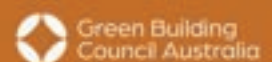


Smart energy management in government operations

strengthening budgets | slashing emissions

DECEMBER 2021



Key insights

Governments around Australia can slash their own emissions by 2030 and make a major contribution to achieving Australia’s target of net zero emissions by 2050 while saving billions of dollars.

The key is ensuring departments and agencies are supported to reduce energy use and emissions in their own operations through smart energy management.

This guide sets out tried and tested best practice principles that every government in Australia can use to unlock this opportunity. It also steps through the compelling case for starting with energy efficiency, which is the lowest cost option for driving down emissions in the near term, and makes the task of decarbonisation easier and cheaper in the medium and long term.

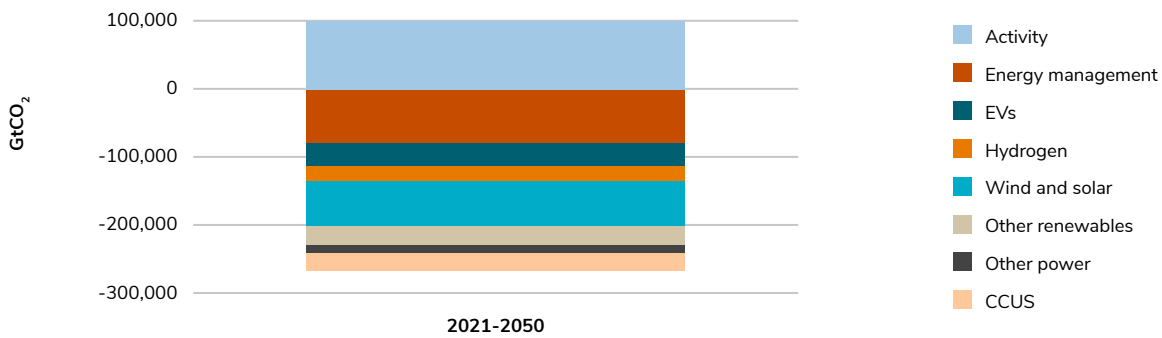


Figure 1 Energy management will contribute greater emissions abatement than solar and wind power in the path towards net zero. Note: energy management includes fuel switching and electrification, but excludes electric vehicles (EV) emissions savings.

Source: International Energy Agency (IEA) 2021, *Net Zero by 2050*, IEA, Paris, p. 56.

Smarter energy management can reduce energy use in facilities by 30 per cent or more, delivering big cost savings and emissions reductions to governments. However, experience in Australia and around the world has shown that unlocking these benefits requires a whole of government approach.

“ ...a gigawatt of power not needed because you’ve done an efficiency measure is the best form of energy generation that you could ever hope to have. ”

Dr Alan Finkel
Former Australian Chief Scientist

Unlocking the opportunity

- Governments that do not already have centralised, whole-of-government energy management programs in place should establish them quickly as they deliver major benefits to the budget bottom line and act as a critical foundation for decarbonisation efforts.
- Governments that already have centralised, whole-of-government energy management programs in place should build on these foundations to scale up their impact.

Is your government following the seven ‘best practice’ principles set out on the next page?

Establishing effective energy management programs

Experience from Australia and around the world shows that effective government energy management programs have the following characteristics:

1. Whole-of-government approach

A 'whole-of-government' approach to energy management is far more effective than an ad hoc system where each department uses a different approach to energy management.

A department-driven approach can result in higher overall costs and lower returns due to administrative redundancies and lack of sufficient expertise and experience within the procurement divisions of departments and agencies.

2. A lead department

A lead department can support and coordinate energy upgrades, minimising administrative costs and inefficiencies.

3. Carefully chosen program targets

Whether energy- and emissions-saving or financial, targets support ambition and action. The NSW Government aims for energy efficiency upgrades to have an internal rate of return of at least 12 per cent, which holds departments and agencies to account.

4. Mandates on public sector bodies

Due to treasuries recouping the financial benefits of efficiency dividends, the benefits of energy upgrades generally accrue at the whole-of-government level, rather than the departmental or agency level. Accordingly, it is critical that governments set mandates on departments and agencies to both undertake certain actions – e.g. have energy audits on all their facilities by a certain date – and contribute to whole-of-government targets – e.g. implement the energy upgrades recommended by the audits.

5. Repayable capital finance

Providing repayable capital finance for agencies to fund energy upgrades, including streamlined funding approval to fast-track project delivery, supports governments to invest in smart energy management with no increase in government debt once the loans are repaid.

6. Proven performance-based delivery models

Performance-based delivery models assure energy and emissions savings, mitigating financial risks and maximising energy savings.

7. Transparency and accountability

Standardised public reporting of commitments and performance and building the commitments into the KPIs of department and agency heads helps to ensure commitments are met while maintaining public confidence.



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Energy management includes energy efficiency and demand management. In government facilities, energy management goes beyond lighting upgrades, including improvements to heating and cooling systems, building envelopes, as well as electrification and demand response.

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Improving energy management in government operations is a ‘hard-working investment’ that delivers multiple benefits, including strengthening budgets, creating jobs and stimulating the economy, improving public infrastructure, reinforcing the electricity system and demonstrating governments’ leadership on climate change.

4 Designing an effective energy management program for government operations Pages 15 – 24

Decades of collective experience from Australia and around the world demonstrates that governments can be confident in securing excellent financial, economic, social and environmental outcomes from energy management programs. To secure these benefits, governments should design their energy management programs around seven key principles.

5 Resources for departments, agencies and councils Pages 25 – 26

Governments that are ready to demonstrate their leadership on energy management by rolling out new programs and scaling up existing ones have access to resources to get started and continue on their energy and carbon management journey.

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Introduction

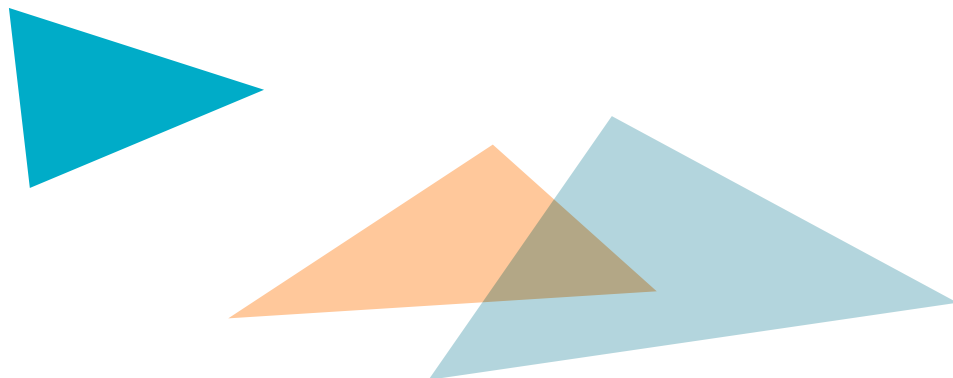
This document provides guidance for federal, state and local governments on how to manage energy use in their own operations. Energy management is a broad term that includes energy efficiency – using less energy to achieve the same outcome – and demand management – or changing when energy is used.

All levels of government have significant property holdings, with state and territory governments holding particularly large assets. Governments own and occupy over 25 per cent of the commercial building stock in Australia, including schools and hospitals, and run energy-intensive facilities such as water supply and treatment facilities.¹ Consequently, governments use a huge amount of energy. Smarter energy management can reduce energy use in facilities by 30 per cent or more, with very significant impacts on both governments' budgets and policy goals.

