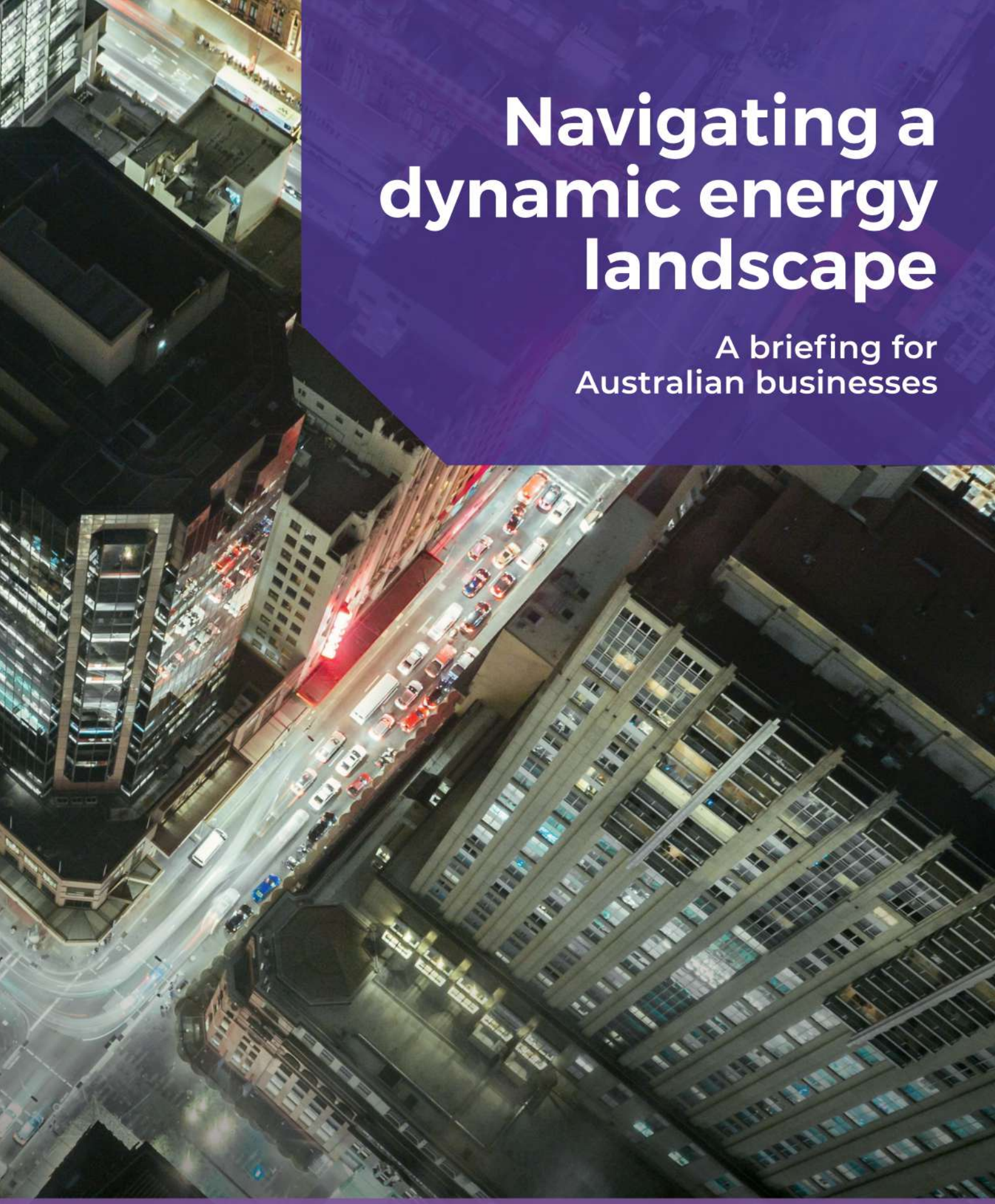
Navigating a dynamic energy landscape

A briefing for Australian businesses



energy efficiency COUNCIL

UPDATE AND OUTLOOK

JULY 2019

Critical insights

'Our energy system is transforming'; it's a phrase uttered so regularly by politicians and energy experts that it has begun to sound like a platitude. However, Australian businesses know that this transformation is very real, even if the market, policy and technological drivers behind it can be opaque.

[1] Grattan Institute 2019, *Keep calm and carry on: managing electricity reliability*, p. 3.

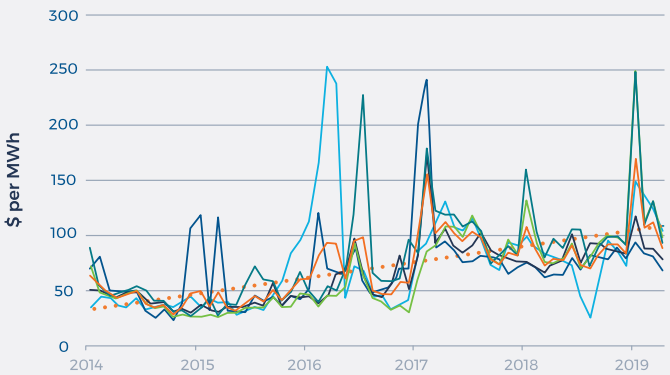


Figure 1: Spot market wholesale electricity prices have doubled.

Monthly spot price, weighted average $ per megawatt hour, May 2014 to April 2019.

Source: Intelligent Energy Systems (IES) 2019, *NEOpoint*.

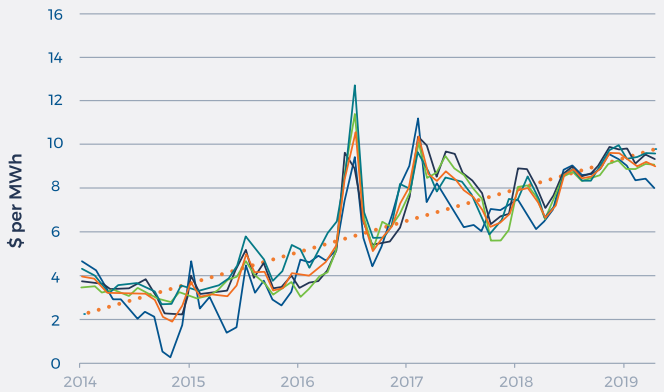


Figure 2: Wholesale gas prices have more than doubled.

Monthly weighted average wholesale gas spot market price, $ per gigajoule, May 2014 to April 2019.

Source: Intelligent Energy Systems (IES) 2019, *NEOpoint*.

Key:

New South Wales | Queensland | South Australia | Victoria

Tasmania | Average | Average trendline

One of the places businesses are seeing this transformation play out is in their bills. Not only have prices been going up, they have become increasingly unpredictable, with volatility in futures markets making it more challenging for businesses to manage rising costs.

The good news is that electricity futures prices and wholesale gas prices eased in 2018. While there was a spike in electricity prices over the summer, overall prices have remained relatively steady into 2019. New, cost competitive generation – such as wind and solar – is coming online, increasing competition and driving down electricity prices. Yet, the expert consensus is that the unit cost of energy is highly unlikely to return to historic lows anytime soon.

As Australia's generation mix changes, our energy system is also decentralising with more businesses – and households – investing in renewables. The transition to renewables is not reducing reliability; in fact, a lack of generation capacity only caused 0.1% of all outages over the past decade.[1] However, these trends are changing the tools the Australian Energy Market Operator (AEMO) needs to balance supply and demand at different times of the day.

The past decade has been marked by energy and carbon policy uncertainty at the federal level. This has hindered investment and inflated prices, and needs to be resolved. At the time of writing, efforts to secure that policy stability continue.

Meanwhile, the fiduciary responsibility of directors around carbon risk was highlighted by the Reserve Bank of Australia earlier this year. These comments echoed interventions from the Australian Prudential Regulatory Authority, the Australian Securities and Investment Commission and the Task Force on Climate-related Financial Disclosures in recent years. Increased recognition of the risk profile around carbon is driving unprecedented levels of disclosure. Increasingly, investors and other stakeholders are expecting businesses to play a proactive role in efforts to decarbonise the global economy. Leading businesses are getting on the front foot to ensure they capture the opportunities opened up by this transition.

