



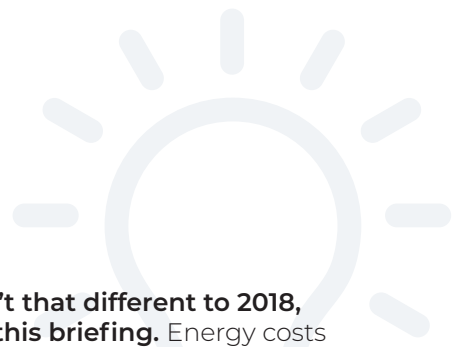
Navigating a dynamic energy landscape

A briefing for Australian businesses



energy efficiency
COUNCIL

UPDATE AND OUTLOOK
NOVEMBER 2021



Critical insights

In some ways the energy landscape of 2021 isn't that different to 2018, when we launched the first, annual edition of this briefing. Energy costs continue to be a major concern for Australian businesses, and 2021 has been a rollercoaster. The year started with relatively low energy prices, however, high international gas prices drove the local cost of gas higher, which in turn contributed to electricity price spikes.¹ The return of COVID-19 restrictions mid-year drove down demand and put a dampener on electricity prices.² However, gas prices remain high after reaching a historic peak in July 2021.³

While price volatility remains a challenge, the reliability of Australia's energy system is not. The shift in Australia's generation mix continues apace; indeed renewables reached a record high of 61.4 per cent of Australia's generation mix on 24 September 2021.⁴ This shift is not reducing reliability; a lack of generation capacity only caused 0.1 per cent of all outages over the past decade.⁵

In short, price volatility abounds, and the guidance we provided in 2018 remains sound: a proactive strategy that reduces your exposure to energy market risk through investments in energy efficiency, demand management and renewables is good business.

However, in other ways, the landscape has transformed, and net zero is driving the agenda. The number of ASX200 companies with net zero goals

jumped from 14 to 49 in the 12 months to March 2021.⁶ Net zero announcements continue to come thick and fast. And just last month, the Business Council of Australia joined a growing chorus of voices calling not just for net zero emissions by 2050, but more ambitious interim targets for 2030.⁷

This shift has a range of drivers; consumer and supply chain pressures are real, as are the risks of increased capital costs for companies – and nations – that don't have a credible plan for driving down emissions. This risk was recently recognised by Australia's Treasurer, Josh Frydenberg, an important intervention that helped pave the way for the Coalition to formally join the Labor opposition in committing to target net zero emissions across the Australian economy by 2050.⁸ Bipartisanship around a 2050 target is a significant step forward, providing business with a level of clarity

- 1 Australian Energy Market Operator (AEMO) 2021, *Quarterly Energy Dynamics Q2 2021*, p. 3.
- 2 Australian Energy Market Operator (AEMO) 2021, *Quarterly Energy Dynamics Q3 2021*, p. 7.
- 3 Australian Energy Market Operator (AEMO) 2021, *Quarterly Energy Dynamics Q3 2021*, p. 36.
- 4 Australian Energy Market Operator (AEMO) 2021, *Quarterly Energy Dynamics Q3 2021*, p. 24.
- 5 Grattan Institute 2019, *Keep calm and carry on: managing electricity reliability*, p. 3.
- 6 Australian Council of Superannuation Investors (ACSI) 2021, *Promises, pathways and performance – Climate change disclosure in the ASX200*, p. 5.
- 7 Business Council of Australia 2021, *Achieving a net zero economy*.
- 8 Commonwealth of Australia 2021, *Australia's Long-Term Emissions Reduction Plan*.

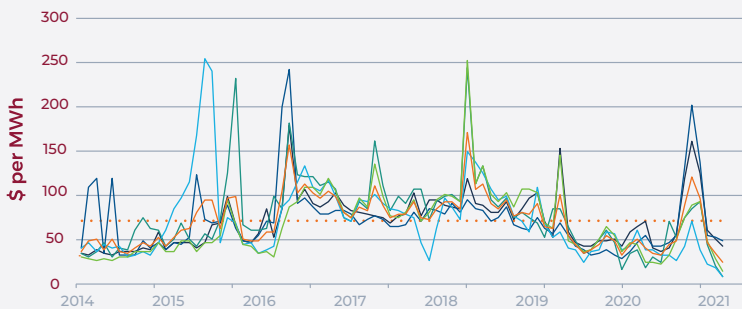


Figure 1: Spot market wholesale electricity prices bounced back in 2021. Monthly spot price, weighted average \$ per megawatt hour, November 2014 to October 2021.

Source: Intelligent Energy Systems (IES) 2021, *NEOpoint*.



Figure 2: Wholesale gas prices have hit their highest levels yet. Monthly weighted average wholesale gas spot market price, \$ per gigajoule, November 2014 to September 2021.

Source: Intelligent Energy Systems (IES) 2021, *NEOpoint*.

Key:

- New South Wales
- Tasmania
- South Australia
- Queensland
- Victoria
- Average
- Average trendline

around Australia's ultimate emissions reduction goal. Yet uncertainty remains on how this target will be achieved, and with an election just around the corner, near-term targets are likely to remain contested.

However, for businesses committing to net zero, the debate in Canberra is background noise, as they turn their mind to the task of translating their net zero aspiration into action. And unsurprisingly the vast majority are finding that smart energy management is the quickest and most cost-effective way to drive down their emissions.

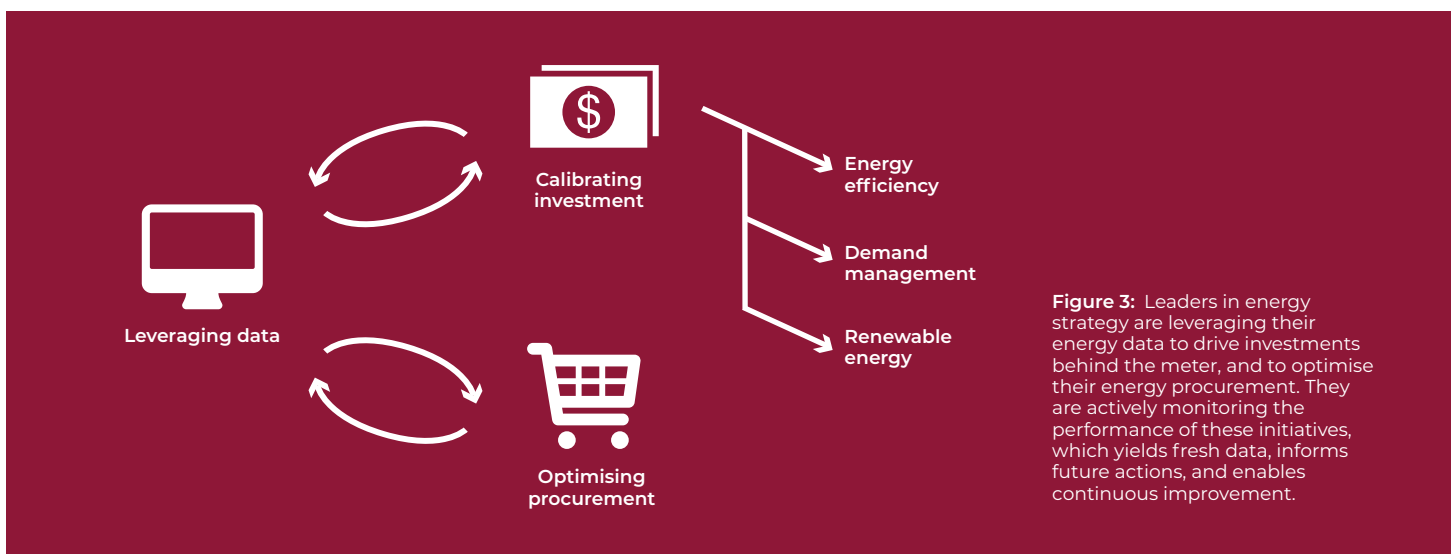
So whether driven by costs, carbon or both, Australian businesses continue to respond to the challenges of an energy system and an economy in transition.

Many have already made significant investments to manage the risks and capture the opportunities. Even more are actively reviewing their strategies or weighing investment options.

Businesses that are leading in energy strategy and management have recognised this, and have moved to optimise their energy position in three key areas:

- 1. Leveraging data** to unlock performance improvements, drive strategic decision-making and investment, and enable reporting and communication of progress against targets;
- 2. Calibrating investment** across energy efficiency, demand management technologies and renewable energy; and
- 3. Optimising procurement** by exploring innovative energy contracting strategies to source the remainder of their energy requirements.

In this briefing you'll find up-to-date information on electricity and gas prices, insights on the three key drivers for energy market transformation, and practical guidance on how businesses are taking control of their energy position. It is for business leaders who are looking to stay on top of their energy strategy, and improve their profits and productivity in the process.



Edition 4: November 2021

The Energy Efficiency Council regularly revises this energy briefing for business. To download the latest edition and other resources, sign up for updates or provide feedback, visit energybriefing.org.au

Navigating this briefing

There is an enormous amount of information on energy in the public domain, yet it can be hard for business leaders to extract what matters for their businesses. This energy strategy briefing is designed to cut through the noise and provide a roadmap that will help businesses confidently navigate Australia's dynamic energy landscape.

Section 1 Update and outlook: electricity and gas prices



Pages 5 - 10

The transformation of the National Electricity Market (NEM) and the rapid growth of Australia's gas export market are having flow-on effects for businesses' energy costs. While the drivers for increased gas and electricity prices are distinct, the result is largely the same: experts predict both wholesale electricity prices and gas prices will continue to be volatile in the short to medium term.

Section 2 The three characteristics of energy market transformation



Pages 11 - 20

All over the world, energy markets are transforming. The generation mix is changing, the grid is decentralising and the demand profile is shifting. These changes make the energy landscape more dynamic. Yet these same trends and technologies can be leveraged by businesses to mitigate the risks – and capture the opportunities – opened up by energy market transformation.

Section 3 How businesses are taking control



Pages 21 - 30

A 'business as usual' approach to energy strategy and management risks operational profits, business productivity and competitiveness. By contrast, businesses with a best in class energy strategy are mitigating these risks and delivering big benefits from reduced energy spend to improved competitiveness. Businesses are taking control of their energy position by:

- Leveraging data;
- Calibrating investment; and
- Optimising procurement.

Section 4 Next steps: connecting with experts and accessing finance



Pages 31 - 34

Businesses successfully navigating Australia's dynamic energy landscape are relying on a mix of internal and external expertise, and are accessing energy-specific financing and funding options.

Glossary

Pages 35 - 36

Dedication and Acknowledgements

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Energy pulse check

We talked to Australian businesses that are leading the field in energy strategy and management about the questions directors and executives should pose internally to ensure they are proactively managing their energy position. Three key questions came up again and again:



Do we have a granular understanding of how and when we are using energy across our business, and how our usage drives our energy costs?

Leaders in energy strategy and management have advanced metering, submetering and analytics that give them a granular understanding of energy use across their operations, broken down not just by site but by particular subsystems and equipment, which internal and external experts can monitor in real-time.

Leaders in energy strategy are leveraging their energy data. They are making sure the right data is captured, and that it drives decision making, rather than simply sitting in a spreadsheet (**page 22**).



Are we actively monitoring efficiency, demand management and generation opportunities, and investing where it is cost-effective to do so?

Leaders in energy strategy and management have re-calibrated their approach to energy investment. They are ensuring that their energy data is actively monitored and analysed by experts in relation to:

- Key business performance metrics;
- Current energy cost profile;
- Energy market outlook and risk; and
- Opportunities to achieve a more cost-effective outcome through investments in energy efficiency, demand management and on- or off-site generation.