Multiple benefits

Improving energy management in government operations is a hard-working investment that delivers multiple benefits:

- **Strengthening budgets:**
Energy management in government buildings and operations delivers major reductions in energy and maintenance bills that strengthen budgets.
- **Creating jobs and providing economic stimulus:**
The International Energy Agency (IEA) and International Monetary Fund (IMF) have identified energy efficiency as the most jobs-rich part of the energy sector. Government investment in energy management is perfectly suited to stimulus following COVID-19, as government investment now delivers long-term savings to budgets.
- **Improving public infrastructure:**
Energy management upgrades to facilities improve the health, safety and comfort outcomes of occupants, and make buildings more resilient to extreme weather events.
- **Reinforcing the electricity system:**
Reducing peak demand and shifting when facilities use energy through demand management can boost the reliability and affordability of the electricity grid as it transitions to variable renewable energy (VRE).
- **Demonstrating leadership on climate change:**
The IEA estimates that energy management matches the role of wind and solar in achieving net zero – see **Figure 1**. If governments improve their energy management it would deliver major emissions reductions, set an example to the community, and send a clear message to industry.



¹ Sustainable Built Environment National Research Centre (SBENRC) 2017, *Retrofitting public buildings for energy and water efficiency*, SBENRC, Brisbane.

By investing in energy management within its own operations, governments can:

- **Cut operational greenhouse gas emissions by 30 per cent:**
Energy management plays a substantial role in decarbonising the global energy system, according to the IEA – see **Figure 1** – and government operations are ripe for opportunity across energy intensive assets like hospitals and water corporations.
- **Save hundreds of millions of dollars each year:**
The opportunities for state-by-state savings are significant. Ramping up energy efficiency in Victoria could save the state up to \$122 million each year from energy savings. For New South Wales, savings could amount to \$94 million.²
- **More effectively use taxpayers' money:**
Investing in energy management can be done at no cost to taxpayers, with reduced energy bills for governments offsetting the initial capital investments. Savings can also be re-invested into additional energy management upgrades, resulting in further bill savings for governments.

“ Energy efficiency
is a jobs machine. ”

Fatih Birol
Executive Director, International Energy Agency

- **Create up to 15 jobs per US\$1 million invested in energy efficiency investment across the economy:**³
Investing in energy efficiency can provide more jobs at lower cost than investment in renewable energy; these jobs are critical following the first recession that Australia has experienced in 30 years due to the COVID-19 pandemic.
- **Utilise proven delivery models:**
Scaling up existing energy management programs is the simplest and fastest way to deliver the largest financial returns and greatest potential for job creation. Successful programs are in place in NSW and Victoria that can be replicated in jurisdictions where such programs currently do not yet exist.

² These savings figures have been derived from approximately 30 per cent of each state's energy spend.

³ International Energy Agency (IEA) 2020, *Sustainable Recovery*, IEA, Paris.

Accelerating effort on energy management

Adopting the proven delivery models established by other jurisdictions can help governments to unlock the benefits of smart energy management. Several Australian governments have extensive experience with energy management, with the governments of both New South Wales and Victoria running large programs over the last decade.

These programs have several 'best practice' features that other governments can readily adopt, which are set out on **page 2**, and explored in more detail on **pages 15 - 24**. The well-documented experiences of the NSW, Victorian and international governments make it low-risk and straightforward for other jurisdictions to introduce or improve their own energy management programs.

The **Victorian Greener Government Buildings (GGB) program** was established in 2009 and has invested over \$280 million in energy efficiency and renewable energy projects, achieving annual estimated savings of \$39 million and 173,000 tonnes of CO₂e.

In 2020, the Victorian Government decided to build on the incredible success of the GGB program, setting up a revolving fund that would invest a further \$200 million in energy management over the next decade.⁴

The **NSW Government Resource Efficiency Policy (GREP)** was established in 2014 and requires all government agencies to create a plan to implement energy savings projects at all eligible sites, delivering aggregated energy savings of at least ten per cent by 2023-24.

GREP also sets out several minimum energy efficiency standards for offices and appliances. From 2012 to 2020, over 1,100 energy efficiency projects were undertaken by NSW Government agencies, which have resulted in about \$19 million in annual energy cost savings and 114 million kilowatt hours (kWh) of total annual energy savings.⁵

Where programs exist, there is often an opportunity to scale them up by ensuring that they are aligned with the 'best practice' characteristics – like targets for net zero emissions, mandates and available capital – that are outlined on **page 2**, and explored in more detail on **pages 15 - 24**.

⁴ Victorian Government Purchasing Board 2021, *Energy performance contract*.

⁵ NSW Department of Planning, Industry and Environment 2020, *Energy efficiency projects*.

What is energy management?

Smart energy management refers to better management of energy use, and includes:

- **Energy efficiency:**
Using less energy to achieve the same – or better – outcomes. As a simple example, LED lighting consumes over 80 per cent less energy than incandescent bulbs, whilst also producing superior lighting.
- **Load shaping:**
Changing when energy is used to reduce costs, such as heating water at times when electricity generation exceeds demand and electricity prices are lower.
- **Demand response:**
Reducing demand in response to a signal from the electricity system, such as a financial signal to reduce demand during heatwaves when demand – and the price of electricity – is high.

Energy management activities in government facilities involve a range of technologies, including:

- Replacing older lighting technologies with advanced LED systems, including updating streetlights, traffic lights and lighting in buildings;
- Upgrading heating and cooling systems;
- Installing building automation systems;
- Improving the building envelope with insulation, draught proofing and more; and
- Upgrading pumps and operational systems in public pools, water treatment and distribution facilities.

While the central focus of most government energy management programs is energy efficiency, this core goal can be supplemented with secondary goals, such as:

- Using **demand response** to both reduce facilities' energy bills and enhance the affordability and reliability of the electricity system;
- Adopting **electrification** of processes, such as replacing gas boilers with electric water heaters that are powered by renewables to support the decarbonisation of Australia's electricity system;
- Deploying **distributed energy resources (DER)** like solar PV and battery storage capacity to enable smart demand management and support fully electric buildings; and
- Leading on electrification or **fuel switching** of government vehicle fleets, with the installation of electric vehicle (EV) chargers to support the transition to decarbonised transport systems.

Energy efficiency: the first fuel

The IEA refers to energy efficiency as the 'first fuel', as energy efficiency investments are often more cost-effective than investments in other energy upgrades, like on-site renewable generation or battery storage.

Energy efficiency is where smart organisations start before considering other investments, and not just because it immediately cuts energy bills. Importantly, as energy efficiency lowers an organisation's energy demand, it can reduce the size of generation and demand management technologies required by businesses, reducing the risk of over-investment.

Ideally, energy management upgrades should be considered before or alongside energy generation and procurement decisions. For example, energy efficiency measures can significantly reduce the size of the solar PV system required for a site, and changing the timing of energy use can better align a site's demand with the output from its solar PV.

North East Water is leading the way in energy management; to learn more about how your department, agency or council can too, read [Navigating a dynamic energy landscape: a briefing for government agencies](#).



3

The benefits of energy management

3.1 Strengthening budgets

Governments use large amounts of energy. For example, several water corporations meet the National Greenhouse and Energy Reporting (NGER) thresholds for large energy users. This means that better managing energy use can deliver major benefits to the budget, including:

- Significantly reducing the energy use of key facilities, often by 30 per cent or more, which reduces governments' energy bills and exposure to volatile energy markets; and
- Delivering major reductions in maintenance costs that, in circumstances like street lighting upgrades, can be worth more than the energy savings.

Studies suggest that buildings that perform better from an energy perspective deliver levels of occupant productivity that are potentially worth four times the value of the energy savings⁶ – see **Section 3.3** for more. However, these benefits are typically overlooked when assessing the budgetary benefit of energy management upgrades.

