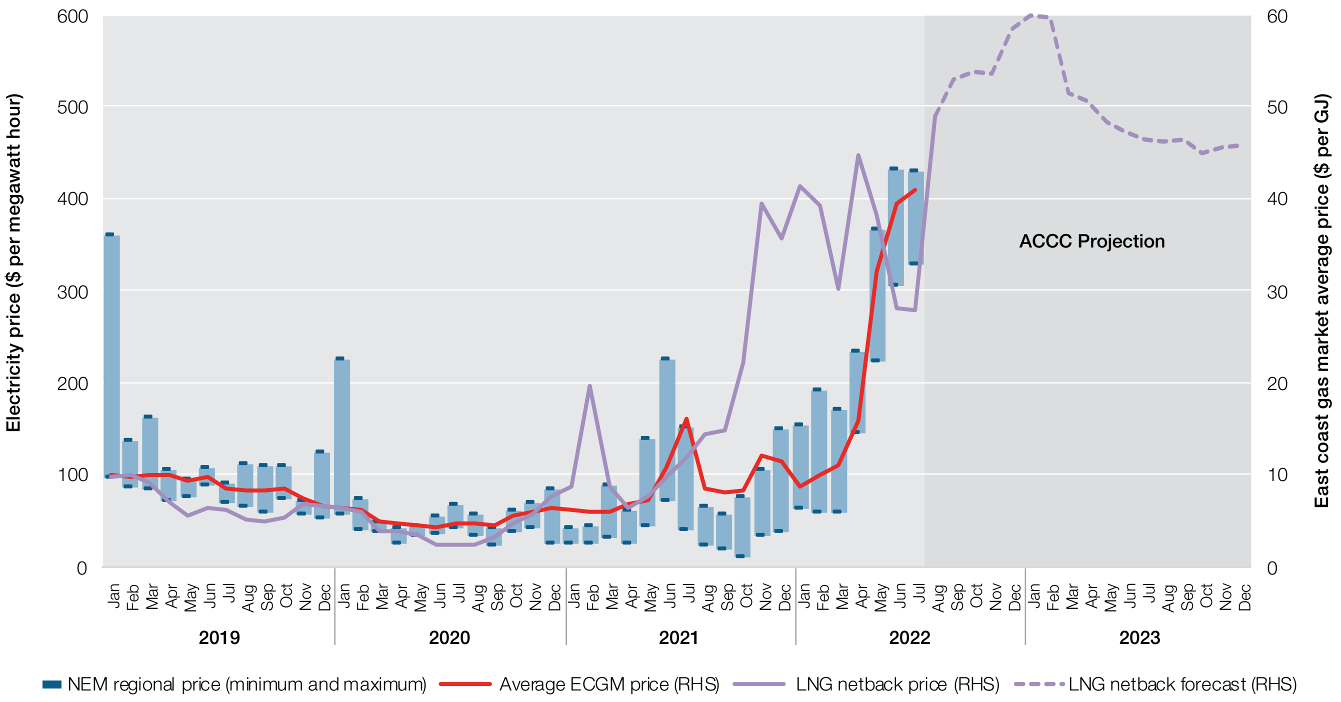
Image source: Shutterstock.

Market overview

Australia's energy markets are undergoing a profound transformation. The National Electricity Market (NEM) is moving from a centralised system of large fossil fuel (coal and gas) generation towards an array of smaller scale, widely dispersed wind and solar generators, hydroelectric generation, grid-scale batteries and demand response. We have observed over the last 12 months that the transition continues to accelerate.

Electricity and gas wholesale market prices were relatively low at the start of 2021 but have since surged to record and persistent highs, driven by a perfect storm of supply-side constraints. At the peak of recent market turbulence, the Australian Energy Market Operator (AEMO) simultaneously suspended all mainland regions of the NEM for the first time ever. In parallel, it invoked the Gas Supply Guarantee for the first 2 instances ever. Electricity contract markets alongside coal and LNG netback projections suggest those high prices will persist over at least the next 2 years.