Leaders in energy strategy are controlling everything possible behind the meter at their sites, and taking a proactive approach to investment in efficiency, demand management and generation (**pages 23 - 28**).



Are we exploring the full range of energy procurement options?

Having reduced their exposure to energy market volatility through energy efficiency, demand management and renewables, leaders in energy strategy and management are exploring alternative contracting strategies to optimise energy costs and balance market risks when sourcing the remainder of their energy.

Rather than defaulting to the traditional procurement option of a contract with a fixed price, they are assessing the solutions available in the marketplace against their individual needs.

Leaders in energy strategy have optimised their energy procurement. They have ensured their businesses are not passive price-takers, and are effectively managing energy market exposure by properly assessing all available procurement options (**pages 29 - 30**).

Update and outlook: electricity and gas prices

1.1 Current drivers of electricity prices

The National Electricity Market (NEM) is a wholesale commodity exchange for electricity spanning Australia's eastern and south-eastern coasts. It comprises five interconnected states that also act as price regions: New South Wales (including the Australian Capital Territory), Queensland, South Australia, Tasmania and Victoria.

The transformation of the NEM – described in detail in **Section 2** – is having flow-on effects for business electricity costs. However, different issues are playing out in different cost components; in some cases, these issues are shifting rapidly; in others, long run trends are playing out slowly.

⁹ Australian Energy Market Operator (AEMO) 2020, *Quarterly Energy Dynamics Q2 2020*, p. 3.

¹⁰ Australian Energy Market Operator (AEMO) 2021, *Quarterly Energy Dynamics Q2 2021*, p. 7.

¹¹ Australian Energy Market Operator (AEMO) 2021, *Quarterly Energy Dynamics Q2 2021*, p. 3.

¹² Australian Energy Market Operator (AEMO) 2021, *Quarterly Energy Dynamics Q3 2021*, p. 3.

¹³ This analysis focuses on the NEM; different – although in some cases analogous – issues are playing out in electricity markets in Western Australia and the Northern Territory; Western Australia's electricity market is considered in more detail on [page 10](#).

COVID-19 impacts on electricity demand

In 2020, the economic impact of the COVID-19 pandemic didn't significantly change demand in the NEM. Industrial demand was broadly flat, and the 10 - 20 per cent drop in demand from commercial buildings was offset by the increase in residential demand as people moved to working from home.⁹

However, demand rose following the easing of restrictions; indeed, operational demand in the NEM in April to June 2021 was the highest since 2012.¹⁰ After a year in decline, this rebound led to wholesale electricity prices averaging \$95 per MWh in April to June 2021, compared with \$37 per MWh in January to March 2021.¹¹ Whilst high prices continued into July 2021, they moderated with increased renewables supply, falling gas prices, mild weather and COVID-19 restrictions in NSW and Victoria.¹²

Below we consider the three key components of business electricity bills and discuss the drivers and current outlook for each.¹³

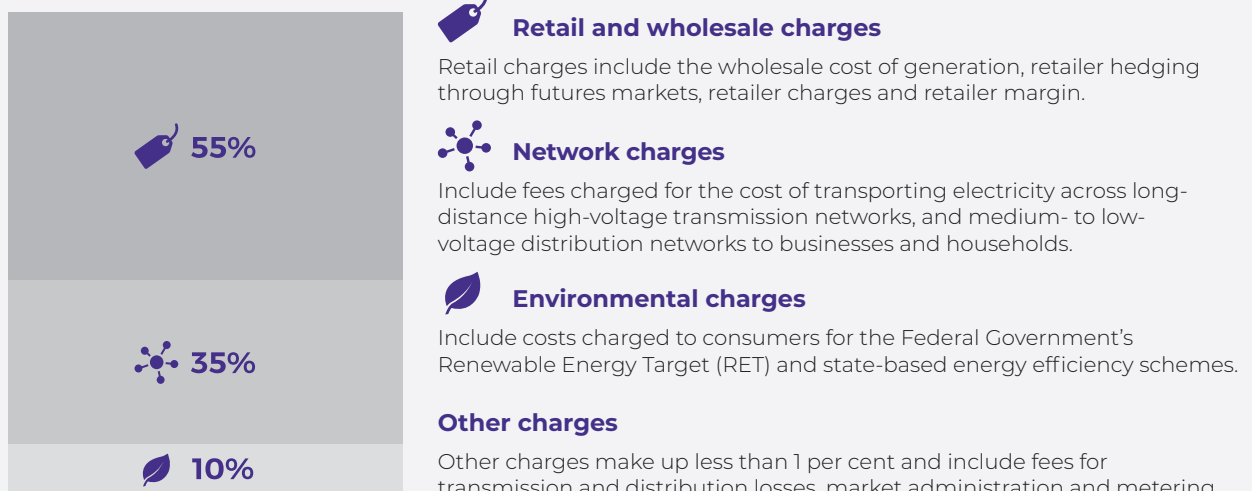


Figure 4: Electricity bill components for the average commercial and industrial customer, as calculated by the Australian Competition and Consumer Commission (2018). While a useful guide, there can be significant variation in this breakdown from business to business. For example, smaller businesses – and large businesses with many small sites – often have a higher proportion of their electricity bill made up of network costs.

Source: Australian Competition and Consumer Commission (ACCC) 2018, *Restoring electricity affordability and Australia's competitive advantage: Retail Electricity Pricing Enquiry – Final Report*, p. 30.

1.1.1 Retail and wholesale charges

While some energy users buy electricity directly from the wholesale market, most purchase electricity through a retailer. Retail and wholesale charges make up 55 per cent of the bill for the average commercial and industrial customer. Wholesale charges typically account for the vast majority of this expense; retail margins have actually decreased slightly for commercial and industrial customers in the last ten years.¹⁴

Higher wholesale prices were the overwhelming driver of the electricity bill increases experienced by businesses during 2016 and 2017. Over this period there were cumulative increases in wholesale electricity prices of between 77 per cent and 176 per cent across the four major NEM states.¹⁵

Analysis has found that around 40 per cent of this increase was due to higher fuel costs – gas and black coal – however, 60 per cent was driven by the closure of two large power stations, which tightened the supply/demand balance, driving up wholesale prices.¹⁶

More recently, new renewable generation has entered the wholesale market, increasing supply, and therefore competition, putting downward pressure on prices. Despite this, outages from coal-fired power stations in Queensland and Victoria over the 2021 winter contributed to significant price volatility throughout the NEM.¹⁷ This was exacerbated by increased reliance on gas-powered electricity generation, which also jumped dramatically in 2021 – see **Section 1.2**.

¹⁴ Australian Competition and Consumer Commission (ACCC) 2018, *Restoring electricity affordability and Australia's competitive advantage: Retail Electricity Pricing Inquiry—Final Report*, pp. 30-32.

¹⁵ Ai Group 2018, *From Worse to Bad*, p. 6.

¹⁶ Grattan Institute 2018, *Mostly Working: Australia's Wholesale Electricity Market*, p. 11.

¹⁷ Australian Energy Market Operator (AEMO) 2021, *Quarterly Energy Dynamics Q2 2021*, p. 7.

The role of gas in volatile electricity prices

In recent years, a confluence of factors – including a tightening supply/demand balance, and an increase in intermittent renewable energy generation – has resulted in gas-fired generation being used more frequently to meet electricity demand in the NEM. This increased reliance on gas has occurred at the exact moment gas prices have entered a period of significant volatility.

As a result, when gas prices increase, so do wholesale electricity spot market prices, with flow-on effects for futures prices and the prices of new electricity contracts available to businesses. Conversely, when gas prices drop – as they did in 2020 – wholesale electricity prices ease. 2021 has seen gas prices increase again, with familiar flow-on effects for wholesale electricity prices.

Australia has entered a period in which many ageing coal-fired generators are reaching the end of their asset life and are being replaced. This means that across the system there is a need for investment in new generation. This will continue to have an impact on wholesale prices, regardless of whether the generation capacity comes from fossil fuels or renewables.¹⁸ **And whilst wholesale electricity prices plummeted by the end of September, with record levels of negative prices,¹⁹ most experts anticipate that prices will remain volatile in the short-to-medium term.**

¹⁸ Grattan Institute 2018, *Mostly Working: Australia's Wholesale Electricity Market*, p. 40.

¹⁹ Australian Energy Market Operator (AEMO) 2021, *Quarterly Energy Dynamics Q3 2021*, p. 3.

How wholesale spot prices are set

All electricity in the NEM is traded through a spot market, where supply and demand are matched in real time through a centrally coordinated dispatch process.

Every five minutes, generators offer to supply the market with specific amounts of electricity at particular prices. From all offers submitted, the dispatch process decides which generators will produce electricity, based on the principle of meeting demand in the most cost-effective way.

The spot market price is determined by the bid from the generator supplying the last unit of energy required to balance supply and demand during a given supply period. All generators that supply electricity in this period receive that price.

The role of retailers

Retailers manage risk on behalf of their customers. They swap volatile wholesale electricity prices for fixed retail prices. However, the price actually paid by retailers to generators is determined by their hedging position. If a retailer does not own generation assets, hedging is managed through futures contracts.

Other costs – notably network charges, and to some extent environmental charges – are simply passed through to customers.

1.1.2 Network charges

Increased network charges were responsible for 35 per cent of the overall increase in electricity costs across the economy in the ten years up to 2018.²⁰ In 2018, the Grattan Institute reported that the value of Australia's electricity network had grown from \$50 billion in 2005 to \$90 billion in 2018 – and that around \$20 billion of this investment was unnecessary given the discrepancy between projected and actual demand growth.²¹

Estimates of the level of overinvestment in network infrastructure vary, and overinvestments are more prevalent in New South Wales and Queensland than in other states. Even so, experts agree that overinvestment has led to significant additional costs flowing through to many businesses and households. Importantly, avoiding overinvestment in networks is receiving more attention than it has in the past. While further reform is needed, new network investments are not expected to be a major driver of additional electricity cost increases for businesses in the near term.

1.1.3 Environmental charges

Environmental charges make up around ten per cent of energy costs for commercial and industrial customers, though they receive a lot of attention in Australia's energy debate. There are two broad categories:

1. The Federal Government's Renewable Energy Target (RET), which drives investment in both large- and small-scale renewables. The RET is designed to increase the percentage of Australia's generation capacity delivered by renewables. Policy uncertainty in recent years led to significant fluctuations in confidence around the RET. In spite of this uncertainty, the RET exceeded its legislated target for additional large-scale renewables – 33,000 gigawatt hours (GWh) of renewable generation capacity – in 2020.²² Achieving this target has been made easier due to steep falls in the cost of new renewable generation assets in recent years.

2. State and territory-based energy efficiency schemes, which fund energy efficiency activities. Schemes exist in the Australian Capital Territory, New South Wales, South Australia and Victoria, although not all businesses in these jurisdictions contribute to the cost of these schemes. When looking across all consumers, bill reductions resulting from energy efficiency measures driven by the schemes substantially outweigh the costs passed through to consumers on their bills.

²⁰ Australian Competition and Consumer Commission (ACCC) 2018, *Restoring electricity affordability and Australia's competitive advantage: Retail Electricity Pricing Enquiry – Final Report*, p. 156.