If governments set the right objectives and investment criteria, the financial outcomes of behind-the-meter – i.e. demand-side – investments are compelling. Investments in energy management typically increase the value of government assets, so that increases in debt are offset by increases in asset values. This means that energy management investments result in immediate improvements to financial statements, and these benefits grow over time as energy savings increase.

For example, a \$2 million investment in new LED lighting and heating, ventilation and air conditioning (HVAC), which yields annual savings of \$350,000 in energy and maintenance costs, is accounted for as follows:

- **Operating statement impact:**
The \$2 million capital investment is depreciated over 15 years, resulting in an annual expense of \$133,000. Additionally, there is an annual reduction in energy and maintenance expenses of \$350,000. The net result of this is a \$217,000 annual improvement to the operating statement.
- **Balance sheet impact:**
The net impact on the balance sheet at the time of investment is zero. The \$2 million capital investment increases non-financial assets by \$2 million. However, it either creates a liability – if a loan funds the project – or reduces financial assets – if cash is used to pay for the project – by \$2 million.
- **Net debt impact:**
This impact varies over time, following the net cashflow for the project. At the time of investment, there will be an increase in net debt of \$2 million. Over six years, the net debt impact will reduce to zero. Over the remaining years, the annual savings will achieve a net reduction in debt.
- **Net present value (NPV):**
Over a 15-year period, assuming a discount rate of four per cent (real), the NPV is \$2 million. A positive NPV indicates it is worth investing in the project.

Well-designed energy management programs deliver good returns with low risk. And, for larger projects, governments can use contracting models that guarantee savings and a positive internal rate of return – see **Section 4.6**.

⁶ ACIL Allen 2015, *Commercial Building Disclosure Program Review*, ACIL Allen, Sydney.

3.2 Creating jobs and providing economic stimulus

Improving energy management in government facilities can deliver rapid economic stimulus and create and protect jobs. In 2020, the IEA and IMF identified investment in energy efficiency as a key tool for economic stimulus in response to the COVID-19 pandemic.

In particular, energy efficiency in buildings was identified as the most jobs-rich area of the energy sector, creating 15 jobs for every US\$1 million of capital investment – see **Figure 2**. This is significantly more jobs than are created by equivalent investments in solar, wind or gas-fired generation.

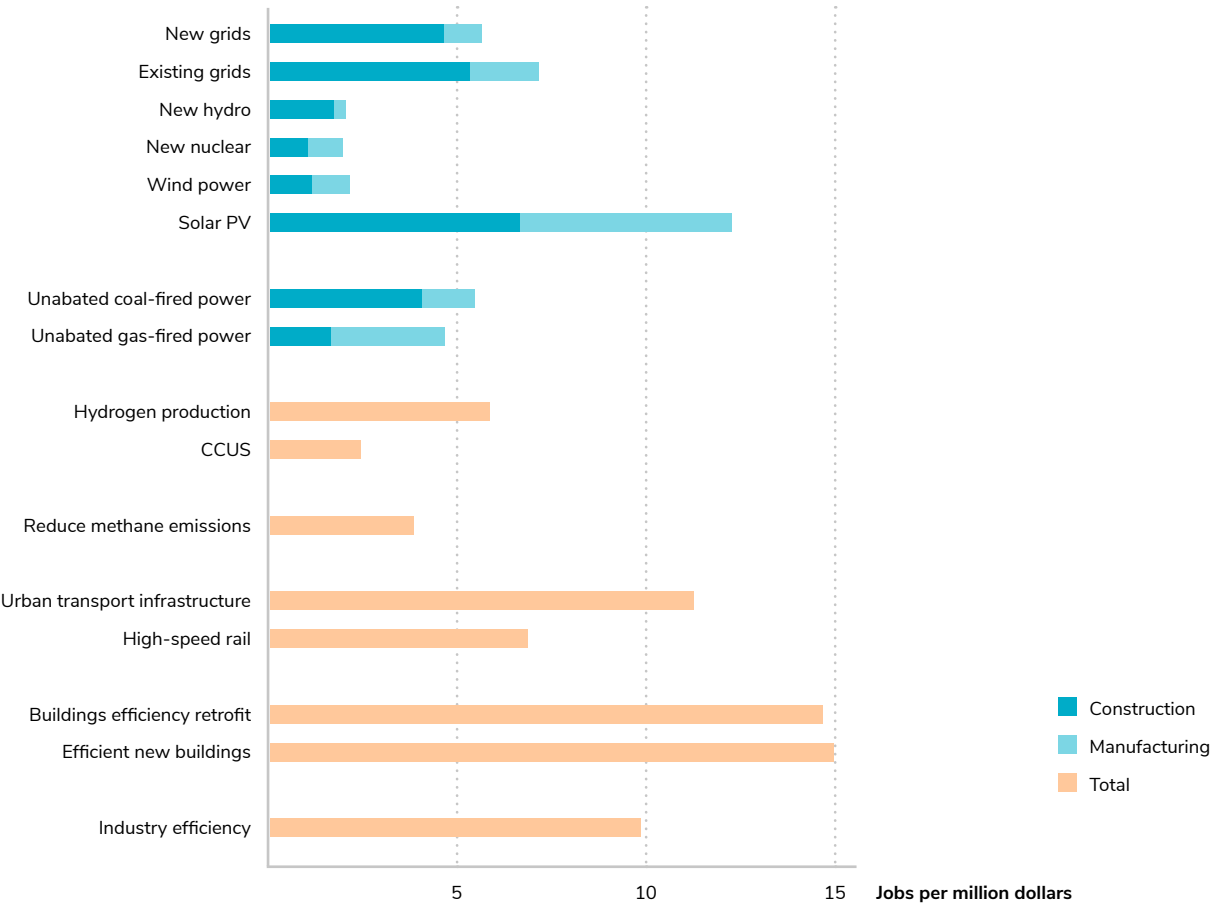


Figure 2 Jobs per million dollars of capital investment in energy technologies
 Source: International Energy Agency (IEA) 2020, Sustainable Recovery, IEA, Paris, p. 40.

There are already more Australians working on energy management than in any other part of the energy sector. In total, there are an estimated 236,000 workers in Australia holding jobs that involve some level of energy efficiency and management,⁷ including:

- Mechanical engineers and technicians;
- Construction workers;
- Electricians;
- Air conditioning and refrigeration mechanics; and
- Facilities managers.

However, investing properly in energy management across the whole economy would create an estimated additional 120,411 job-years of employment.⁸ Investment in energy management in government operations is a critical catalyst to unlock the full potential for employment in this sector.

3.3 Improving public infrastructure

Energy management upgrades in facilities generally deliver significant enhancements to the health and wellbeing of occupants. These include:

- **Improved air quality:**
In 2020, severe bushfires and the COVID-19 pandemic reignited the debate on the importance of air quality in buildings. As a result, building owners have been placing a much higher focus on the health and wellbeing of occupants. Air quality is particularly important in health-sensitive environments often owned or run by governments, such as hospitals;
- **Reduced risks from extreme weather:**
Recent studies show that improving the energy efficiency of existing buildings in Melbourne could reduce deaths associated with heatwaves by 90 per cent. The quality of building envelopes is particularly important for maintaining occupant comfort and safety in the event of power outages that can occur during periods of extreme weather;⁹ and
- **Better productivity from improved lighting quality and thermal comfort:**
Upgrading lighting, heating and cooling systems, as well as developing better controls of building systems, can deliver significant improvements in occupant comfort and productivity. A review of the impact of energy management improvements in offices found that the dollar value of improvements in occupant productivity were worth approximately four times the value of the energy savings.¹⁰

Improvements in energy management are typically also associated with improvements with other aspects of functionality of upgraded equipment. For example:

- Upgrading public lighting to LEDs delivers higher quality and more directional light than traditional technologies such as metal halide lights. These are more easily integrated with controls and other smart technologies, which results in better public safety, improved amenity and reduced light pollution; and
- Upgrading water pumps with more efficient models delivers better pumping, better controls and more robust equipment.