Figure 1.1 Wholesale electricity prices, east coast and international gas market prices



Note: The range between the minimum and maximum NEM regional price shows the range of average monthly volume weighted wholesale electricity prices across the NEM regions. A large column illustrates a large variation between regions, while a short column highlights that prices are relatively similar across regions. NEM prices reflect the administered price caps on prices (limiting prices to $300 per megawatt hour) from 15 to 24th June. Average ECGM price is the average monthly east coast gas market price. The prices in May onwards include periods of price setting and administered price caps.

Source: AER analysis using NEM data and gas data.

Network price pressures have remained low in recent years and continued to be low in 2021–22. However, upward pressures are expected. Network costs are updated annually for consumer price index (CPI), and recent high CPI outcomes will contribute to increasing network costs throughout 2023 and likely into 2024. Recent low costs of capital also appear to be increasing. These are the costs networks face to raise equity and debt capital for investment and are a major driver of network costs to consumers.

Consumers are not well-placed to absorb the higher retail prices that will flow from increased costs. Retailers typically update their offers in July, and the impact of updated offers will begin to impact consumers over the months until October depending on the length of their billing cycles. Slow wage growth compared with the growth of energy costs means that the number of consumers facing energy debt and the levels of that debt were increasing even before the current market events.

The AER is concerned about the impact of these market developments on consumers experiencing vulnerability. Later in 2022 we will publish a strategy to better address the needs of consumers experiencing vulnerability. This will include actions to reduce barriers to participation, support consumers experiencing payment difficulty, ensure consumer voices are heard in market reforms and improve affordability by reducing the cost to serve energy consumers.

1.1 National Electricity Market (Chapter 2)

In 2022 overlapping factors combined to put extreme upward pressure on prices in the NEM. These included multiple supply-side problems experienced by generators – coal plant outages, coal supply issues, domestic gas supply shortfalls and hydro generating constraints. These supply-side constraints increased the NEM's reliance on gas and hydroelectric generation at a time of record high gas prices and when hydroelectric generators were also facing environmental constraints. High international coal and gas prices put pressure on domestic fuel costs, amplifying the impacts of generators being required to source additional fuel through spot markets.

At the start of 2021 prices were low in all regions due to an abundance of cheap renewable generation and mild summer conditions. Nevertheless, supply-demand conditions were tight and the explosion at the Callide C power station in May 2021 was sufficient to lift prices in all regions. Queensland and NSW saw the largest price increases, because they also faced network outages that restricted access to lower priced imports from neighbouring regions.

Wholesale prices remained high for the remainder of 2021, as international pressures added to existing domestic pressures. The war in Ukraine exacerbated pressures caused by the global energy crisis in Europe and China. International fuel prices rose to unprecedented levels and Australian coal and gas was worth more in export than in domestic markets.

Many other factors combined from May 2022 onwards to drive record wholesale electricity prices.

Coal-fired generation in Australia experienced high levels of coal plant outages as well as coal supply and transport problems. Heavy rain impacted open cut mines in NSW and Queensland, geological issues reduced output from others and some generators needed to manage low stockpiles.

Winter 2022 was early and cold, which increased demand for heating. Reduced coal-fired output meant the NEM was reliant on very expensive gas generation to meet daily energy needs, despite gas price increases. The unanticipated increase in gas demand put upward pressure on gas prices at the same time as local gas markets were being used to cover short-term spot exposure over the higher demand winter period. LNG exporters in Queensland were exporting near record volumes for the April to June quarter, and flows of domestic gas were primarily being transported from south to north until June.

Generators exposed to higher coal and gas prices offered capacity at higher prices to cover costs. Some generators buying coal on the spot market reported they needed a price of more than $300 per megawatt hour (MWh) to break even. Gas generators buying fuel on the spot market needed around $400 per MWh.