No matter how you look at it, ***Australia's energy landscape is becoming much more dynamic*** and Australian businesses are responding. Many have already made significant investments to manage the risk – and capture the opportunities – thrown up by a more dynamic energy landscape. Even more are actively reviewing their strategies or weighing investment options.

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** 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 and renewable energy; and

3. **Optimising procurement** by exploring innovative energy procurement 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.

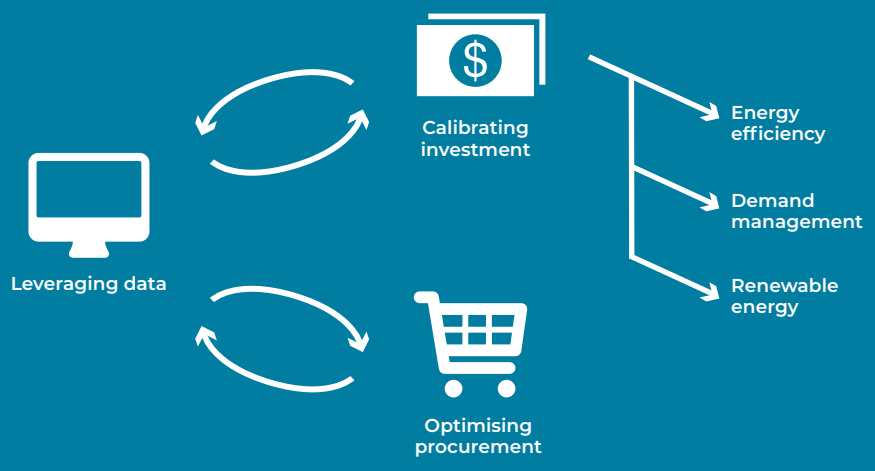


Figure 3: Leaders in energy strategy are leveraging their energy data to drive investments behind-the-meter, and to optimise their energy procurement. They are actively monitoring the performance of these initiatives, which yields fresh data and informs future actions.

Edition 2: July 2019

The Energy Efficiency Council regularly revises this briefing. 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 briefing is designed to cut through the noise and provide a roadmap that will help businesses confidently navigate Australia's dynamic energy landscape.

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 (pages 21-22).

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 22-28).

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.

Below we consider the three key components of business electricity bills and discuss the drivers and current outlook for each.[2]

[2] 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.

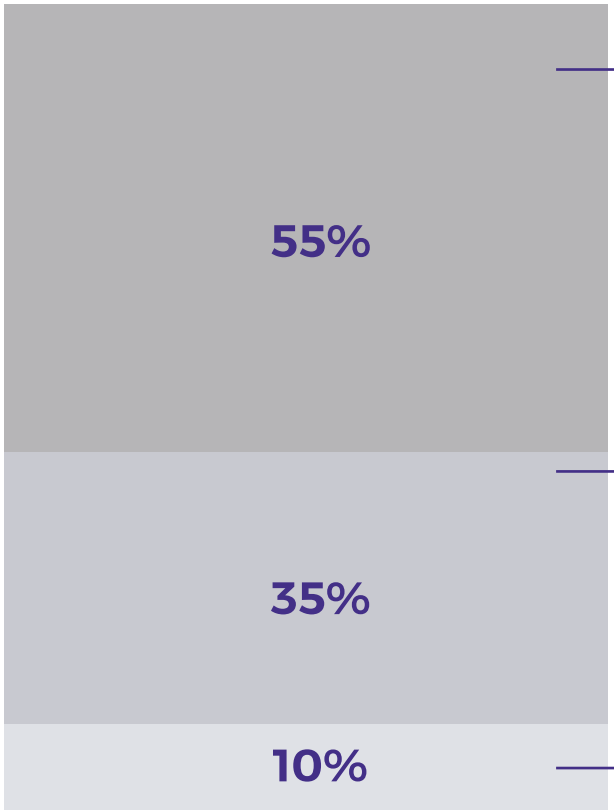


Figure 4: Electricity bill components for the average commercial and industrial customer, as calculated by the Australian Competition and Consumer Commission (2018). While a useful guide, there can be significant variation in this breakdown from business to business. For example, smaller businesses – 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.

Retail and wholesale charges

Retail charges include the wholesale cost of generation, retailer hedging through futures markets, retailer charges and retailer margin.

Network charges

Include fees charged for the cost of transporting electricity across long-distance high-voltage transmission networks, and medium- to low-voltage distribution networks to businesses and households.

Environmental charges

Include costs charged to consumers for the Federal Government's Renewable Energy Target (RET) and state-based energy efficiency schemes.

Other charges

Other charges make up less than 1% and include fees for transmission and distribution losses, market administration and metering.

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% 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.[3]

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% and 176% across the four major NEM states.[4]

Recent analysis has found that around 40% of this increase was due to higher fuel costs – gas and black coal – however, 60% was driven by the closure of two large power stations, which tightened the supply/demand balance, driving up wholesale prices.[5]

New renewable generation is entering the wholesale market, increasing supply, and therefore competition, and even more renewables are being built.

Even so, few experts expect wholesale prices to return to the lows of 2015. Australia has entered a period in which many, aging, 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.[6]

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

[4] Ai Group 2018, *From Worse to Bad*, p. 6.

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

[6] Ibid., p. 40.

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 30 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 are responsible for 35% of the overall increase in electricity costs across the economy over the past ten years.[7] 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.[8]

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 10% 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 is now expected to exceed its legislated target for additional large-scale renewables – 33,000 gigawatt hours (GWh) of renewable generation capacity – by 2020.[9] 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.

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

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

[9] Clean Energy Regulator 2018, *Large-scale Renewable Energy Target market data*, accessed 18 July 2018, <**http://www.cleanenergyregulator.gov.au/RET/About-the-Renewable-Energy-Target/Large-scale-Renewable-Energy-Target-market-data**>.

The role of gas in rising electricity prices

Recently, 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. This increased reliance on gas in the NEM has occurred at the exact moment gas prices have undergone an unprecedented surge.

As a result, wholesale electricity spot market prices have increased, with flow on effects for futures prices and the prices of new electricity contracts available to businesses.

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.