⁷ Energy Efficiency Council (EEC) and Energy Savings Industry Association (ESIA) 2019, *Energy Efficiency Employment in Australia*, EEC and ESIA, Melbourne, p. 12.

⁸ Ibid, p. 20.

⁹ Alam, M. Rajeev, P. Sanjayan, J., Zou, P. and Wilson, J. 2018, "Mitigation of heat stress risks through building energy efficiency upgrade: a case study of Melbourne, Australia", *Australian Journal of Civil Engineering*, 16(1), pp. 64-78.

¹⁰ ACIL Allen 2015, *Commercial Building Disclosure Program Review*, ACIL Allen, Sydney.

Peninsula Health EPC to save millions

In Victoria, Peninsula Health is investing \$7 million to increase its energy efficiency and improve frontline services. The investment will fund new lighting, heating and cooling upgrades across Peninsula Health's two hospitals, two major rehabilitation facilities and one other local health facility, which is also having a solar array and battery installed. The use of an energy performance contract (EPC) means that the savings are guaranteed, reducing the risk for Peninsula Health, and ensuring that the promised financial benefits are delivered.

Peninsula Health is delivering this project with the support of the Victorian Government's GGB program and a no-interest loan from the Victorian Government.

The overall project will reduce annual utility costs by \$1.2 million, or 14 per cent, reduce annual energy consumption by 23 per cent, and reduce emissions by over 4,000 tonnes, or 21 per cent.

In 2017, the GGB program committed a further \$26 million to health services to finance energy projects. These upgrades to Victorian hospitals are estimated to save more than \$70 million over the life of the investments and cut greenhouse gas emissions by more than 20,000 tonnes each year.



3.4 Reinforcing the electricity system

Better management of energy use can improve the affordability and reliability of the electricity system. Governments are large users of energy, with NSW Government agencies owning and operating facilities that use almost three per cent of electricity sold in that state.¹¹ This means that their energy use can have a significant impact on the energy system. For example:

- Participating in demand response during periods when demand for electricity exceeds supply, or when there are disruptions on the grid, helps maintain the affordability and reliability of the system for all users;
- Regular load shifting, by moving demand for electricity to periods of very high supply – i.e. moving demand to the middle of the day when solar PV output is highest – can help smooth out demand to reduce peaks; and
- Improving the energy efficiency of equipment that regularly operates during the peak demand period of between 5pm and 9pm reduces strain on the grid and reduces the need for further investment in electricity generation and networks.

Energy management is integral to managing a grid powered by VRE – i.e. solar and wind power – as it supports flexibility of energy usage which supports variable supply.

¹¹ Office of Environment and Heritage 2019, NSW Government Resource Efficiency Policy, Government of NSW, Sydney.

3.5 Demonstrating leadership on climate change

The Paris Agreement, negotiated in December 2015 and signed by 197 states, commits signatories to limit global warming to 'well below 2°C above pre-industrial levels,' and to achieve net zero global emissions in the second half of this century. This commitment has been ratified by the Australian Government.

Since then, all Australian states and territories, and the Australian Government, have adopted the goal of net zero emissions by 2050. And at the 26th Conference of the Parties (COP) in Glasgow in November 2021, governments and businesses from around the world renewed and strengthened their commitments to limit warming to 1.5°C.

The political consensus around net zero is already shaping decisions taken by businesses and local governments. Climate risk is increasingly being factored into investments in infrastructure, and decarbonisation pathways are being actively studied as both the private and public sectors consider the most effective way of playing their parts in the journey to net zero.

Governments have a critical role to play in reducing their own emissions, as this not only delivers large emissions reductions, but also sets an example to the community and sends a clear message to industry. For example, the Victorian Government's annual operational emissions are estimated at 3.7 MtCO₂e, roughly four per cent of the state's total emissions. The Victorian Government has committed to reduce these emissions by over 70 per cent between 2018-19 and 2025.¹²

Governments and other organisations around the world are already getting to work

The **ClimateWorks Australia Net Zero Momentum Tracker** tracks the progress of key Australian economic sectors towards net zero emissions. Of 215 organisations analysed, 55 have committed to net zero by 2050, and 22 of the 57 largest local government areas¹³ have at least set a net zero by 2050 aspiration.

The **World Green Building Council's Net Zero Carbon Buildings Commitment** encourages businesses, cities and states to commit to reaching net zero in asset operations by 2030. 122 businesses and organisations, 28 cities and six states have taken the pledge.

The **Carbon Disclosure Project (CDP)** supports thousands of companies, cities, states and regions to measure and manage the risks and opportunities of climate change through an annual reporting process. In 2020, 88 cities and 277 companies made the A list, recognising their leadership on climate action.

Cities Power Partnership (CPP) is Australia's largest network of local councils leading the way to a thriving, zero emissions future. Through the CPP, councils make action pledges to tackle climate change. The partnership is made up of over 145 councils from across the country, representing almost 60 per cent of the Australian population.

And these are just a handful of initiatives available to government departments, agencies and councils.

¹² Government of Victoria 2021, *Whole-of-Victorian-Government Emissions Pledge*, Government of Victoria, Melbourne.

¹³ Australia's 57 largest local government areas by population covers 52 per cent of the country's population.

Data and analytics driving efficiency and emissions reductions at the G

The Melbourne Cricket Ground (MCG) is one of the most iconic stadiums in the world, usually attracting millions of patrons to its hallowed turf every year. But unbeknownst to punters, the Melbourne Cricket Club (MCC) has moved decisively to take another leadership position, putting in place a best-in-class energy and carbon management strategy.

The MCC started by working with experts to identify big-ticket energy savings opportunities like LED lighting and demand control ventilation technology. Using an energy performance contract (EPC) – and taking advantage of discounted energy-efficient products enabled by the Victorian Energy Upgrades (VEU) program – the MCC locked in the financial savings generated by these energy efficiency upgrades. Those initial works were completed in 2015, however, the savings will continue for years to come – including annual electricity savings equivalent to the annual consumption of 835 homes.

Crucially, they haven't stopped there: the MCC are now using cutting edge sensors and software to monitor electricity and gas usage in real-time. Maintaining a constant watch on this data has driven even further savings, enabling the MCG's annual electricity savings to more than double to the equivalent of near to 1,900 homes.

Lighting the way: The MCG has cut costs and carbon by converting its lighting to LEDs, amongst other energy upgrades.



4

Designing an effective energy management program for government operations

Decades of collective experience from Australia and around the world demonstrate that governments can be confident in securing excellent financial, economic, social and environmental outcomes from energy management programs. To secure these benefits, governments need to design their energy management programs around seven principles.