Sustained high prices in the wholesale electricity markets in June triggered a protective price cap of $300 per MWh in every mainland region for the first time ever. The price cap, combined with high fuel costs, contributed to a number of generators withdrawing capacity from the market, which resulted in forecast supply shortfalls in Queensland and NSW. To ensure reliable supply, AEMO took the extraordinary step of suspending the spot markets in all regions. It also activated emergency reserves to reduce demand.

While underlying conditions explain these market outcomes to a large degree, the AER is investigating whether bidding behaviour breached any rules and legislation. The AER will also examine whether generator conduct and market outcomes were consistent with an efficient and competitive market serving the long term interest of consumers.

The high and volatile spot prices impacted contract markets. In Queensland and NSW, base futures prices (for Q2 2022) increased six-fold in 12 months. Traded volumes visible through the ASX fell sharply in June and July.

Contract outcomes indicate the market expects that high prices will continue beyond 2022–23. Factors such as persistently high fuel costs, generation closures and gas supply issues will contribute to this.

The NEM generation mix also continued to evolve. Key coal-fired generators announced earlier closure dates and over 4.5 gigawatts of new renewable generation has entered the market since January 2021. New entry included the NEM's largest wind farm, its largest solar farm, largest battery and record levels of rooftop solar.

Growing rooftop solar output continued to carve out demand from the grid in the middle of the day. Record low levels of minimum demand were reported across spring in 2021 and are expected to break more records again this spring. Although middle of the day prices fell during periods of low demand and high solar output, evening peak prices remained high.

Maintaining system security continued to be challenging and costly. Even though the outlook has improved (because of recent rule changes for system strength and frequency and the installation of synchronous condensers in South

Australia), there is still a risk of high frequency control costs. In 2021 Queensland experienced record local frequency control ancillary services (FCAS) costs of $234 million because of extended constraints on the NSW-Queensland interconnector, meaning FCAS had to be sourced from within the state.

Significant market reforms were implemented in 2021. In October 2021, 5-minute settlement was applied to the NEM to provide better price signals to fast response generation such as batteries, gas peaking plants and demand response. Battery capacity in the NEM tripled in 2021 and participants registered demand response capacity for the first time.

A wholesale demand response mechanism was also introduced in October 2021. Demand response allows consumers, either directly or through aggregators, to offer and be rewarded for reducing their load during peak periods. It can also be used to help keep the power system stable. Adoption of demand response in Australia is still limited, but by June 2022 Enel X had registered 60 MW of demand response facilities. These units participated in the market in May and June at times of high prices.

1.2 Gas markets in eastern Australia (Chapter 4)

Domestic prices remained below soaring international prices in late 2021, but events from May 2022 onwards, including unprecedented increases in wholesale electricity prices, pushed domestic spot gas prices above export parity levels. The depletion of local legacy gas fields supplemented by diminishing local gas storage supplies further tightened the supply–demand balance, as a particularly cold start to winter drove increased domestic demand and led to numerous unprecedented market outcomes across both the gas and electricity sectors.

East coast exports increased to record levels from late 2020 and continued to exceed previous records into 2022 as the conflict in Europe put pressure on global gas demand and drove up international oil and gas prices.

Gas prices were capped in the Sydney and Brisbane short-term trading markets following the failure of Weston Energy—a large gas retailer in NSW—with the failure of Weston Energy resulting in a Retailer of Last Resort (RoLR) event. Separately, prices were also capped in the Victorian and Sydney markets when high price thresholds were breached in May and June.

To secure additional gas supplies from gas producers to support gas-powered electricity generation in the NEM, AEMO activated the Gas Supply Guarantee (GSG) in July. The market operator also limited the operations of 2 gas-powered generators in Victoria as low storage levels presented a threat to system security.