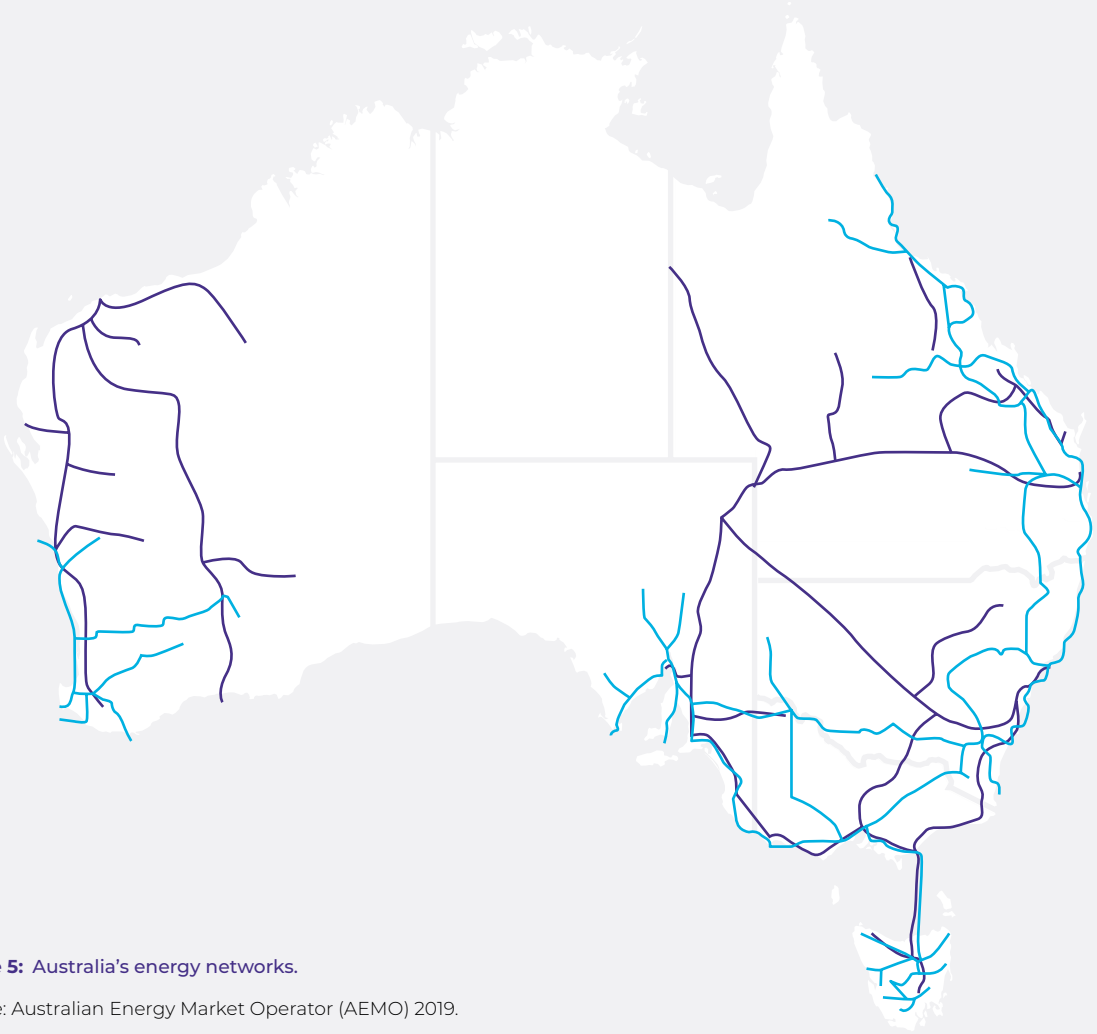


Figure 5: Australia's energy networks.

Source: Australian Energy Market Operator (AEMO) 2019.

Key: Electricity network Gas network

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.[10]

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.[11]

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 have fallen since the Federal Government made it clear it was willing to enact the ADGSM. Gas producers have made more gas available to the domestic market, and retail price offers for industrial users moderated to around $10 per GJ in 2018,[12] a price point that has remained relatively steady into 2019.[13] Assuming competition is maintained, most experts expect gas prices to stabilise around this level, at around triple the historic price.

[10] Ai Group 2018, *From Worse to Bad*, p. 9.

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

[12] Ai Group 2018, *From Worse to Bad*, p. 9.

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

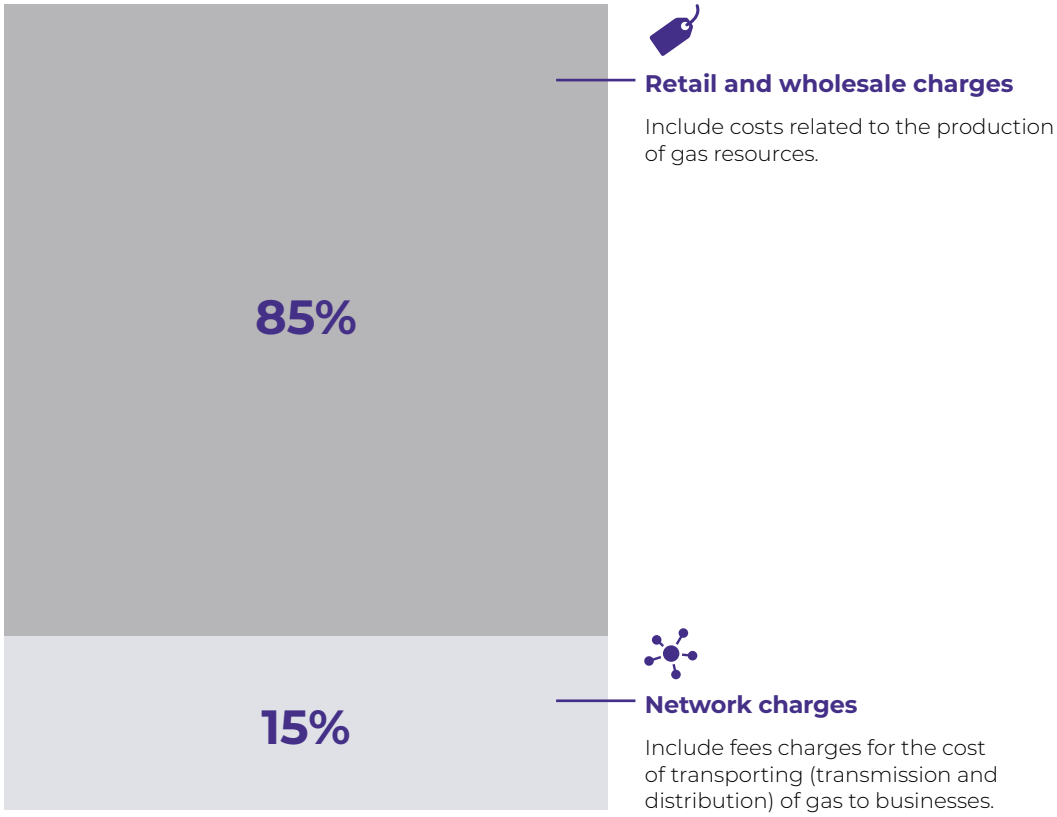


Figure 6: Gas bill components for the average large industrial user on the south-east coast, as calculated by Oakley Greenwood (2018). While a useful guide, there can be significant variation in this breakdown from business to business.

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% 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% of its electricity supply. By comparison, the NEM relies on gas generators for only 20% 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 The transformation has only just begun

The drivers for increased gas and electricity prices are distinct, yet the results are largely the same. In both cases, experts agree that the price peaks of 2017 are behind us, but expect market prices to stabilise well above their historic lows.

Costs are shifting rapidly, but the transformation of Australia's energy system has only just begun. Businesses that are leaders in energy strategy have a clear understanding of how the energy system is evolving; they know that the trends and technology driving this transformation are the same ones they 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 increasingly by renewables becoming cost-competitive 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, which 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.

Aging 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. Sustained concerns around climate change 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.

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% compared to 2005 levels by 2030. Nevertheless, most states and territories have gone further – the ACT, NSW, Queensland, South Australia, Tasmania and Victoria have all committed to pursuing net zero emissions by 2050. Victoria has provided the most certainty around this trajectory by putting the target into legislation, with interim targets required every five years from 2020.

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.

