs of implementation. Review external funding opportunities such as grants. Calculate returns and savings using methods such as internal rate of return or net present value.

Financial savings will be achieved either directly through savings on your tenancy energy bills, or indirectly through savings to the base building, which can then be passed on to tenants by providing opportunities for expenditure elsewhere. In addition to the financial savings, other positive outcomes may include market perception of leadership, resource efficiency, staff retention and the ability to attract ethical investors.

Use the rating tools

Tools such as the NABERS Energy rating can be used to measure your environmental achievements. Achieving a good rating will demonstrate your commitment to sustainability to both internal and external stakeholders.

External stakeholders may also include the base building's managing agents and facilities manager, as well as other tenants.

Raise awareness

Raise awareness about the need to avoid energy waste in order to achieve both financial and environmental savings.

What are your business drivers?

Identify business drivers such as increased operational cost efficiency, corporate and environmental responsibility, carbon reduction, engagement with staff, the energy savings and sustainability goals of external stakeholders, and improved reputation.

Identify risks

Identify any risks associated with energy-saving initiatives and quarantine them accordingly, e.g. safety lighting, after-hours lighting and external lighting. Identify the capital outlay needed to improve efficiency, e.g. movement sensors and timers.

Investigate the 'do-nothing' alternative. Take into account future price increases for energy, which present a risk to your budget. Also identify any potential damage to your business reputation or loss of marketing potential around the issues of sustainability and good governance.

Seven key success factors in a business case review
(continued)

6: Risk management

Have the appropriate stakeholders been consulted in assessing major risks associated with the project, and contingencies and mitigation measures been allowed for? A good example of contingent costs is future carbon prices and increasing electricity tariffs.

7: Change management

Has the extent of change been identified and assessed? Have the processes to manage change been determined?

Source: Business Case Gate Review Workbook – Issue No. 5. June 2009, NSW Treasury

3 Developing a business case

Government help

The Office of Environment and Heritage NSW (OEH) has a Sustainability Advantage program to help medium-to-large organisations understand sustainability and strengthen their environmental performance. A new component of the program – Sustainability Advantage Energy Saver – offers an energy audit and free technical support to undertake effective and practical power-saving and money-saving projects.

If your organisation joins Sustainability Advantage, specialist consultants will help you improve in the following areas of business sustainability:

- vision, commitment and planning
- resource efficiency
- environmental risk and responsibility
- external stakeholder and staff engagement
- supply chain management
- climate change.

www.environment.nsw.gov.au/ sustainbus/ sustainabilityadvantage.htm

Identify best opportunities

Identify the best opportunities for achieving savings and identify the budget required for low-cost initiatives, e.g. awareness campaigns, rewards (which might include a box of chocolates or donation to a nominated charity), and staff deployment to instigate, monitor and report on energy-saving initiatives.

What are the most cost-effective opportunities to spend your capital?

Identify the best opportunities to spend your capital to achieve energy savings. These will need to be measured against the conditions and duration of your lease.

Consider any indirect costs such as 'make-good' requirements at the end of the lease.

Keep it simple

Examine the language and structure of your corporate or business plan so your proposal is easily understood by the intended audience.

Keep it open to change

Make sure the business case is dynamic and develops as organisational priorities change and staff awareness increases. This will keep your business case relevant to the organisation's objectives.

Start implementing

Implement the approved savings projects identified in your business case.

Report back

Review outcomes and report back – it is important to keep all stakeholders informed of your progress and your achievements. Also measure and report on previous projects.

Take this as an education opportunity to raise staff awareness of energy efficiency by measuring your energy performance.

Reinvest the savings

Reinvest your savings in further energy efficiency projects or invest in GreenPower renewable energy purchases.

Implementing the successful business case: who will be responsible?

Successful energy management needs a leader. If you are in senior management, appoint an energy manager – someone who will coordinate initiatives across your various departments. In each of these departments appoint an energy champion – someone who will take the message to their team, foster energy-saving initiatives and report back. If you are attempting to drive this change from further down the ladder, it is important that senior management and other decision-makers are visible supporters of your efforts. Section 4 looks at how to identify and support your energy champions and build energy awareness.

More information

- *ESD Operations Guide for owners, managers and tenants,* Australian Government Department of the Environment, Water, Heritage and the Arts (DEWHA) 2009

- *Business Case Gate Review Workbook*, Issue No. 5, NSW Treasury 2009

- *Sustainable Property Guide,* Office of Environment and Heritage 2009: www.environment.nsw.gov.au/sustainbus/SustainPropertyGuide.htm

Section 1.1	Sustainability – the business context
Section 2.1	Building the business case for your organisation
Worksheet 2.1A	Sustainability business case template
Worksheet 2.1B	Which sustainability project? Evaluating the options

- *Forging New Links – Enhancing Supply Chain Value Through Environmental Excellence*. Global Environment Management Initiative 2004: www.gemi.org/supplychain/resources/ForgingNewLinks.pdf

- *The Sigma Business Case Tool: Sigma Guidelines:* www.projectsigma.co.uk

Successful energy management needs a leader to coordinate the implementation of energy-saving initiatives across departments.
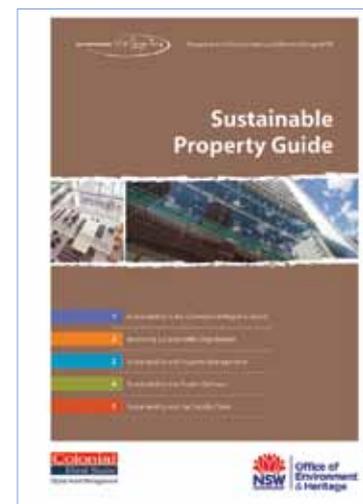
Sustainable Property Guide

Published by the Office of Environment and Heritage in association with Colonial First State, this is a comprehensive guide to incorporating sustainable practices into the many aspects of the commercial property industry.

The guide puts sustainability into context, from showing how to prepare a business case, through to managing property more sustainably and setting up and running projects to meet new environmental standards. It provides step-by-step guidance, case studies, practical checklists and worksheets.

www.environment.nsw.gov.au/ sustainbus/SustainPropertyGuide.htm

EmPOWERing your people

This section of the guide will help you to maximise the effectiveness of your energy efficiency activities by engaging your staff and encouraging behaviour change.

Energy management in your workplace is not just about identifying opportunities, investigating initiatives and getting funding approval. The success of your program hinges on staff involvement – the primary driver behind efficiency and conservation efforts. By making sure that key staff are responsible for energy efficiency, developing an energy policy and educating your staff, you can give them the tools to contribute and motivate them to help you achieve the savings you want.

Educating and motivating your staff

You should never underestimate the value of encouraging participation and cooperation by staff and management in using energy wisely. Ongoing motivation and education are key to improving energy efficiency.

If you keep your staff abreast of energy management activities and raise individual awareness of greenhouse issues you can generate real benefits by:

- encouraging participation and environmental responsibility – the more support, the more effective your energy-efficiency program and initiatives will be
- helping dispel misconceptions that energy-saving measures are uncomfortable or result in loss of amenity
- boosting staff morale and pride – as they are made to feel part of the solution.

Improved cooperation and communication towards a common goal can also increase employee unity and harmonious workplace relations.

Communication is education

Regularly communicating your program plans and progress to staff reminds them of the value of their contribution and helps fuel ongoing enthusiasm and participation. Utilise communication and marketing resources in your organisation – sustainability is generally a 'good news' story. Provide feedback via newsletters, signage, posters, memos, billboards, reports, internal bulletins, email, or meetings on:

Energy awareness at work

The biggest and most cost-effective energy savings can be made when your staff embrace the changes. By creating awareness of how even small steps towards energy efficiency can add up to big changes, you can begin to change the way your staff work.

- energy efficiency initiatives
- handy hints for conserving energy in the office (and at home)
- news on global warming and the greenhouse effect
- results of progress against targets (e.g. NABERS)
- savings achieved (dollars and greenhouse gases)
- challenges faced and ideas for improvement
- lessons learnt from failures.

If you have shareholders, speak with your organisation's corporate communications team about publishing information in your shareholder magazine, and also in your annual report. Shareholders will be interested to hear how saving energy improves the bottom line.

Encourage active participation

Make **involvement of key staff** in energy efficiency activities a priority by creating an energy management taskforce or team to coordinate initiatives and motivate the rest of the organisation into action.

Encourage constructive feedback from staff in regular meetings. You could set up a staff suggestion scheme to help the continual improvement of the design of the program.

Add sustainability to team and management **meeting agendas**.

It is important to **recognise successful efforts**. Run an office competition to find ways to make the workplace more energy efficient and environmentally friendly, offering a small reward (e.g. a water-efficient showerhead for the home) or incentive for an employee who saves the most money or provides the best suggestion.

Use training programs to raise awareness

Incorporate efficient energy management and use of equipment and technologies into existing training programs. Ensure that energy efficient practices are included in staff induction processes for new employees. Apart from knowing how to enable ENERGY STAR (see Section 9) on their office equipment and operate lighting systems more efficiently, staff should also know:

- why energy savings are important and how they impact on budgets and greenhouse gas emissions
- how their everyday behaviour affects energy consumption
- what actions can be taken
- how they will benefit.

Take a step forward

If you are a member of staff who wants to be involved in change, volunteer to become the energy champion for your department and initiate some simple, low or no-cost ideas to inspire others.

Avoid making wallpaper

Don't let 'reminder' posters or stickers become wallpaper: replace or reposition them from time-to-time so they are fresh to the eye and staff will read them again.

Motivating staff

Motivation comes from within, so how do you create that interest?

While you shouldn't assume that money is the only or the best way to motivate, financial rewards can be a recognition for work well done.

The winning department each quarter could choose a charity and make a corporate donation equal to that quarter's savings on energy bills.

Recognition and responsibility have a big impact on motivation.

Increasing autonomy, discretion and personal accountability will increase motivation.

Use existing training programs to raise awareness of the energy efficient practices in your tenancy, and ensure this information is included in staff induction processes.

Colliers International Project Services (previously Roberts Weaver Group) provides integrated project and change management, interior design and IT expertise to clients who are moving, developing or reshaping their workplaces.

Colliers achieved a **4 star NABERS Energy** rating out of a possible 6 stars through management commitment and encouraging staff to change their behaviour.

The high NABERS Energy rating was achieved by:
- management encouragement and leading by example:
  - switching off lights and PCs
- encouraging positive staff behaviour
- installing signage on central light switches that indicated zoning:
  - early starters generally limit use of lighting to their areas
- reinforcing the energy conservation message through:
  - regular emails
  - posters
  - announcements at staff meetings.

The result was achieved without the use of contemporary lighting technologies.

Photo: Colliers International.

If you are a senior manager, present your energy management plan for executive or board endorsement. Consider drafting an energy management policy for the organisation and build a business case (see Section 3).

Turning awareness into action – define your message

Adopt the slogan: 'Turn it off'. This is the simplest and most effective message to communicate. Make the reduction in energy a platform from which to build energy awareness. A range of promotional material, such as stickers and posters, is available to help you communicate your message (see 'More information' at the end of this section).

Implementing your awareness program will take energy, enthusiasm and imagination. Consider a presentation, special event or challenge to launch your campaign.

Helpful hints on getting underway

- Distribute a simple questionnaire to staff to establish the level of awareness about energy waste and energy efficiency.
- Use the energy management checklist at the end of this guide to identify energy-saving opportunities in your office.
- Use simple graphs or charts to show your organisation's energy use patterns over time. This will also help you to identify your biggest energy users.
- Promote your campaign launch at least two weeks in advance using a range of tools. If your organisation has a staff newsletter, use it to generate interest and compare the progress of various departments. Offer some sort of recognition or prizes on the way through. These could be as simple as chocolates left on workstations or nominating the charity to which a donation could be made.
- Adapt your techniques to match staff culture: learn from experience and adapt your program as you go. Remember, this is not a one-off exercise and you need to maintain your momentum.
- Repeat your 'Turn it off' message frequently, using a variety of approaches over a sustained period. It can take a long time to embed change into an organisation's culture.
- Identify your biggest targets – these can include your staff and other building users.
- Evaluate your energy awareness campaign against your original goals – remember your vision and mission and lead strategies (see Section 3).
- Remember that awareness programs are more effective when linked to changes that staff can see. If you are planning to invest in energy-efficient lighting, start your awareness programs at the beginning of the installation and continue the programs throughout.

How to run a successful campaign

For an energy campaign to be ongoing and successful, you need to consider funding for:

- staff training
- rewarding competition winners for achievement
- ongoing monitoring, evaluating and reporting.

Staff need to understand that their efforts are not just short-term actions but represent a fundamental change in the way your organisation conducts its business. This can be supported by continuing education, information and recognition of how their change has not only reduced costs but increased value and productivity.

All stakeholders need to identify with this change and benefit from it. The rewards can take many shapes and forms but acknowledging effort and sharing the results of good energy management is a great place to start. For example, initiate a staff competition linked to environmental ideas for your workplace.

Feedback – sharing your successes with the office

Keep your staff informed by:

- regularly reporting progress against objectives in your energy management program – inform employees of performance successes and failures in your staff newsletters and via internal email
- placing your organisation's energy policy, educational material and progress reports in staff communal areas – this can increase general staff awareness and engagement with your workplace energy initiatives
- posting simple clear messages on staff noticeboards outlining handy energy-saving tips, energy-efficiency initiatives and the latest greenhouse gas savings
- sticking posters around your office reminding staff to switch off lights and computers and use power-saving functions on photocopiers
- circulating an EnergySmart newsletter to staff providing energy-saving hints for the home – you could distribute this monthly or at the start of each season
- regularly sharing information through internal newsletters, emails, staff billboards, posters or reports between the different management levels and functional areas within an organisation – this can lead to more streamlined and effective energy-management systems and better results
- including energy-saving actions as an agenda item in staff meetings or as part of a weekly or monthly informal meeting – this is an effective system for gathering feedback from staff.

ARUP uses the Office Realtime data visualisation system in their Brisbane office to allow staff members to see their energy, water, paper and flight consumption trends in 'real time'. Photo: ARUP.

BRIGHT IDEA

Share shut-down savings with staff. You can demonstrate how much can be saved with a plug-in power meter. Simply plug the meter into any power socket then plug your appliance or equipment into it. It will give you a readout of the kW used by an appliance such as a kettle, mobile phone charger, printer or computer and an indication of cost. This is a great way to demonstrate the drain of small power at work stations from appliances continually plugged in and drawing power, even in standby mode.

Small power

This is the term used for the many pieces of low-energy equipment that are plugged in around the office including phone chargers, calculators and lamps. Combined, they can contribute about 4% of an office's power consumption.

Make sure that staff can reach power points so it's easy for them to unplug their equipment when not being used.

4 Empowering people

Shut-down checklist

- ☐ Appoint a switch-off monitor. This could be someone who works late, the cleaners or security staff.
- ☐ Place red-dot stickers on equipment and switches which must not be turned off, such as computer servers, PABX systems (telecommunications) and security lighting marking exits.
- ☐ Consider using a USB-controlled powerboard (which ensures the computer can only be on when the USB port on a computer is powered up.)
- ☐ Ask your ICT staff to implement initiatives such as enabling ENERGY STAR on computers.
- ☐ Adjusting the brightness on computer screens will lead to big long-term savings when implemented across all departments.
- ☐ Have a regular shut-down reminder day each week, when staff are actively reminded to switch off.
- ☐ Provide reminders such as stickers, posters and emails.
- ☐ Promote awareness and have special reminders before weekends and holiday periods.
- ☐ Convince IT staff to operate the computer data room air conditioning at a temperature higher than the chilled environment previously required. This can lead to significant savings.

👍 **Tip**

Say 'No' to personal heaters. A personal heater will upset the balance of the air conditioning system and someone else may 'freeze' as a consequence!

Start your colleagues thinking

This step may be the bravest but it's not necessarily the hardest.

The questionnaire you send out will be a good way to learn how energy-aware your staff are, how uniform the departmental culture may be and how to 'break through' and motivate the staff as individuals. It will also start staff thinking about energy awareness and may even start their journey towards becoming energy champions.

There are many no-cost or low-cost options to explore as a way of getting people thinking. Give your colleagues an energy-use benchmark, such as how they use energy in their home, to get them to take a personal interest in their energy use at work. For example:

- When they leave home, do they leave all their lights or their computer on? If not, then why is this the case at work?
- If they are hot or cold at home do they adjust how much clothing they are wearing?
- Do they think that shutting down their computer will interrupt the network or after-hours backing up?
- Do they understand that collective, small initiatives can add up to big savings?
- Do they understand the implications of energy waste?

A 'Turn it off' campaign can only operate with the full support of your organisation's management because energy-saving initiatives need to be owned, shared and experienced by an organisation's decision-makers.

You should focus on two groups – management and your Information and Communication Technology (ICT) department. Management can set policies for energy reduction and the ICT department is in control of the area of the business that can bring about the greatest changes and savings.