High local and international demand for gas resulted in record east coast production levels, with gas flows transporting southern supply towards Queensland despite rising local spot market prices.[1] The increased pressure on sourcing gas supply also resulted in record spot market trade levels[2] and a rebound in trade on the Gas Supply Hub. Record quantities were also won on the day-ahead auction (DAA) to transport gas across the east coast transmission system. This assisted in bringing gas south following activation of the GSG, with activity shifting to change the direction of interregional gas flows from June.

With a lack of new supply coming online in the short term, pipeline expansions should increase supply options to southern markets over winter. AEMO forecasts that these capacity expansions alongside reductions in peak-demand are crucial in mitigating the risks of potential supply shortfalls as early as 2023.[3] As projected output from reserves in the Gippsland Basin decline, the delay in bringing new supply sources online, such as the Port Kembla import terminal in NSW, has left southern markets reliant on northern supply for requirements outside long-term supply arrangements.

In the immediate term, southern markets are facing acute risks from declining gas storage. Victoria has become increasingly reliant on gas storage inventory from Iona. In 2021 east coast storage levels fell to their lowest point since reporting commenced. A similar trend occurred over winter 2022, leading AEMO to issue a notice of a threat to system security due to low storage levels in Victoria.[4] Recent upgrades have improved supply rates, but this has led to storage inventory being drawn down earlier than in previous years. With low storage levels, there is a higher risk of supply being insufficient to meet demand on peak days.

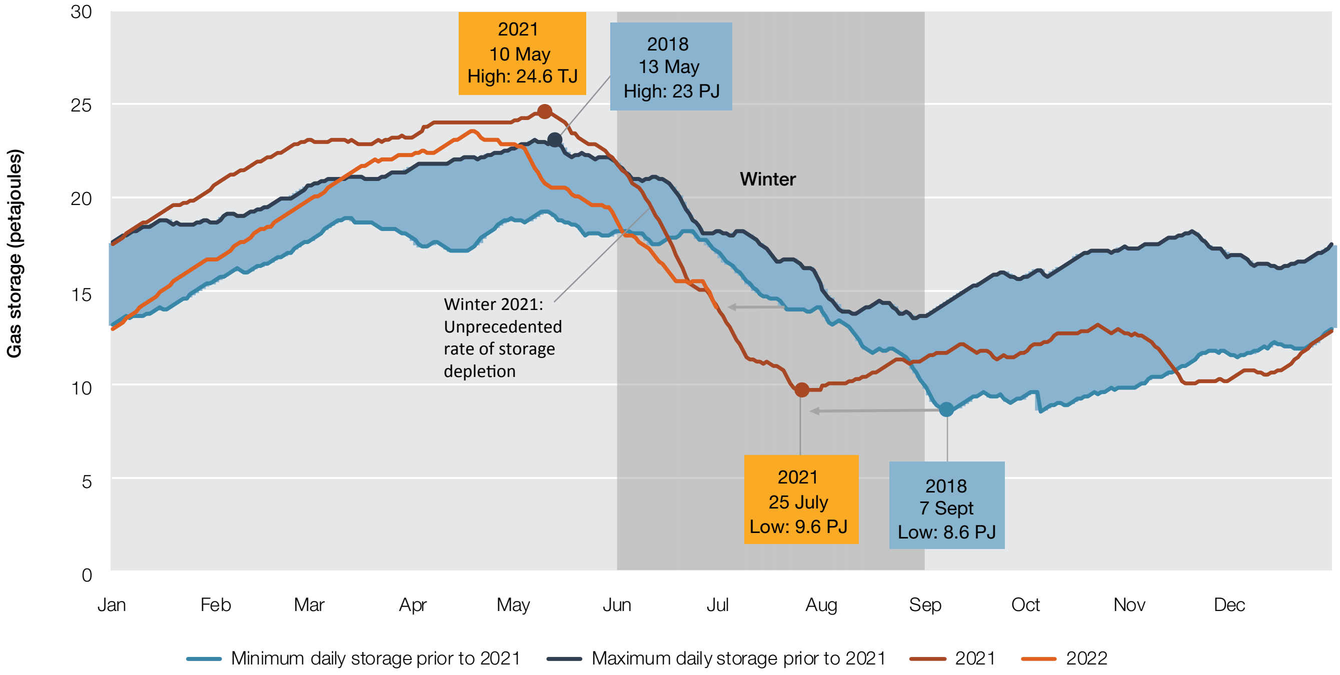
1 Close to 10 PJ of gas was transported north from southern supply sources over April-May to feed international exports.