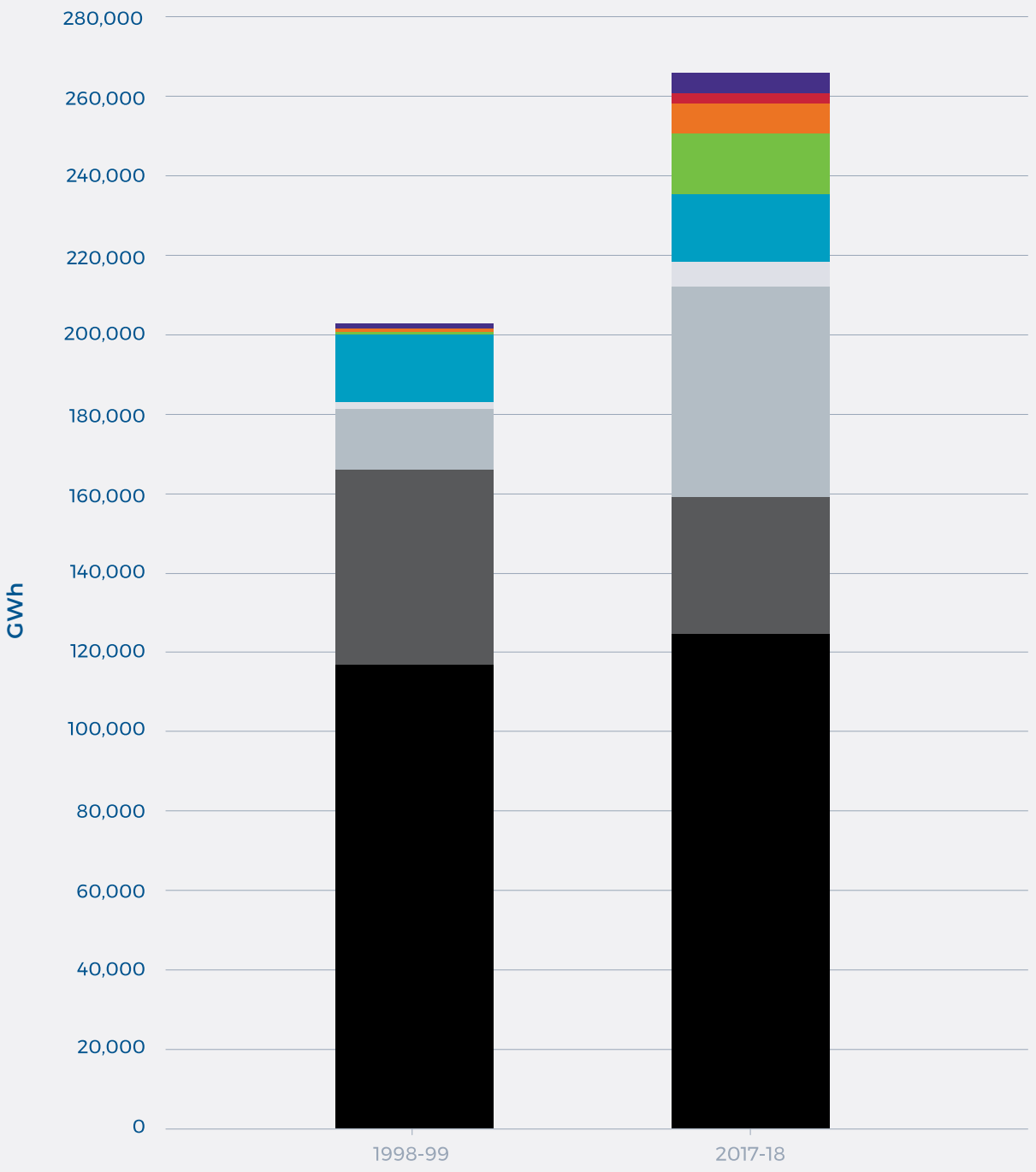


Figure 7: 20 years of generation in the National Electricity Market (NEM).

Renewable generation is growing at more than double the rate of fossil fuels in the NEM, with wind power growing by over 540% in the last 20 years.

Source: Department of the Environment and Energy 2018, *Australian Energy Statistics, Table O: Australian electricity generation, by fuel type, physical units.*

Key:

Hydro | Wind | Small-scale solar PV | Large-scale solar PV | Biomass

Black coal | Brown coal | Natural gas | Oil products

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. Since 2010, large-scale solar costs have fallen by 80%, and onshore wind energy installation costs have dropped by 39%. By 2025, further reductions – of 59% and 26% respectively – are projected.[14]

[14] International Renewable Energy Agency (IRENA) 2017, *Renewable Power: Sharply falling generation costs*, p. 3.

We are now passing 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 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 response – discussed further in **Section 3.2.2** – are more immediate options for dealing with this variability.

We want to play a leading role in the transition to a low carbon economy. That's why in 2015, ahead of the Paris Agreement, we set ourselves the ambition of becoming carbon positive by 2030. This ambition is a statement of commitment; demonstrating that **businesses can commit to a low carbon economy, and that a low carbon economy can be good for business.**

By becoming carbon positive, we expect to **lower operational cost, improve resilience in our energy supply,** attract increasingly carbon conscious investors, and develop a closer relationship with our consumers.

We're committed to sourcing all our electricity purchased from the grid from renewable sources by 2020 and **100% of our energy across our operations from renewable sources by 2030.** This includes directly supporting the generation of more renewable energy than we consume and making the surplus available to the markets and communities where we operate.

Clive Stiff
Chief Executive Officer
Unilever Australia & New Zealand

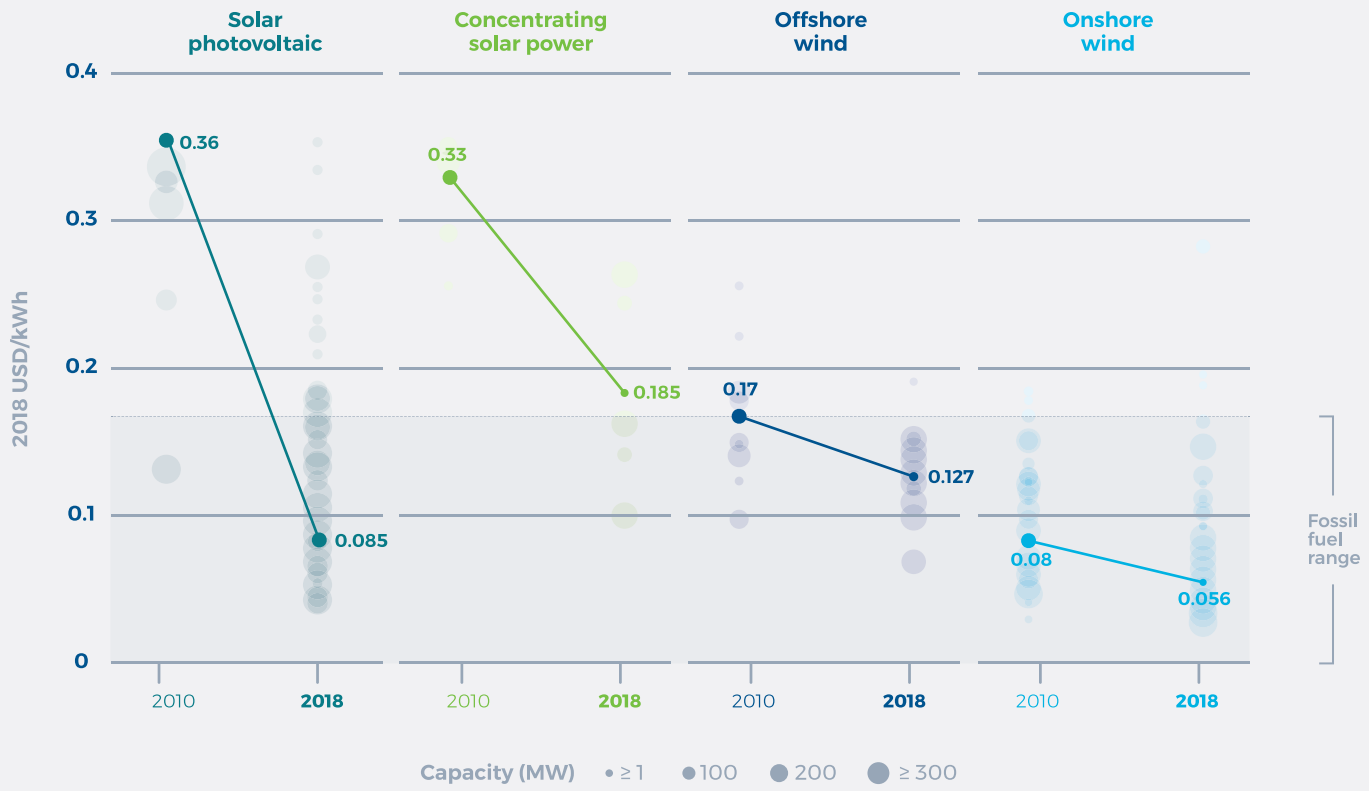


Figure 8: Average global levelised cost of electricity from utility-scale renewable power generation technologies, 2010-2018.