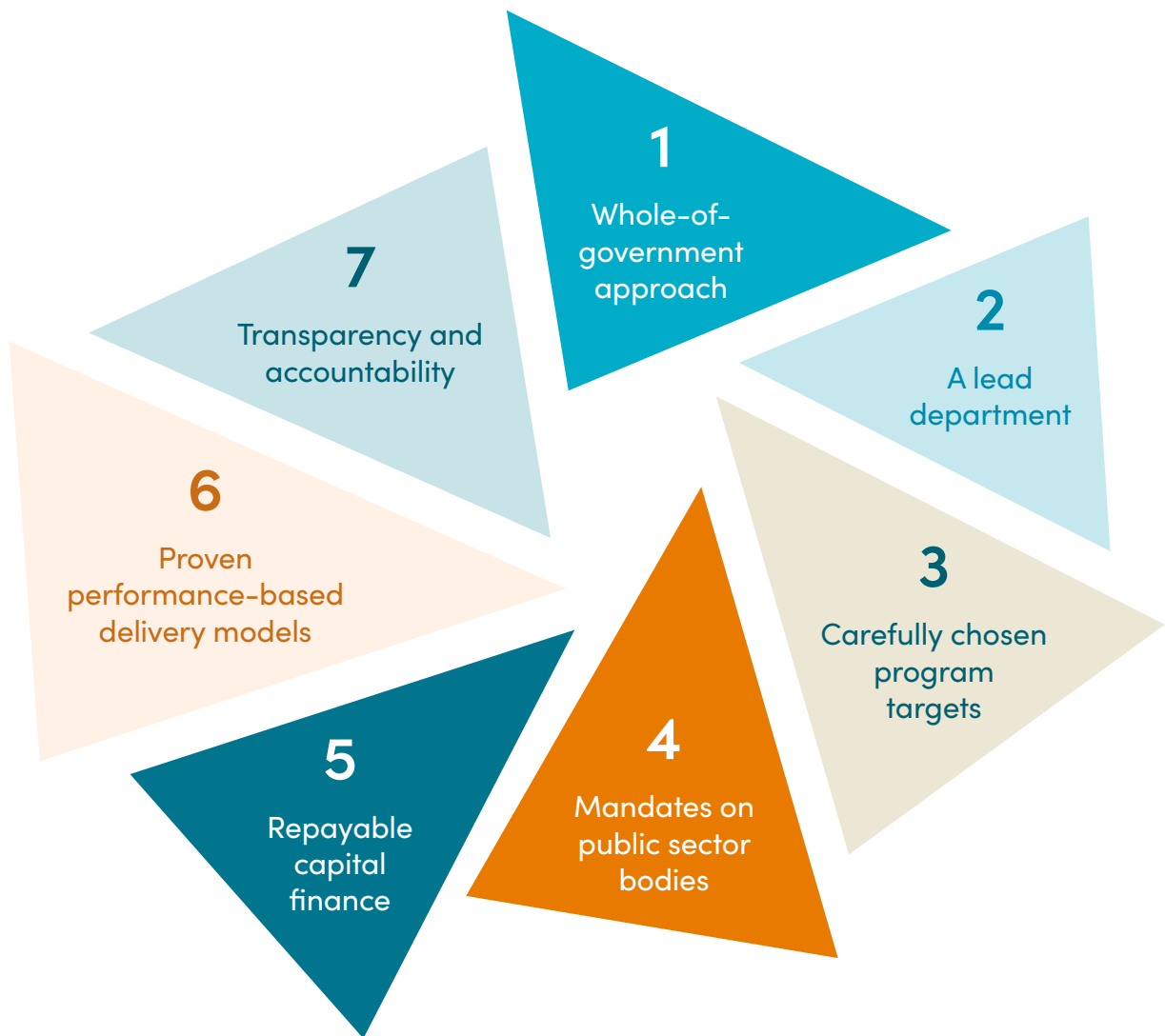


Figure 3 Seven key principles of designing effective energy management programs for government operations

4.1 Whole-of-government approach

A whole-of-government approach to energy management is far more productive and cost-effective than each department, agency or council developing its own approach. There are three main reasons why a whole-of-government approach is more effective:

- **Split incentives:**

For government agencies, energy management generally delivers much larger benefits to the finances of the government overall than the finances of individual agencies. There are several reasons for this, including energy contracts often being negotiated at the whole-of-government level and treasuries recouping recurrent savings from agencies in order to maximise their returns. This means that if agencies are left to approach energy management on an ad hoc basis, governments will underinvest in energy management and fail to secure the full benefits that are available.

- **Restricted budgets:**







Energy management upgrades to facilities generally require more funding than departments, agencies and councils have in their discretionary budgets. However, individual energy management upgrades are generally too small to be well-suited to individual budget bids. Whilst individual departments, agencies and councils benefit from the efficiencies of taking an integrated approach to energy upgrades, further efficiencies can be made by investing in energy management across a governments' whole operations, rather than analysing hundreds of small budget bids.

- **Lack of (and need for) decentralised energy management expertise:**

Departments, agencies and smaller councils often lack in-house staff expertise and systems to invest in energy management. Developing protocols and expertise in energy management across a whole government is far more efficient and effective, and involves far less redundancies, than each department, agency or council developing their own systems.

A centralised, whole-of-government framework enables governments to implement energy management solutions cost effectively and at scale, supporting rapid progress towards cost and emissions reduction targets – see **Section 4.3**. This framework should establish the other six key principles of an effective energy management program for government agencies – see **Sections 4.2-4.7**.

Benefits of a whole-of-government approach

-  **Achieve energy and emissions reduction targets faster and more cost effectively**
Support provided by a centralised department with expert guidance and advice enables individual departments, agencies and councils to achieve their targets.
-  **Lower administration costs**
Clear guidance and guidelines set out by a centralised department removes the burden for individual departments, agencies and councils.
-  **Portfolio-wide upgrades**
Integrated upgrades enable deeper energy savings and allow departments, agencies and councils to pursue upgrades beyond those that have very low payback periods and are therefore becoming 'business as usual'.
-  **Lower installation costs**
Pursuing multiple upgrades at once reduces costs and efforts associated with ad hoc upgrades, including costs for site visits and quotes, as well as staff time to manage upgrades.
-  **Maximise energy and emissions reductions from deep, integrated building retrofits**
Upgrades with a greater initial capital outlay can result in greater cost and energy savings over time, especially when combined with low-cost measures. Focusing on opportunities across a site and maximising energy-savings is the most cost-effective method for achieving emissions reduction targets.
-  **Higher return on investment (ROI)**
Maximising the holistic nature of upgrades by grouping upgrades together and pursuing deep retrofits reduces implementation costs and increases ROI, opening up funds for core service delivery in coming years.

4.2 A lead department

Energy management programs are far more effective if there are lead agencies that:

- Design and oversee the program;
- Provide expertise and support to help agencies across government to:
 - Learn the basics of energy management;
 - Set up reliable in-house systems; and
 - Design good energy upgrades and smart management processes; and
- Evaluate project proposals and allocate funding.

It is generally simplest if all these functions are housed in a single central department that already has a whole-of-government focus or is a shared services provider, such as Public Works, Treasury and Finance, or Premier and Cabinet. For example, the Victorian GGB program is entirely run out of the Victorian Department of Treasury and Finance. In the case of councils, the state government department responsible for local government is most appropriate.

However, there may be sound reasons that these functions are split between departments. For example, the NSW GREP splits responsibility so that the Department of Planning, Industry and Environment (DPIE) oversees the program and provides support to agencies, while NSW Treasury reviews projects and allocates funding.

Sydney Harbour Bridge lights the way

Governments are investing in energy efficiency projects of all sizes. Notably, the NSW Department of Planning, Industry and Environment (formerly the Office of Environment & Heritage) offers a range of programs for supporting the uptake of energy efficiency through the Government Resources Efficiency Policy (GREP). An example of one such program for energy upgrades was the Small Sites and Heritage Energy Efficiency Scheme (SSHEES), which the Roads and Maritime Services (RMS) used to upgrade the Sydney Harbour Bridge's 65 lights to LED.

The new LED lights use 31 per cent less energy and have improved illumination of the road, making it safer to cross the bridge.

The project generates annual energy cost savings of \$2,000 and emissions reductions of 2.7 tonnes. The cost savings generated by the lighting upgrade are reinvested back into maintaining the bridge so that it preserves its reputation as a world-famous Australian landmark.