2 Over the April to June quarter of 2022, record net trade quantities in Victoria and Sydney drove east coast market trade to the highest levels observed since the gas markets commenced, exceeding 20 PJ.

3 AEMO, Gas statement of opportunities, March 2022, p 58.

4 The AEMO notice was issued on 11 July, indicating the facility at current usage rates would decrease to 6 PJ by 31 July. This would result in reduced injection capability due to low pressure, increasing the risk of curtailment on peak demand days.

Figure 1.2 Iona underground storage, low storage levels in winter 2021 and 2022



Source: AER analysis, Gas Bulletin Board data.

In response to ongoing supply uncertainty, government initiatives have been launched to encourage new supply projects. In recent years, this has included:

- the Queensland Government offering areas for additional 'domestic only' exploration tenements
- the Australian Government and NSW Government signing a memorandum of understanding to bring new supplies to the domestic market
- a Heads of Agreement between the Australian Government and east coast LNG exporters to assist local users in procuring gas supply at competitive rates from exporters.

There is significant risk that new gas projects will not come online in time to prevent expected supply shortages. Sustained high prices are likely if forward contracts incorporate international price pressures.

In August the Australian Government confirmed it is taking steps to secure domestic gas availability, including renegotiating the Heads of Agreement alongside reviewing and extending the Australian Domestic Gas Security Mechanism to 2030.

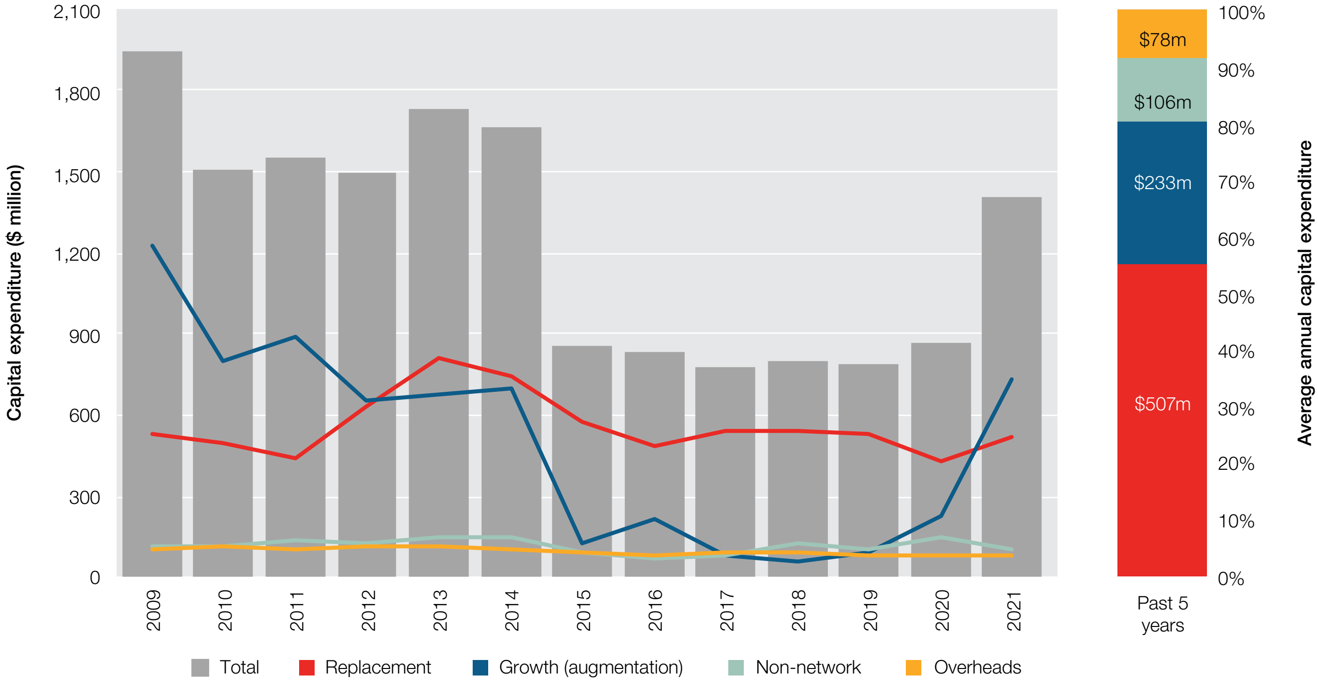
1.3 Electricity and gas networks (Chapters 3 and 5)