Source: International Renewable Energy Agency (IRENA) 2018, *Renewable Power Generation Costs in 2018*, p. 12.

Low carbon vehicles are driving the transport agenda.

Most experts agree that while the electric vehicle (EV) revolution is coming, it isn't quite here yet. It is true that over a third of Australian small businesses intend to purchase electric vehicles,[15] and that EV sales jumped 460% between 2011 and 2017. However, total sales in 2017 were only 2,284 vehicles,[16] and they slightly declined to 2,176 vehicles in 2018.[17] BloombergNEF suspects that this drop is due to consumers waiting for the low cost, mass market EVs that are expected to hit the Australian market in 2019.[18] Clearly, while interest is peaking, actual use is not.

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 internal combustion engines – are fast improving the case for EVs.

Notably, ClimateWorks estimates 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.[19] 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.

[15] Energy Consumers Australia (ECA) 2018, *Energy Consumers Sentiment Survey December 2018*, p. 47.

[16] ClimateWorks 2018, *The state of electric vehicles in Australia*, p.6.

[17] BloombergNEF 2019, *Australia EV Market Update*, p. 8.

[18] Ibid.

[19] ClimateWorks 2018, *Recharging the economy: the economic impact of accelerating electric vehicle adoption*, p. 30.

Toyota plans to cut emissions at company facilities to zero – globally. One way we're doing that in Australia is by **embracing green building solutions for new and upgraded facilities.** We can achieve this by cutting CO_2 emissions and **adopting renewable energy sources such as solar and wind power and utilising alternative fuel sources such as hydrogen.**

For example, at our new Toyota Parts Centre in Western Sydney, we plan **to reach zero emissions by 2020 by using energy efficient LED sensor lights and more than 2,000 solar panels.** In the year since they've been installed, the solar panels have generated 865,394 kWh, or enough energy to power 195 four-person households.

Matthew Callachor
President and CEO
Toyota Australia

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.

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.

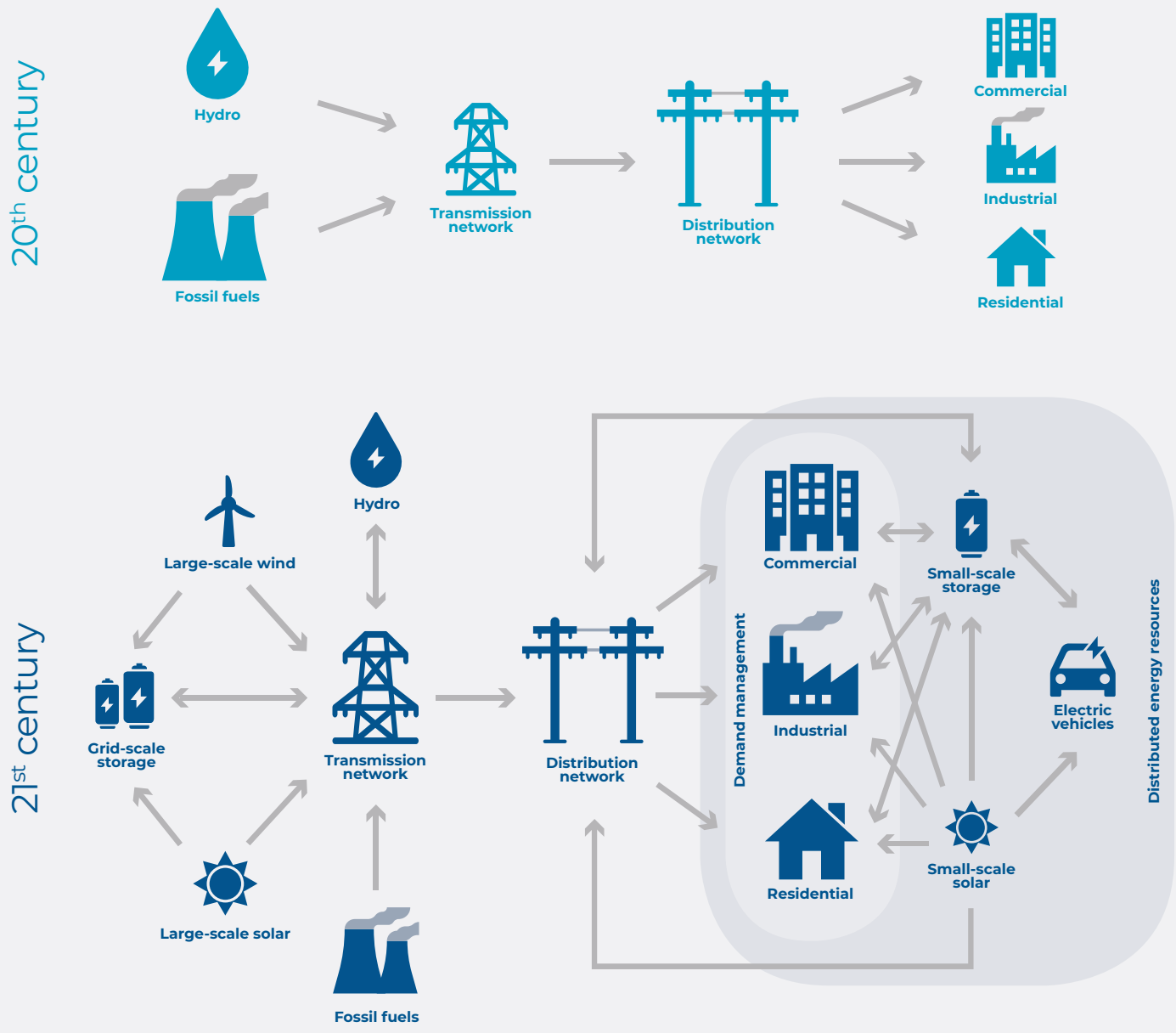


Figure 9: Electricity grids are transitioning from centralised to distributed systems.

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 few years. 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.

The Australian Energy Market Operator (AEMO) 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 energy 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 energy 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. Peaky 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.

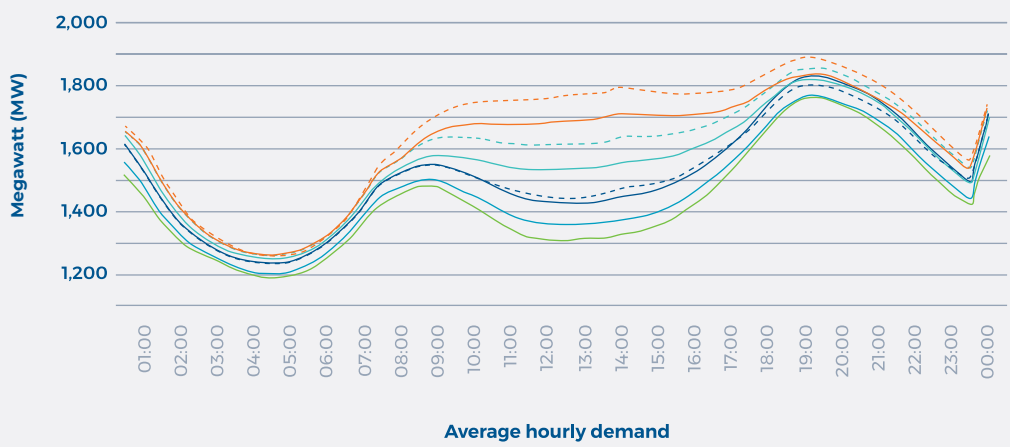


Figure 10: Average operational demand in South Australia.

Source: Australian Energy Market Operator (AEMO) 2018, *AEMO observations: Operational and market challenges to reliability and security in the NEM*, p. 6.

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 transformation.

As a large consumer of energy, with an ambitious carbon emissions reduction goal of net zero by 2040, across our $11 billion commercial real estate portfolio, **Investa's ongoing approach to the management of electricity is critical to our business.** We have made progress by taking advantage of market timing, negotiating flexible electricity contracts and exploring innovative solutions such as power purchase agreements, enabling the reduction of electricity costs for our tenants, whilst simultaneously moving us towards our emissions reduction target.