NSW Roads and Maritime Services (RMS) used a grant to fund the replacement of the Sydney Harbour Bridge's lighting with LEDs.



4.3 Carefully chosen program targets

Energy upgrades can deliver multiple goals at the same time. While there is significant overlap and complementarity between these goals, there will be, at times, some degree of tension. For example, there is a push and pull between the priorities of both maximising financial savings from energy management programs and supporting the adoption of emerging technologies like electric vehicles.

The best way for governments to address these tensions is to set clear goals for their energy management programs. Given that energy management programs typically have multiple goals, governments should set a mix of outcome targets, input targets and financial investment criteria.

An output target relates to the amount of energy saved, emissions reduced, or similar. For example, the Victorian Government has pledged to reduce its emissions by 2.7 MtCO₂e by 2025, which is roughly equivalent to a 70 per cent reduction in emissions. Similarly, the NSW GREP has set a goal that every agency should achieve aggregate energy savings of at least ten per cent by 2023-24. These outcome-oriented targets are useful for clarifying and communicating the intent of energy management targets, but are often less useful for communicating the actions that agencies need to undertake.

In contrast, input targets can give agencies clear guidance about what is expected. For example, the NSW Government expects its agencies to:

- Implement energy saving opportunities at all of its larger sites by certain dates;
- Ensure that all owned and occupied offices achieve a NABERS Energy rating of at least 5 stars by 2020 and maintain that rating; and
- Ensure that from 2021 at least ten per cent of vehicles hired or leased are electric or hybrid.

Finally, financial metrics are critical to ensure that a program delivers financial goals. As an example, the NSW GREP effectively aims for energy management upgrades to have an internal rate of return of at least 12 per cent.



The **National Australian Built Environment Rating System (NABERS)** is a national rating system that measures the environmental performance of Australian commercial buildings. NABERS measures a building's energy efficiency and carbon emissions and compares it to similar buildings. Several of Australia's state and territory governments require that their government-owned or occupied office buildings achieve a minimum NABERS Energy rating as a way of maintaining an acceptable level of energy performance across many sites.

While NABERS began as a rating for office buildings, it has expanded significantly in recent years, with ratings added for buildings as diverse as data centres and hospitals.

NABERS for Hospitals was developed in collaboration with all state public health portfolios, and 343 hospitals have already been certified in Queensland, South Australia and Victoria, with plans for further ratings to be rolled out across the country. NABERS for Hospitals provides a robust, performance-based benchmark in a highly energy intensive area of government operations. It gives health services the opportunity to:

- Set a minimum level of acceptable performance;
- Publicly promote the hospitals that are leading in energy strategy; and
- Support all hospitals to measure the success of energy efficiency measures.

To learn more, go to nabers.gov.au

4.4 Mandates on public sector bodies

Departments and agencies often focus on only those performance measures against which they are rated. As a result, they may put a lower priority on matters such as energy management, which delivers on less specific, whole-of-government priorities.

Experience demonstrates that governments need to place mandates onto departments, agencies and councils if they want to achieve public sector-wide energy saving goals. Mandates are most effective where they are:

- Monitored by a central agency;
- Publicly reported on a regular basis; and
- Built into the key performance indicators (KPI) for the senior executives of departments, agencies and councils.

Mandates on departments, agencies and councils should typically line up with whole-of-government goals, but generally lean towards clearly measurable input goals. For example, requiring every agency to achieve a certain level of energy savings by a certain year – e.g. 30 per cent savings by 2030 – may be complicated to measure, and the level of cost-effective savings may vary between agencies. Some smaller agencies may only occupy one or two facilities that have already exhausted their energy savings potential, whereas health agencies will often oversee facilities that can economically reduce their energy use by 40 per cent or more.

For agencies, input goals may be easier to monitor and more effective. For example, requiring an agency to undertake energy audits on all their major sites by 2030, and invest in all identified energy saving projects that deliver returns of at least 11 per cent, would be straightforward to measure and account for the variation in the facilities managed by agencies.



Green Star is an internationally recognised holistic rating system that provides independent assurance for sustainable buildings, fit-outs, social infrastructure, and master-planned communities. Along with NABERS, Green Star is used by state and territory governments in Australia to set standards of sustainability through procurement guidelines for both new and existing buildings and fit-outs.

Green Star tools rate the design, construction and operational performance of buildings and fit-outs using industry-agreed best-practice benchmarks. Attention to holistic sustainability ensures that government projects can respond to pressing industry-wide challenges related to resource efficiency, climate action and health and wellbeing.

The Green Star – Performance rating tool assesses the operational performance of existing buildings across nine impact categories. Governments can use Green Star – Performance to identify areas for improving operational efficiencies and direct their efforts as they embark on simple upgrade programs or more comprehensive retrofitting projects. A ‘continuous improvement framework’ has been built into the rating tool, as the certification process is on a three-year cycle, which allows for improvements to be recognised over time.

Green Star certification delivers transparent assurance and provides independent verification that the sustainability outcomes the project is seeking have been met.

To learn more, go to gbca.org.au

4.5 Repayable capital finance

Departments, agencies and councils invariably have limited access to capital finance for investment in energy upgrades. Further, many can only source funding through their government's budget processes, and understandably prioritise budget bids that support core service delivery. These constraints are substantial barriers to strategic investments in energy upgrades. Perversely, this can lock departments and agencies into significantly higher operating expenditure (OpEx) on energy, wasting taxpayer money year after year.

As a result, establishing a dedicated source of repayable capital finance is essential. Governments often set up treasury loan mechanisms for government agencies to finance energy upgrades; loan repayments are made from the savings generated by the projects and reinvested into further upgrades across government operations. The ACT's Carbon Neutral Government Fund, NSW Government's Finance Facility loans, and Victoria's GGB program have led in this regard, with hundreds of millions of dollars of investment being rolled out across the public sector.

4.6 Proven performance-based delivery models

In addition to high-level elements, a whole-of-government process should set out best practice processes for energy management and procurement of energy management services. Processes are essential to ensure that governments get value for money from their contractors, and include:

- **Pre-approved panel of providers:**
Establishing a pre-approved panel of energy services providers populated by companies with sufficient expertise to design, deliver and, where necessary, maintain an energy upgrade. Increasingly, such panels differentiate between companies with expertise to deliver simpler, targeted projects and those that deliver more complex upgrades.
- **Appropriately qualified providers:**
Ensuring that providers are appropriately qualified individuals, such as a professionals certified under the Energy Efficiency Certification Scheme (EECS). The EECS recognises individuals with the knowledge and capability to lead and manage the end-to-end delivery of an integrated building energy retrofit (IBER), which provides a comprehensive program of energy upgrades for a commercial building.
- **M&V of energy upgrades:**
Requiring measurement and verification (M&V) protocols for energy upgrades ensures energy savings. The International Performance Measurement and Verification Protocol (IPMVP) is the globally recognised methodology for M&V of energy upgrades.



EECS provides professional certification for individuals who lead and manage integrated building energy retrofits (IBERs). Certification is available to professionals who deliver focused, comprehensive projects that deliver better energy efficiency outcomes for customers.

EECS:

- Identifies industry leaders in the delivery of IBERs;
- Provides a benchmark for aspiring energy management professionals who wish to develop their skills; and
- Allows governments, alongside commercial building owners and managers, to identify industry professionals with the right expertise.

To learn more, go to [energycertification.org.au](https://www.energycertification.org.au)

4.6.1 Energy performance contracts and simple models

Experience in energy management procurement models has evolved significantly in the last decade. Successful energy management programs now consist of a mix of:

- Energy performance contracts (EPCs) for large, complex and multi-technology projects, as performance risk is transferred to the contractor; and
- Simpler procurement models for targeted energy upgrades, such as lighting upgrades in schools.