If your colleagues understand that their savings make a difference and will be valued, then they will be more open to change.

Black balloon campaign

It is difficult to visualise energy use and waste.

The Victorian and NSW governments have been running successful campaigns to save energy by explaining the extent of greenhouse gas emissions and carbon pollution through the use of symbolic black balloons. Other state and territory governments are also using the black balloon to give a tangible example of what 50 g of carbon pollution could look like as a unit of pollution.

A 36-cm diameter black balloon represents 50 g of greenhouse gas pollution. While the campaigns are often aimed at householders, many of the appliances and equipment targeted are also used in offices. With the price of electricity increasing, the good habits promoted at home can be mirrored in a similar campaign at work.

For example you can:

- save 11,000 black balloons a year by switching lights off in unoccupied areas
- save 111,000 black balloons a year by converting twin-lamp luminaires to a single lamp with high-efficiency reflectors and electronic ballast
- reduce energy consumption by around 10% by increasing the temperature of your supplementary air conditioning system by 1°C in warm months. This will save 4000 black balloons each year.

See more at the Save Power website (www.savepower.nsw.gov.au).

Base building: make it part of your campaign

As a tenant, you may have little direct control over base building services such as lighting in the common areas and air conditioning. The largest use of energy in buildings is air conditioning for staff thermal comfort and to provide a suitable operating temperature for ICT equipment rooms. The demand for after-hours air conditioning – either by you or other tenants – may impact on the whole building if after-hours requirements cannot be isolated from the heating, ventilation and air conditioning (HVAC) system.

Have your base building's facility manager join your team of energy champions and invite their participation and ideas at meetings. This way, you are working with the building owner's representative to achieve energy efficiency outcomes from which both sides can benefit.

More information

- Black balloon campaign: these resources include information about the black balloon campaigns in NSW and Victoria, and include ideas about how to engage your staff in energy-saving initiatives:

  www.savepower.nsw.gov.au

  www.saveenergy.vic.gov.au

  www.resourcesmart.vic.gov.au

- Sustainable Energy Ireland has developed the Energy MAP (Energy Management Action Program) which is a campaign to promote energy efficiency awareness and practices among employees: www.seai.ie/EnergyMap/Energy_Awareness

- *Staff Awareness and Motivation: Saving Energy with People Power* & *Questionnaire Template*, Energy Efficiency and Conservation Authority New Zealand: www.eecabusiness.govt.nz

- *Energy Innovators Initiative: Saving Money through Energy Efficiency. A Guide to Implementing an Energy Efficiency Awareness Program,* Natural Resources Canada: http://oee.nrcan.gc.ca/publications/infosource/pub/ici/eii/m144-22-2003e.cfm

Knight Frank conducts random computer audits to make sure staff shut down their computers overnight. Each staff member who turns their computer off during the audit receives a chocolate, and those who have not turned their computers off have a black balloon taped to their computer screen as a gentle reminder. Photo: Knight Frank.

BRIGHT IDEA Run a competition for inventive office campaigns e.g. posters and black balloons placed near printers and photocopiers.

Send the YouTube link for the Black Balloon TV advertising campaign to staff: www.youtube.com/watch?v=gcMNZuelyNI

👍 **Tip**

A great way to promote communication and knowledge sharing is by having the building's facilities manager or engineer join your Green Team as one of your champions.

CitySwitch

CitySwitch is a national energy efficiency program that works with tenants to improve office energy efficiency, thereby reducing the CO_2 emissions attributed to office use. As a signatory you make a committment to:

- commence a benchmark NABERS Energy rating for your tenancy within three months
- implement an energy action plan to maintain a 4 star or higher accredited NABERS Energy tenancy rating
- appoint an Energy Manager to monitor actual performance
- request a NABERS Energy base building rating from the building owner/manager
- promote energy efficiency to staff, customers and suppliers and share their experiences with other signatories
- obtain annual NABERS Energy ratings and provide feedback on success in a formal progress report.

Benefits include:

- positioning/promotion as an environmental leader
- increasing staff productivity, morale and loyalty
- offering a structured way to commit to reducing greenhouse gas emissions
- networking opportunities with like-minded businesses
- gaining market recognition for your achievements
- regular updates and a dedicated web resource.

www.cityswitch.net.au

- *Sustainable Property Guide*, Office of Environment and Heritage, www.environment.nsw.gov.au/sustainbus/SustainPropertyGuide.htm
- Sustainability Victoria's website has information and resources on sustainability: www.sustainability.vic.gov.au
- Fostering sustainable behaviour, community-based social marketing: five resources for fostering sustainable behavior in agriculture and conservation, energy efficiency, transportation, waste and pollution reduction and water efficiency: www.cbsm.com/public/world.lasso

Negotiating an energy-efficient lease

If you are renegotiating your existing lease or negotiating a lease for new premises for your business, you have an excellent opportunity to make sure that the new premises are set up to be energy efficient. This section provides guidance in assessing potential tenancies, understanding how lease structures can affect your costs and the landlord's costs, and incentives to facilitate improvements in energy efficiency.

Understanding your lease

The way a commercial property lease is structured will affect the way costs are split between the tenant and the landlord. As a savvy tenant, you should understand the implications of your lease arrangements and use the agreement to support your organisation's objectives for energy efficiency and cost effectiveness.

Lease structures

There are generally three types of commercial lease:

Net lease – rent does **not** include outgoings (base building costs such as cleaning, servicing of air conditioning plant and equipment, building repairs, etc. – these costs are shared by tenants). Tenants pay for their own electricity for power, lighting and tenancy air conditioning package units.

Gross lease – rent includes **all** outgoings (i.e. the landlord is responsible for the base building costs such as cleaning, servicing of plant and equipment, building repairs, land tax, insurance, etc.) The landlord pays for the electricity used by both the base building and within the tenancy.

Semi-gross lease – rent includes all outgoings except statutory costs (e.g. land tax, insurance etc.). In some instances the outgoings are included in the rent, but you pay increases above the base year.

Lighting and equipment in tenancies is a major contributor to the internal heat load in the building. Inefficient lights produce more heat than efficient ones. The heat load produced by the lights and other equipment is removed by the building's air conditioning. The landlord under a net lease pays for the cost of electricity used by the base building's air conditioning to cool the building, but reclaims the cost from the tenants.

Therefore, net-lease tenants in buildings with inefficient lights are likely to pay higher outgoings. It is therefore in the tenant's best interest to occupy buildings with energy-efficient lights.

5 Negotiating a lease

Lease costs

The total leasing cost you pay your landlord includes:

- rent, usually based on a rate per square metre, times the net lettable area (total rent = $/m^2$ x NLA), and
- outgoings, which are the tenant's share of the operating costs of the building.

Outgoings include:

- repairs and maintenance
- cleaning
- base building energy costs for running heating, ventilation and air conditioning (HVAC), foyer lighting, pumps, fans, central hot water, etc.

You should understand exactly how the outgoings component of the lease cost is structured and how all services are provided.

Under gross leases with the running costs factored into the rent it should be in the landlord's interest to install efficient lighting.

Energy efficiency and lease structure

The problem with net leases

Under net leases the tenants pay the base building's energy bills indirectly through outgoings. In addition, they pay the direct costs of lighting and the power they use in their tenancy, as well as their rent, to the landlord.

Net leases do not give the landlord a financial incentive to install energy-efficient systems, such as efficient lighting and controls. This is because the landlord carries the upfront costs but it will be the tenant who gains from the ensuing savings.

However, you may request that you manage your lighting throughout your lease, which would enable you to make the changes you require to meet your energy-efficiency goals. Allowing a tenant the freedom to make these changes may make a premises more attractive for potential tenants. This would be an incentive for landlords.

The benefits of gross leases

Gross leases allow the landlord to gain from investing in equipment that will reduce energy costs in the base building. The tenant still pays the costs of running their own equipment and the light fittings provided by the landlord in the tenancy.

Under a gross lease, air conditioning energy costs are mostly incorporated as a flat lease rate, instead of as a variable cost passed to tenants through the rent. This creates an incentive for building owners to provide central cooling services in the most cost-effective and efficient way. The lighting in the tenancy is a major contributor to the air conditioning load, but the cost of electricity for the lighting is a hidden tenant cost (billed through the rent). Reducing this load will improve the efficiency of the base building.

However, be warned – with net leases there are fewer risks to the landlord because they pass on their costs directly. With gross leases landlords may seek to charge a rental premium to cover their risks associated with managing and paying for base load costs.

Before you decide on the lease arrangement best suited to you, find out about the financial implications of each lease type. Your tenancy advisor should be able to produce a financial model to assess the difference between net and gross rents. You may need some assistance in the calculation from your energy advisor.

Environmental or energy performance clauses in leases

Specific clauses may be inserted into a lease to encourage improvement in the base building and tenancy energy use. This is part of what is referred to as **environmental performance** or **green lease** clauses.

During initial negotiations, you can insert energy performance clauses to ensure building services are managed to the required specifications and targets.

These specifications may include kWh/m^2 benchmarks and a commitment from your landlord to achieve an agreed NABERS Energy rating for the base building (e.g. 4.5 stars) within a specified time (e.g. 18 to 24 months). These types of benchmarks should also be supported by regular audit assessment periods – at least every six months. It may also tie in with the tenant's use of after-hours air conditioning (which uses the base building cooling towers and chillers).

Environmental performance clauses in leases are becoming more common and they generally have mutual obligations. In other words they place obligations on both the landlord and the tenant. It is not unusual for the tenant also to be required to commit to achieving energy performance benchmarks in their tenancy within a specific time.

Examples of environmental performance requirements that could be considered for inclusion in the lease are:

- for the landlord to achieve and maintain a certain NABERS Energy rating for the base building
- for you to achieve and maintain a certain NABERS Energy rating for your tenancy
- for the landlord to install energy-efficient lighting
- for the landlord to provide zoned lighting.

Examples of environmental performance targets and initiatives that can be included in green lease provisions

Landlord

- Improve base building to be NABERS Energy rated to 4.5 stars or above by year two of the lease.
- Establish an energy management committee and develop an energy management plan for the building.
- Establish an environmental management committee, or add sustainability to the agenda and responsibilities of the building management committee.
- Undertake continual monitoring of energy consumption of the premises and provide the lessee with reports of the energy consumption at each environmental management committee meeting.

When negotiating or renegotiating a lease on a tenancy, make the most of the opportunity to facilitate improvements in energy efficiency.

Lighting power density is a measure of the electrical power used to provide lighting to a space. It is measured in watts per square metre.

The Knight Frank Brisbane office has achieved a 4.5 star NABERS Energy tenancy rating. Photo: Knight Frank.

- Establish in-house training for the environmental management committee to ensure dissemination of emerging developments in 'green' building management.
- Provide adequate metering/sub-metering of individual lighting and power supplies for the base building.
- Wherever possible install and use energy-efficient lighting and controls.
- Ensure the lighting system has the capability to provide individually switched lighting zones that do not exceed 100 m^2.
- Base building lighting level to be set at particular lux or light level, e.g. lighting power density of less than 7 W/m^2 for 320 lux and fitout to set lighting at particular lux level.
- Install and maintain a building management system (BMS), upgrade during the term of the lease and undertake regular reviews of settings and performance to optimise operation of the system.
- Set the BMS to turn lighting off in the building at 6pm with the ability for the landlord or tenant to override the default switch for lighting in the building.
- Provide the tenant with quarterly reports of the environmental performance of the building.

Tenant

- Achieve and maintain during the term a 4.5 or 5 star NABERS Energy rating for the tenancy.
- Participate in the building's energy management committee and energy management plan that would be prepared by the landlord.
- Undertake (as a minimum) quarterly monitoring of energy consumption for the tenancy and provide the landlord with reports of the energy consumption at each environmental management committee meeting.
- Join and participate in the CitySwitch Program (see page 30).
- Install timer controls to supplementary air conditioning systems.
- Incorporate energy conservation initiatives into the tenancy where the tenant:
  - must not use incandescent, halogen or energy-intensive lighting
  - must have movement sensors in meeting rooms, store rooms, etc. to control the lighting and to trigger the lighting switch when required
  - should install and use adequate metering/sub-metering for energy consumption
  - should encourage energy-efficiency practices among staff
  - should install separate light switches for individual work spaces.

Adapted from Royal Institution of Chartered Surveyors (RICS) Environmental Performance Clauses – Commercial Property Leases Australia.

Negotiating a new lease

Assessing the building before you sign

Ask for a NABERS Energy rating for the base building and look for a base building NABERS Energy rating of at least 4 stars.

Ask if the building purchases GreenPower and, if so, what percentage. See Section 8 for more information on GreenPower.

Assessing the tenancy before you sign

Look for tenancies with good levels of daylight reaching all areas and efficient floor plates (see for example the figures below). This will enable you to save energy and energy costs through the term of your lease simply by ensuring that your fitout design and layout optimises these features. Remember that west-facing windows can cause considerable solar heat gain and glare.

Office floor plan

Shading will be required

Area for workstations. Maximum natural light, but no direct sunshine if shading is provided.

Lifts, services & toilets core

Com./IT room away from solar load

Shading will be required

North
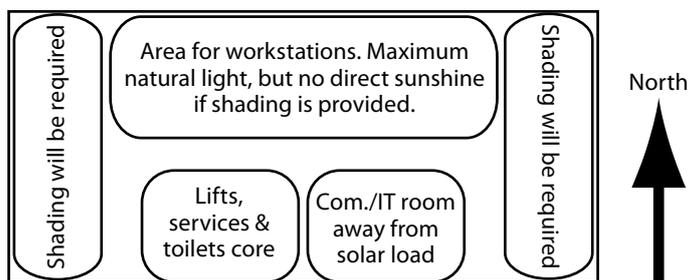
West–East section

West:
Heat and glare from horizontal sun in the afternoon
Look for:
- shading by other buildings
- solar control blinds
- obscuring blinds
- high performance glass
- double glazing

Window → ← Window

Office area

East:
Sun horizontal in the morning
Look for:
- solar control blinds
- obscuring blinds
- high performance glass
- double glazing

North–South section

North:
Sun high at midday summer
Glare and sun control are priorities in winter
Look for:
- shading to windows (no direct sun)
- solar control blinds for winter
- high performance glass
- double glazing

Shade structure

Shading
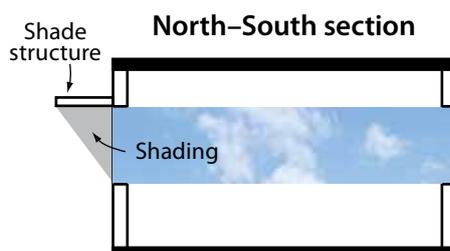
South:
Little sun except around mid-summer
Glare and sun control are low priorities
Look for:
- solar control blinds
- high performance glass
- double glazing

Source: J Goddard & Co. 2009

Commercial Building Disclosure

Commercial Building Disclosure (CBD) is a national program designed to improve the energy efficiency of Australia's large office buildings. The program has been developed by the Australian, state and territory governments, as part of a package of measures to encourage building energy efficiency. It is managed by the Australian Government Department of Climate Change and Energy Efficiency.

Under the program, most sellers or lessors of office space of 2000 m² or more are required to obtain and disclose a current NABERS Energy base or whole building rating. The NABERS Energy star rating must also be included in any advertisement for the sale, lease or sublease of the office space.

The transition period for the first year of the program (where a valid NABERS Energy base or whole building rating is all that must be disclosed) ended 31 Oct 2011.

From 1 November 2011, a full Building Energy Efficiency Certificate (BEEC) will need to be disclosed. BEECs are valid for 12 months, must be publicly accessible on the online Building Energy Efficiency Register, and include:

• a NABERS Energy star rating for the building (base or whole building rating)

• an assessment of tenancy lighting in the area of the building that is being sold or leased and

• general energy efficiency guidance.

(continued next page)

Commercial Building Disclosure *(continued)*

The program will help you make informed decisions when looking for office space and let you easily access credible and meaningful information to compare the relative energy performance of buildings before making a leasing decision.

If you want to sub-lease office space, watch out for the disclosure requirements that apply if the space is more than 2000 m².

www.cbd.gov.au

Energy-efficient equipment and lighting installed as part of the base building will achieve cost savings for you as the tenant. Such equipment and lighting may include:

- energy-efficient light fittings such as T5 or light emitting diodes (LED) lights – lights considered efficient consume less than 8 W/m²
- wiring that is configured so that light switching may be zoned – in this way areas of 60–100 m² can be switched separately and only small areas switched on when needed
- movement sensors for lighting areas when they are not in use, i.e. meeting rooms or for office areas after-hours
- photo electric (PE or light-level sensitive) cells to turn off perimeter lights when the daylight is sufficiently bright
- sub-metering so that tenant lighting and power can be tracked
- blinds on windows to control solar heat gain.

Be careful of:

- tenancies with inefficient base building air conditioning systems metered from your electrical distribution board
- floors with single light switches.