Energy efficiency is also a key priority for Investa's large property and facilities management teams, who through active management, have been able to reduce electricity usage intensity by 48% since 2004, delivering significant savings to Investa's tenants and owners, whilst also reducing the environmental footprint of our portfolio.

Jonathan Callaghan
Chief Executive Officer
Investa

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.

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. [20]

[20] 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.

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.

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.[21] 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.

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

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.

> In line with our sustainable practices policy, we wanted to know **where energy was being consumed and how we could manage that use more efficiently.** Installing an energy management system has provided a visibility of where energy is actually being consumed within the business that was not available previously. This allows us **to optimise our machinery to operate more efficiently.** The sub metering platform is a cost-effective solution that has helped my company **reduce costs and improve the overall productivity** of the business.
>
> **Simon Whiteley**
> Chief Executive Officer
> Corex Plastics

Meters pay dividends for leading plastics manufacturer

Corex Plastics is one of Australia's leading suppliers of rigid plastic sheets, with brand names including Corflute, Fluteboard and Armaboard, and over thirty years of experience in innovative plastic manufacturing. Located in Dandenong South, Victoria, Corex Plastics is a member of the South East Melbourne Manufacturers Alliance (SEMMA).

Australia's manufacturing industry is amongst the most energy intensive in the world, so SEMMA invited its members to work with a leading energy services company to improve their energy management. As part of this collaboration, Corex recognised the need to get a granular understanding of its energy consumption to enable proactive cost management.

Corex subsequently installed an energy metering solution so the business could properly monitor its energy spend. This has enabled Corex to:

- Slash energy waste – Corex has saved in excess of $200 a day on non-production days by identifying energy load on lines that were meant to be switched off;
- Accurately assign the true cost of energy to each product type and production line – Corex is now able to identify where the costs are being absorbed by both line and expense centre to provide a true and accurate picture of the way energy is consumed within the business;
- Identify the most profitable lines and avoid subsidising less efficient products and lines;
- Optimise production lines – meters have revealed previously unknown inefficiencies, resulting in big wins, such as 50% savings from a single water pump;
- Identify and prioritise efficiency opportunities based on actual energy performance and predicted cost savings; and
- Measure and verify cost savings.

The introduction of energy metering and energy management systems has reduced Corex's average cost of energy per kilo of plastic by 15%, and is enabling a new, ongoing program of continuous improvement in energy management.

Corex Plastics Dandenong South factory (pictured) has energy intense manufacturing processes.

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 is 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.

Batteries not included — yet

As battery technology develops, businesses with relatively little flexibility 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.

While battery costs are coming down, in most cases using them for this sort of energy management is not yet economically viable. However, many businesses already have the ability to reduce their bills by optimising their energy use over time, without waiting for battery costs to fall.

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.

> It is clear that **demand response has untapped potential** to manage demand during extreme peaks in Australia, just as it does in other countries.
>
> **Audrey Zibelman**
> Chief Executive Officer
> Australian Energy Market Operator

Demand response is a win-win.

Energy market rules are currently being updated in ways that could broaden the types of demand response for which businesses can be compensated. This will bring 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.

This type of 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.

Oxford Cold Storage warms to demand response

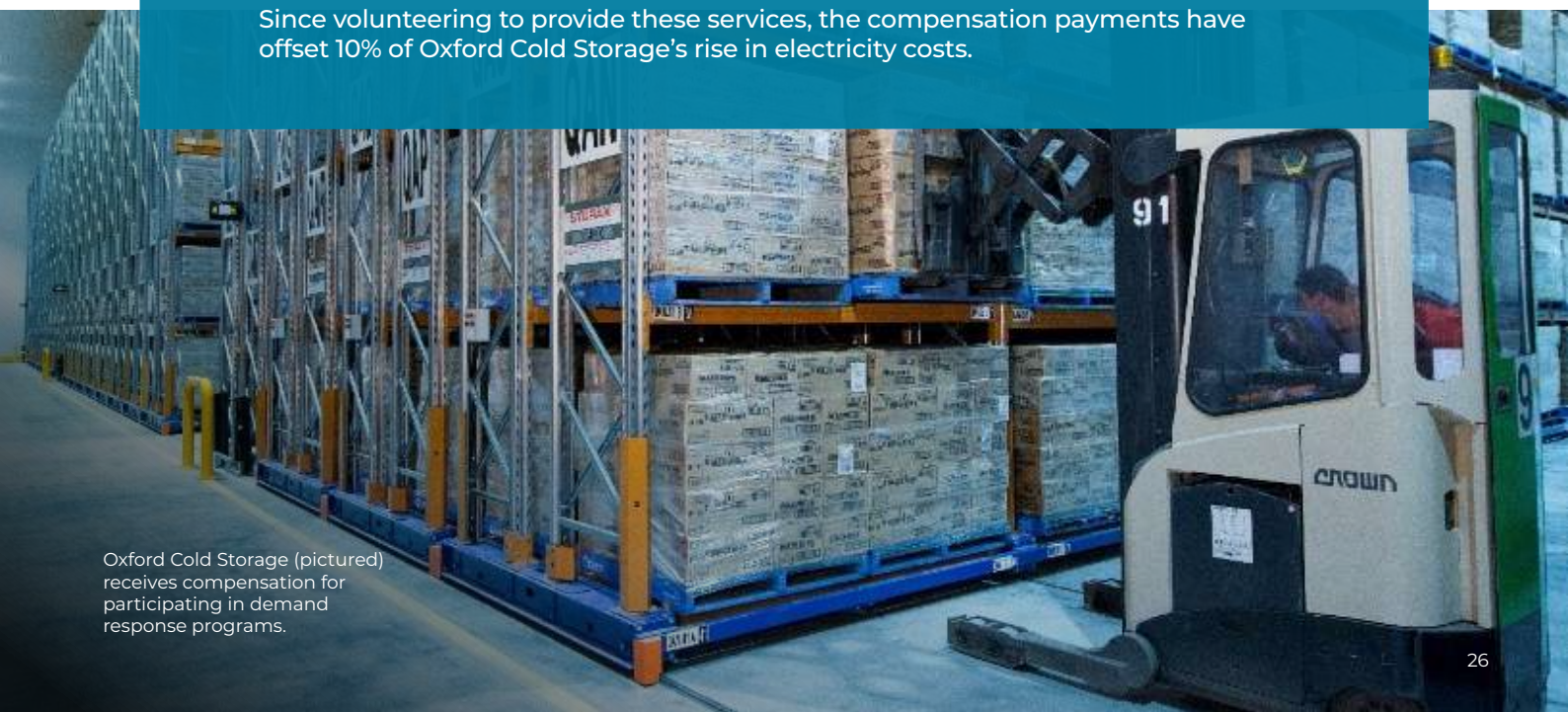
Oxford Cold Storage employs more than 400 people and operates the largest temperature controlled third-party logistics warehouse in Australia. Its 26-hectare site in Laverton North in Victoria accommodates 13 buildings with a total capacity of 1,040,000m^3. 165,000 pallets of meat, dairy and food products are stored at temperatures from 18ºC to -25ºC.

Oxford Cold Storage had undertaken substantial energy efficiency improvements over the past eight years, which have allowed the company to double its cold storage capacity while keeping total electricity use at 37GWh per annum. Despite these efforts, during 2018 the company's annual cost of electricity rose 215% to over $6.4 million. With straightforward energy efficiency opportunities exhausted, Oxford Cold Storage began exploring opportunities to participate in demand response programs with the support of a partner aggregator.

Oxford Cold Storage now participates in two demand response programs. One facilitates reductions in electricity demand by up to 3,250kW for short periods – usually no longer than six minutes. This helps the market operator maintain the frequency in the National Electricity Market (NEM), with large energy users' electricity loads automatically stopping and starting when required.