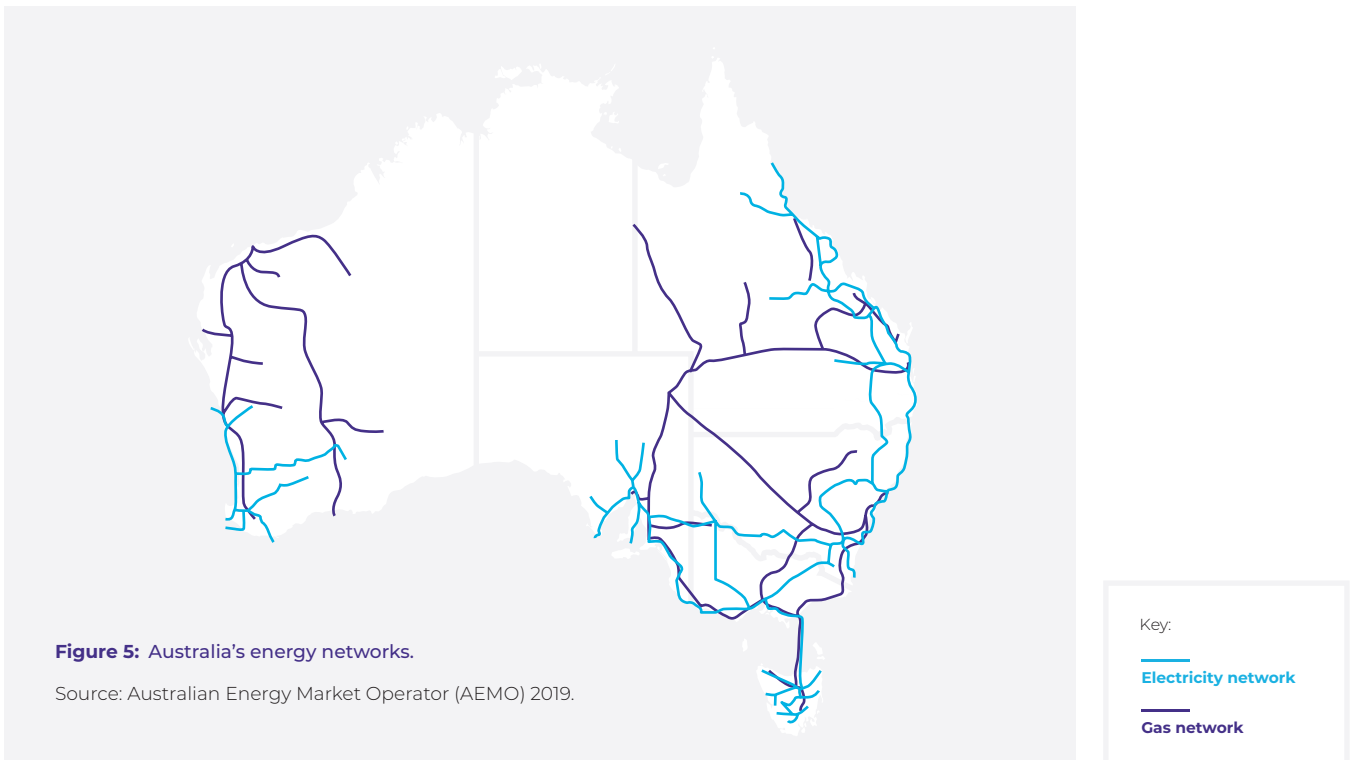
²¹ Grattan Institute 2018, *Down to the Wire: A sustainable electricity network for Australia*, p. 6.

²² Clean Energy Regulator 2021, *Large-scale Renewable Energy Target market data*, accessed 1 October 2021.

Upgrading our electricity network

While overinvestment in the network has been a problem in the past, well-targeted network investments will be needed as our energy system continues to evolve. In particular, we need to increase interconnections between states, build transmission lines to parts of the country that can support large-scale renewables, and maintain the reliability and safe operation of electrical infrastructure as our energy system decentralises.

Getting the balance right between over- and under-investment in the network as our energy system transforms is one of the key challenges facing policymakers and regulators.



The goal that I'm setting for us, Australia's independent system operator, is to harness the talents, capabilities, experience and know-how across the industry, to engineer grids that are capable of running at 100 per cent renewables penetration – at any moment in any day – by 2025.

Daniel Westerman
Chief Executive Officer
Australian Energy Market Operator

1.2 Current drivers of gas prices

Prior to 2015, Australia's east coast gas market was not closely linked to international markets. For many years industrial customers enjoyed stable and relatively low gas prices of between \$3 and \$4 per gigajoule (GJ), rising to around \$6 per GJ by 2015.²³

In late 2015 liquefied natural gas (LNG) exports from Queensland commenced, transforming the east coast gas market. Exporters committed a large percentage of available gas supply to the higher priced international gas market. Gas production failed to expand fast enough to meet this increase in gas demand, creating a domestic gas shortfall. The price of east coast gas rose dramatically, especially for industrial and commercial consumers. Gas prices offered to businesses in bilateral contracts varied substantially, with some offers in 2017 exceeding \$20 a GJ.²⁴

Concern around the gas supply shortfall and high prices prompted the Federal Government to establish the Australian Domestic Gas Security Mechanism (ADGSM) in 2017. Under the ADGSM, Queensland gas producers can be compelled to release gas into the east coast market if supply to the domestic market is assessed to be insufficient.

Gas prices fell once the Federal Government made it clear it was willing to enact the ADGSM. Retail price offers for industrial users moderated to around \$10 per GJ in 2018,²⁵ a price point that remained relatively steady into 2019.²⁶ In 2020, during the early period of the COVID-19 pandemic, gas prices fell even lower, in line with falling global prices, with some gas contracts priced below \$7.²⁷ However, 2021 has been a very different story. International oil prices returned to pre-COVID levels of A\$100 a barrel, influenced by the Organisation of the Petroleum Exporting Countries' (OPEC) ongoing production cuts and reductions in global oil stocks due to economic recovery from COVID-19.²⁸ These dramatic shifts flowed through to the international gas market, and in turn, the Australian domestic gas market, resulting in wholesale gas prices increasing to \$12 per gigajoule – see **Figure 2**. Unfortunately the gas price rollercoaster continues, and experts expect gas prices to remain volatile.

²³ Ai Group 2018, *From Worse to Bad*, p. 9.

²⁴ Australian Competition and Consumer Commission (ACCC) 2018, *Gas Enquiry 2017-2020: Interim report*, April 2018, p. 10.

²⁵ Ai Group 2018, *From Worse to Bad*, p. 9.

²⁶ Core Energy & Resources 2019, *Delivered Wholesale Gas Price Outlook 2019-2040*, p. 18.

²⁷ Australian Competition and Consumer Commission's (ACCC) 2020, *Gas inquiry 2017-2025: interim report*, p. 54.

²⁸ Australian Energy Market Operator (AEMO) 2021, *Quarterly Energy Dynamics Q2 2021*, p. 37.

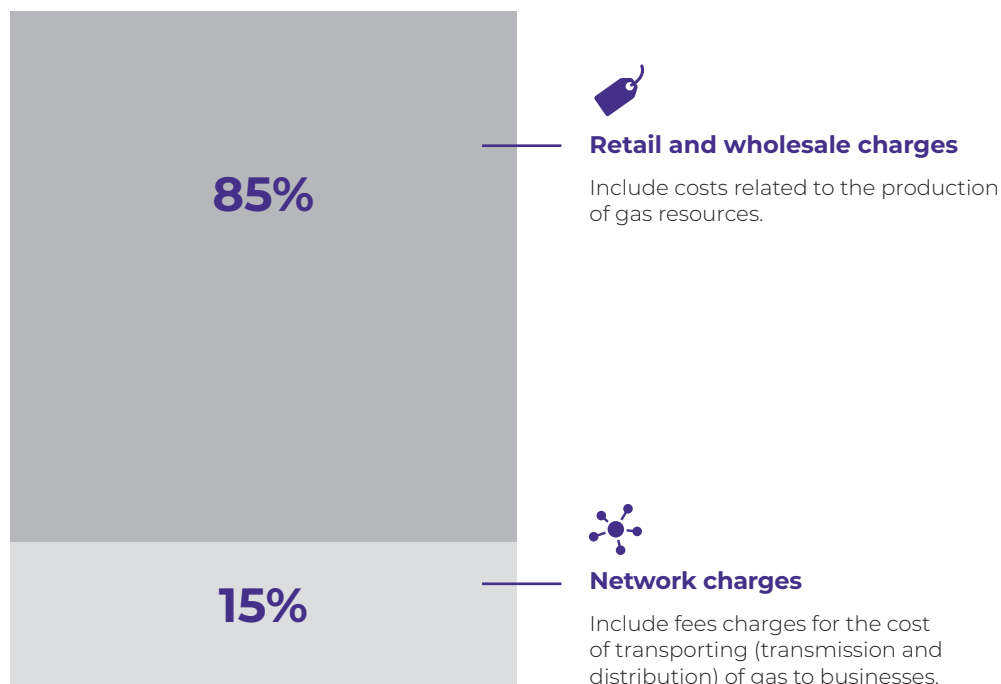


Figure 6: Gas bill components for the average large industrial user on the south-east coast, as calculated by Oakley Greenwood (2018). While a useful guide, there can be significant variation in this breakdown from business to business.

Source: Oakley Greenwood 2018, *Gas price trends review 2017*, p.99.

They do things differently in the West

Western Australia has its own electricity and gas markets, and it operates these markets a little differently to those on the south-east coast.

The western gas region operates in much the same way as the eastern gas region. However, the Western Australian Government has put in place a gas reservation policy, which requires producers to reserve 15 per cent of production for the domestic market. As a result, Western Australia has largely avoided the export-driven price volatility that has been experienced in the east coast in recent years.

The domestic reservation policy has also resulted in more stability in Western Australia's Wholesale Electricity Market (WEM), which relies on gas generators for approximately 40 per cent of its electricity supply. By comparison, the NEM relies on gas generators for only 20 per cent of supply.

However, the key difference between the WEM and the NEM is that the WEM is a 'capacity market'. This means that a reserve capacity mechanism (RCM) is in place to guarantee sufficient capacity in the system. The use of an RCM – which is not used in the NEM – leads to a capacity charge being passed onto customers. However, the effect of the capacity market is historically lower price volatility in the WEM than in the NEM.

Another difference between the east and west is that futures electricity prices in the WEM are not openly traded on the Australian Securities Exchange (ASX Energy) as they are in the NEM. This means that there is no visibility of traded prices. In the absence of a futures market to provide an indication of future prices, it is harder for businesses to utilise innovative approaches to buying electricity, like progressive procurement – discussed further in **Section 3.3.2** – or **long-term power purchase agreements (PPAs)** – discussed further in **Section 3.2.3**.

Because of these different circumstances, businesses in Western Australia are paying less for both electricity and gas than businesses on the south-east coast.

1.3 Volatility is with us for a while yet

Despite hopes that the energy price peaks of 2017 were behind us, both electricity and gas markets continue to be volatile. How long this volatility will be with us is unclear as the mid- and long-range impacts of a global pandemic are hard to predict, and Australia's energy and carbon policy is constantly evolving. However, the expert consensus remains that electricity and gas prices will ultimately stabilise well above their historic lows.

It is a complex picture, but the message for business is clear. Leaders in energy strategy are making investments that reduce their exposure to volatile energy markets, and help them take control of their own energy position. Doing this requires a clear understanding of how the energy system is evolving, as the trends and technology driving this transformation are the same ones businesses can leverage to thrive.

The three characteristics of energy market transformation



The current upheaval in Australia's energy markets has distinct characteristics, but it is not unique; energy markets are transforming in similar ways around the world. Three key trends are in the process of re-defining the way businesses use, produce, and contract their energy:

1. The generation mix is changing

The transition away from fossil fuels towards renewable energy, initially driven by government policy, and later by renewables reaching cost-parity with fossil fuels, is resulting in the decarbonisation of the electricity grid. Global climate commitments and investor pressures to decarbonise are accelerating this trend.

2. The grid is decentralising

Highly centralised, one-way electricity grids are becoming more distributed, with multiple sources of generation, storage and demand management. Energy consumers are increasingly producing energy, and a world in which businesses sell energy to other businesses is becoming more feasible, enabled by new technologies and trading platforms.