Questions to ask when looking for office space

Given the complexities in assessing a lease, the following items need to be provided to those people in your organisation (or outside) who are assessing a lease (e.g. building owners, real estate agents and solicitors):

- Type of lease structure (gross or net)?
- Type of power purchased for the space (standard or GreenPower)?
- Average cost per square metre for base building energy consumption (electric, gas and other)?
- If the tenancy has supplementary air conditioning, confirm whose meter the supplementary air conditioning is on.
- Is after-hours air conditioning included in the outgoings? How is it metered and apportioned?
- Is there a building management system (BMS)? How often is it checked and recalibrated? Sensors and controls need to be checked, maintained and recalibrated every six to twelve months to ensure the BMS is functioning properly and set up to maximise energy savings. (See more in Section 7).
- Does the building have a NABERS Energy rating? If so, what is it? What plans are in place to improve the rating?
- What energy-efficiency initiatives have been made in the office space and building to date?
- At refurbishment time, will consideration be given to upgrading or installing energy-efficient building plant services? On what basis would projects be given the go-ahead, e.g. a specific internal rate of return (IRR)?
- Does the landlord have an ISO14000 plan (Environmental Management Plan) in place? If so, what energy-efficiency incentives have been introduced?

Negotiating good ratings

If you are satisfied that the building can meet your accommodation needs, but the tenancy and base building are not energy efficient, negotiate better performance with the owner. After all, the landlord may be looking for a reason to upgrade or introduce new systems and performance levels. Positive tenant demand will help landlords understand that occupiers want to be energy efficient. Tenants can demonstrate that they understand that occupying energy-efficient buildings with energy-efficient lighting will reduce their costs and environmental impact.

Around half of the greenhouse gases from office buildings come from base building activities. Lease negotiations provide the best opportunity for the tenant to influence the base building's greenhouse performance.

Renegotiating your existing lease

If your lease is expiring and you plan to stay in your current premises, you will need to agree to an extension to your lease, or to a new lease. This will give you an opportunity to negotiate improvements in energy efficiency as well as other benefits.

Start your negotiations in good time (12–18 months ahead is a good guide). Work out how much time you will need by estimating how long it would take to source alternative premises in case you can't reach a satisfactory agreement on your existing space. Allow time to:

- find suitable alternative space
- negotiate the lease deal
- plan, design and document your fitout
- choose a contractor
- fitout and relocate to new premises
- make-good your existing premises.

In a typical 1000 m^2 premises this can take about six to eight months depending on location. You should then add a time allowance for the negotiations with your current landlord. Make sure that you understand the financial and embodied energy costs of relocating against the cost of staying and negotiating improved energy efficiency.

Suggestions to the landlord

After you have reviewed the options for improving your current building, you could provide the building owner with suggestions for energy management and possible efficiency initiatives they could be undertaking in the building to achieve significant energy and cost savings. Prepare a list of initiatives and changes that you would like to see incorporated into the arrangements for the prospective premises, both tenancy and base building. These will be a combination of physical changes and management initiatives. Examples may include:

Cameron Chisholm Nicol's adaptive reuse of an early 20th century building for their head office in Perth integrated the interior fitout to coincide with the essential base building refurbishment, avoiding redundant works.
Photo: Cameron Chisholm Nicol.

Reuse old buildings where possible

Remember there is a huge amount of embodied energy contained in an existing building. The reuse of existing buildings will save most of the embodied energy.

The demolition of an existing building wastes that embodied energy and it can take many hundreds of years to recover those losses even if the old building is replaced with an energy-efficient one.

RICS publications

The Royal Institution of Chartered Surveyors (RICS) produces the following publications that may help with lease negotiations:

- *Guide to Environmental Performance Clauses in Commercial Leases*
- *Greening Make Good Australia.*

www.rics.org.au

Tenancy

- New tenancy lighting system and controls
- Sub-metering
- Energy-efficiency incentives where the landlord shares the cost of tenant works that lower building heat loads and reduce demand on the base building air conditioning system

Base building

- Base building lighting upgraded to best available technology throughout the building, carparks, etc. – the building owner will gain energy savings, as well as air conditioning savings where the more efficient lights are in air conditioned areas
- Improved after-hours air conditioning control
- Separate monitoring and cost apportioning of after-hours air conditioning (for buildings with multiple tenancies)

Changes in building management

- NABERS Energy rating target
- Base building purchase of GreenPower; this may add to outgoings costs, but will reduce the carbon footprint (see Section 8 for more information on using GreenPower)
- Regular environmental management meetings with an agreed agenda
- Disclosure of building performance – energy, waste, water and air quality
- Incorporation of environmental performance clauses or green lease clauses into your lease
- Better building cleaning and control of pollutants in the building.

Finally, always have a Plan B in case you can't reach a satisfactory agreement with your current landlord. Make sure that your leasing manager has been instructed to track which buildings have space and the performance characteristics that would suit you.

Make-good liabilities and costs at lease end – take care!

At the time you negotiate your lease you can also work to minimise your costs and waste at the end of your lease. 'Make-good', or 'Dilapidations' as it is also known, refers to the process at the end of a commercial property lease where the tenant is required to hand back the premises they are vacating in a particular condition which is established by the terms of the lease. Make-good can involve tenants carrying out the work prior to lease end or the payment of a monetary sum to the landlord to cover their liabilities.

To make sure that you will be protected at the end of the lease, always record the condition of the premises in writing and with supporting photographs before you take possession at the start of the lease.

Traditional make-good is by nature very wasteful in materials, money and time, and can be very stressful when the tenant is in the process of moving to new premises. However, through careful consideration when negotiating a lease, there are many ways the process can be improved.

If you have an existing lease in place there may still be ways to reduce the impact and waste from your make-good, particularly if you have an environmentally aware landlord. Options for minimising the work, stress and cost to you at lease end include:

- agreeing the cost of make-good when negotiating your lease
- negotiating with your landlord to waive the make-good clause if the environmental performance of the tenancy has improved with the installation of more efficient systems such as lighting
- paying the cost of make-good as a small regular payment in addition to the rent so that the landlord takes over the responsibility for make-good
- agreeing that the landlord will carry out any work associated with your make-good, and
- lodging a bond covering the value of the make-good so the landlord is given time to try and re-let the space with the fitout in place (See the RICS guide in 'More information' below).

More information

- *The National Green Leasing Policy,* Australasian Procurement and Construction Council (APCC) and Ministerial Council on Energy (MCE): www.apcc.gov.au/Resources/News/NationalGreenLeasingPolicy/tabid/233/Default.aspx
- *Sustainable Property Guide*, Office of Environment and Heritage: www.environment.nsw.gov.au/sustainbus/SustainPropertyGuide.htm
- *Guide to Environmental Performance Clauses,* Royal Institution of Chartered Surveyors (RICS): www.rics.org/oceania and search under 'Knowledge'
- *Green Lease Guide for commercial office tenants*: www.investa.com.au/sustainability/innovation/#for-tenants
- Energy efficiency in government operations: www.environment.gov.au/sustainability/government/index.html
- *Better Buildings Partnership – Green Lease Toolkit*: www.betterbuildingspartnership.co.uk/media/toolkits/
- *BOMA International Commercial Lease: Guide to Sustainable and Energy Efficient Leasing for High-Performance Buildings* (Product no. GL2011), Building Owners and Managers Association (BOMA) International: www.boma.org and visit BOMA Store
- *Incorporating Environmental Best Practice Into Commercial Tenant Lease Agreements, Good Practice Guide Part 1*, Centre for Research in the Built Environment, Cardiff University 2007: www.greenleases-uk.co.uk/publications.php

Get professional advice

Make-good can be very complex and expensive, and every situation will be different, so it is wise to seek professional advice.

Green Lease Guide for commercial office tenants

Energy-efficient design and refits

This section provides information on how you and your team can take energy efficiency into account when planning alterations to your existing premises or fitting out new premises.

Designing for energy efficiency

Achieving energy efficiency is easiest when you are designing the premises. This is the perfect time to incorporate energy-saving design and technologies. It is imperative that your premises are designed to be energy-efficient from the outset. Once the design has started it becomes increasingly difficult and expensive to change.

With the right brief and understanding, it is relatively straightforward to design your fitout to be energy efficient. Follow the guidelines in Section 9 'Energy-efficient technology' to ensure that your new premises are designed – and then managed and maintained – to achieve energy efficiency.

Preparing the briefing

The planning stage provides the perfect opportunity to incorporate energy-saving design and technologies into your new office. Good clear briefing to all members of the design, services and construction team is essential if you are to achieve your goals.

Altering your existing office

A major consideration in refurbishing an existing tenancy is whether you are likely to remain in occupancy while the works are being carried out.

You will need to work out:

- What's wrong with the existing fitout?
- What needs to be changed?
- How much disruption can the business take?
- Is space available that can be used temporarily while other areas are being refitted?
- What preparatory works need to be completed before the main works start?
- Which parts of the fitout can be reused or not altered?
- What equipment will be reused?
- Can your goals can be achieved satisfactorily?

- Can the capital expenditure be justified over the period of occupancy?
- Is 'make-good' being kept to a minimum?

It is essential to address these questions in the early planning stage. All these points will have an impact on the scale of the work you can undertake.

If you are approaching the end of your lease and you plan to remain but retrofit your existing office, then start discussions with the landlord. The earlier you do this, the better your position to negotiate a deal that meets your requirements.

Before you meet with the landlord, prepare your list of requirements. This should include the requirements for your tenancy as well as changes you would like to see to the building. For example:

- Will energy-efficient lights be installed in the tenancy?
- Will the lights be zoned?
- Will there be new lighting controls?
- Will the base building have energy-efficient lights?
- Will the landlord install solar control blinds?
- Will there be some sub-metering?

Include on your list other environmental initiatives such as waste minimisation, indoor environment quality, management changes, and a requirement for regular meetings with the building's facilities manager and property manager.

Fitting out your new office

Before you talk to designers or consultants, work out what it is that you want to achieve in the way of design, standards, finishes and performance and write this down. Include your thoughts on how it can be achieved because this will affect the scope of works, how long they take and their cost. You should seek professional help, but the best way to manage the process efficiently is to have a draft brief prepared and written down before you talk to project managers or designers.

Discuss this with your colleagues, management and staff, particularly those involved in procurement and the management of the business.

Many initiatives can be incorporated into the design. Rolling a number of initiatives into one project makes financial sense as capital outlay only has to happen once. Your budget calculations should include the payback savings that energy-efficiency projects will generate throughout your occupancy. Doing so will produce a more attractive business case.

Include the following standards in your brief:

- NABERS Energy ratings you want to achieve (see Section 7)
- Green Star rating you want to achieve
- the look you like and what you don't like – use photos or magazine articles
- open plan or offices – e.g. offices on windows or away from windows, breakout spaces, reception areas

Sample checklist for refurbishing an existing office

Goals could include:

☐ 5 or 6 star NABERS Energy rating (see Section 7 for more details)

☐ Green Star 5 star office interiors rating

☐ new look workstations and reception

☐ energy-efficient lighting and appliances

☐ using daylight and views

☐ energy-aware management and operation

☐ reuse.

The checklist for sustainable fitouts in Worksheet 4.3A of the *Sustainable Property Guide* (Office of Environment and Heritage) can help you to prepare, manage and achieve your goals.

www.environment.nsw.gov.au/ sustainbus/SustainPropertyGuide. htm

6 Energy-efficient design

The Green Building Council of Australia's GreenHouse is rated 5 star Green Star – Office Interiors v1.1 and 5.5 star NABERS Energy. Photo: GBCA.

Using Green Star

To assess the environmental credentials of your fitout design, you may wish to use the Green Star tools. The Green Star rating system is administered by the Green Building Council of Australia (GBCA). It is an environmental rating system designed for the property industry that evaluates the environmental merits of the design and construction of buildings.

The Green Star office interiors rating tool is designed for building owners, tenants and interior designers to assess the environmental initiatives and/or the environmental impact of an office tenancy fitout. The categories to be assessed include the project management aspects of the fitout process, indoor environment quality, energy, water, material, emissions, transport, land use and ecology and innovation.

Newly constructed buildings with a Green Star rating have been designed to minimise energy use. When fitting out a tenancy in a Green Star-rated building, ask for documentation to help you understand the design features that helped achieve the rating and how they should be maintained in operation. This will also assist you in minimising your energy use.

www.gbca.org.au

- details of equipment you like and do not like
- equipment that you will be moving
- your budget and timing.

Consider a NABERS Commitment Agreement for your fitout

A NABERS Commitment Agreement allows tenants to target and promote the greenhouse performance of a new fitout project from its inception. It is called a Commitment Agreement because you are stating a commitment to design, fitout and commission your tenancy to a selected star level.

A Commitment Agreement allows you to nominate the star level that the project will perform at, once the tenancy is fully operational. As 3 stars currently represents average performance, it is expected that Commitment Agreements will be taken at 4 stars or above. Once signed, the agreement allows you to promote the greenhouse performance of your tenancy from the outset. You will pay a fee for the use of the NABERS trademark and to promote your tenancy performance. The Commitment Agreement covers the design, fitout and occupation phases of the project as well as a 12-month post-occupancy period to allow operational data to be collected to prove performance.

A Commitment Agreement can also help to guide the process, increasing collaboration and improving outcomes. See more about NABERS in Section 7.

Building your team of consultants

Typically, the consultants engaged for a substantial fitout include:

- project manager – to manage the process and make sure the project is run on program and to budget
- architect or interior designer – to design the fitout including specifying quality and materials
- Green Star accredited professional – to ensure adherence to Green Star requirements; this role can be filled by the project manager if appropriately qualified
- quantity surveyor – to help set the budget and monitor costs
- services consultants.

Services consultants cover:

- mechanical issues – supplementary air conditioning and mechanical systems
- electrical issues – electrical design, may also be the energy consultant
- hydraulics – water systems
- fire control and warning systems
- construction.

In smaller tenancies it is quite usual for the architect or interior designer to manage the fitout process. To achieve energy efficiency you are advised to use

a services consultant with energy expertise. To simplify achieving a Green Star rating consider engaging a designer who is a Green Star-accredited professional.

Shortlist your consultants

Prepare a shortlist of consultants you would consider using. Talk to your building owner, talk to professional associations – gather as much information and as many recommendations as you can. Talk to other companies who have had fitouts carried out recently and ask the following questions:

- Did their consultants perform well?
- Did they keep to budget?
- Was the project delivered on time?
- Did they like what they saw when they looked at the fitout?
- Did the consultant meet the environmental brief?
- Did the fitout deliver the required outcomes?

Requests for proposal

Provide potential consultants with your written brief and seek their written proposals. Use your brief to describe your requirements and make sure potential consultants address all the points in your brief in their submission to you.

Ask them to demonstrate a clear understanding of good environmental design and ask for their qualifications, experience and references.

Make sure you ask them to include in their team someone who can prepare an analysis of cost, e.g. of extra initial costs of energy-efficient electrical fittings against their payback periods.

To optimise your energy performance you will need advice on how to manage your energy. This can be provided through the services consultancy you use, or from an energy consultant. The energy consultant must be able to advise you on the latest energy-efficient technologies, such as lighting, lighting control systems and IT control, and give you solutions tailored to your office needs. The consultant should also provide reasonably accurate figures for capital outlay and potential savings. Make sure you address these requirements in your request for proposals.

Interviewing potential consultants

Prepare a shortlist of consultants, and invite two or three from each discipline for interviews.

When you interview project managers and consultants for your fitout team make sure they have a good track record and clear understanding of good environmental performance. Look for qualifications and check the references they provide, and look for a strong knowledge of good environmental design and existing relationships with suppliers of environmental services and goods.

Time for change

Something to think about: the process of moving to new premises provides a wonderful opportunity to adopt behavioural changes as well as new technology.

6 Energy-efficient design

Use natural amenities such as views and daylight when designing your furniture and equipment layout.

A good layout will maximise your use of daylight, reducing the need for artificial lighting and providing a good working environment.

Energetics reconstructed its North Sydney office to better use and share natural light, with motion and light detectors installed by the windows to calculate the correct output for the lights. Photo: Energetics/Ute Wegmann Photography.

Design, development, specification and documentation

When you have appointed your team make sure they become familiar with the space you are going to occupy, or are occupying, and the building in which it is situated.

They should inspect the premises and meet with the building operations and management staff.

They should ask questions about the building's energy management systems and be provided with copies of the building's fitout guide and house rules.

Ensure you take advantage of energy-efficient options already in use in the building such as:

- lighting switching, zoning and the fittings supplied
- mechanical system zoning, control and after-hours operation.

Always work with the building's systems and design and not against them, particularly if they are energy-efficient.

Ensure that you involve the whole team in overall design review and coordination from the start. In this way systems will be better integrated and it will be cheaper and more efficient for you in the long run.

Also bear in mind that good environmentally sustainable design includes more than just energy efficiency. There are many other environmental considerations when making decisions about the design of your fitout such as the origin of wood products and the disposal of existing carpets.