The second demand response program is activated during periods of unusually high demand. For example, during heatwaves when air conditioner loads are very high, Oxford Cold Storage can reduce demand by 3,250kW for up to two hours with no impact on business operations or quality.

Since volunteering to provide these services, the compensation payments have offset 10% of Oxford Cold Storage's rise in electricity costs.



Oxford Cold Storage (pictured) receives compensation for participating in demand response programs.

3.2.3 Renewable energy

The price differential between renewable and fossil fuel energy sources has closed as the cost of grid supplied electricity goes up and costs of renewables fall. This, 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, 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 Viva Energy. Even so, PPAs do not suit all businesses, and require extensive feasibility assessments to ensure alignment with operational needs.

> The investment also stacks up when you look at the reduced price we will be paying to power our operations. **Moving to renewable energy will ensure that we have certainty of supply and pricing.**
>
> **Peter Filipovic**
> Chief Executive Officer
> Carlton & United Breweries

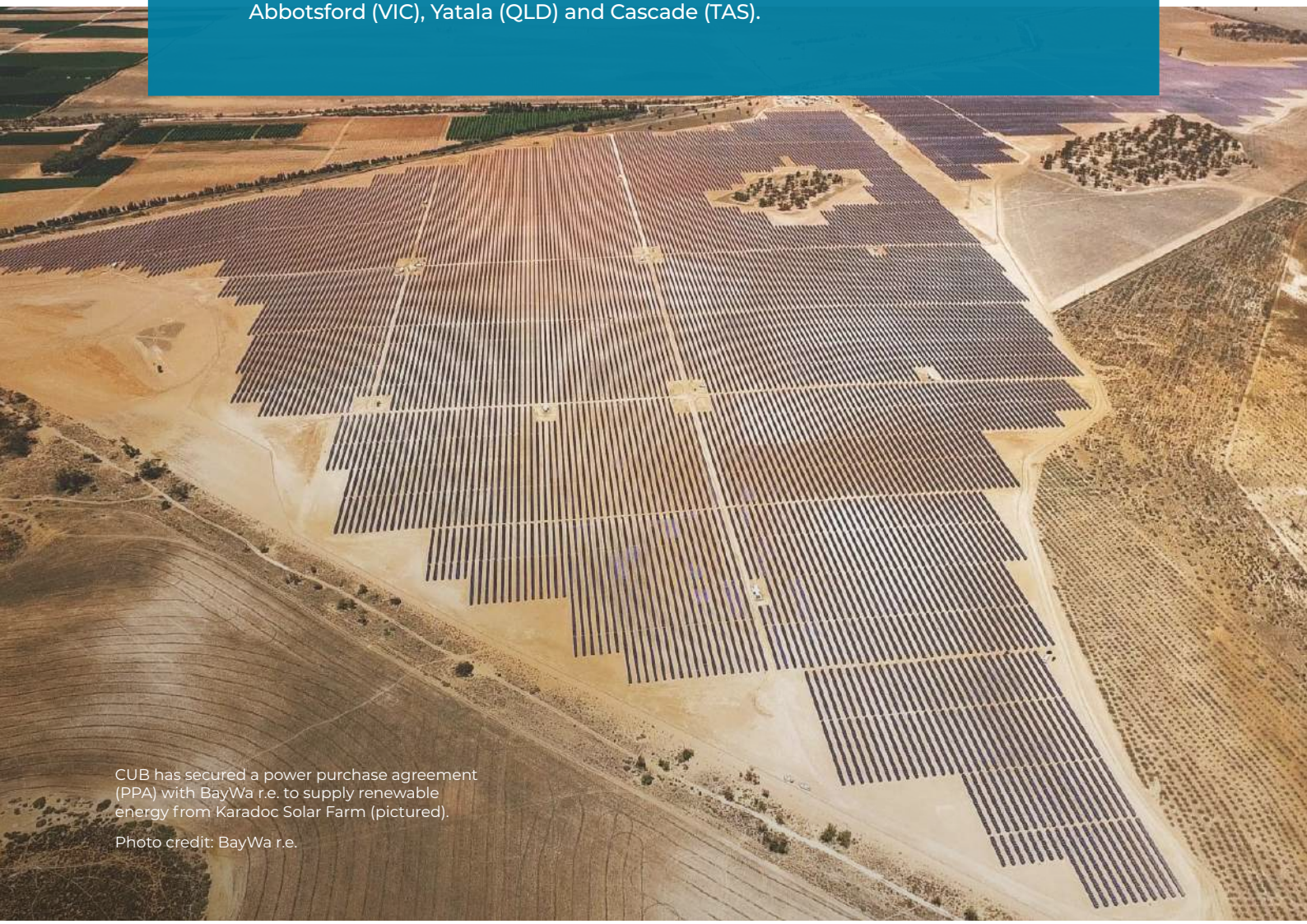
Carlton & United Breweries moves towards 100% renewables

Carlton & United Breweries (CUB) is one of Australia's most iconic beer companies. It's history dates back to 1832 and it employs more than 1,500 people around Australia.

CUB acknowledges that it has a role to play in tackling climate change and is committed to an ambitious sustainability agenda, which includes securing 100 per cent of its electricity needs from renewable sources by 2025.

To this end, in early 2018 CUB entered into a 12-year power purchase agreement (PPA) to procure energy from a solar farm located in Karadoc, outside Mildura, Victoria, developed by BayWa r.e. and constructed by Melbourne-based Beon Energy Solutions. The solar farm is 664 acres and is the largest in northern Victoria. CUB's PPA provides 74,000 MWh per year of renewable energy, which is enough to power 7,500 homes.

Following the commencement of output at Karadoc solar farm in November 2018, CUB is installing onsite solar generation on the roofs of its breweries at Abbotsford (VIC), Yatala (QLD) and Cascade (TAS).



CUB has secured a power purchase agreement (PPA) with BayWa r.e. to supply renewable energy from Karadoc Solar Farm (pictured).

Photo credit: BayWa r.e.

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 30 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.