3. The demand profile is shifting

The amount of energy flowing from the grid to consumers – known as the demand profile – is shifting as more consumer needs are met by on-site renewable generation. In addition, proactive demand management is starting to play a bigger role in our energy system. Businesses are increasingly controlling not just where their energy comes from and how much they use, but when they use it. This flexibility will improve system stability and help balance electricity supply and demand.

2.1 The generation mix is changing

The transition to the National Electricity Market (NEM) 20 years ago set the stage for the energy transformation we are experiencing today. Since then, government-owned energy assets and companies have been sold, markets have been deregulated, and state barriers to energy transmission dismantled.

Ageing and now less efficient coal-fired power stations – built by governments prior to privatisation and deregulation – are being decommissioned as they approach or exceed their asset life. As discussed in **Section 1**, when generation capacity is withdrawn – as seen over the past few years with the closure of the Northern Power Station in South Australia and Hazelwood in Victoria – the balance of supply and demand in the NEM becomes tighter.

This capacity needs to be replaced. The private sector is highly unlikely to finance new coal-fired generators in Australia; indeed, in early 2021, EnergyAustralia announced that it would close Victoria's Yallourn power station in 2028, four years ahead of schedule.²⁹ This is compounded by sustained concerns around climate change, which are driving deep scepticism that investors will be able to recoup their investment by running coal-fired generators for their full asset life. Investment in new, less carbon-intensive gas-fired generation is more likely. However, this too is being delayed by instability in energy and climate policy, and concerns over the cost of gas.

²⁹ EnergyAustralia 2021, *EnergyAustralia powers ahead with energy transition*.

Over the past ten years, most new generation capacity added to the NEM has been underpinned by the Federal Government’s Renewable Energy Target (RET). State- and territory-based renewable energy targets are also contributing new renewable generation capacity, and will continue to do so over time.

Furthermore, the cost of building large-scale renewable energy generation is now lower than the cost of building new conventional fossil fuel generators, with the rest of the world following Australia’s lead – see **Figure 7**. Generation costs for utility-scale solar fell 85 per cent between 2010 and 2020, with onshore wind costs falling by 56 per cent in the same period,³⁰ which is why renewables have outpaced fossil fuels in new power capacity additions overall since 2012 around the world.³¹

We have now passed through an inflection point where the electricity supply mix is beginning a rapid transition towards a low carbon, renewable energy-powered grid.

While generation from renewable sources is variable, much effort is being expended to rapidly develop and scale up demand management – or flexibility – and storage technologies – such as grid-scale batteries and pumped hydro – that would allow electricity generated from renewables to be used at other times of the day. As storage at the necessary scale is not yet cost-competitive, gas peaking plants and demand management – discussed further in **Section 3.2.2** – are more immediate options for dealing with this variability.

³⁰ International Renewable Energy Agency (IRENA) 2021, *Renewable power generation costs in 2020*, p. 3.

³¹ International Renewable Energy Agency (IRENA) 2020, *Renewable power generation costs in 2019*, p. 3.

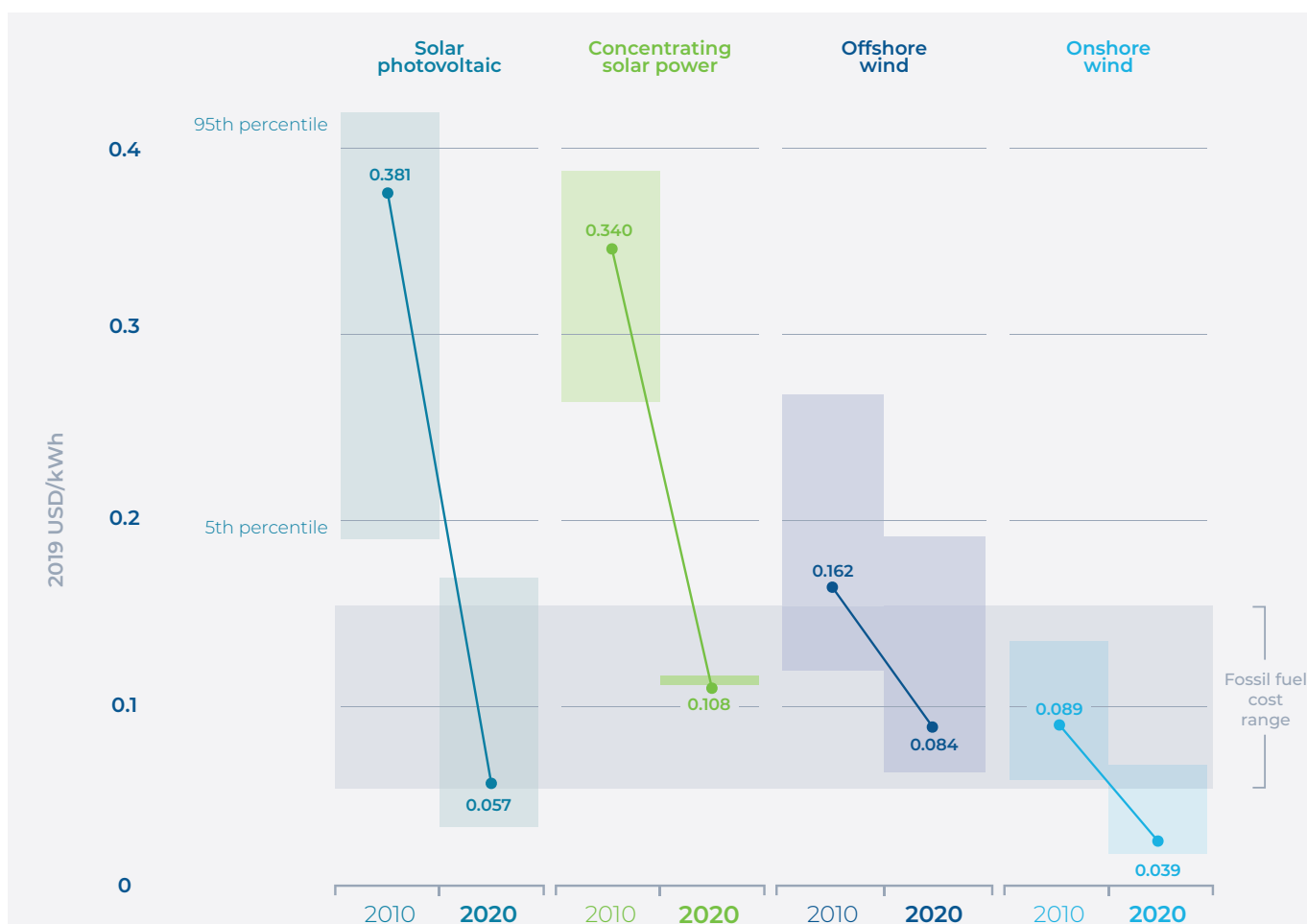


Figure 7: Average global levelised cost of electricity from utility-scale renewable power generation technologies, 2010 and 2020.

Source: International Renewable Energy Agency (IRENA) 2021, *Renewable Power Generation Costs in 2020*, p. 15.

The three characteristics of energy market transformation

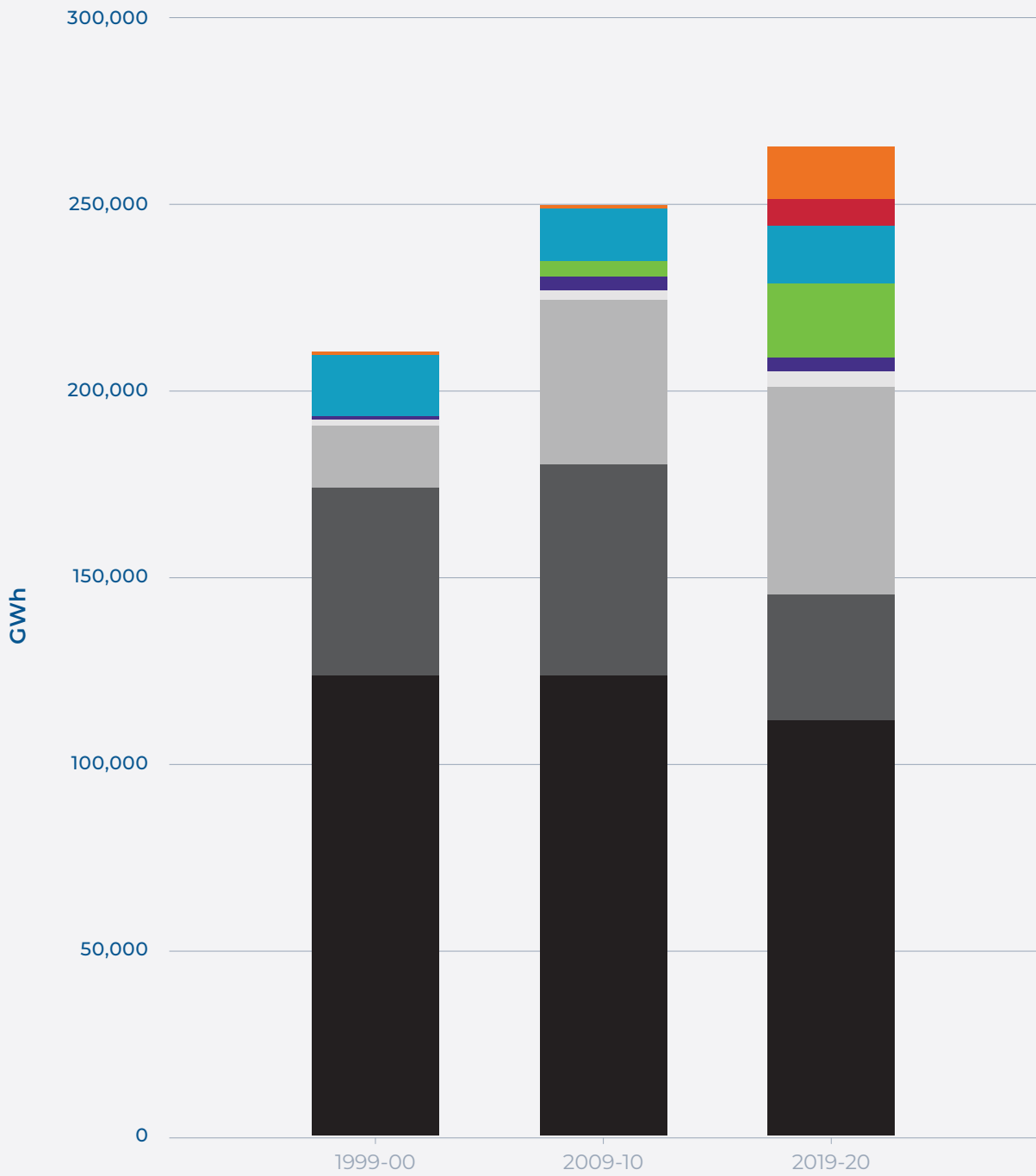
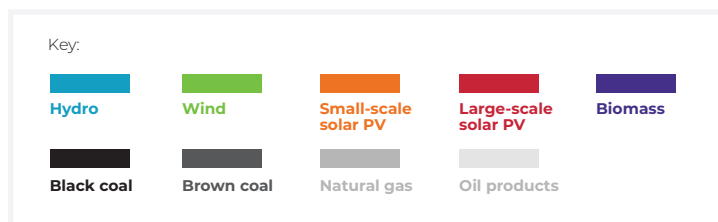


Figure 8: 20 years of generation in the National Electricity Market (NEM): by fuel type.

Coal use is declining as renewables take off, now making up almost a quarter of the generation capacity in the NEM.