Questions for designers and suppliers

Lighting

Can you incorporate:

- high-efficiency lamps?
- low-loss ballasts, preferably electronic?
- high-efficiency light fittings?
- innovative ways to maximise natural light?
- movement detectors, timers, light sensors?

Office appliances

- Do all computers, monitors, printers, fax machines and photocopiers have a 'sleep' mode facility and is it enabled?
- Are kitchen appliances highly efficient with an energy rating of 4 stars or higher?
- Can you fit a 24-hour, 7-day timer on the hot water system?

Office planning

- Does the planning and design of the office facilitate flexibility in the office layout, and minimise the demand on building services?

Furniture and work stations

- Are the surfaces polyurethane-free and finished with natural products?
- Are chairs/couches stuffed with natural materials?
- Is there a buy-back policy for when the product has reached the end of its life with your organisation?
- Is timber sourced from plantations or being reused?
- Does any particle-board material produce minimal emissions of volatile organic compounds (VOCs)?

Flooring

- Are your products and adhesives free of VOCs?
- Do you need carpet?
- Are your carpets mechanically fixed (rather than fixed using adhesives)?
- Are materials sourced from recycled or renewable products?

Walls and doors

- Can you build from steel or timber, rather than aluminium, and incorporate recycled material?
- Do your paints minimise emissions of VOCs? (Many paints have strong odours after application that can affect the productivity of your staff for some time after the premises have been painted. Consider using plant-based paints.)

Fitout contractors

- What proportion of site demolition materials and waste will be recycled?

Minimising future make-good liabilities

If you propose to replace base building equipment with more efficient equipment, e.g. switching from older fluorescent lights to newer efficient alternatives, or installing zoned switching, you should agree with the landlord that this is an improvement of their premises and therefore will not be included in any claim by the landlord for make-good at the expiration of the lease. Otherwise you could be required to reinstate the old fittings you removed earlier, at your cost. See more about make-good in Section 5.

Minimise the impact of your fitout on the base building by:

- trying to avoid removing or replacing the landlord's equipment such as flooring and ceilings
- agreeing where possible with the landlord that where you replace building equipment with better quality, it will not be included in any make-good claim by the landlord
- using systems that are free-standing where possible so that their fixings do not damage the base building
- keeping as much as possible to an open plan layout which requires the minimum changes to the building services

Cameron Chisholm Nicol used ecospecifier to locate low-VOC fixtures and fittings for their head office fitout. Photo: Cameron Chisholm Nicol.

While you are thinking green

Fitouts generally have an average life of about four to five years before being changed or discarded, so try to minimise the environmental impact of materials, fittings and works.

Embodied energy

❑ Which materials are used?

❑ Where do the materials come from?

❑ Can you reuse an existing fitout?

❑ Are materials minimised in the design, particularly in furniture?

❑ Can it be recycled or re-assigned when you finish with it?

Environmental impact

❑ Are timbers from plantations or low-impact sources?

❑ If you use stone, is it widely available and not rare?

❑ How far has the material been transported?

Waste minimisation

❑ Can use of wrappings be minimised?

❑ Can the fitout be removed easily at lease end to minimise waste?

❑ Can it be recycled or reused?

Indoor environment

❑ Can you use materials with low volatile organic compounds?

❑ Can you use materials, finishes, cleaning materials or pesticides that don't contain pollutants that could be ingested?

- considering wireless data systems as they dramatically reduce the cabling waste, and you can take them with you at the end of your lease
- considering mounting materials that require the removal of landlord finishes (e.g. stone wall panelling) on panels that can be installed over the top of the base building finishes and later removed
- remembering that if you have to make-good you need to allow an appropriate amount of time to complete the works
- always seeking landlord permission for alteration works and bearing in mind your liability for make-good.

More information

In preparing your brief, use resources such as:

- *Sustainable Property Guide*, Office of Environment and Heritage: www.environment.nsw.gov.au/sustainbus/SustainPropertyGuide.htm
- *A Guide to Office Building Quality*, Property Council of Australia 2006: www.propertyoz.com.au and search under 'Bookshop'
- Green Building Council of Australia: www.gbca.org.au
- EcoSpecifier: www.ecospecifier.com.au

Benchmarking and measuring energy use

To understand your energy use and to start to manage it you need to measure and record it. You will then have a baseline. If you take the trouble to know your energy use before you start making savings, you will see how you are doing and how easy it is to make improvements.

Understanding your energy use

Effective monitoring and reporting of your organisation's energy use and performance are crucial aspects of ongoing review. Setting up a system to collect, analyse and report on your organisation's costs and consumption can help you to:

- maintain savings from existing energy-efficiency investments and initiatives
- identify areas of energy wastage and any new opportunities for savings
- create a solid database to enable cost control and external comparison
- understand trends of energy consumption in your office
- monitor greenhouse impact
- communicate progress for your energy management program internally and externally.

The system should record both historical and ongoing energy use and the information required to undertake NABERS self-assessments. It should also produce summary reports on a regular basis. Using indicators such as the annual energy use, or benchmarks such as NABERS, can help you measure your performance and identify opportunities for improvement.

Start recording your energy consumption

The amount of energy you have consumed is set out on each of your energy bills (measured in kilowatt hours: kWh). The simplest way of monitoring your energy performance is by checking the energy used in the last billing period and recording it. You could set up a simple spreadsheet or a graph. Keep copies of all your energy bills and be sure to copy the whole bill, as you must keep the record of the amount of energy consumed, which is often on the second page.

If you also use gas (measured in mega joules: MJ) or diesel you should also keep a record of the amount of these you have consumed. (Note: diesel is typically only used in premises that have back-up generators that run off diesel.)

BRIGHT IDEA

Ask your local library if they have a power meter you can borrow so you can measure the energy used by your appliances.

7 Benchmarking & measuring

A typical tenancy electricity bill

Use the energy management checklist

Use the energy management checklist at the end of this guide to conduct a simple walk-through in your office. The checklist is designed to help you identify energy-saving opportunities.

★ ★ ★ ★ ★

What does the number of NABERS stars indicate?

NABERS Energy ratings are expressed as a number of stars – the more stars the more energy-efficient the premises:

0	Very poor
1	Poor
2	Below average
2.5–3	Average
4	Good
5	Excellent
6	Market leader

A typical tenancy will reduce its energy use and greenhouse gas emissions by 50% to 60% if the NABERS Energy rating is improved from 2.5 stars to 5 stars.

What determines the NABERS Energy rating?

NABERS Energy ratings for base building and tenancy are benchmarked based on the intensity of greenhouse gas emissions produced from using energy.

By keeping your energy records you will be able to track progress. There will be seasonal variations so do not be alarmed. Understanding the trends is part of your own education process.

NABERS ratings for offices

NABERS is the National Australian Built Environment Rating System. It is a performance-based rating system for existing buildings. NABERS rates a building on the basis of its measured operational impacts on the environment, and provides a simple indication of how well you are managing these environmental impacts compared with your peers and neighbours.

NABERS can be used to rate the energy, water, waste and indoor environment quality of an office. (Water ratings are only available for whole buildings.)

Types of NABERS Energy ratings for offices

- **Tenancy** – based on the intensity of energy used and greenhouse gas emissions by individual tenants – in other words, the amount of energy used per square metre of the tenancy
- **Base building** – based on the energy intensity and greenhouse gas emissions of the building excluding all the tenants' energy use
- **Whole building** – where the tenants' and landlord's energy use cannot be separated, a whole building rating rates the building based on the intensity of the energy used and greenhouse gas emissions of the base building and tenancies. (This is far less common than tenancy and base building ratings.)

Using NABERS to benchmark your energy use

Recording energy consumption will enable you to start monitoring your energy use, but it will not give you an indication of how high or how low your energy consumption is in comparison to other tenancies. To create a benchmark for your energy consumption you should think about undertaking a NABERS Energy rating for your tenancy.

To rate your premises you will need:

- your past 12 months' electricity bills (plus natural gas and diesel if used within the tenancy)
- hours of operation for your office
- number of people and computers in your office
- net lettable area of your office (usually noted on your lease or survey plans for the tenancy).

You can carry out your own informal NABERS Energy rating on your premises or you can engage a NABERS Accredited Assessor to prepare a formal rating of your premises. An informal rating will not be as accurate as a formal rating, but it is a good start and will give you a basic understanding of how you are performing and also of the information that needs to be gathered for a formal rating to be prepared.

Self-assessed NABERS ratings

Your self-assessed rating will:

- be fast
- be easily repeated as new information comes in
- cost you nothing
- be a useful and instructive way to monitor your progress
- include no formal certificate or accreditation.

To perform a self-assessment rating go to the NABERS website (www.nabers.gov.au) and use the online NABERS Rating calculator. Select the 'Tenancy' rating and enter the information. The website also provides guidance to help you collect data.

If your rating is 2 stars (or less) you are likely to be wasting money on energy. If you rate well, i.e. higher than 2.5 or 3 stars which is average, you might wish to showcase your performance by getting an **accredited** NABERS Energy rating to promote your organisation's achievement in energy and greenhouse efficiency.

Accredited NABERS ratings

To obtain an accredited NABERS rating you need to engage a NABERS Accredited Assessor. An accredited rating gives you the right to use the NABERS Energy trademark to promote publicly the performance of your premises. Your rating will be accurate and represent your real performance in comparison to other tenancies.

To find an assessor go to the NABERS website (www.nabers.gov.au), or obtain a recommendation.

Discuss your brief with the assessor. The options may be to either:

- obtain a rating, or
- obtain a rating as well as obtaining advice on how you could improve your performance and rating.

The NABERS assessor will charge a fee for the service so you may wish to obtain more than one quotation. There will also be an accreditation fee when the rating is lodged with NABERS.

If you become a CitySwitch signatory you will receive lots of encouragement and assistance in energy efficiency, as well as a discount when you lodge your rating with NABERS.

NABERS tenancy rating versus NABERS base building rating

The NABERS methodology separates tenancy and base building energy efficiency performances.

Research commissioned by the Office of Environment and Heritage found that base building ratings are primarily determined by the efficiency of the base building rather than tenant behaviour. A poor base building rating inevitably means that there are issues with the base building operation and/or

The Department for Manufacturing, Innovation, Trade, Resources and Energy has earned a market-leading 6 star NABERS Energy rating for its Adelaide office. Photo: DMITRE.

👍 **Tip**

Become a signatory to the CitySwitch program – see page 30 for more information.

What is a watt?

One watt (W) is a unit of power equal to one joule per second.

A kilowatt (kW) is a unit of power equal to 1000 watts.

A kilowatt hour (kWh) is the unit usually used to measure electricity consumption. It's the amount of kilowatts used over a one-hour period. For example, a common incandescent light bulb uses 60 W, or 0.06 kW. If it runs for 24 hours a day, 365 days a year, it will run for a total of 8760 hours. This means the light will consume 525.6 kWh (8760 hours x 0.06 kilowatts) of electricity over the year.

One joule (J) is the work done by one watt operating for one second. 4.184 joules of heat energy (or one calorie) is required to raise the temperature of 1 g of water 1°C. There are 3.6 million joules in one kilowatt hour.

A kilovolt-ampere (kVA) is a measure of power, and its relationship with kW is defined by the equation $kW = kVA \times$ power factor.

Consider engaging a consultant to perform an energy audit of your tenancy.

design. In essence, a 4 star base building rating indicates good efficiency while a 1 star base building rating indicates poor efficiency – and the efficiency of your tenancy has little bearing on either result.

While the impact of a tenancy rating on the landlord is insignificant, it is important for you as a tenant to understand that buildings are generally designed with a limitation on the density of equipment loads that can be carried by the base building air conditioning system. A tenancy with a very high equipment load and occupant density may affect the base building rating to a limited extent if the building is not designed to meet high loads. It is therefore important for building owner and tenant to understand and, where necessary, establish agreed operational/design parameters at the time of signing the lease.

Set benchmark targets

An office with a 2.5 or 3 star NABERS Energy rating has average performance in terms of its carbon emissions from energy use. CitySwitch sets a target of 4 star NABERS Energy and above for all their signatories. This is readily achievable for most offices.

Once you have measured and benchmarked your energy use you should be able to assess what is achievable and set your targets for short-term and longer term performance accordingly.

Even if your tenancy is performing at 4 star NABERS Energy or better, you should monitor your energy use so that you can maintain or even improve your performance.

If the tenancy is not performing well you should look for ways to improve. This guide provides plenty of information on how energy efficiency can be achieved in tenancies. You can also carry out your own energy audit or engage a professional. Some NABERS assessors will carry out energy audits as part of their services.

Auditing your energy use

An energy audit will evaluate your current energy use and show how you can make and prioritise improvements.

An energy audit can be as easy as a walk-through of the premises to identify obvious areas of wastage, or it may involve a comprehensive analysis, including sub-metering and data cataloguing to provide a detailed cost-benefit analysis for investigating energy-saving actions.

Think about engaging a consultant to do an energy audit when you want to:

- investigate how much electricity, gas, and other forms of energy are consumed
- check on how energy use is managed and monitored
- identify what needs to be done to reduce your energy consumption
- find out how to attain a carbon reduction target

- evaluate which energy conservation measures will provide the best savings and payback
- estimate the potential costs and energy savings of implementing efficiency measures.

The process for energy audits is set out in the Australian Standard *AS/NZS 3598:2000 Energy Audits*, produced by Standards Australia and available from SAI Global (www.saiglobal.com).

This standard sets out minimum requirements for commissioning and conducting energy audits which identify opportunities for cost-effective investments to improve efficiency and effectiveness in the use of energy.

AS/NZS 3598:2000 covers three levels of audit and when hiring a professional energy auditor you should know to what standard they will be auditing.

Level 1 audit

A Level 1 energy audit is a low-level assessment used to provide an overview of cost-effective energy saving initiatives for your tenancy. This is often described as a 'walk-through' assessment.

Level 2 audit

This is a preliminary assessment of energy use at a site. It looks at patterns of energy use and provides a higher level of assessment than Level 1. It should also provide details of how energy can be saved and the associated costs. A Level 2 audit includes:

- a broad calculation of energy for the main energy uses such as lighting and equipment; in the absence of separate metering, figures are estimated from plant ratings and operating hours, using appropriate assumptions
- identification of measures to achieve predicted savings, capital costs and savings estimates to an accuracy of plus or minus 20%.

Level 3 audit

This audit is the most detailed. It is described in AS/NZS 3598:2000 as a 'firm' assessment of energy use. It provides a more detailed breakdown of the energy use across the site and by equipment. It moves the assessment from an overview to much deeper levels of detail. A Level 3 audit enables the organisation to make informed decisions about investment in energy-savings measures, based on a firm business case. It includes the tasks specified for Level 1 and Level 2 audits, as well as:

- a detailed analysis of energy usage, involving metering, monitoring, analysis and tracking to determine where, when and how energy is used
- capital costs and savings estimates to an accuracy of plus 10% for costs, and minus 10% for benefits
- identification of measures to achieve 'actual' savings and recommendations sufficiently detailed and accurate to enable you to seek quotations.

Power factor

Power factor (PF) is a measure of how efficiently electrical power is consumed. A high power factor can help you use the full capacity of your electrical system. In an ideal world, power factor would be unity (or 1). In reality, power factor is reduced by highly inductive loads to 0.7 or less. This is caused by equipment such as lightly loaded electric motors, luminaire transformers and fluorescent lighting ballasts.

Difference between kW and kVA

kW refers to actual or real power: the amount of power that is available to do real work. On the other hand, kVA is often known as 'apparent' power because only a portion of the available power may be available to do real work. The remainder is excess current. The difference between kVA and kW depends on the power factor (PF). Say an electrical system has a 'real' (kW) demand for electrical energy of 500 kW and a power factor of 0.8. The 'apparent' power required to produce this 'real' power would be 500/0.8 = 625 kVA. Improving the power factor will reduce this kVA and therefore reduce the supply transformer requirements or increase the available 'real' power from the transformer.

How does this affect your bills?

One way a utility supplier bills its heavy-duty consumers is to take account of the power factor and kVA, so there will be a charge for total electrical energy consumed – actual power in kW – and there will also be a charge that takes into account the power factor or kVA. There is often a maximum demand charge too. That is, if you exceed a certain agreed instantaneous demand within say one billing period, you pay a premium for this. This is because you are effectively using up reserve power capacity which has to be maintained.

You can't manage if you don't measure

Go one step further and use sub-metering to pinpoint the biggest areas for improvement. This involves installing metering equipment in tenancies at key points, allowing tenants to monitor their energy use in different areas of their tenanted space.

What is a Building Management System?

A Building Management System (BMS) is a central computerised system for managing and operating systems within a building. A BMS usually incorporates controls for energy management, maintenance management, security, access and fire systems.

A BMS is an essential tool in tuning the operation of any building and, just like a well-tuned car, a well-tuned building not only runs more efficiently, it generally provides better performance. This ensures that operating costs are minimised and occupants are more comfortable.

To manage energy use, the BMS can monitor various parameters in the building such as temperature, humidity, energy consumption and occupancy patterns. By doing so, services such as air conditioning, ventilation and heating, lift services, hot water systems and lighting can be controlled in ways that minimise energy use while optimising comfort and functionality.