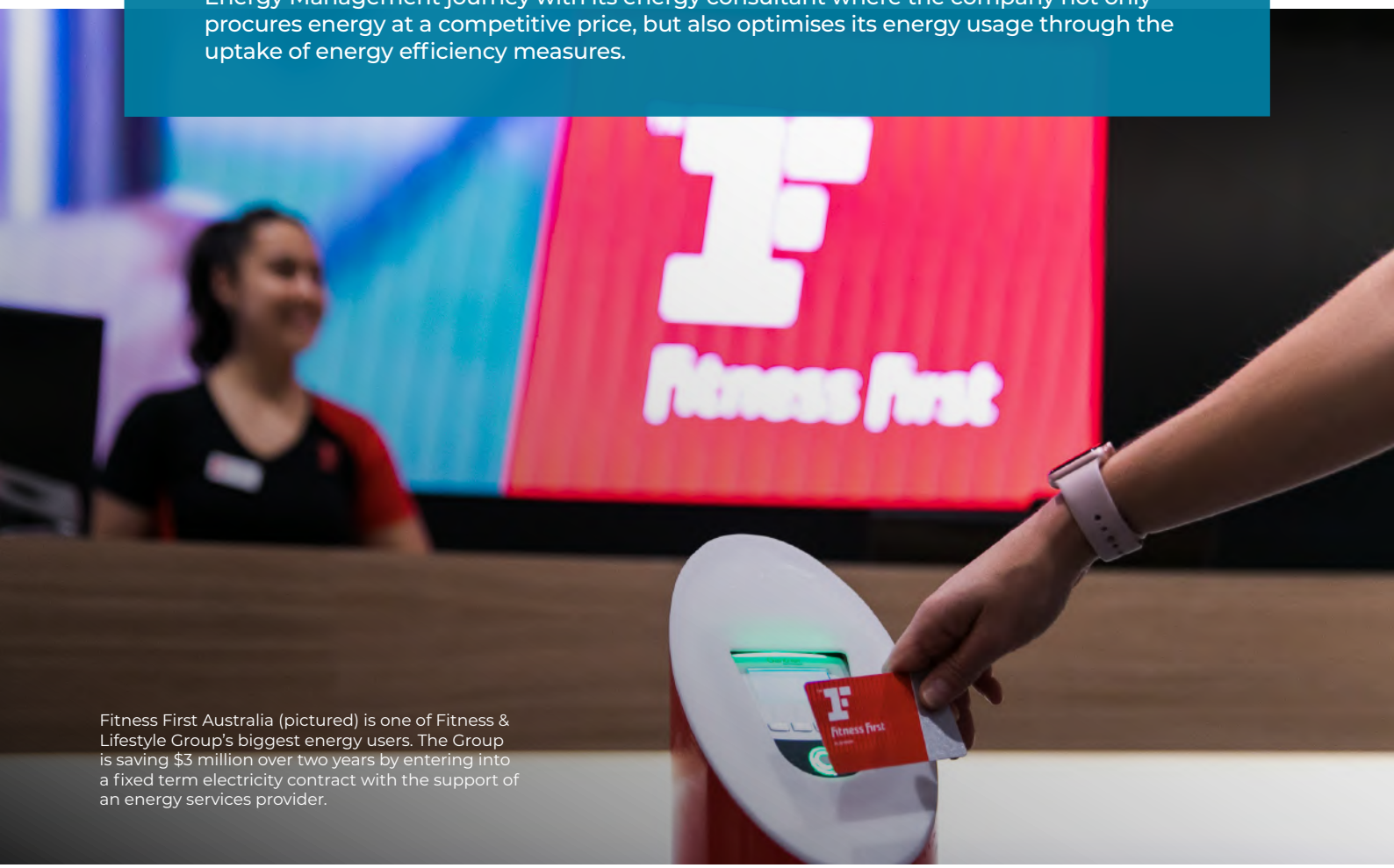
A healthy bottom-line enables a healthy Australia

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.



Fitness First Australia (pictured) is one of Fitness & Lifestyle Group's biggest energy users. The Group is saving $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 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.

energy efficiency COUNCIL

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; 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.

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 finance (EUF) and power purchase agreements (PPAs), discussed in more detail in **Section 3.2.3**.

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 used to invest in energy efficient and renewable technologies; and

2. **The Australian Renewable Energy Agency (ARENA)** provides finance for early stage innovative energy technology, supporting businesses to participate in pilot projects 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/rees/overview**

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 **environment.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/training-and-support-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
ADGSM	Australian Domestic Gas Security Mechanism
AEMO	Australian Energy Market Operator
ARENA	Australian Renewable Energy Agency
CEFC	Clean Energy Finance Corporation
DELWP	Department of Environment, Land, Water and Planning (Victoria)
ECA	Energy Consumers Australia
EEC	Energy Efficiency Council
EPC	Energy performance contract
ESA	Energy service agreement
ESS	Energy Savings Scheme (New South Wales)
EUF	Environmental upgrade finance
EV	Electronic vehicle
GJ	Gigajoule
GWh	Gigawatt hour
IEA	International Energy Agency
IRENA	International Renewable Energy Agency
ISP	Integrated system plan
LNG	Liquefied natural gas
MW	Megawatt
M&V	Measurement and verification
NEM	National Electricity Market
PV	Photovoltaic
PPA	Power purchase agreement
RCM	Reserve capacity mechanism
RET	Renewable Energy Target
VEU	Victorian Energy Upgrades
WEM	Wholesale Electricity Marker (Western Australia)

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- **Tracy Jennings,** Director – Insights, Trans-Tasman Business Circle;
- **Paul Murfitt,** Executive Director, Energy Sector Reform, DELWP; and
- **Anna Skarbek,** CEO, ClimateWorks Australia.

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- Energy advisory firm **Energetics**, particularly **Dr. Mary Stewart, Dr. Peter Holt** and **Stuart Darragh.**

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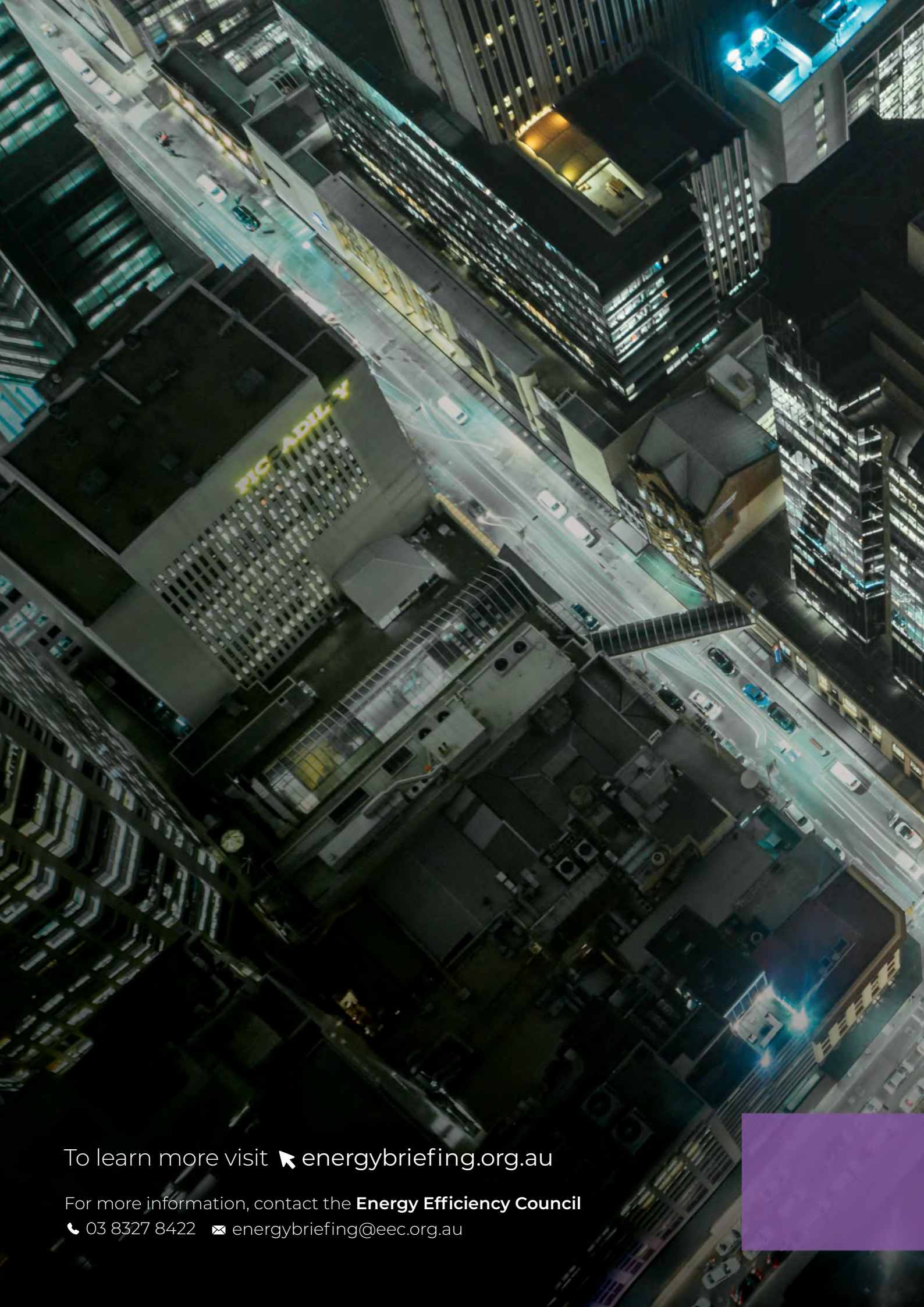

To learn more visit energybriefing.org.au

For more information, contact the **Energy Efficiency Council**
03 8327 8422 energybriefing@eec.org.au