Source: Department of Industry, Science, Energy and Resources 2021, *Australian Energy Update - Table O: Australian electricity generation by fuel type, by state and territory, by fuel type, physical units.*



Low carbon vehicles driving the transport agenda

Most experts agree that while the electric vehicle (EV) revolution isn't quite here yet, it's fast becoming a reality. EVs have continued to slowly integrate into the Australian market, with sales growing despite the recession. In the first half of 2021, 8,688 EVs were sold – a large jump from the 3,226 EVs sold in the first half of 2020.³² As the economy recovers, it is expected that sales will continue with more than half of Australians interested in purchasing an EV as their next vehicle.³³

EV uptake is largely muted by the high up-front costs of EVs, and the lack of charging infrastructure. However, EV costs – including the cost of batteries – are reducing, and the maintenance and fuel savings – compared with vehicles that rely on an internal combustion engine – are fast improving the case for EVs.

Notably, it is estimated that “the total cost of ownership to be A\$5,000 less for EVs relative to [internal combustion engines] by 2021 and A\$11,000 less by 2025,” over a ten-year ownership period.³⁴ This means that businesses can save up to \$1,700 per annum by 2030 per EV. Depending on the size of a business' fleet, EVs have the potential to enable substantial financial savings for businesses.

³² Electric Vehicle Council 2021, *State of Electric Vehicles – August 2021*, p. 4.

³³ Electric Vehicle Council 2021, *Consumer Attitudes Survey 2021*, p.1.

³⁴ Electric Vehicle Council, NRMA, PwC & St Baker Energy Innovation Fund 2018, *Recharging the economy: the economic impact of accelerating electric vehicle adoption*, p. 30.

Partnerships are key to success for electric freight

Linfox, Woolworths and Volvo are collaborating to pilot the use of a refrigerated EV truck to deliver fresh produce to stores in metropolitan Melbourne, highlighting that businesses that have already made significant strides in reducing their energy and emissions can leverage partnerships to make further savings.

The environmentally friendly EV has no carbon emissions, unlike a diesel-powered truck, and can travel up to 200km before needing to be recharged, which can be completed in approximately eight hours. It also has 'regen' capability which means every time it travels downhill or brakes, the battery partially recharges. A charging station at the Melbourne Fresh DC will boost the battery while deliveries are unloaded.

We will be watching the results of this trial closely with Linfox to understand how electric trucks can support our shift to a low carbon future in the years ahead.

Chris Brooks
Chief Supply Chain Officer (Acting)
Woolworths Group

And this collaboration is just one example of how the transition to low carbon vehicles is speeding up.

In 2007, Linfox set out to cut its greenhouse gas emissions in half and we did that. Today we are not just interested in making our own business practices greener, we are committed to helping our customers act sustainably too. Linfox is proud to lead the way in the adoption of electric vehicles as we strive to meet our zero emission targets and support our customers to do the same.

Peter Fox
Executive Chairman
Linfox Pty Ltd

Net zero emissions means achieving an overall balance between greenhouse gas emissions produced and greenhouse gas emissions removed from the atmosphere.

To learn more, read the **Learn the lingo: understanding net zero emissions** box on page 20.

³⁵ The Australian Institute 2021, *Climate of the Nation 2021*, p.4

³⁶ Essential Report 2021, *Preferred emissions targets*, 12 October 2021.

³⁷ Australian Council of Superannuation Investors (ACSI) 2021, *Promises, pathways and performance – Climate change disclosure in the ASX200*, p. 10.

³⁸ Investor Group on Climate Change (IGCC) 2021, *Aspiration to action: insights into investor progress towards net zero*, p. 19.

Climate as a driver for 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.

Under the agreement, Australia committed to reduce its greenhouse gas emissions by 26 to 28 per cent compared with 2005 levels by 2030. Australian states and territories have gone further, with all Australian state and territories having committed to pursuing net zero emissions by 2050 or earlier.

Policy is one driver for business decision making, as is ensuring operational resilience to the physical risks of extreme weather. However, Australian businesses are also responding to consumer, investor and supply chain sentiment.

1. Consumer sentiment

Public concern for climate change continues to grow across Australia, with support for reducing emissions reaching a high of 75 per cent,³⁵ and 43 per cent wanting a more ambitious target for 2030.³⁶

2. Investor sentiment

Investor sentiment is shifting as well. The Australian Council of Superannuation Investors (ACSI) reported that net zero commitments tripled to 49 companies over the 12 months to March 2021. This group now accounts for half of the ASX200 and a \$1 trillion market.³⁷

Moreover, according to the Investor Group on Climate Change (IGCC), over 40 per cent of surveyed Australian superannuation funds, asset managers and sovereign wealth funds have made portfolio wide commitments to net zero emissions by 2050, up from 27 per cent in 2020.³⁸

When companies disclose clear, consistent and accurate information on the risks they face from climate change, **investors and business leaders can make more informed and sustainable financial decisions.**

Michael R. Bloomberg

Chair

Task Force on Climate-related Financial Disclosures

³⁹ Task Force on Climate-related Financial Disclosures (TCFD) 2021, *Fourth TCFD status report highlights greatest progress to date on TCFD adoption*, 14 October 2021.

And disclosures to the Task Force on Climate-related Financial Disclosures (TCFD) increased more between 2019 and 2020 than in previous years, with 83 of the world’s largest 100 companies now supporting or reporting in line with the TCFD’s recommendations.³⁹

While any shift to move economies away from carbon intensive activities and sectors will take time, there is significant global momentum towards a net zero economy. To that end, **we are accelerating the reduction of our own greenhouse gas emissions against our target to achieve a 51 per cent reduction by 2030.**

Our approach to climate change is evolving and we now intend to update and publish key priorities and progress against this plan in our Annual Report each year. **This iterative and responsive approach ensures we are well placed to keep pace with the latest scientific and public policy developments and international agreements** including COP26, the UN Intergovernmental Panel on Climate Change and the Task Force on Climate-related Financial Disclosures (TCFD).

Christine McLoughlin AM

Chairperson
Suncorp Group

3. Supply chain sentiment

As part of their broader push towards net zero, both multinationals and some large Australian corporates are working to track the emissions intensity of their supply chains, whilst also supporting businesses in their supply chains with cutting their own emissions.⁴⁰

⁴⁰ CDP 2021, *Transparency to transformation: a chain reaction.*

We want to do the right thing for the world around us and in 2020 we were the first Australian company to join CDP Supply Chain. This partnership helped us deliver training, tools and support to our strategic suppliers as they considered and disclosed their environmental impacts. We're now using this information to **understand the volume of emissions being released from the products and services we purchase** from our suppliers and to **develop ambitious strategies together to further reduce them.**

Alexandru Butiri

Chief Procurement Officer
Telstra

Australian businesses are watching these developments closely. Some have already achieved net zero emissions through a combination of energy efficiency, renewables and emissions offsets, while others have strategies in place to achieve net zero by a given year.

Many other businesses are considering what a move to net zero emissions would mean for their operations. For some, the recalibration of their energy strategy – while driven primarily by cost concerns – is an opportunity to get ahead of the curve on carbon.

2.2 The grid is decentralising

In the past, electricity flowed from large, centralised generators, across poles and through wires, via retailers, and to consumers at the end of the line.

Now, the move to renewables is seeing the grid decentralise. Large-scale renewable installations are situated in parts of the country favourable to wind or solar. Solar photovoltaics (PV) have become part of the fabric of our suburbs, and it now appears likely that increased uptake of electric vehicles will put batteries in many Australian garages over the next 15 years.

The move to decentralisation is only just getting started.

Technologies that connect distributed energy resources and consumers to form a decentralised energy network – including ‘embedded networks’ and ‘micro-grids’ – are emerging. Embedded networks and micro-grids enable resources that are often under-utilised – such as solar panels, small-scale storage and on-site generators – to support nearby consumers by supplying power and managing demand at critical times.

In the future, experts expect more and more businesses to take control of their energy needs by generating and storing energy behind the meter. This will enable them to:

- Reduce their need for relatively expensive grid-supplied electricity;
- Avoid network costs and highly-priced peak demand periods; and
- Sell electricity back into the grid or to other consumers directly.

If properly managed, decentralisation will also have system benefits, such as enhancing grid stability and facilitating the avoidance of unnecessary capacity upgrades to transmission network infrastructure. This will help avoid network charges that would otherwise have been passed through to consumers.

Managing the transformation

In 2016, Australia’s energy ministers established an Independent Review into the Future Security of the NEM, which was led by Australia’s Chief Scientist Alan Finkel. After a comprehensive process – with support from across the community – the Finkel Review made 50 recommendations, 49 of which are being implemented.

Since the Finkel Review, Australia has made progress on dealing with some longstanding challenges in our electricity sector. For example, in July 2018 the Australian Energy Market Operator (AEMO) released its first Integrated System Plan (ISP), a key recommendation of the Finkel Review. The ISP is designed to establish a strategic approach to infrastructure investment to effectively manage the transformation underway in our energy system. The 2020 ISP offered five different scenarios through which Australia’s Paris Agreement target of a 26 per cent reduction in 2005-level emissions by 2030 could be achieved.⁴¹

Despite this progress, most experts agree that there is still much to do, and key issues – such as the ambition of national carbon reduction targets – remain unresolved.

⁴¹ Australian Energy Market Operator (AEMO) 2020, *2020 Integrated System Plan for the National Electricity Market*, p. 98.

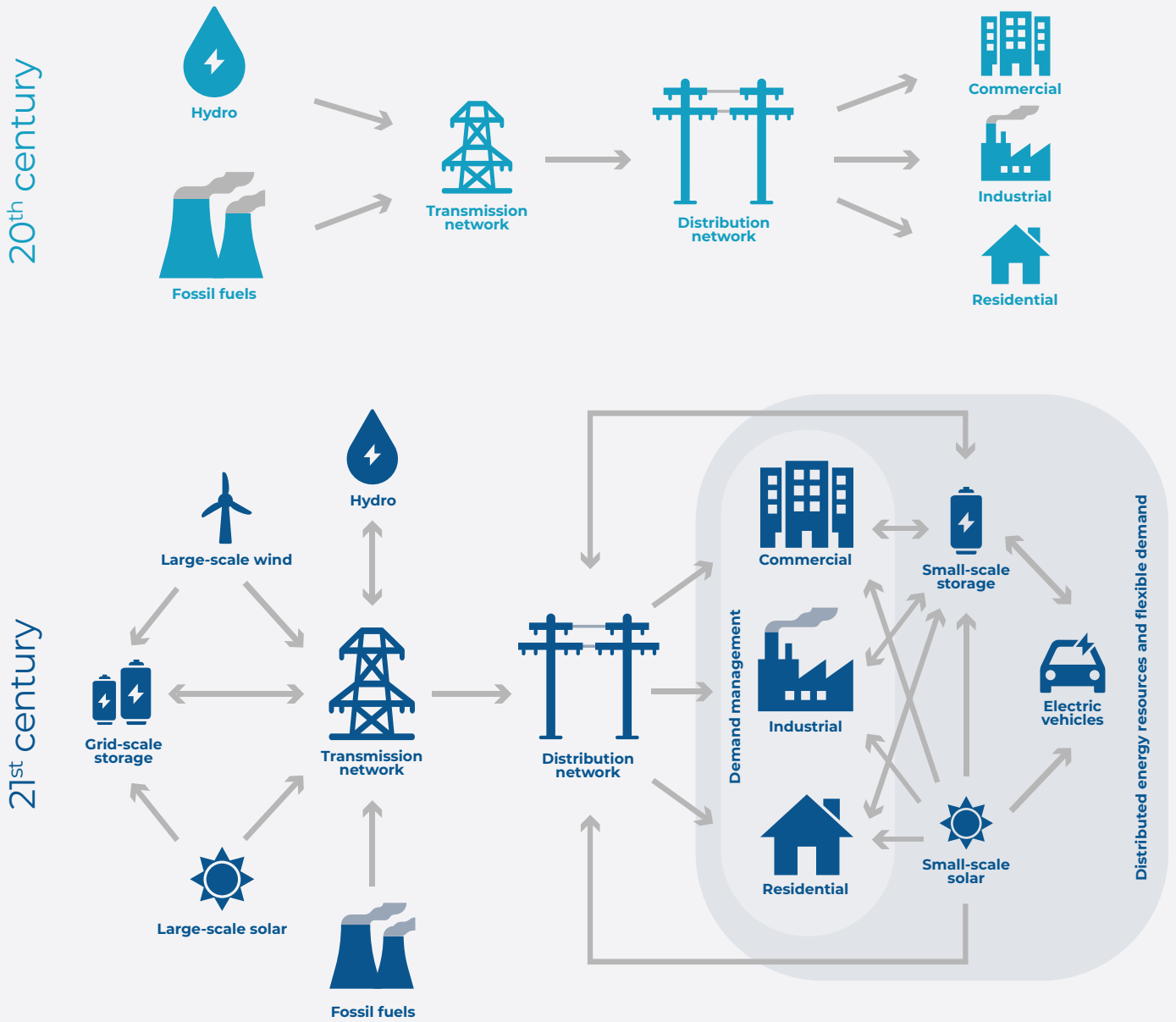


Figure 9: Electricity grids are transitioning from centralised to distributed systems.