Setting up a monitoring and reporting system

Keep information and be able to produce standard summary reports at agreed times:

- File copies of energy bills (electricity and gas) showing energy use.
- Track or graph energy use (use Excel).
- Record the amount of GreenPower used.
- Record your carbon offsets.
- Keep copies of past ratings.

Record the following for your office:

- hours of operation
- the number of people and computers
- the net lettable area of your tenancy
- contact details for assessors used.

Record changes to:

- fitout
- staff numbers
- operating hours
- occupied area
- equipment purchased
- equipment removed.

More information

- *Guide Note 3 – Technical Review Requirements for Energy Savings Action Plans*: www.environment.nsw.gov.au/resources/sustainbus/08567gn3techr eviewreq.pdf

- The Australian Institute of Refrigeration, Airconditioning and Heating (AIRAH) runs a course titled 'Carbon Detectives – Operation: Energy Audit'. This provides training in energy auditing, energy use and measurement, understanding energy auditing as defined in *AS/NZS 3598:2000 Energy Audits*, understanding energy audit reports, identifying energy waste and understanding air conditioning system performance and operation. See www.airah.org.au for more information.

Buying power: a guide to procuring energy

The energy market in Australia is becoming increasingly competitive. Customers are able to choose their electricity or gas retailer and negotiate their own agreement for energy supply. This has major implications for operating and energy costs. If you do your homework and take the time to investigate your options, it can bring real savings, particularly in times of rapidly increasing energy prices.

Negotiating an energy supply contract

Negotiating an energy contract provides important opportunities for energy management:

- Achieved savings can be allocated to fund strategies and capital outlay for energy efficiency improvements, which will reduce greenhouse gas emissions and may reduce electricity contract costs even further.

- It provides a stronger argument for establishing monitoring programs to track the energy demand of your office, allowing you to identify energy-saving opportunities.

- You can choose to incorporate GreenPower into your contract, reducing greenhouse gas emissions and improving your tenancy greenhouse rating.

The best deals go to the best informed

Negotiating an energy contract will be a new experience for most people, so it is crucial that you inform yourself so you can maximise the benefits and savings available. You may have to sign a new contract every year, depending on the terms you agree with your provider.

Know your current electricity and gas costs. Look at your energy bills to get an idea of how much you spend on electricity. This will help you compare the quotations offered by various retailers with what you are currently paying.

Understand the pricing and tariff structures. Electricity contract costs include:

- contestable charges for electrical energy (kWh)
- regulated charges for electrical energy (kWh) and electrical demand (kW or kVA)
- regulated fixed charges, e.g. for metering.

Tariff structures

Examples of tariff structures (which can be applied in combination):

Seasonal tariffs – for example, Western Power (WA) has introduced a tariff which is higher during summer daytime hours (air conditioning load) and winter mornings and evenings (heaters), to reflect the higher cost of supplying peak demand.

'Time of use' tariffs – a higher price is charged per unit of electricity at peak periods, and lower prices during periods of low demand.

GreenPower electricity tariffs – a slightly higher price is charged for energy from renewable sources, which has zero greenhouse gas emissions. However, if you choose a GreenPower option as well as investing in energy efficiency, you can reduce both total energy costs and greenhouse gas emissions.

What is electrical demand?

Electrical demand refers to the rate at which electricity is used. This is important because the higher the (maximum) rate of electricity use, the larger the required capacity of wires, transformers and related distribution equipment.

If the electricity demand is higher than the carrying capacity of the distribution infrastructure, the infrastructure may fail, resulting in blackouts and brownouts.

To encourage medium and large electricity consumers to control their demand, electricity companies include a demand component in their total charge. You won't see these in domestic tariffs which only include charges for energy (kWh) and a fixed supply charge.

Negotiating the agreement

First you need to assess your current needs.

Look at bills from the past 12 months to evaluate your electricity use and cost in terms of:

- your highest **rate** of electricity use during the year (i.e. your peak demand, in kW or kVA)
- your electricity consumption (kWh) during peak periods; the times considered to be peak periods vary between network areas (confirm with your electricity retailer)
- your electricity consumption in other periods.

Use this data to estimate how much electricity your business will be likely to use over the next year. Remember to take into account potential energy savings from proposed projects, office fitout or refit, etc.

Consider which value-adding services you would like, and specify them in your negotiations with retailers. For example:

- energy management advice – can a retailer help you use less energy or lower your demand? Is there a charge for this service?
- flexible billing – do you prefer 7-day, 14-day or 30-day payment terms? Can the retailer offer pre-defined billing periods that suit your business?
- account management – what level of service does your business require and is the retailer likely to meet your standards?
- monitoring – can a retailer provide you with more information on the pattern of your electricity consumption? For example, a graph of average daily electricity use in each billing period of the previous year, or an hourly electricity profile for the past month (where an electricity smart meter is installed).
- emergency 24-hour service – can a retailer provide a contact?

Consider the type of deal you want. Key considerations can include:

- do you want to fix firm prices for the contract period ('risk aversion')?
- how long a contract would you like?

A longer contract can be more attractive to electricity retailers and may result in lower energy prices. It may also provide a stronger incentive for the supplier to establish automated billing and recording systems. It will also reduce your administrative burden by increasing the time between tendering.

Include GreenPower

Around 90% of electricity used in Australia is generated from burning fossil fuels such as coal, and over 34% of Australia's emissions come from electricity generation (Australian Bureau of Agriculture and Resource Economics: www.abare.gov.au). This makes the electricity sector the biggest single contributor to Australia's greenhouse gas emissions.

GreenPower is a government accreditation program for renewable energy. Renewable energy is bought by your energy provider on your behalf. It is generated from sources like wind turbines, solar, micro-hydro and biomass which produce no net greenhouse gas emissions.

When you purchase GreenPower it means that an equivalent amount of renewable energy is added to the electricity grid. Therefore the amount of energy you use directly influences the amount of renewable energy that goes into the electricity grid.

The benefits of switching to GreenPower accredited renewable energy include:

- reduced carbon emissions
- increased demand for renewable energy which helps it to compete with polluting coal-based and gas-based generation
- reduced water consumption at coal and gas-powered stations.

Consider purchasing at least some of your electricity as GreenPower. Most Australian energy suppliers provide an accredited GreenPower product, varying in price according to the mix of renewable energy used. The GreenPower website contains a list of accredited GreenPower suppliers (www.greenpower.gov.au). Green Electricity Watch is an independent website that compares and rates different green energy providers (www.tec.org.au/green-energy-action/77-green-electricity/637-green-electricity-watch).

You can combine GreenPower and an energy efficiency program to maximise reductions in both greenhouse gas emissions and energy costs.

Using GreenPower will improve your NABERS Energy rating. However, make sure the product you purchase is an accredited GreenPower product if you want to use it for NABERS ratings as only accredited products are accepted.

Seeking quotes from retailers

When you have worked out your requirements, ask for quotations from electricity retailers. You can do this yourself or work with a consultant or broker.

Provide prospective retailers with a structured and concise document giving details of your business, location, preferred supply period, type of contract required (i.e. firm, flexible, etc.), value-adding services and load scenarios for the following 12 months.

There are energy consultancies and brokers who can offer advice so that you can compare energy prices from retailers. They can provide free gas or

GreenPower in NABERS Energy ratings

NABERS rewards premises that use GreenPower to reduce their greenhouse gas emissions with higher NABERS Energy star ratings. The NABERS rating certificate provides both the NABERS Energy rating with GreenPower (a rating of greenhouse efficiency) and the star rating if no GreenPower was used (a rating of energy efficiency).

When you purchase GreenPower, your electricity provider purchases an equivalent amount of electricity from renewable sources and adds it to the electricity grid.

electricity quotes upon request. You may need to provide information on contract options required and site details (operating hours, type of space, etc.). A copy of a recent bill would be useful for requested details on your energy use, e.g. amount of electricity, cost of last bill, or usage pattern (peak, off-peak).

Choosing a supplier

Evaluate the quotes and decide on the best deal for you:

- Compare the cost and value-added services offered by the various retailers – make sure there are no hidden costs.
- Focus on key issues, not just price.
- Does the retailer understand your business?
- Are you likely to get good service?
- Meet the retailers to gain a better understanding of their expertise and profile.
- Work out where further gains are possible and how they can be made.
- Identify ways to improve the deal and find out about any associated risks with prospective options.

Make sure your contract conditions allow you to reduce the monthly peak demand charge if you can demonstrate that the actual maximum demand has decreased, either by:

- proving that recent energy-efficiency and load-management measures have reduced your peak electricity demand, or
- showing that your maximum demand in the previous year is lower than the contracted value. As electricity suppliers are, in many cases, increasing demand charges while reducing the cost per kilowatt hour, it is important that you demonstrate this to gain full financial benefit from your greenhouse gas reduction strategies.

Keeping an eye on your contract

In addition to monitoring your energy consumption, monitor your energy costs to track how your contract is working for you.

More information

- GreenPower: www.greenpower.gov.au
- Green Electricity Watch: www.tec.org.au/green-energy-action/77-green-electricity/637-green-electricity-watch
- Our Environment It's a Living Thing: www.livingthing.net.au
- Renewable energy power supplies, Australian Government Department of Climate Change and Energy Efficiency: www.environment.gov.au/settlements/renewable/power/index.html

Energy-efficient technology

Any equipment that draws electrical power should be chosen based on its efficiency, or managed efficiently to minimise its power use. The equipment used in an office includes computers, photocopiers, printers, kitchen equipment, lighting, supplementary air conditioning, data centres and server rooms. It also includes small power such as phone chargers and other equipment plugged in at work stations.

Getting the right equipment

Buying energy-efficient equipment, setting it up appropriately for your needs and educating staff on how to use it will save you money. It will provide significant direct electricity savings, plus savings in your air conditioning costs by reducing the amount of heat your equipment generates. The first step in procurement is to establish whether your equipment needs to be changed. There may be both financial and environmental cost advantages to delaying a purchase if a substantially more energy-efficient appliance – or one more suited to your needs – is not yet on the market.

Always factor into your procurement decision whether the company from whom you are purchasing has a take-back policy. Check with the company to see whether the take-back policy covers goods to be replaced that were not manufactured by the same company or purchased through the same distributor.

For more information see 'Extended Producer Responsibility' on the OEH website (www.environment.nsw.gov.au/warr/EPR.htm).

Also factor in the distance your purchases need to be freighted when weighing up your total emissions and cost to the environment. Make sure all new equipment has an energy rating, can be ENERGY STAR enabled or has an energy-saving mode.

Embodied energy – cradle to grave and cradle to cradle

Embodied energy is the energy required to produce a physical object. When making a purchasing decision consider how the object was made, where it has come from, how much energy it will use in operation, and how it will be disposed of when it is no longer of use to your organisation. All these processes consume energy. This perspective is referred to as 'cradle to grave'.

Selecting energy-efficient office equipment is a simple and effective way to reduce energy consumption and save money.

9 Energy-efficient technology

Go one step further and think about 'cradle to cradle': how will this product be disposed of, or dismantled and cycled or even up-cycled. Cradle to cradle involves energy consumption. Where possible use local recycling options.

Cradle-to-cradle product life cycle
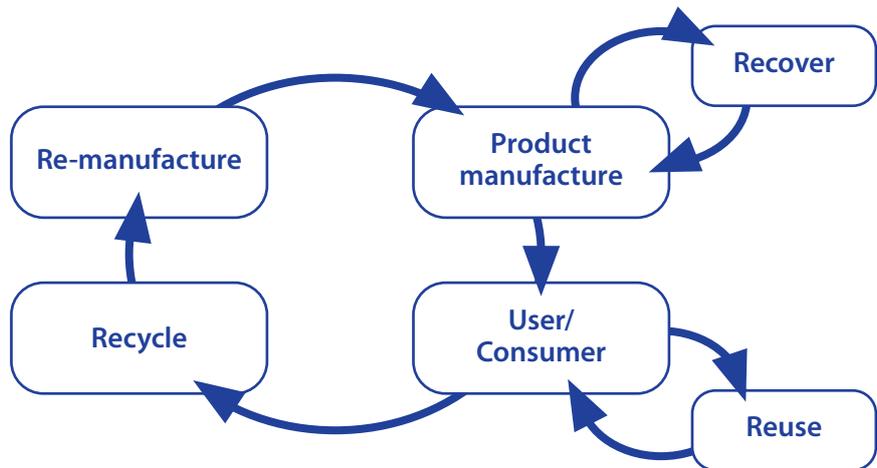
Sustainable purchasing

If your organisation doesn't already have a sustainable procurement policy, start a checklist of sustainability criteria. This will allow you to build the platform for organisational change.

Paper is a good example. First, assess your rate of acquisition. For example, you can slow down paper – and energy – consumption in your office by adjusting printer settings so they default to the printing double-sided option. If your printer can't do this, see whether it will print odd numbered pages, then even numbered pages in a re-feed.

The next step is to look at the composition of your paper. Is the recycled component of your paper 100% or less, and, if so, how much? Is the recycled content paper sourced locally or imported, requiring shipment from overseas?

The same selection criteria apply to purchasing office equipment. Does the company from whom you are purchasing have an end-of-life take-back policy? Perhaps they do for new equipment purchases but how do you responsibly dispose of the equipment they are replacing? Landfill is no longer considered a responsible option: many pollutants are released into groundwater when equipment is dumped, cracked and broken. Transport for landfill is becoming more costly as sites are located further away from urban areas. Also look at operating costs and the star rating for energy consumption (see under 'Office equipment' in this section for information about ENERGY STAR).

The end question in assessing all your criteria is 'How much energy – in consumption of fossil fuels for manufacture, use or transport – does this option involve?' Go for the best net sum.

With carbon emission reporting set to change the business landscape, this new context of product life, and the energy and resources it involves before it arrives and after it leaves you, has an impact on how you establish your business case for energy and cost savings. A common goal for all organisations is to convert environmental opportunities into business growth and continuity. See 'Building the business case for energy management' in Section 3.

Sub-metering

Tenancies will have a main electricity meter that is used by the energy supply company to measure the energy that you use, so that you can be charged accordingly.

Sub-metering entails installing additional meters to measure energy used by specific pieces of equipment or areas of a business. Typically in an office tenancy these may include the IT room, or package air conditioning units or others areas of intensive use.

Sub-metering which separates out plant or facilities that serve areas outside the tenancy is essential for obtaining a NABERS Energy rating. For example, if an IT room is used to serve several off-site offices, its energy consumption and area can be excluded from the premises for the purpose of calculating the energy intensity, and hence rating, of the tenancy.

Sub-meters can also be used as management tools to help identify energy wastage and to monitor ongoing performance and improvement when energy saving initiatives are put in place.

It is important to note that sub-metering on its own will not save energy – you have to act on the information that it provides you.

A word of caution: verify the accuracy

In the past some sub-meters proved to be inaccurate and misleading. Make sure that your sub-meters are calibrated. Non-utility metering must have a certified (or verified) accuracy of 5% or better. If you believe that the actual recorded readings may not register within these limits, the metering system as a whole must be independently certified to be within the accuracy limits.

Lighting

Lighting can account for more than 60% of tenants' energy costs in offices, and is one of the biggest consumers of energy directly controlled by tenants. Increases in lighting efficiency will have a significant effect on your energy use. This section will help you assess your current lights and lighting system, and guide you in making it more efficient.

Light fittings available today are far more energy-efficient and have longer lives than in the past, making them cheaper to run and reducing replacement costs. They can provide a range of light qualities for different uses.

EP&T smart metering

EP&T is using smart metering to reduce energy consumption. The metering system allows the building managers to analyse anomalies in electricity, gas and water consumption through the use of smart software.

For example, in one incident, site managers used the metering system to investigate unusual consumption of electricity on one particular building level. They discovered that package air conditioning units in meeting rooms had an override control in place, causing them to run from 8am to 6pm each day. The override was disabled, allowing the units to be controlled on an as-need basis by the occupants.

Following this control change, EP&T monitored the area to ensure that the new control strategy achieved maximum efficiency. The results are displayed in the graph below.

Annual savings

The following estimated annual savings were derived from EP&T's EDGE data:

• electricity savings: 57,148 kWh

• total savings: $6286/year ($0.11/kWh).

Electricity consumption profile before and then after the issue was rectified.

The Australian Institute of Refrigeration, Airconditioning and Heating (AIRAH) uses task lighting to reduce the overall energy consumption of lights in its Melbourne office. Photo: AIRAH.

Advantages of CFLs

Compared to incandescent lamps, compact fluorescent lights have the following advantages:

- they last up to 10 times longer
- use about a quarter of the energy
- produce 90% less heat, while producing more light per watt.

www.energysavers.gov/your_home/lighting_daylighting/index.cfm/mytopic=12060

LEDs compared to CFLs

Light-emitting diodes (LEDs) (solid-state lights) are about as efficient and last three times longer than CFLs.