EPCs are often utilised where M&V is necessary to prove the energy and emissions reductions. Simpler procurement models can have much lower overheads and are appropriate for simpler projects where the cost of measuring and verifying energy savings outweighs the benefits.

4.6.2 Energy service companies

EPCs are models for delivering integrated energy services by an energy service company (ESCO). Under an EPC, the ESCO is contractually obliged to achieve a minimum level of energy savings, or to pay a financial penalty to the customer. This reduces the financial risk to the government department, agency or council. EPCs include M&V, which is agreed prior to contract signing and forms the basis for the energy savings guarantee.

EPCs are often the preferred delivery model in the following situations:

- Large and complex sites consisting of multiple systems and potential solutions – e.g., hospitals, TAFEs, sporting facilities and art galleries;
- Where energy spend exceeds \$400,000 annually;
- Where the risk associated with the performance of a proposed technology is high; and
- Where it is important to achieve a specific energy performance – for example, where funding needs to be repaid using energy cost savings, or a target emissions abatement is sought.

Measurement and verification (M&V)

M&V methods and processes are used to measure and verify, in a defined, disciplined and transparent way, the energy savings resulting from planned and defined changes to all or parts of the energy infrastructure of a specific facility or group of specific facilities. The savings are measured and verified only at facilities at which an energy conservation measure (ECM) is implemented.

M&V is an active and on-going process. In a generic sense, M&V is what good facilities managers should do continuously: measure energy performance, make changes to their energy infrastructure and/or operations and maintenance, and verify that the changes work as planned and continue to work over time. M&V requires additional discipline and transparency in measuring and verifying savings than normally is provided for facility/energy management. For EPC projects, the M&V process is formal and an integral part of contractual arrangements.

Professionals accredited to the Certified Measurement & Verification Professional (CMVP) qualification are globally recognised M&V practitioners.

To learn more, go to energybriefing.org.au/m-and-v-101

4.6.3 Targeted energy upgrades

Simple or small-scale energy efficiency upgrades typically involve an energy audit or assessment that identifies the best opportunities for energy savings and provides a basis for specifying upgrades.

These targeted energy upgrades often include M&V to enable reporting on energy savings – as is the case for all projects funded by Victoria's GGB program. As well as reporting on energy savings, M&V enables government departments, agencies and councils to report energy and emissions reductions. However, they generally don't include contractual guarantees that energy savings will be maintained over time.

The NSW Government has implemented several targeted energy upgrades at its facilities throughout the state, including at:

- A NSW Spatial Services facility in Bathurst, where a whole-of-building upgrade included LED lighting upgrades, submetering of electricity data and fine-tune of building operations. This resulted in a 63 per cent reduction in electricity use and an increase in the NABERS Energy score from 2.5 to 5 stars;
- A NSW Parks and Wildlife building in Armidale, where electrification of the building's heating systems, combined with installation of rooftop solar PV and an LED lighting upgrade resulted in a 50 per cent reduction in electricity consumption, 49 per cent reduction in gas consumption, and a NABERS Energy rating increase from 3.5 to 5 stars;
- A NSW Government office building in Lithgow, which upgraded the building management control system (BMCS) and variable speed drive (VSD), which resulted in 30 per cent electricity savings and an increase in NABERS Energy rating from 3 to 4.5 stars; and
- Various sites across the NSW Government property portfolio in FY2019-2020, including installation of 41 smart meters, 24 HVAC and BMCS upgrades, and 1.14MW of solar PV installation, which resulted in a 42.5 per cent reduction in electricity consumption compared to the baseline of FY14-15, with an additional \$1.95 million in utility savings on the previous year.

4.7 Transparency and accountability

Maintaining accountability for meeting commitments and targets, as well as creating transparency around how these commitments are met, is a critical component of maintaining trust and confidence in all levels of government.

Proper reporting on progress towards targets and commitments can improve confidence that action is being pursued by other public sector bodies, businesses and the general public.

For governments to ensure transparency and accountability in their energy management programs, the programs should include:

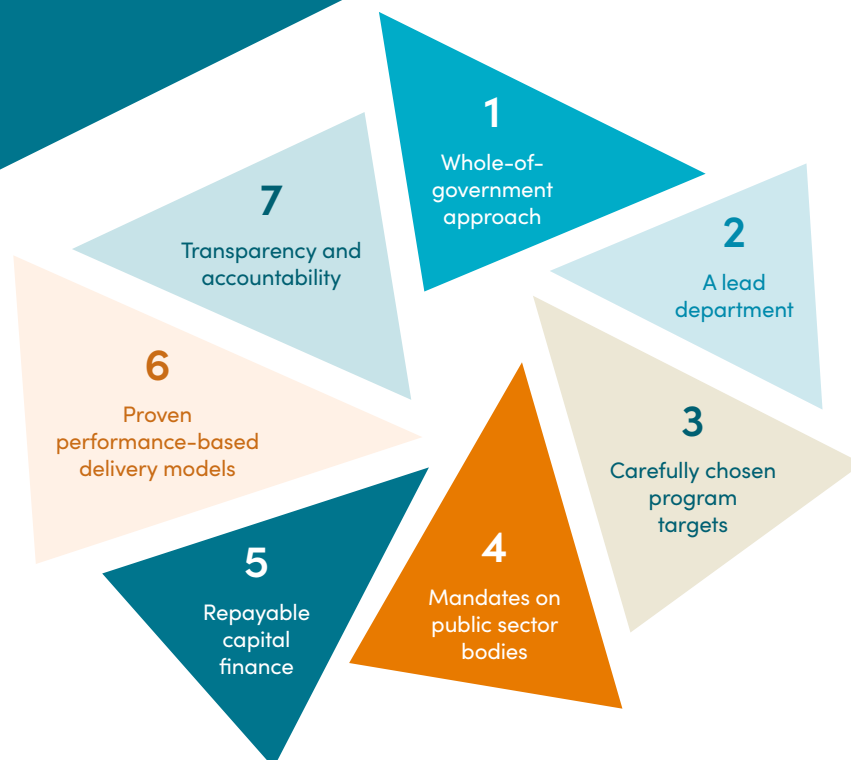
- Regular reporting periods;
- Standardised reporting methods across departments, agencies and councils;
- Public accessibility of reporting; and
- Incorporation of performance reporting into the KPIs of department heads.

4.8 Next steps

Significant experience in Australia and overseas has demonstrated that well-designed whole-of-government energy management programs deliver robust financial savings, emissions reductions and other benefits. Governments can be confident that they will gain significant benefits from energy management if they follow well-established best-practice protocols.

Key steps for implementation include:

1. Committing to a whole-of-government approach to energy management;
2. Appointing a lead department to support departments, agencies and councils with implementing energy upgrades;
3. Carefully choosing program targets to support energy and emissions reductions;
4. Mandating departments, agencies and councils to act on energy management opportunities;
5. Establishing a source of repayable capital finance;
6. Selecting performance-based delivery models; and
7. Ensuring transparency and accountability are hard-wired into the energy management program.



5

Resources for departments, agencies and councils

5.1 Connecting with experts

The authors of this resource regularly work with governments to develop new and enhance existing energy management programs, including energy management in government operations. Their members can support departments, agencies and councils with implementing energy upgrades.

Government agencies looking to get on the front foot can find guidance in **Navigating a dynamic energy landscape: a briefing for government agencies**, which considers the specific issues faced by Australian government federal, state and territory agencies, and guides them in improving their energy management strategy.