2.3 The demand profile is shifting

The changing generation mix and the decentralisation of the grid have attracted significant media attention over the past decade. Yet another related shift is underway, which will have a profound impact on the supply and demand characteristics of the electricity grid, creating significant opportunities for businesses.

AEMO – the energy market operator – is responsible for systems that ensure demand is matched by supply in real-time, which is crucial to maintain grid stability. However, matching supply and demand on the grid is more complex than it used to be.

Renewables are impacting demand across the system by changing the level of demand on the grid at different times of the day; this is known as the grid's 'demand profile'.

Consumers' need for energy is increasingly being met by on-site renewables, which reduces their need for electricity from the grid at particular times of the day. When on-site renewables are not generating, demand for energy from the grid goes up again. An example of this is the so-called 'duck-curve'. When the sun is shining brightest during the middle of the day, generation from distributed solar PV systems peaks, reducing demand on the grid. However, demand for electricity from the grid ramps up quickly towards the end of the day as families return home, the sun goes down, and generation from solar PV drops.

This is just one example of how demand on the grid is becoming more 'peaky' – rapidly ramping up and down depending on the availability of distributed energy resources – or DER as the works like to call them. Peak demand can be managed, but it requires a range of new technologies and management systems that enable a more flexible and responsive energy system, on both the supply and demand sides.

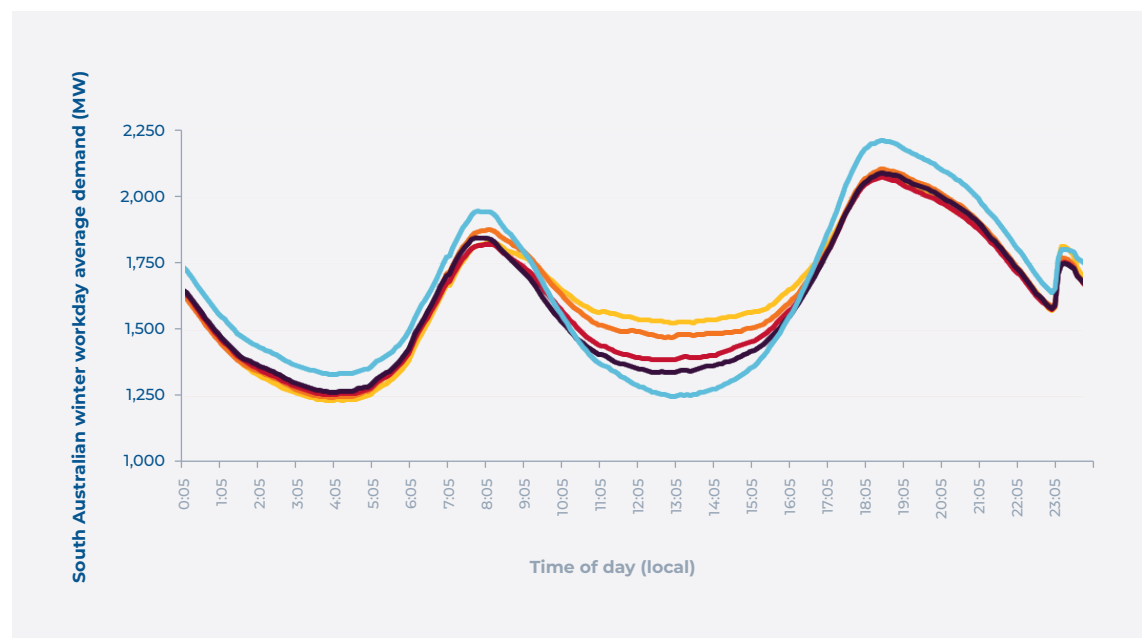
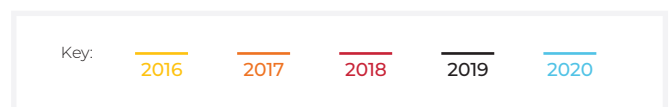


Figure 10: Average operational demand in winter in South Australia.

Source: Australian Energy Market Operator (AEMO) 2020, *South Australian Electricity Report*, p. 35.



Navigating a dynamic energy landscape

These are major shifts, and much of the policy and technical debate is focused on how to achieve them while facilitating the reliability, affordability and sustainability of our energy systems.

However, businesses that are leading in energy strategy are not waiting for these debates to play out, or for things to go back to normal. They are recognising that a dynamic energy landscape is the new normal and are taking action. They are moving to manage risk, and just as importantly, capture the opportunities thrown up by the energy transition.

But they aren't stopping there. With energy accounting for over 80 per cent of greenhouse gas emissions across the Australian economy,⁴² leading businesses are backing energy management to realise their net zero goals – see **Section 3**.

⁴² Department of Industry, Science, Energy and Resources 2021, *Quarterly Update of Australia's National Greenhouse Gas Inventory*: March 2021, p. 9.

Learn the lingo: understanding net zero emissions

The term 'net zero emissions' is often taken to mean every part of the economy will be zero emissions, however that is not the case. Some parts of the economy will be very challenging to fully decarbonise, which means the actual target is for each sector of the economy to transition to either low, zero or negative emissions, acknowledging that activities that draw emissions from the atmosphere and store them are described as generating negative emissions. Net zero emissions is achieved when the sum of these activities results in no net increase in emissions added to the atmosphere.

Emissions that are difficult or impossible to eliminate may be dealt with by purchasing offsets, which are generated through activities like reforestation. In Australia, Climate Active provides consistency and confidence in the offsets market. Climate Active is an ongoing partnership between the Federal Government and Australian businesses to drive voluntary climate action. The Climate Active certification is one of the most rigorous carbon neutral certification standards in the world.

The use of offsets acknowledges that achieving an economy-wide target of net zero emissions does not mean that every sector of the economy needs to achieve net zero emissions, and instead that we can use offsets to leverage the achievements of negative emissions sectors. Importantly, offsets should be used as a last resort after embracing emissions abatement activities like proactively managing energy – see the **Net zero target? Proactive energy management is the first cab off the rank** box on page 21.

To learn more, go to climateactive.org.au



How businesses are taking control

Given the scale of the transformation underway in Australia's energy markets, a business as usual approach to energy strategy and management risks operational profits, business productivity and competitiveness.

Businesses that are leading in energy strategy have recognised this, and have moved to optimise their energy position in three key areas:

1. Leveraging data

Granular, real-time data is providing businesses with a deep understanding of how energy is being used across their operations. This information can unlock performance improvements, drive strategic decision-making and investment, and enable reporting and communication of progress against targets.

2. Calibrating investment

Businesses are using this data to understand where they should invest resources and capital, whether it be in energy efficiency, demand management technologies or renewable energy. Identifying opportunities to change how and when energy is used, and investing where cost-effective, is setting these businesses up for future growth and competitiveness.

3. Optimising procurement

As well as optimising their own operations, businesses are exploring innovative energy procurement strategies to source the remainder of their energy requirements. Businesses are ensuring they are not passive price-takers, and are assessing alternate solutions to meet their energy needs.

Net zero target? Proactive energy management is the first cab off the rank

Energy is responsible for over 80 per cent of Australia's emissions. The good news is that there are three big, cost-effective options for cutting energy related emissions: energy efficiency, demand management and renewables.

That means for companies that have set a net zero target, running the ruler over the 'big three' energy management opportunities should be the first cab off the rank, as they can deliver big, early wins in the effort to drive down emissions.

Strategies for dealing with non-energy related emissions vary by sector. And there are always offsets where there isn't a zero carbon option, but these should be treated as a last resort, rather than a starting point for most businesses.

To learn more about best practice for Australian company net zero commitments, go to: climateworksaustralia.org/resource/corporate-action-for-1-5-degrees-best-practice-for-australian-company-net-zero-commitments

The net zero by 2030 commitment is our flagship initiative as part of our program to address climate change resilience.

Alastair Symington
Chief Executive Officer
Blackmores

3.1 Leveraging data

Leaders in energy strategy have advanced metering, submetering and analytics that provide them with a granular understanding of energy use across their operations, broken down not just by site, but by particular subsystems and equipment. Usage is linked to key business metrics, and active monitoring, analysis and reporting is enabling process optimisation and supporting decision making around energy investments.

Not all businesses have energy use data with this level of detail. Most businesses understand the significant areas of energy consumption within their operations, but have opportunities to improve the granularity of available data, as well as how it is analysed and utilised in decision-making.



First we measure and then we act. There's no question that operational efficiency supports sustainability. Energy usage affects everyone at Kathmandu, so we are excited to be integrating solutions to reduce our impact. **These strategies minimise our impact and also boost our bottom line.**

Reuben Casey
Chief Operating & Financial Officer
Kathmandu

For businesses looking to revamp their approach to energy management, working with an experienced professional to undertake an energy audit will help develop a deeper understanding of energy use, identify opportunities for process, equipment and management system improvements, and establish a baseline that can be used to assess ongoing performance. A comprehensive audit every three to five years by a highly experienced auditor is best practice.⁴³

⁴³ Standards Australia 2014, AS/NZS 3598.1:2014 *Energy audits*, p. 11.

However, an audit is just a snapshot in time. It is also important to ensure the business has access to real-time, granular energy performance data, which means having the right sensors, submeters and systems in place.

The next step is to ensure this data is driving decision-making rather than sitting in a spreadsheet.

To learn more about identifying energy management opportunities and to get sector-specific guidance on implementing the opportunities, go to

👉 energybriefing.org.au/sector-spotlights



3.2 Calibrating investment

Access to granular, real-time energy data is necessary but not sufficient for making informed investment decisions. Leaders in energy strategy ensure that this data is actively monitored and analysed by experts in relation to key investment opportunities.

These experts consider usage in relation to:

- Key business performance metrics;
- Current energy cost profile;
- Energy market outlook and risk; and
- Opportunities to achieve a more cost-effective outcome through investments in energy efficiency, demand management and on- or off-site generation.

Businesses that take a considered, proactive approach to investment in efficiency, demand management and generation solutions are optimising the areas where they have a high level of control.

As with any business investment, a robust monitoring framework for energy projects is crucial to ensure investment thresholds are met. Businesses are increasingly quantifying energy project performance through **measurement and verification** (M&V) methodologies, which establish a baseline and variables up-front, thereby enabling a proper assessment of whether the investment criteria have been met.