Scientific American, March 2008

The switch ...

'… whereas that new fluorescent bulb is sure to lower utility bills … the real energy-crunch saviour has been there all along: the light switch.'

Scientific American, March 2008

Light efficiency standards

In 2007 the Australian Government announced minimum energy performance standards (MEPS) for lighting products. The new minimum standard efficiency level is 15 lumens per watt.

Simple improvements to lighting energy efficiency

- Label light switches.
- Put signs in areas where lights are used infrequently to encourage and remind staff and cleaners to switch off when leaving – just this simple strategy can save up to 15% of your lighting energy.
- Make sure you're not 'overlighting': measure your lighting levels – it may be possible to have some tubes removed from fittings.
- Appoint specific people to be responsible for turning lights off.
- Make the most of what you've got, and clean light fittings and tubes – dust and dirt build-up can cut light output by up to 30%.
- Paint your office walls and ceilings with lighter colours to reflect light and achieve the required illuminance without needing as many lights.
- Make the best use of daylight when laying out your office.
- Choose to power your lights with renewable energy.
- Incorporate electrical sub-metering for lighting so that you can track its energy use and your continual improvement.
- Arrange lighting into zones of 100 m^2 or less to enable small areas to be switched off after-hours.
- Place a 'zone map' near the light switches to identify lighting zones.

How efficient is your current lighting system?

Offices may have inefficient lighting systems, be over lit or have outdated equipment. There will be many ways in which lighting can be improved to achieve better quality of light to suit the work in your office, energy efficiency, lower heat loads and reduced maintenance.

Australian Standards suggest that the lighting levels in a typical office should be not less than 320 lux. An efficient lighting system can achieve this by using 7 W/m² or less.

Engage a lighting or energy consultant to assess your lighting and make recommendations on how it may be improved, the cost-benefit of making the changes and the likely disruption while the work is carried out.

How much light do you need?

Different tasks need different amounts of light – known as 'illuminance'. Illuminance levels for office areas are prescribed in Australian Standard 1680 (there are several publications in this set, for specific applications) which sets out recommendations for illuminance in lux, lamp colour appearance and rendering, and maximum glare. (See Table 2 opposite.)

A lighting technician can check that your lighting meets the levels specified in the Standard. You may find that you can reduce energy used for lighting through energy-efficient fittings and not over-lighting your office, while still meeting the required levels.

Table 2: Recommended maintenance illuminances for various types of tasks, activities or interiors

Class of task		Recommended maintenance illuminance (lux)	Characteristics of the activity / interior	Representative activities / interiors
Movement & orientation		40	Interiors rarely visited with visual tasks limited to movement and orientation	Corridors; cable tunnels; indoor storage tanks; walkways.
Rough intermittent		80	Interiors requiring intermittent use with visual tasks limited to movement, orientation and coarse detail	Staff change rooms; live storage of bulky materials; dead storage of material needing care; locker rooms; loading bays.
Normal range of tasks and work places	Simple	160	Any continuously occupied interior where there are no tasks requiring perception of other than coarse detail. Occasional reading of clearly printed documents for short periods.	Waiting rooms; staff canteens; rough checking of stock; rough bench and machine work; entrance halls; general fabrication of structural steel; casting concrete; automated process monitoring; turbine halls.
	Ordinary or moderately easy	240	Continuously occupied interiors with moderately easy visual tasks with high contrasts or large detail (>10 min arc).	School chalkboards and charts; medium woodworking; floor preparation; counters for transactions.
	Moderately difficult	400	Areas where visual tasks are moderately difficult with moderate detail (5–10 min arc or tolerances to 125µm) or with low contrasts.	Routine office work; inspection of medium work; fine woodwork; enquiry points; car assembly.
	Difficult	600	Areas where visual tasks are difficult with small detail (3–5 min arc) or with very low contrasts.	Drawing offices (boards); most inspection tasks; proofreading; fine machine work; fine painting and finishing; colour matching.
	Very difficult	800	Areas where visual tasks are very difficult with very small detail (2–3 min arc) or with very low contrast.	Fine inspection; paint retouching; fine manufacture; grading of dark materials; colour matching of dyes.
	Extremely difficult	1200	Areas where visual tasks are extremely difficult with extremely small detail (1–2 min arc or tolerances below 25µm) or of low contrast. Visual aids may assist.	Graphic arts inspection; hand tailoring; fine die sinking; inspection of dark goods; extra-fine bench work.
	Exceptionally difficult	1600	Areas where visual tasks are exceptionally difficult with exceptionally small detail (<1 min arc) or with very low contrasts. Visual aids will be of advantage.	Finished fabric inspection; assembly of minute mechanisms, jewellery and watchmaking.

Source: Australian Standard *AS/NZS1680.1:2006: Interior and workplace lighting – general principles and recommendations*

Sharing the cost so that everyone wins

A commercial property in Canberra of almost 7000 m^2 is leased to a single tenant. A NABERS Energy rating for the whole building found it performed around the 2.5 star level. With lease negotiations commencing, the building owner was keen to offer some energy improvement commitments.

Proposals were obtained from an organisation specialising in energy efficiency improvements and these were reviewed by a consultant.

The building owner agreed to implement the improvements associated with the base building services, along with a relatively simple initiative that would cut lighting energy consumption.

Another significant energy saving opportunity associated with the lighting systems was also identified, but the opportunity did not offer a high rate of return. Lighting consumes power from the tenant's supply, so the tenant stood to benefit directly from the initiative.

The consultant suggested that the superior lighting solution be adopted, that the building owner contribute funds to the value of the simple lighting initiative, and that the tenant pay for the remainder. The tenant was happy with the rate of return and the owners were able to upgrade the lighting system at a reduced cost. Everyone won.

Later, the tenant was obliged to re-negotiate their energy contract not long after the works were completed. Their tariff doubled, but because they had reduced their energy consumption by 50% the energy cost remained the same. The rate of return also doubled, so their investment in the lighting system will be paid back in half the estimated time.

Low energy lights are cool

Be aware that the more energy lights use, the more heat they give out, so reducing energy use in lighting reduces the amount of cooling required. In effect, a lighting energy reduction has a double energy-saving impact.

Upgrading lighting technology

Lighting technology includes light fittings, the way they are controlled and the positions in which they are installed. There has been a huge improvement in energy-efficient lighting technology and the technology will continue to improve and produce better and more efficient products and systems. The technology falls broadly into two categories:

- fittings that are efficient when in use
- equipment that controls the light so it is on only when needed or reduces the power it uses.

Lighting controls can help with lighting energy efficiency, but if you have an inefficient lighting system at the start, and all you do is add sophisticated controls, you end up with a *sophisticated* but *inefficient* lighting system.

If you have a long lease term to run, it could be to your advantage to have lights replaced – even if you have to share some installation costs – both in terms of energy costs and savings and in the quality of the light the newer equipment produces.

If you are approaching the end of your lease and are considering staying, the replacement of light fittings could be put on the agenda for the re-leasing discussions with your landlord. Remember that to achieve the best efficiency the lighting needs to be dimmable, divided into light switching zones (for example 100 m^2 or less), and have some form of controls such as a motion detector or timer, or linked to the building management system – to reduce after-hours use when the premises are unoccupied.

Remember, the standard lights in a tenancy are usually the property of the building owner. Removing and replacing them in full or part may lead to a claim at the end of the lease to reinstate the original equipment.

You should obtain landlord approval prior to any changes. The approval may require you to remove lights that are being replaced and store them, or the landlord may accept that these are an improvement that does not need to be made good at the end of the lease. These agreements must be in writing.

You may also be able to encourage the landlord to contribute to the upgrade, particularly if the discussion is being held prior to, or at, lease renewal. If, following investigation, you believe that the fittings in your tenancy can be improved, talk with your landlord. There are many systems where older inefficient light fittings can be retrofitted with high-efficiency equipment, with minimum disruption to the tenancy.

The effectiveness of the fittings and equipment will depend on the tenancy, its design and how it is managed. To determine which are the cheapest or most efficient lighting systems for you to install, seek advice from professional lighting designers.

Shared benefits of a lighting upgrade

Benefits for landlords

- Reduced occupancy costs
- Increased asset value
- Marketing advantage in attracting new tenants
- Improved relations with tenants
- Improved public relations

Benefits for tenants

- Increased net operating income
- Improved NABERS tenancy rating
- No investment in new systems
- Increased lighting quality
- Improved productivity
- Reduced lamp and ballast replacement costs

Zone your lighting

After-hours lighting and infrequently used, continually lit areas add up to considerable – and unnecessary – energy and environmental cost.

- Install **occupancy sensors** to activate lights in areas not constantly in use such as store rooms, toilets, computer rooms, etc. or to turn off general lighting outside working hours.
- Set lights to **turn on** automatically, but set controls so that the lights **turn off** when sensors detect that the space is no longer occupied or turn off automatically after a set time.
- Zone your lighting for after-hours workers and cleaning staff. Ensure that no lighting zones exceed 100 m².
- Negotiate for your cleaners to work during business hours instead of after hours. If this is not convenient, then ensure that your cleaners adopt a policy of working in one area at a time, and that they turn off the lights in that area before moving to the next.
- If there is a concern that the office environment feels more secure if it is fully lit, explain how zoning works and that sensors will turn lights on in particular areas when someone enters them.
- Installing a single 'all off' button at the master switch panel is an easy way to switch off large areas of lighting after cleaners/security staff finish their rounds.

Calculate the savings

The **lighting calculator** on the website (www.nabers.gov.au/public/WebPages/DocumentHandler.ashx?docType=3&id=5&attId=0) can help you evaluate the energy and greenhouse gas savings you could make by upgrading your light fittings with a more energy-efficient system. You can also search for 'lighting calculators' online and a number of private lighting companies have developed calculators that will help you with your lighting upgrades.

Talk to your energy consultant to find lighting specialists who can help with advice on an appropriate lighting system for your situation. You should ask lighting consultants to provide you with estimates of both the energy savings and greenhouse gas emission reductions of the proposed system.
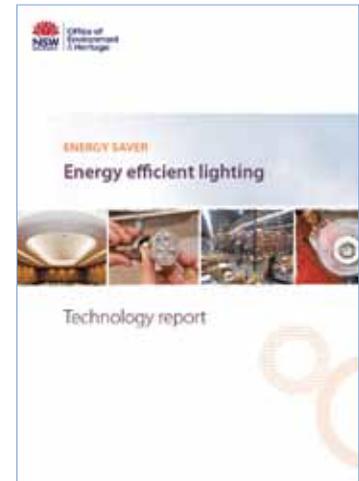
Energy Saver Energy Efficient Lighting Technology Report

Published by the Office of Environment and Heritage, this report will help you understand the potential for energy efficient lighting at your site and provides guidance for making the most cost-effective energy efficient technology upgrades. Generic technical specifications are provided which will allow you to confidently approach lighting suppliers and contractors. It will also assist you to build a business case by modelling annual energy savings, capital costs and payback periods and providing examples.

www.environment.nsw.gov.au/sustainbus/energyefflight.htm

New lamps for old

When upgrading to new lights check:

- what they replace
- what is available
- how they will look
- where to go for help
- light temperature (measured in kelvin: °K).

Royal Institution of Chartered Surveyors Sydney office

- 149 m^2
- 9 full-time staff
- Fitout completed in 2008
- 5 star NABERS Energy rating achieved 15 months after Practical Completion of the tenancy
- Green Star 4 star Interiors Rating

Recycle fluorescent lights

Make sure that when you replace fluorescent light bulbs you recycle them properly. They contain very small amounts of mercury (about 4–5 mg each) which is released when they break and must not end up in landfill. They must also be cleaned up carefully when they are broken.

Set up a system for responsible disposal of linear fluorescent tubes and energy-efficient compact fluorescent lamps (CFLs) that contain mercury. Safe disposal is currently under investigation by the Environment Protection and Heritage Council. Go to www.environment. gov.au/settlements/waste/lamp-mercury.html for a list of state and territory government websites and industry-based mercury recycling services.

Lighting showrooms

Some major lamp manufacturers have showrooms which provide tours and comprehensive public information sessions.

Royal Institution of Chartered Surveyors

The Royal Institution of Chartered Surveyors (RICS) is a leading worldwide property organisation with 140,000 members. RICS is acutely aware of the impact of the built environment and provides leadership in the sustainability of buildings and the processes involved in property ownership.

In 2007 when it relocated its Sydney office to Level 16, 1 Castlereagh Street Sydney, it wanted to lead by example. Although being a small tenant in Sydney it carried out its fitout to achieve high standards of energy efficiency in accordance with NABERS Energy ratings for tenancies, and environmental performance in accordance with Green Star. The RICS Sydney office occupies 149 m^2 and employs nine full-time staff, with space for visiting members to use a desk or hold a meeting. The space is open plan, with a fully partitioned 40 m^2 meeting room, and a kitchenette and storage area.

RICS installed energy-efficient lighting at a cost of $3810 (Scenario B below) which was part of the total electrical installation cost of $15,213. This included design, supply and installation of all the power and lighting circuits, a C-Bus control board with timers and sensors, and the lighting switched in four zones. The high-tech specification increased upfront costs but led to greater energy savings. As shown in Table 3 below, this option becomes more cost-effective two years after its installation compared to a typical T8 and halogen downlight installation. The upgrade would be even more cost effective in a larger tenancy and over a longer time.

Table 3: Comparison of lighting costs

Installation cost	Annual energy cost	After 1 year	After 2 years	After 3 years
Scenario A: Supply and install 42 x 36 W T8 tubes and starters and 11 x 50 W halogen downlights				
$3090	+ $918	= $4008	$4008 + $918 = $4926	$4926 + $918 =$5844
Scenario B: Supply and install 28 x 28 W T5 tubes and conversion kits, 14 LED tubes – including the conversion of the fittings – and 11 x 5 W LED downlights				
$3810	+ $516	= $4326	$4326 + $516 =$4842	$4842 + $516 =$5358

Note: Scenario A is cheaper to install, but more expensive to run.
Scenario B becomes cheaper than Scenario A between two and three years in use.

Energy costs are based on: all lights on for 40 hours, 50 weeks; standing charge of 67c/day and electricity at 15c/kWh. The calculations do not include projected energy cost increases. Additional savings could be achieved by turning off equipment and lights when not needed. Additional savings associated with increased lifespan of fittings have not been included.

Results

RICS achieved a 5 star NABERS Energy tenancy rating 15 months after the installation was completed. Energy consumption was reduced by 44% compared with typical T8 and halogen downlight installation.

Office equipment

Choosing the right equipment will have a significant impact on the energy use of your premises. Simply by purchasing energy-efficient office equipment and running it wisely, significant cost and greenhouse savings can be made. Other benefits include:

- if less electricity is used, less heat will be produced and less energy needed to cool the premises – a double gain
- energy-efficient equipment often has an extended life and lower maintenance
- you can relocate your energy-efficient equipment, so it does not matter which stage of the lease cycle you are in; you can make the change at any time
- there is usually a reduction in office noise level when the equipment powers down when not in use.

Equipment location

Locate heat-generating office equipment including printers, copiers, etc. away from HVAC thermostats, as the heat generated by them may distort the temperature data the thermostat uses.

ENERGY STAR®

ENERGY STAR is an international standard for energy-efficient electronic equipment. All Australian governments have adopted this initiative through the national ENERGY STAR program.

ENERGY STAR reduces the amount of energy consumed by a product by either automatically switching it into 'sleep' mode when it is not being used and/or reducing the amount of power used when in 'standby' mode. It is a feature of both office equipment and home electronics products. Using energy-efficient office equipment can reduce energy consumption of individual products by more than 50% (www.energystar.gov.au/products/index.html).

Purchasing ENERGY STAR-compliant equipment

Make ENERGY STAR-compliance a requirement of your procurement policy for electronic equipment.

As a general guide, manufacturers and purchasers should make sure that all products are shipped with the ENERGY STAR low-power feature activated or enabled and tested. This eliminates the need for users to configure the power management feature after delivery, and helps ensure that the energy-saving feature is used. When buying new equipment that is ENERGY STAR-compliant, ask the seller to:

- configure personal computers so they automatically enter a low-power mode of 30 W or less after a period of 15 minutes of inactivity; where the computer and the monitor are in the same casing, the system must enter a

CHANGE FOR THE BETTER WITH ENERGY STAR

Office equipment selection checklist

❏ Is the equipment really necessary or are there other ways to provide the service?

❏ Is the equipment the correct size for the job it is required to do? Oversizing of equipment often means it won't work at optimum efficiency.

❏ What is the energy consumption per year when the equipment is on but doing nothing useful? As most equipment stands idle for a large proportion of the time and then is used for relatively short periods, between 20% and 80% of total energy use occurs when it is on 'standby'.

❏ Can the equipment be set to a minimum energy consumption level? For many types of office equipment, the ENERGY STAR logo indicates it is fitted with a set low-energy 'standby' mode.