5.1.1 Australian Sustainable Built Environment Council

The Australian Sustainable Built Environment Council (ASBEC) is the peak body of key organisations committed to a sustainable built environment in Australia. ASBEC's membership consists of industry and professional associations, NGOs and government observers.

For more information visit [🐾 asbec.asn.au](https://asbec.asn.au)

5.1.2 Energy Efficiency Council

The Energy Efficiency Council is Australia's industry association for energy efficiency, energy management and demand response. It is a not-for-profit membership association for businesses, governments, universities and NGOs.

For more information visit [🐾 eec.org.au](https://eec.org.au)

5.1.3 Green Building Council of Australia

The Green Building Council of Australia (GBCA) rates the sustainability of buildings, fitouts and communities through Australia's largest national, voluntary, holistic rating system – Green Star.

For more information visit [🐾 gbca.org.au](https://gbca.org.au)

5.1.4 Property Council of Australia

The Property Council of Australia is the leading advocate for Australia's biggest industry and biggest employer – property.

For more information visit [🐾 propertycouncil.com.au](https://propertycouncil.com.au)

5.2 Government programs

Australian Government – Resources for Commonwealth agencies:

➤ energy.gov.au/government-priorities/energy-productivity-and-energy-efficiency/government-buildings

Australian Government – National Australian Built Environment Rating System (NABERS):

➤ nabers.gov.au

ACT Government – A new climate strategy:

➤ environment.act.gov.au/cc/act-climate-change-strategy/act-government-leadership

NSW Government – Government Resource Efficiency Policy:

➤ environment.nsw.gov.au/research-and-publications/publications-search/nsw-government-resource-efficiency-policy

SA Government – Energy management in government buildings:

➤ energymining.sa.gov.au/energy_and_technical_regulation/energy_efficiency/government_building_energy_fund

Victorian Government – Greener Government Buildings:

➤ dtf.vic.gov.au/funds-programs-and-policies/greener-government-buildings

5.3 Energy efficiency and energy services contracting resources

Energy Efficiency Certification Scheme:

➤ efficiencycertification.org.au

- Find a certified EECS professional:

➤ efficiencycertification.org.au/find-a-certified-professional

Energy Efficiency Council – Measurement and verification 101:

➤ energybriefing.org.au/m-and-v-101

NSW Government – Pre-qualified energy service providers:

➤ environment.nsw.gov.au/topics/sustainability/sustainability-in-government/government-agencies/services/approved-energy-service-providers

Victorian Government – Environmental data management tools:

➤ health.vic.gov.au/planning-infrastructure/environmental-data-management-tools

Victorian Government – Energy performance contract:

➤ buyingfor.vic.gov.au/energy-performance-contract

Glossary

ASBEC	Australian Sustainable Built Environment Council
BMCS	Building management control system
COP	Conference of the Parties to the United Nations Framework Convention on Climate Change
CMVP	Certified Measurement & Verification Professional
DER	Distributed energy resource
EEC	Energy Efficiency Council
EECS	Energy Efficiency Certification Scheme
ECM	Energy conservation measure
EPC	Energy performance contract
ESCO	Energy service company
GBCA	Green Building Council of Australia
GREP	Government Resource Efficiency Policy (NSW)
GGB	Greener Government Buildings (Victoria)
HVAC	Heating, ventilation and air conditioning
IBER	Integrated building energy retrofit
IEA	International Energy Agency
IMF	International Monetary Fund
IPMVP	International Performance Measurement and Verification Protocol
KPI	Key performance indicator
kWh	Kilowatt hour
LED	Light emitting diode
MtCO_{2e}	Metric tonnes of carbon dioxide equivalent
M&V	Measurement and verification
NABERS	National Australian Built Environment Rating System
NGER	National Greenhouse and Energy Reporting
NPV	Net present value
OpEx	Operating expenditure
PV	Photovoltaic
ROI	Return on investment
VRE	Variable renewable energy
VSD	Variable speed drive



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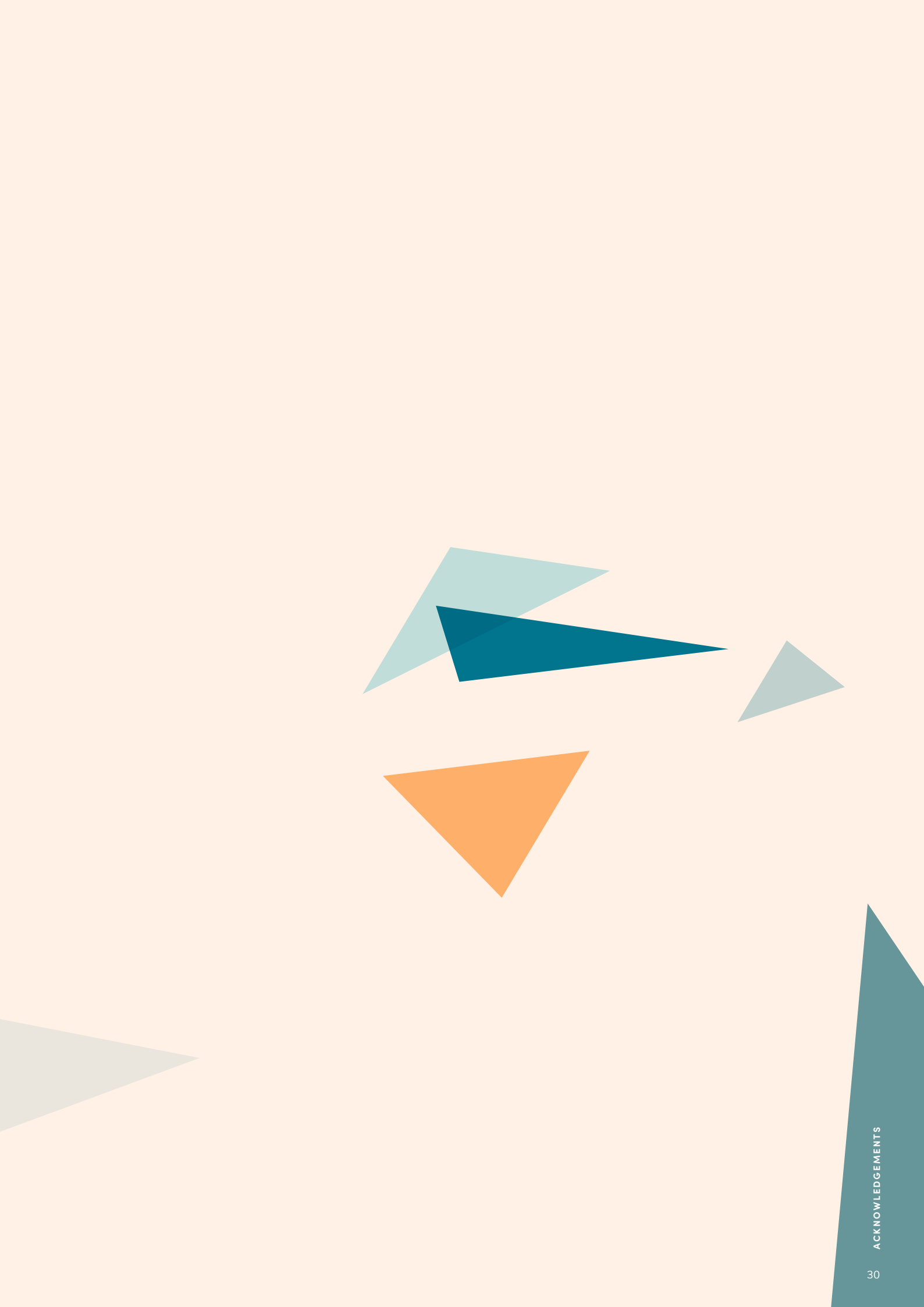
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