To learn more, read the *M&V 101* found at energybriefing.org.au/m-and-v-101

3.2.1 Energy efficiency

The International Energy Agency (IEA) refers to energy efficiency as the 'first fuel', as energy efficiency investments are often more cost-effective than investments in other energy sources, including fossil fuels and renewable energy technologies. Significantly, the benefits of energy efficiency extend well beyond just simple energy cost savings. Lower maintenance costs, process improvements, enhanced product quality and cheap carbon abatement are often by-products of sound energy efficiency investments.

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

Yet, despite the multiple benefits of energy efficiency, there is evidence that suggests businesses tend to underinvest in energy efficiency, even where the business case is compelling.⁴⁴ Many internal budget and capital allocation processes tend to prioritise investment cases focused on revenue growth over cases based on avoided cost. Businesses focused on capturing the benefits of energy efficiency have reviewed their internal processes to remove barriers like this, ensuring energy efficiency investments are properly considered.

Opportunities for improving energy efficiency vary greatly by sector, but generally range from straightforward – and often low-cost – tuning and optimisation, to targeted upgrades to plant and equipment, to site or facility wide retrofits.

Energy efficiency is increasingly being driven by powerful cloud-based analytical tools that identify areas for performance and process optimisation in commercial buildings, manufacturers, mine sites, agricultural holdings and freight systems.

⁴⁴ ClimateWorks Australia 2016, *Could boosting energy productivity improve your investment performance: A guide for investors*, pp. 7-8.


Bellarine Hydroponics plants energy efficiency to boost growth

Bellarine TechBio Pty Ltd – trading as Bellarine Hydroponics – is a leading producer of hydroponic horticultural crops located in the Bellarine region of Victoria. The business has been running commercial greenhouse operations for over 17 years, producing premium quality cherry truss tomatoes. Full control over the greenhouses' environment and irrigation enables Bellarine Hydroponics to produce every week of the year, reaching the highest possible yields for cherry truss tomato production. The temperature controlled growing conditions of greenhouses means that energy is Bellarine Hydroponics' single highest expense after staff costs.

Realising that their energy expenses weren't set in stone, the company leveraged a free energy audit provided by the Victorian Government to identify energy savings opportunities. This audit identified opportunities that included introducing an automated climate control system, a 22kW solar PV system, thermal screens, and a heat buffer tank.

Bellarine Hydroponics started with the thermal screens upgrade as they offered the largest savings opportunity: a \$24,000 per annum reduction in the gas bill. This is achieved by reducing the amount of heat that escapes the greenhouses, which minimises the need for climate control. Importantly, beyond these energy bills savings, the improved growing conditions enabled by the energy upgrades mean that Bellarine Hydroponics is expecting production gains of up to ten per cent, which will result in more than \$70,000 in additional annual revenue.

The business has also leveraged the Victorian Energy Upgrades (VEU) program to help fund some of the energy upgrades, which are expected to save around 85 per cent of the capital costs.



Bellarine Hydroponics looks forward to lower energy bills and increased productivity from investments in energy management upgrades.

3.2.2 Managing when energy is used

As explained in **Section 2.3**, the electricity system is becoming more peaky due to the impact of renewables on both energy supply and demand.

Storage plays a significant role in dealing with peaky demand, and the higher costs that businesses can face during those peaks. Substantial investment and effort are being expended to increase the availability and use of storage technologies – including grid-scale batteries and pumped hydro – to smooth out the availability of electricity generated from renewables at particular times of the day.

Savvy businesses with a granular understanding of when they use electricity have the opportunity to manage when they use energy, which can reduce their energy costs and create new revenue streams.

Businesses can manage their use of grid-sourced energy in a number of ways. The most common approach is shifting use away from regular periods of peak demand, such as afternoons. This reduces exposure to peak demand charges, which can be a component of both retail and network costs.

Some commercial and industrial equipment, such as appliances used for heating and cooling, facilitate this type of energy management, as they do not need to draw energy continuously from the network.

However, businesses can also manage their energy use in more sophisticated ways. New technologies are enabling businesses to rapidly adjust their energy use to adapt to changes in the energy system. This is known as demand response, and it can deliver a variety of benefits. For example, if energy prices peak due to an unplanned generator outage, businesses can voluntarily reduce their energy use to avoid high costs. Demand response can also help to stabilise the grid, which is why businesses can already get paid for some kinds of demand response services.

Demand response is a win-win.

Energy market rules have been updated to make it easier for businesses to be rewarded for providing demand management – or flexibility – services to the grid. In October 2021, a wholesale demand response mechanism (WDRM) was introduced into the NEM. This has brought Australia into line with other parts of the world where demand response is common, including in the United States, Europe and New Zealand. This increases system resilience and reduces the need for additional spending on generators or networks to deal with peak demand.

Wholesale demand response is potentially a much more affordable way to ensure a secure and reliable energy supply than other sources of peaking generation such as gas or pumped hydro. It can be used to address sudden drops in supply or spikes in demand.

John Pierce
Former Chair
Australian Energy Market Commission

Demand response is a win-win: businesses that do not participate in demand response benefit from increased reliability and affordability of the energy system because of voluntary demand response undertaken by others. Businesses that do participate receive these same system-level benefits, plus a direct payment for the demand response.

Different demand management options make sense depending on business type, demand profile and requirements around security of supply. What is crucial is that businesses carefully consider not just where their energy comes from and how they use it, but when they use it.

Data centres deliver innovative energy use with demand response

Digital Realty is a leading global provider of data centre, colocation and interconnection solutions, with over 290 data centres across six continents. The business is focused on delivering practical solutions that maximise energy productivity and resource efficiency. This is important given that data centres are large energy users, and the demand for their services continues to increase as the digital economy grows.

In 2020, Digital Realty's energy use increased by 24 per cent, due to the new demand for data that followed the pandemic with more people working from home and increased use of streaming services. This amounted to a total energy consumption of 8,000 GWh across the year. That's enough power for approximately one million average Australian family homes!

Digital Realty partnered with an energy flexibility services provider to identify opportunities to reduce energy costs and help decarbonise their energy supply. As a result, Digital Realty signed two of its data centres up to a virtual power plant (VPP) program with an independent aggregator. A VPP is a network of distributed energy resources – like solar, battery systems and flexible loads – that work together to reduce demand or supply power to the grid when it is needed most. Data centres are good candidates for VPPs because they are typically large energy users with a consistent load.

At times of peak electricity demand, Digital Realty's sites can support the VPP by proactively shifting to back-up power generation sources, thereby reducing energy consumption from the grid. By participating in a VPP and capitalising on its flexible capacity, Digital Realty directly supports the reliability, security and affordability of Australia's electricity grid, whilst also increasing the efficient use of their equipment.

This is one facet of Digital Realty's comprehensive approach to sustainability, which puts energy efficiency first with an ISO 50001-certified energy management system (EnMS), and is supported by a range of renewable energy initiatives and procurement opportunities. This is all underpinned by a commitment to the Science Based Targets initiative (SBTi) for realising net zero with science-based emissions reduction targets.

By supporting our grid power use, **we directly help Australia's grid to be more reliable, efficient and sustainable**, both now and into the future.

Jon Curry

Vice President of Operations, Asia Pacific
Digital Realty

To learn more about ISO 50001, read the *Energy management systems 101* found at energybriefing.org.au/enms-101

To learn more about the role of science-based targets in achieving net zero, go to sciencebasedtargets.org

Digital Realty embraces energy efficiency, demand management and renewables to achieve net zero.



3.2.3 Renewable energy

The price differential between renewable and fossil fuel energy sources hasn't just closed, renewables are now the cheapest form of electricity generation in Australia. This cost differential, combined with current low interest rates, is seeing leading businesses seize the opportunity to invest in renewable energy generation, either on- or off-site.

Renewable energy investment helps reduce a business' reliance on grid-supplied electricity and gas, managing exposure to high energy prices and market volatility. For many businesses, on-site renewable energy is now cheaper than grid-supplied electricity – whether coming from fossil fuel or renewable sources – and when generation is situated behind the meter there is an added benefit of avoided network charges. Other benefits for businesses include enhancing sustainability performance and the potential to increase budget certainty.

The capacity for on-site renewable energy is generally limited by factors such as available space and structural issues. This is prompting some businesses to actively pursue contracts with large-scale off-site renewable energy generators to meet all or part of their energy supply needs.

Corporate **power purchase agreements (PPAs)** are long-term contracts – typically 10-15 years – for the direct purchase of electricity between a business and a large-scale renewable energy generator. PPAs can provide businesses with electricity cost savings, increased budget certainty, and a long-term hedge against any future energy market volatility. A number of high-profile PPAs have been announced in the past couple of years, including ones involving BlueScope Steel, Carlton & United Breweries (CUB), Mars, Orora, Telstra, and more recently, Amazon, BHP, Kellogg's, Salesforce, Shell, Transurban, the major supermarket chains and more. Even so, PPAs do not suit all businesses, and require extensive feasibility assessments to ensure alignment with operational needs.

Batteries not included – yet

The market for large-scale energy storage is growing at a rapid rate in Australia, with batteries and pumped hydro playing an ever increasing role in the grid. In particular, revenue generated by big batteries is increasing rapidly and AEMO estimates that the capacity of big batteries could grow 70-fold or more.⁴⁵

Despite a growing role for grid-scale batteries, using batteries behind the meter for on-site demand management is not economically viable for most businesses at the moment. In the future, businesses may be able to use on-site batteries to store energy for later use, sourced either from on-site renewables, or from the grid during off-peak periods when energy is cheaper.

⁴⁵ Australian Energy Market Operator (AEMO) 2021, *Energy explained: big batteries*.

ANZ leads by example

As one of the top four banks in Australia, operating in 32 markets globally and with over 185 years of experience, ANZ is committed to supporting the transition to a net zero carbon economy. To achieve this, the organisation has embedded within its operations a focus on how ANZ can reduce its own impact whilst also supporting its customers with improving their environmental sustainability.

In line with this, ANZ recently undertook an energy and water audit of its ANZ Centre in Melbourne to identify potential energy savings. The audit presented several recommendations that would achieve a 12 per cent reduction in total energy consumption of 950MWh, equivalent to an annual savings of \$169,000. This included improvements to control and meeting room temperature management as well as reduction of unnecessary electrical load on weekends and public holidays. In addition, ANZ have commissioned a 400kW Solar Array, which is expected to deliver an output of 500,000kWh per annum.

ANZ's continuous energy efficient improvements have ensured that the ANZ Centre in Melbourne has continued to run at the 5.5-star NABERS Energy level, and that the business continues to demonstrate energy management and sustainability leadership.

The National Australian Built Environment Rating System (NABERS) is a simple, reliable and comparable sustainability rating for the built environment.

To learn more about NABERS, go to nabers.gov.au/ratings

We know we have a role in enhancing environmental sustainability and we are focusing our efforts on energy, water and waste.

Shayne Elliot
Chief Executive Officer
ANZ

The ANZ Centre is one of Australia's leading sustainable buildings.





3.3 Optimising procurement

After calibrating their energy investment strategy, almost all businesses still require grid supplied electricity. Leading businesses are exploring innovative energy procurement strategies to optimise energy costs and balance market risks when sourcing this portion of their energy requirements.

3.3.1 Fixed-price electricity contracts

Most medium and large businesses purchase electricity through a fixed-price forward contract. This is an agreement with a retailer in which the price is fixed for one, two or three years. Businesses typically conduct a formal tender process designed to source the most cost-effective electricity contract; a reverse auction is an alternative procurement option used by some businesses to achieve the same outcome.