❏ How much energy does the equipment use per year when it is actually operating?

low-power mode of no more than 60 W after a period of 15 minutes of inactivity

- configure computers so they switch connected ENERGY STAR monitors into a low-power mode after a period of 15 minutes of inactivity. (Most monitors cannot enter low-power mode by themselves but rely on an external trigger. This is normally provided through a signalling protocol called Display Power Management Signalling [DPMS]. Both the computer and monitor must be DPMS-compatible for this system to function)

- ensure that monitors meet the US EPA's ENERGY STAR specifications and are DPMS-compatible – monitors must be able to enter a low-power mode of 15 W or less when connected to a correctly configured computer

- ensure that the computer is compatible with your network system and does not disconnect from this network while in low-power mode – many manufacturers test their ENERGY STAR equipment on networks and can report, for example, that they are compatible with Novell NetWare, Banyan Vines, Windows NT, LAN Manager and other network systems.

For more information visit the ENERGY STAR® website (www.energystar.gov.au).

Simple improvements: how office equipment is used

Office equipment accounts for approximately 20% of electricity used in offices. However, how people use equipment will have at least as much impact on energy consumption as the type of equipment used.

Having ENERGY STAR-compliant equipment is not enough. Some equipment items, particularly computers, have to be 'enabled' in order to activate the energy-saving features:

- Enable ENERGY STAR on computers – use the simple guide to enabling ENERGY STAR on your computer at www.energystar.gov.au or talk to your IT manager about enabling the power-saving feature on computers throughout the organisation. Consider password-protecting the ENERGY STAR control menu so it can't be disabled. See www.energystar.gov.au for step-by-step instructions.

- ENERGY STAR-compliant photocopiers, fax machines and printers can all be set to 'sleep' or 'shut down' to save energy.

- Set printers to print only when activated by a PIN or swipe card. Many print jobs are never claimed by users and get thrown out or recycled and these methods ensure the recipient is at the device when their job is printed. This will save paper as well as energy.

- Set office equipment to go to sleep in as short a time as you can tolerate – minutes not hours.

- Turn down the brightness on your monitor – a reduction to 50% can reduce energy used by about 40%.

- Screen savers with pictures do not save energy because they consume computing resources and may prevent the system from entering standby or sleep modes. If you want to use screen savers, set your computer to blank

screens. It is more effective to switch off your monitor if you are away from your desk or not using your computer for longer than about 15 minutes.

- Consider changing to LCD screens at low brightness in preference to using old CRT screens.
- Limit the number of people with multiple monitors and link them to job requirements. Most people do not require more than one monitor. Similarly for screen size, the larger the screen the more energy typically gets used.
- Turn off computers and monitors when not in use, especially overnight and on weekends. This is one of the most efficient ways of reducing energy use. This can be managed by educating staff and bringing about behavioural change. You can also install management software that will turn the equipment down, while still allowing software upgrades overnight.
- Switch off equipment at the power point when not in use, especially for long periods – office equipment can still use energy and cost you money when switched off at the appliance but not at the power point.
- Make power points easily accessible so staff do not have to scramble under workstations.
- Staff should be encouraged to switch off chargers and other equipment.
- Investigate laptops as an alternative to desktop computers.

Kitchen equipment

Kitchen equipment includes boiling water units, urns, refrigerators, microwave ovens, vending machines, etc. This equipment used in staff rooms and kitchenettes is often inefficient and may be left on all the time. By changing your office practices, evaluating your needs carefully, choosing the right models and setting them up to work efficiently you can make significant savings.

Energy Rating Label

The Energy Rating Label can help you to choose energy-efficient appliances.

The Energy Rating Label includes:

- a star rating, which compares the energy efficiency of an appliance to other appliances of the same size, and
- an estimate of the annual energy consumption in kWh.

How to choose an efficient fridge (or other whitegoods)

- Choose the highest-star-rated appliance you can afford in the appropriate size for your needs.
- Don't buy a larger appliance than you need. For instance, a 2 star 296-litre fridge uses 404 kWh, while a 3 star 642-litre fridge uses 530 kWh. If you only need the 296-litre size, it would be a better energy choice than the higher rated 642-litre fridge.

👍 **Tip**

Visit your office after-hours to see if any computers and other equipment items are being left on – you can reward those who turn theirs off.

Office equipment accounts for about 20% of the energy used in offices. Turning off computers, monitors and other electrical equipment is a simple but effective way to reduce energy use.

- Compare the kWh per year, found in the red box, which lets you know how much energy each fridge or appliance is likely to use under typical circumstances.
- Look at the interactive website www.energyrating.gov.au, which lists all the energy-rated electrical appliances registered in Australia and provides tips for selecting the most efficient models. It covers dishwashers, fridges and freezers, air conditioners, televisions and other appliances.
- If you are buying a dishwasher, look at the water rating as well.

Standby modes, boiling and chilled water dispensers, vending machines, lamps and lighting equipment are proposed for future regulation.

Hot-water system

The design, selection and layout of a hot-water system within a tenancy will have an impact on the amount of energy it uses. Hot-water systems are typically required to run kitchenettes, showers, additional toilets and cloak rooms, etc.

Ideally you should ask yourself whether hot water is really required in a kitchenette where the dishes will be washed in a dishwasher (which will heat the water from cold).

When designing a kitchen layout try to minimise hot-water pipe lengths (dead legs). This avoids wasting hot water due to running the water waiting for it to be hot enough to use.

Instantaneous water heaters installed in the kitchenette may be far more efficient than a system with long dead legs where water will cool off between uses. Consider using a heat-pump unit and use the rejected cooled water elsewhere, for example in the computer room.

Simple improvements in the kitchen

Fit timer controls to switch off boiling water units when not needed; consider a seven-day timer so it can be switched off over the weekend. Possibilities include:
- plug-in timers available from hardware stores for plug-in units, or
- a timer supplied and installed by an electrician for permanently wired units.

A fridge can use around the same amount of electricity as a photocopier (up to 800 kWh annually) and they are on all the time. Ways to ensure your fridge operates at its optimal capacity include:
- locating the fridge in a cool spot, out of the sun – this can save up to 100 kg of CO_2-e each year
- ensuring ventilation is provided over coils and around the cabinet and, if you are planning a new fitout, providing ventilation for the fridge
- ensuring door seals are clean and the door closes properly – this can save up to 50 kg CO_2-e each year

👍 **Tips for selecting boiling water units**

- Is it needed? Large hot water boilers can use as much electricity as 10 desktop computers (2500 kWh annually) and generate 2.5 t of CO_2. Check the power use. Are more efficient alternatives available?
- Install low-standby-loss boiling water units (preferably less than 50 W loss – manufacturers can give details).
- Do not oversize the unit – a 5-litre model is often more than adequate and costs much less to buy and run than larger units.
- Consider alternatives – electric kettles and small drink dispensers may be more cost-effective and energy-efficient.

- setting the temperature at around 4°C (for every degree lower than this, the energy consumption increases by 5%).

Other energy-saving tips for the office kitchen include:
- only running a dishwasher with a full load
- if you are using an electric kettle, boiling only the water you need – each litre of water boiled generates about 100 g of greenhouse gases
- repairing dripping taps – they waste energy (if it is a hot water tap, up to 100 kg CO_2-e each year) and water
- insulating hot-water pipes to avoid heat loss
- minimising the number of drink-vending machines and cold-water dispensers (each can consume 3000 kWh a year) – put them on timer controls such as a simple plug-in time switch, or switch them off at night and weekends
- arranging to get vending machine manufacturers to de-lamp the machines permanently to save energy without affecting the product or warranty.

Calculate the savings

You can use the **Buying new equipment calculator** on the website (www.nabers.gov.au/public/WebPages/DocumentHandler.ashx?docType=3&id=3&attId=0) to help you compare products based on their initial purchase price and the running costs taking into account the energy cost savings from more energy-efficient equipment.

Supplementary air conditioning

Supplementary air conditioning units are commonly used in offices where extra cooling is required on top of that provided from the base building heating, ventilation and air conditioning system (HVAC).

They are typically installed in areas of high occupancy, such as call centres, conference and meeting rooms, as well as computer rooms and for after-hours use. Supplementary air conditioning units can be very energy intensive so they need to be controlled and used carefully. This section explains how they work and how they should be managed for maximum efficiency.

The implications

As a tenant you pay for the alteration of the premises and the installation of the air conditioning. You generally pay for its removal and reinstatement of the base building at lease end.

You also generally pay for the electricity to run the unit in your premises. Units can be energy-intensive and expensive to run.

Conflict between supplementary and base building systems

Care should be taken when installing supplementary air conditioning to ensure that its operation does not compromise the operation of base building air conditioning, leading to significant energy wastage. It is not uncommon

CO_2-e = carbon dioxide equivalent

CO_2-e, or carbon dioxide equivalent, is a standard unit for measuring carbon footprints. The idea is to express the impact of each different greenhouse gas in terms of the amount of CO_2 that would create the same amount of warming. That way, a carbon footprint consisting of lots of different greenhouse gases can be expressed as a single number.

The ultimate climate change FAQ, www.guardian.co.uk

Supplementary air conditioning systems should be set up to operate as efficiently as possible with the plant system. Where possible, plant systems should be set up to heat/cool small zones in the tenancy.

9 Energy-efficient technology

for supplementary air conditioning to be installed in an area that also includes a base building air conditioning sensor. When the supplementary system starts and cools the space, the base building sensor may see the temperature fall and send a heating signal to the base building air conditioning.

You then have a situation where the base building air conditioning is 'fighting' the supplementary air conditioning and wasting energy.

Achieving energy efficiency in new systems

The key to saving energy lies in sizing, installing, maintaining, and running the supplementary air conditioning system correctly.

First, get informed. Ask the building manager about the base building air conditioning system and what options there are for installing supplementary air conditioning units in your premises.

Also investigate your organisation to establish who will occupy the tenancy, what their after-hours usage will be like and the frequency of use. Try and co-locate those staff members who regularly use the after-hours air conditioning and consider housing them in separate offices so the whole space doesn't need to be air conditioned.

Discuss opportunities for supplementary air conditioning with the building owner during lease negotiations and the fitout design for your office – to ensure that your plans comply with lease requirements and fitout guidelines.

You should seek professional advice regarding applicability, costs, appropriate design and size of the unit according to the base building system and your needs. Your air conditioning contractor or supplier, consulting engineers, energy auditors and energy management specialists can help select the best equipment for you.

Remember to stipulate that you want the most energy-efficient unit for your needs. A generic specification prepared by a consultant can influence the type of equipment purchased from suppliers and how it can be used more efficiently. Avoid making your decision solely on the basis of price. The quality of the installation should be your highest priority, because quality will determine lifetime energy cost, comfort and durability.

If cooling is needed in a space and the outside air temperature is low, it may be possible to make use of this 'free cooling' opportunity, through the use of an 'economy air cycle'. Make sure that when adding supplementary air conditioning, your designer gives proper consideration to this. It may not always be practical, but should be considered.

You will need to be on the lookout for energy-efficient performance. The higher the coefficient of performance (COP) of the system, the more energy-efficient the system is, and the greater your savings. For room and split-system air conditioners, check the Energy Rating Label (the more stars, the better). See www.energyrating.gov.au for a list of all models on the market.

It's important to purchase the **right size** air conditioner because buying one that's too big can penalise you in a number of ways:

- it costs more, both in capital and energy costs – in other words it uses more electricity – to buy a larger system than you need
- a larger-than-necessary system cycles on and off more frequently, reducing its efficiency – this makes indoor temperatures fluctuate more, results in a less comfortable environment and wears out the compressor and electrical parts more rapidly.

It is important to choose equipment that will fit into an office ceiling space, on a wall or floor space, and allow sufficient room for servicing and maintenance.

Consider **location**. It's crucial to select the most appropriate position for the unit to:

- allow easy access for regular (e.g. monthly) maintenance, services or repair
- minimise noise – air conditioners can often be noisy and should be installed outside the serviced area such as a conference room in a position with sufficient sound insulation e.g. in a ceiling or wall space.

Install controls. Use a control system that can incorporate timing of use, temperature and can ensure that the system can be switched off when not needed.

Ensure **proper installation**. Faulty installation of your air conditioner can result in leaky ducts and low air flow. As a result, modern energy-efficient air conditioners can perform almost as poorly as older inefficient models. Make sure duct runs are as straight as possible and that ducts are not constricted.

In sunny meeting rooms it may be worth connecting auto solar-control blinds to the supplementary system, so that the blinds are down when the system is not needed. This will reduce the load the system has to deal with when first turned on, or may remove the need for supplementary air conditioning altogether.

If a room is to be run at temperatures below those surrounding it, make sure the walls and ceiling are well insulated, and ensure that the walls are well sealed against air infiltration.

Undertake **regular maintenance**. Make sure your air conditioner's filters, coils, and fins are maintained each month by an independent service company. Have the airflows checked, and get airflows adjusted each year as required. If the supplementary air conditioning system uses the base building chilled water or condenser water, then confirm with the building manager that the system is well-maintained because contamination of the water reduces system efficiency and cooling capacity.

Review your existing system – do you need it?

If you have a central computer room with special air conditioning, consider options for shutting it down – almost all modern computers can operate in a normal office environment, avoiding the need for separate air conditioning systems which can often consume more energy than the computers themselves. Consider updating your computers to modern models with reduced energy requirements.

Install air conditioner controls to allow timing and temperature regulation, to minimise energy consumption.

Arrange regular cleaning of your air conditioning unit to maintain efficiency and capacity.

9 Energy-efficient technology

There may be spaces that have undergone a change of use, or have equipment that generates less heat than the designers expected but still utilise a supplementary air conditioning system. Communications rooms are a case in point – often these rooms do not need any supplementary cooling.

If you need it – use it efficiently

- Make sure thermostats are well-located and not near heat sources such as photocopiers, kettles or in sunlight or in cupboards.
- Keep filters clean and replace them when needed.
- Check the settings for on/off times to avoid the unit running unnecessarily.
- Set 'auto-off' timing (i.e. the time at which the system automatically turns off) to be short, i.e. about 30 minutes.
- Set thermostats to be slightly higher than normal office temperatures, so that the system will only operate when needed.
- Install solar control blinds on windows to minimise heat gain from the sun.
- Put up a sign explaining that it is not worth running supplementary air conditioning for short periods, so in meeting rooms do not turn it on for short meetings.
- Make sure that the pipes and ducts are insulated to avoid heat and cooling losses.
- Incorporate occupancy sensing for control of dedicated air conditioning systems so that staff have to turn the equipment and lighting on manually, and so it turns off when sensors detect that the space is no longer occupied or automatically after a set time.

Can you turn down the heat?

Air conditioning systems may be used when it might be just as effective to open windows and doors. However, in many buildings, it is impractical to do so. If this is the case:

- Reduce the heat load by turning off all unnecessary lighting in the air conditioned area.
- Install energy-efficient (low heat) lights.
- Ensure your office equipment is ENERGY STAR enabled.
- Reduce the amount of excess solar heat that enters the space, for example, by using overhangs on a north-facing façade, or installing double glazing/ tinting on windows.
- Reduce heat loss and heat gain by insulating ducts, pipes, wall and roof spaces; this can save up to 40% of your energy costs.
- Insulate your computer room's walls, floor and ceiling to reduce cooling loads imposed by surrounding areas.

Look at minimum air levels

Outside air is used in most air conditioning systems to control air quality (e.g. to remove odours and CO_2). However, it is important to ensure that **excess** outside air is not used because this can increase the amount of heating or cooling required. Check that the outside air flow rates match what is actually required, based on floor area and occupancy level.

Modern management systems allow the ventilation rate to be varied with building occupancy.

Check the performance of the system

- Clean coils, fins and filters and replace filters regularly. Clogged, dirty filters slow the air flow and reduce efficiency significantly.
- Check for air leaks in ducts. Listen and inspect for damage.
- Seal air leaks around doors and windows.
- Ensure maintenance programs include regular inspections of thermostat calibration, sensors and controllers to check they are operating correctly.

Install controls to existing systems

Controls monitor the heating and cooling requirements of the office and vary the operation of the supplementary air conditioning system to maintain comfort. Seek expert advice regarding options to meet to your office needs.

Timer controls

Supplementary air conditioners can be operated by a manual time switch which can turn the unit on and off as required. This is particularly useful for conference rooms or boardrooms that are only occupied at certain times. Set timer controls to ensure that the unit is not left on after the room has been vacated or provide an 'off' button.

Temperature controls

Increase your thermostat set point by 1 to 2°C in warm weather, and decrease it in cool weather. For a minimal temperature change, large energy savings are possible while still maintaining comfort. Temperature sensors can control the unit's operation according to thermal requirements and occupancy levels.

Data centres, communication and server rooms

In tenancies with large or highly energy-intensive data centres, the information technology equipment may take over from lighting as the single biggest consumer of energy in the tenancy. Server rooms and data centres typically use between 20 to 100 times the amount of energy per square metre as a typical general office area. This section provides guidance in managing and reducing energy use in data centres and server rooms.

Check the temperature

Computer room air conditioning can generate a third or more of the greenhouse gas emissions associated with mainframe computers.

Many IT rooms and data centres are run at unnecessarily low temperatures. Check with the manufacturers to see if equipment can be run at normal office temperatures or even higher.

Maintenance can save money

By keeping your system well maintained and tuned you can save between 20% and 70% of air conditioning operating costs.

In tenancies incorporating data centres, the energy used by the IT equipment and associated cooling can be greater than all the other energy uses combined.

IT management

By virtue of their numbers and excluding lighting, computers are by far the largest energy consumers among your items of office equipment. Efficient management of the IT equipment around the office, as well as in the server room, will dramatically reduce your organisation's energy consumption.

Much of a data centre's equipment is given over to storage – and often much of the storage is duplicated files, or unimportant email that could be compressed or deleted.

Reducing the need for storage reduces the number of file servers, which reduces the energy consumption of the data centre.

Humidity control in computer rooms uses a lot of energy. By setting the humidity range to at least 40–60% RH (Relative Humidity) you can reduce energy consumption.

Many computer rooms have equipment turned on and running after the application system has been decommissioned.

As with desktop and office equipment, the newer equipment in the computer room should have power management features which can be enabled to save power without compromising performance or reliability.

Virtualisation is a technique allowing the workload of multiple devices (computers) to be consolidated onto a single device, leading to significant energy and space savings. Virtualisation can be applied to servers, disk storage, networking equipment and even desktop computers.

Storage quotas and archival practices should be reviewed and technologies such as file de-duplication deployed to reduce the number of spinning disk drives.

In the past, computer rooms were run at temperatures well below office temperatures. Modern equipment no longer requires this, but many computer rooms are still run at unnecessarily low temperatures. Check with your IT equipment suppliers to see if the temperature can be increased to at least 24–25°C. Provided the room does not have any hot spots, this should have no impact on the performance or reliability of the equipment. You will save energy from not over-cooling the room, and also because you will lose less cooling to the adjacent areas.

In air-cooled computer rooms the design and management of the air flow is critical to heat reduction and dissipation. It is important to ensure that cold air is delivered to the front of equipment cabinets at the right pressure and volume, and that it does not mix with the hot air coming out the backs of the cabinets.

If cold air is delivered under an access floor, check that the space is not congested with cables as this will reduce cooling efficiency and increase mechanical and IT equipment heat loads, and energy use. Floor grilles should be positioned carefully to optimise delivery of cold air and separate the cold and hot air flows.

The computer room air conditioning and electrical plant should be designed for energy efficiency. Air conditioning, uninterruptible power supply (UPS) and other components should be modular so that as the active IT equipment load varies over time, the plant can operate at its most energy-efficient levels.

When relocating your computer or server room, or carrying out alterations, you have the opportunity to achieve an energy-efficient room, usually at no additional cost. Consider the use of good design including:

- insulation
- effective air circulation
- siting equipment away from heat sources such as windows
- using economiser cooling when cold outdoor temperatures permit
- incorporating newer technologies, for example localised cooling, by using air ducted directly to the machines or cold liquids piped to racks and equipment
- using surplus heat from the computer room to supplement winter heating in adjacent office areas.

Finally, don't forget computer room lighting. The computers don't care if the lights are on or off. Look to utilise automatic lighting controls to ensure that lights are on only when the space is occupied. This will not only save the energy used to run the lights, but also the energy used to remove the heat the lights generate.

More information

Equipment

- *Green office guide: a guide to help you buy and use environmentally friendly office equipment* – a joint initiative of Australian Government, state and territory government agencies: www.livingthing.net.au/rc/extpartners/engStar_greenofficeguide.pdf

- *Sustainable Property Guide*, Office of Environment and Heritage, Section 5 'Greening the supply chain' and Worksheets 5.1 A & B: www.environment.nsw.gov.au/sustainbus/SustainPropertyGuide.htm

Lighting

- The Australian Government Department of Climate Change and Energy Efficiency *Tenancy Lighting Guide* covers a good range of topics and issues relating to tenancy lighting: www.climatechange.gov.au/government/initiatives/eego/~/media/publications/eego/lighting-report-pdf.pdf

- The Illuminating Engineering Society of Australia and New Zealand has lists of lighting practitioners as well as details of best practice in lighting design and standards: www.iesanz.org

- The Office of Environment and Heritage *Energy Saver Energy Efficiency Lighting Technology Report* will help you understand the potential for energy efficient lighting at your site and understand the business case for

various lighting upgrades: www.environment.nsw.gov.au/sustainbus/energyefflight.htm

- Standards Australia: Information Centre (02) 9746 4748, for advice on standard lighting requirements

- For information on the safe disposal of mercury-containing lamps, which includes low-energy compact fluorescents and linear fluorescent tubes, see Australian Government Department of Sustainability, Environment, Water, Population and Communities: www.environment.gov.au/settlements/waste/lamp-mercury.html

Kitchen equipment and energy labelling

- The E3 Equipment Energy Efficiency website lists all energy-rated electrical appliances registered in Australia and provides tips for selecting the most efficient models. It covers dishwashers, fridges and freezers, air conditioners and other appliances: www.energyrating.gov.au

Supplementary air conditioning

- Australian Institute of Refrigeration, Airconditioning and Heating (AIRAH) is a great starting point for anyone interested in finding out more about HVAC systems: www.airah.org.au

- American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE): www.ashrae.org/

Additional information

Glossary

Financial terms

Average rate of return: The ratio of the savings generated by an investment to the cost of the investment.

Discount rate: The percent by which future projected cash flows are discounted for financial modeling.

Net present value: The value of an investment when future net cash flows are discounted back (using the discount rate) to their present value.

Payback period: The time taken for the savings or profit of investment to repay the initial capital expenditure.

Technical terms

Ballast: A device in a light that provides the correct voltage to start fluorescent and HID lamps (see definition below). A higher voltage is required to start the lamp than to operate it. The ballast then matches the incoming voltage to the lamp voltage and reduces the current being supplied to the lamp.

Base building energy: Energy used to provide heating, ventilation, air conditioning and lighting for central services and common areas in an office building.

BMS: Building Management System. The computer that controls the indoor environment (sometimes referred to as Building Management Control System or BMCS).

Coefficient of performance (COP): An energy-efficiency measure. The higher the number, the more efficient.

Colour rendition: The ability of a light source to convey the true colours of people and objects. The colour rendition index scale is from 0–100. 100 is excellent (true) colour rendition and 0 is poor colour rendition.

Dimming: The reduction of light output from a lamp which reduces light output and power use.

Economy cycle: Energy-saving feature in air conditioning that allows a building to be cooled with 100% outside air when outside conditions allow.

Efficacy (light): The ratio of light output to power input of a light source i.e. lumens emitted per watt inputted.

Fluorescent lamp: The main type of general office lamp. Baton-shaped lamps.

Additional information

Glare: A dazzling effect caused by brighter and more intense light in the field of view.

GreenPower: Government-accredited energy harnessed from renewable energy sources such as solar, wind and water power (see www.greenpower.com.au for more information).

High Intensity Discharge (HID) lamp: The main alternative to high-wattage incandescent lamps. They are generally used in outdoor or industrial applications, e.g. high bay or floodlight lamps.

Illuminance: The amount of light on a surface measured as lumens per square metre or lux.

Incandescent lamp: The traditional type of artificial light bulb which generates light by heating a coil to generate bright light.

Lamp life: The period in which the lumen output remains above 75% of the initial value.

Luminaire: The light fitting, including lamp holders, base, reflectors and diffusers.

Reflectors: Mirror devices that direct the light emitted by a lamp in the desired distribution pattern.

Solar heat gain: The heat load buildings gain from the sun's energy.

Small power: Power consumed by devices such as phone chargers, calculators and desk lamps plugged into general power outlets.

Tenancy energy: Energy used by tenants for their power and lighting.

Thermostat: A device for measuring the space temperature and reporting to the BMS.

Transformer: An electric device used to reduce the voltage in an electrical circuit.

PUE: Power Utilisation Efficiency for IT/data centre benchmarking.

UPS: Uninterruptable Power Supply.

Virtualisation: Allowing a single computer to do the job of multiple computers by sharing resources across multiple environments.

Whole building energy: The total energy used by a building (base building and all tenancies).

Zoned lighting: Lighting that has controls to allow discrete areas to be operated independently of the tenancy.

Real estate terms

Building house rules: A set of rules specific to a particular building designed to control the way tenants conduct their operations within that building.

EMP: Environmental Management Plan – A plan to establish responsibility and set criteria for improving the sustainability of a building.

Fitout guide: A guide specific to a building that sets rules and guidance for how a tenant should manage the planning, approval process and construction of their fitout within the building.

Green lease: A lease or schedule to a lease that contains clauses covering the environmental performance obligations of the parties.

Gross lease: A lease in which the rent covers all outgoings (i.e. landlord pays for base building costs up-front and is reimbursed via tenants' rental payments).

Net lease: A lease in which the rent does not include outgoings (base building costs) which are paid separately by tenants in addition to the rent.

PCA method of measurement: A process defined by the Property Council of Australia that standardises the way the areas within office space are measured and recorded. NABERS ratings require net lettable area calculated by this method.

Semi-gross lease: A lease in which the rent includes all outgoings except statutory costs (e.g. land tax, insurance, etc.) In some instances the outgoings are included in the rent, but the tenant pays increases above the base year.

Environmental rating tools

Energy Rating: The Energy Rating Label uses a star rating to compare the efficiency of dishwashers, fridges and freezers, air conditioners and other appliances. The website www.energyrating.gov.au lists all the energy-rated electrical appliances registered in Australia and provides tips for selecting the most energy-efficient models.

ENERGY STAR®: ENERGY STAR is an international standard for energy efficient office equipment including computers, printers and photocopiers, and home electronics such as TVs, audio products and DVD players, adopted by all Australian governments. ENERGY STAR reduces the amount of energy consumed by a product by either automatically switching it into a 'sleep' mode when it's not being used and/or reducing the amount power used when in 'standby' mode. See www.energystar.gov.au.

Green Star: The Green Star rating system for buildings administered by the Green Building Council of Australia. See www.gbca.org.au.

NABERS: National Australian Built Environment Rating System. See www.nabers.gov.au.

Units and conversions

Quantity	Unit	Symbol
Electrical current	amperes	A
Energy	joule	J
Energy	kilowatt hour	kWh
Illumination	lux	lx
Length	metre	m
Light output	lumen	Lm
Mass	kilogram	kg
Mass	tonne	t
Power	watt	W
Pressure	pascal	Pa
Temperature	° Celsius	C
Volume	litre	L

Multiple-unit prefixes

Unit	Symbol	Order of magnitude
centi	c	10^{-2}
giga	G	10^{9}
kilo	k	10^{3}
mega	M	10^{6}
micro	μ	10^{-6}
milli	m	10^{-3}
nano	n	10^{-9}

Energy management checklist

This checklist can help you to identify energy-saving opportunities in your tenancy, including actions that your staff can take as well as actions that will require consultation with others.

Getting started

Involve your colleagues

Build a sense of ownership of office sustainability and foster positive behaviour by involving your colleagues.

- Don't try and do it all yourself; talk to your colleagues and form a team.
- Let your colleagues know what you are doing and how it benefits the environment, the office and the organisation. Update your colleagues on the progress of the energy management actions in the office and invite their suggestions. This will engage staff and help identify the sustainability enthusiasts in the office.
- Contact the relevant people in your office or organisation who:
  - pay the utility bills such as electricity, gas and water
  - organise or authorise purchasing and procurement (e.g. stationery and office equipment)
  - manage the building (for assistance when completing the checklist).

Complete the checklist

- Work through the checklist by answering yes or no and making notes where applicable.
- Keep an eye out for activities in your office that might explain unusually high energy use; e.g. if your office hosts a regional computer server, this would explain high energy use. Make a note of any of these activities.
- Note any energy saving initiatives currently taking place in the office and share these with your colleagues.
- Take your time – you do not have to complete the checklist all at once. The list is split into sections to assist you.

Review and take action

- Review the checklist and identify areas for improvement.
- Create a list of actions and decide which actions you will undertake first.
- Read the *Energy Management Guide* for ideas on taking action.

Pre-check office information

Check carried out by:

Building address:

Groups/divisions/other organisations you share an office with:

Number of staff (FTE):

Approximate floor space (m^2):

Useful contacts:

Energy management checklist

	Question	Yes / No	Comments / Actions
Office and kitchen equipment	**Actions that staff can influence**		
	Are computers, monitors, printers and photocopiers turned off overnight and on weekends?	Yes / No	How is this encouraged and monitored?
	Do staff switch off their monitors during the day, when away from their desk or when not using the computer for longer than 15 minutes?	Yes / No	How is this encouraged and monitored?
	Are power points easily accessible to turn office equipment off overnight and during the weekends?	Yes / No	
	Are there too many printers?* Could fewer printers be used in a central location?	Yes / No	
	Can photocopiers also be used as printers and faxes?*	Yes / No	
	Is the manufacturer's recommended maintenance schedule followed to ensure the longevity and efficient operation of office machines?*	Yes / No	
	Is ENERGY STAR enabled on computers, printers, faxes and photocopiers?*	Yes / No	If yes, can the ENERGY STAR mode be set for shorter periods of time (60 mins or less)?
	Is the 'sleep mode' enabled on photocopiers?	Yes / No	

	Question	Yes / No	Comments / Actions
	Can the number of refrigerators, dishwashers or microwaves in the office be reduced?	Yes / No	
	Is new equipment purchased rated 4 star or better under the Energy Rating Label Scheme?	Yes / No	
	Is the refrigerator located in a cool, shaded place?	Yes / No	
	Do door seals and hinges work properly?	Yes / No	
	Do machines have enough ventilation to prevent overheating or inefficient operation?	Yes / No	
	Are there special functions performed at the office that might increase energy use?*	Yes / No	
Lighting	**Actions that staff can influence**		
	Are there signs reminding staff to switch lights off when leaving a room or being the last to leave the office?	Yes / No	
	Are there signs reminding staff to switch lights off when leaving areas not occupied continuously? (i.e. meeting rooms, kitchens, storage rooms, etc.)	Yes / No	
	Does your office layout optimise use of natural light?	Yes / No	
	Actions that may require building management involvement		
	Are energy-efficient lamps installed in exit signs?	Yes / No	
	Can lighting zones be improved by switching to smaller groups of lights or installing motion sensors or timers?	Yes / No	
	Are there too many lights?	Yes / No	Often there are too many lights. Cleaning lights and diffusers can reduce the number needed. Mono-phosphor fluorescent lights can be replaced with tri-phosphor fluorescent lights.
	Could some lamps be removed?	Yes / No	
	Are cleaners instructed to turn lights off after they finish work?	Yes / No	

Energy management checklist

	Question	Yes / No	Comments / Actions
Air conditioning & supplementary air conditioning (While air conditioning is considered a base building service provided by the building owner, you can work with your staff and the building management to reduce the energy use while still maintaining a comfortable working environment)	**Actions that staff can influence**		
	Are blinds/shutters used to reduce sun intensity in summer?	Yes / No	Encourage staff to use blinds (or other window coverings) to reduce heat gain in summer and heat loss in winter.
	Is natural ventilation used?	Yes / No	Is this controlled in winter to reduce cold draughts?
	Are photocopiers and other office machines placed away from thermostats?	Yes / No	Machines placed near thermostats can interfere with air conditioning temperature.
	Actions that may require building management involvement		
	Is your maintenance and calibration schedule for air conditioning units consistent with the manufacturer's recommendations?	Yes / No	
	Are thermostats checked and set to optimum temperatures (to prevent over-cooling in summer and over-heating in winter)?	Yes / No	
	Are air conditioning unit filters cleaned regularly?	Yes / No	
	Do air conditioning hours of operation match your office hours of operation?	Yes / No	
GreenPower	**Actions that staff can influence**		
	Does your office purchase GreenPower?	Yes / No	If so, what percentage/how much?
Office trends	**Actions that staff can influence**		
	Is energy use recorded and monitored (from bills)?	Yes / No	
	Are significant changes to energy consumption reported to management?	Yes / No	
	Are maintenance records for office equipment and/or supplementary air conditioning systems kept and reviewed to identify trends or areas of concern?	Yes / No	

	Question	Yes / No	Comments / Actions
Staff engagement	**Actions that staff can influence**		
	Is there a forum or process where staff can suggest energy-saving ideas?	Yes / No	
	Is this encouraged and rewarded?	Yes / No	
	Is time regularly allocated to sustainability issues at general office meetings?	Yes / No	
	Is sustainability training offered and promoted to staff?	Yes / No	
	Do staff give feedback to their sustainability champions so that initiatives can be shared to inspire others?	Yes / No	

* These actions may require discussion with your IT department.

What's next?

Once you have completed this checklist, we encourage you to sit down with members of your team and identify your top five or ten actions and plan how you will implement them in the office.

It is a good idea to set a regular meeting with the team to help achieve your energy management goals and to communicate your success.