A fixed-price contract can work well for businesses that are strategic about when they enter into the contract, and for how long. Businesses should aim to time procurement processes to avoid periods of increased market volatility, such as the summer months. Businesses should look to secure a longer contract in a market in which prices are increasing, and a shorter contract in a market where prices are falling.

3.3.2 Progressive purchasing contracts

A progressive purchasing contract allows businesses to buy electricity in parcels over an agreed contract period. By facilitating the purchase of smaller parcels of electricity more regularly, progressive contracting can help manage market price volatility. This approach is well suited to very large energy users that are willing to more actively manage their energy procurement.

It is crucial that progressive contracting is complemented by an active risk management strategy that monitors market conditions and measures the risk exposure of any unpurchased load.

3.3.3 Block purchasing with managed spot exposure

Block purchasing allows the business to hedge part of its load by purchasing a block of electricity. This contract type, in which either a wholesaler or a retailer can act as an intermediary, specifies the block price and demand, with any additional demand supplied at the spot market price.

In block purchasing, the business takes the volume risk of under- or over-consumption versus the block demand. Depending on the contract structure, under- or over-consumption may be settled at spot price, which varies every five minutes and can be highly volatile.

To manage the unhedged portion of the load and further mitigate the risk associated with spot market exposure, businesses can:

- Curtail load – a physical hedge;
- Agree to a price cap or a collar – a financial hedge; or
- Exercise options to buy electricity at a pre-determined strike price.

While these are some of the more common energy procurement contracts, others exist, and businesses that are leading in energy strategy have internal or external experts charged with assessing energy procurement options. Businesses that thoroughly assess the available energy contract options are ensuring they are not passive price-takers, and are effectively managing their energy market exposure.


A healthy bottom-line enables a healthy Australia

Fitness & Lifestyle Group, as one of Asia-Pacific's largest health and wellness groups, includes well-known brands Fitness First Australia, Goodlife Health Clubs Australia, Barry's Bootcamp Asia-Pacific, Jetts Fitness and Zap Fitness. The group helps 725,000 members in Australia, New Zealand and South-East Asia live healthier and more active lives.

With a portfolio of over 400 owned and operated fitness clubs across Australia, Fitness & Lifestyle Group has a considerable energy load. And with some of the group's gyms operating 24/7, the company works with a leading energy services company to optimise its energy strategy.

One of the ways in which Fitness & Lifestyle Group was able to improve its energy management was by working with its energy services provider to monitor energy market behaviour and model future market trends. By doing this the Group has been able to enter into a two-year fixed-term electricity contract that is saving the company \$3 million.

In addition to energy procurement, Fitness & Lifestyle group is engaged in an Active Energy Management journey with its energy consultant where the company not only procures energy at a competitive price, but also optimises its energy usage through the uptake of energy efficiency measures.

A photograph showing a person's hand holding a red Fitness First membership card over a white circular device at a gym reception desk. In the background, a woman in a black and red shirt is smiling, and a large red sign with the Fitness First logo is visible.

Fitness First Australia (pictured) is one of Fitness & Lifestyle Group's biggest energy users. The Group saved \$3 million over two years by entering into a fixed-term electricity contract with the support of an energy services provider.



Next steps: connecting with experts and accessing finance

A proactive approach to energy strategy will ensure that your business successfully navigates an increasingly dynamic energy landscape.

Given this, what you do next is critical. We suggest:

1. Seek a briefing from an internal or external energy expert about your energy strategy and management;
2. Ensure your team is across energy specific financing and funding options; and
3. Explore the sector spotlights and other resources available at energybriefing.org.au and share them with your team.

4.1 Connecting with experts

Energy is a complex area, and it is only getting more complex over time. Managing it effectively can require domain knowledge across areas as diverse as business strategy, energy markets, engineering and carbon accounting, to name just a few. Businesses are responding to increasing complexity by ensuring they have relationships with external experts that complement their internal expertise.

Many businesses have existing relationships with trusted experts in the areas covered in this briefing. For those that do not, sourcing a referral from professional networks is a natural first option.

Beyond that, seeking out a member of a well-established, credible industry association can act as a good starting point.



The Energy Efficiency Council's membership directory is an excellent place to start. The Council is Australia's peak body for experts in energy efficiency, energy management and demand response. The Council's membership list can be accessed at eec.org.au/members

Many industry and professional associations have members who support businesses on the topics covered in this briefing. They include:

- **Australian Alliance for Energy Productivity;**
- **Carbon Market Institute;**
- **Clean Energy Council;**
- **Energy Savings Industry Association;**
- **Energy Users Association of Australia;** and
- **Smart Energy Council.**

There are also many sector, technology and discipline specific industry and professional associations, a number of which are members of the **Australian Sustainable Built Environment Council.**

For a full list of relevant industry associations go to energybriefing.org.au/industry-associations

4.2 Energy-specific financing and funding options

Businesses are experts in considering options for investment and capital expenditure. However, leading businesses are also accessing a range of specific financing and funding options that are unique to energy investments.

Businesses are exploring alternative financing mechanisms, including **energy performance contracts (EPCs)**, **energy service agreements (ESAs)**, **environmental upgrade agreements (EUAs)** and **PPAs**, which are discussed in more detail in **Section 3.2.3**.

To learn more go to energybriefing.org.au/financing-and-funding-101s and for the latest grants and incentives, go to energybriefing.org.au/business-support

Leveraging tax incentives for energy upgrades

As Australian businesses recover from the first recession in thirty years, cost management has become more crucial than ever. Some businesses have scaled back on planned capital investments. However, with the roll out of new and expanded tax depreciation incentives as part of a broader suite of stimulus measures to boost the economy, now is an excellent time to invest in energy upgrades that deliver ongoing financial savings.

Leading businesses are leveraging the enhanced instant asset write-off and new temporary full expensing tax depreciation incentives to invest in efficient equipment, amplifying the financial benefits by accessing tax savings in addition to the energy cost savings. Businesses that are investing in energy management upgrades are improving their energy performance, profits, and productivity, whilst supporting the nation's energy transition.

Over 99 percent of businesses will be able to write off the full value of any eligible asset they purchase for their business.

A trucking company will be able to upgrade its fleet, a farmer will be able to purchase a new harvester and a food manufacturing business will be able to expand its production line.

The Hon Josh Frydenberg MP
Treasurer
Commonwealth of Australia

To learn more, read the *Leveraging tax incentives to improve energy performance* guide found at energybriefing.org.au/tax-incentives-guide

An accountant's perspective on behind-the-meter investments

If businesses set the right objectives and investment criteria, the financial outcomes of behind-the-meter investments are compelling.

A \$2 million investment in new LED lighting and rooftop solar, which yields annual savings of \$350,000 in energy and maintenance costs, is accounted for like this:

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 other expenses (energy and maintenance) 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 you borrow to fund the project) or reduces financial assets (if you use cash 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 4% (real), the NPV is \$2 million. A positive NPV indicates it is worth investing in the project.

4.2.1 Energy-specific financing and funding options

Two federally-funded bodies assist business with energy investments:

- 1. The Clean Energy Finance Corporation (CEFC)** funds energy efficiency and renewable projects directly, and partners with major banks to reduce interest margins on loans for energy upgrades; and
- 2. The Australian Renewable Energy Agency (ARENA)** provides finance for early stage innovative energy technology, supporting businesses to participate in pilots and trials.

4.2.2 State-specific support

At the level of states and territories, energy efficiency schemes – notably the NSW Energy Savings Scheme (ESS) and the Victorian Energy Upgrades (VEU) scheme – are available to support businesses investing in energy efficiency projects. Importantly, these schemes deliver discounts on energy savings products. For more information on the energy efficiency schemes, please go to:

- ACT environment.act.gov.au/energy/smarter-use-of-energy/energy_efficiency_improvement_scheme_eeis
- NSW ess.nsw.gov.au
- SA escosa.sa.gov.au/industry/rebs
- VIC energy.vic.gov.au/energy-efficiency/victorian-energy-upgrades

Many other state government funding programs for energy projects are available. Some jurisdictions have online business portals focused on energy, which can be used to access information on funding programs and other resources. These include:

- ACT actsmart.act.gov.au
- NSW energysaver.nsw.gov.au/business
- QLD business.qld.gov.au/running-business/energy-business
- SA sa.gov.au/topics/energy-and-environment/using-saving-energy/for-businesses
- VIC victorianenergysaver.vic.gov.au/energy-advice-for-business

An energy expert can work with you to determine which financing and funding opportunities will best suit your business.

4.3 Explore energybriefing.org.au

energybriefing.org.au hosts a carefully curated set of practical resources that will help your business develop and implement an effective energy strategy.



Glossary

ACCC	Australian Competition and Consumer Commission
ACSI	Australian Council of Superannuation Investors
ADGSM	Australian Domestic Gas Security Mechanism
AEMO	Australian Energy Market Operator
ARENA	Australian Renewable Energy Agency
ASX	Australian Securities Exchange
CEFC	Clean Energy Finance Corporation
DELWP	Department of Environment, Land, Water and Planning (Victoria)
DER	Distributed energy resources
DPIE	Department of Planning, Industry and Environment (New South Wales)
ECA	Energy Consumers Australia
EEC	Energy Efficiency Council
EnMS	Energy management system
EPC	Energy performance contract
ESA	Energy service agreement
ESS	Energy Savings Scheme (New South Wales)
ETI	Energy Transitions Initiative (Australian Industry)
EUA	Environmental upgrade agreement
EV	Electronic vehicle
GDP	Gross domestic product
GJ	Gigajoule
GWh	Gigawatt-hour
IEA	International Energy Agency
IGCC	Investor Group on Climate Change
IRENA	International Renewable Energy Agency
ISO	International Organization for Standardization

ISP	Integrated System Plan
kWh	Kilowatt-hour
LED	Light emitting diode
LNG	Liquefied natural gas
MWh	Megawatt-hour
M&V	Measurement and verification
NABERS	National Australian Built Environment Rating System
NEM	National Electricity Market
OPEC	Organisation of the Petroleum Exporting Countries
PV	Photovoltaic
PPA	Power purchase agreement
RBA	Reserve Bank of Australia
RCM	Reserve capacity mechanism
RET	Renewable Energy Target
SBTi	Science Based Targets initiative
VEU	Victorian Energy Upgrades
VPP	Virtual power plant
WDRM	Wholesale demand response mechanism
WEM	Wholesale Electricity Market (Western Australia)

Dedication to Chloe Munro AO

Earlier this year we lost a giant of Australia's energy sector, a trusted advisor of ministers and managing directors, a leader among leaders, a friend and mentor to many. A global expert in energy, climate and digital transformation, Chloe Munro AO was generous, incisive, witty and warm all at once.

Chloe was central to the development of the first edition of *Navigating a dynamic energy landscape: a briefing for Australian businesses* and a key architect of the wider business engagement effort that followed its release in 2018.

As we pulled together that early thinking, Chloe challenged and tested the ideas of those new to the sector, as well as peers with decades of experience. She inspired us all to be creative and agile, finding solutions that don't just work, but that can be scaled for impact across the whole economy.

Chloe pushed us to strive, and we're all the better for it, just as Australia's energy transition is.

Chloe Munro scholarship for transformational leadership

In honour of Chloe Munro's overwhelming contribution to Australia's energy industry, the Energy Efficiency Council (EEC), along with a coalition of leading energy organisations have come together to support women in energy, continuing Chloe's legacy of doing just that.

The *Chloe Munro scholarship for transformational leadership* is for emerging and mid-level female leaders in the fields of renewable energy, energy management and carbon abatement, acknowledging Chloe's deep commitment to supporting a systemic approach to Australia's energy transition.

For more information on the scholarship, eligibility and how to apply, go to cleanenergycouncil.org.au/chloe

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