Consumers spent less on network costs in 2020–21 than in 2019–20 for both electricity networks and regulated gas pipelines. This reflected improvements in our regulatory approach, improved efficiency from the regulated networks and historically low costs of capital to finance the networks' asset bases.

Despite spending less on network services, reliability outcomes continued to improve. Electricity consumers faced the fewest and shortest unplanned outages ever, excluding the impacts of major events. Consumers on gas pipelines continued to experience very few outages.

In recent years, investment in electricity networks has been used to replace ageing assets. In 2020–21 growth expenditure exceeded replacement expenditure for transmission networks for the first time since 2012 (Figure 1.3). This was driven by Transgrid's expenditure on Project Energy Connect. This is a major new interconnector between NSW and South Australia. It is one of the upgrades listed under AEMO's integrated system plan, among other major transmission infrastructure upgrades. As these projects ramp up, the AER expects to see this significant growth expenditure continue.

Figure 1.3 Drivers of capital expenditure – electricity transmission networks



Note: All data are adjusted to June 2022 dollars, based on forecasts of the consumer price index (CPI). The data show outcomes for the reporting period ending in that year (for example, the 2017–18 reporting year is shown as 2018). Augmentation of the Victorian transmission network is carried out by AEMO; hence, AusNet Services reports $0 expenditure for augmentation carried out on the transmission network.

Source: Category analysis regulatory information notice (RIN) responses.

Investment in gas pipelines was slightly down on the previous year and continues to be driven by expenditure on new gas connections, and by several major programs to replace old steel or cast-iron distribution pipes with plastic pipes. The AER initiated a consultation process to encourage wider dialogue about gas investment decisions given the uncertainty about the future of gas pipelines. That future could vary significantly depending on how the energy transformation proceeds, ranging from wide electrification and declining use for pipelines, to significant development of hydrogen and using pipelines to transport it.

Beyond the significant upcoming investment, emerging price pressures will contribute to higher network costs in years to come. High CPI outcomes in 2022 will feed into higher network costs through annual tariff increase processes from 2023 and onwards. In addition, the costs networks incur as a result of raising capital to finance investment appear to be increasing after several years of historically low rates.

The AER continues to develop its regulatory approach to ensure decisions made during this period of high price pressures are well-informed and reflect genuine engagement with consumers. Regulatory proposals that are developed in this way and meet the AER's expectations for forecast expenditure, depreciation and tariff structure statements are more likely to be accepted at the draft decision stage. This creates a more efficient regulatory process for all stakeholders.

The 4-yearly review of the AER's methodology for estimating the costs of capital is also underway. This sets out how the AER will set this key driver of network revenue over the next wave of electricity and gas regulatory decisions. The AER published its draft rate of return instrument in June and will publish the final instrument by the end of 2022.

1.4 Retail energy markets (Chapter 6)

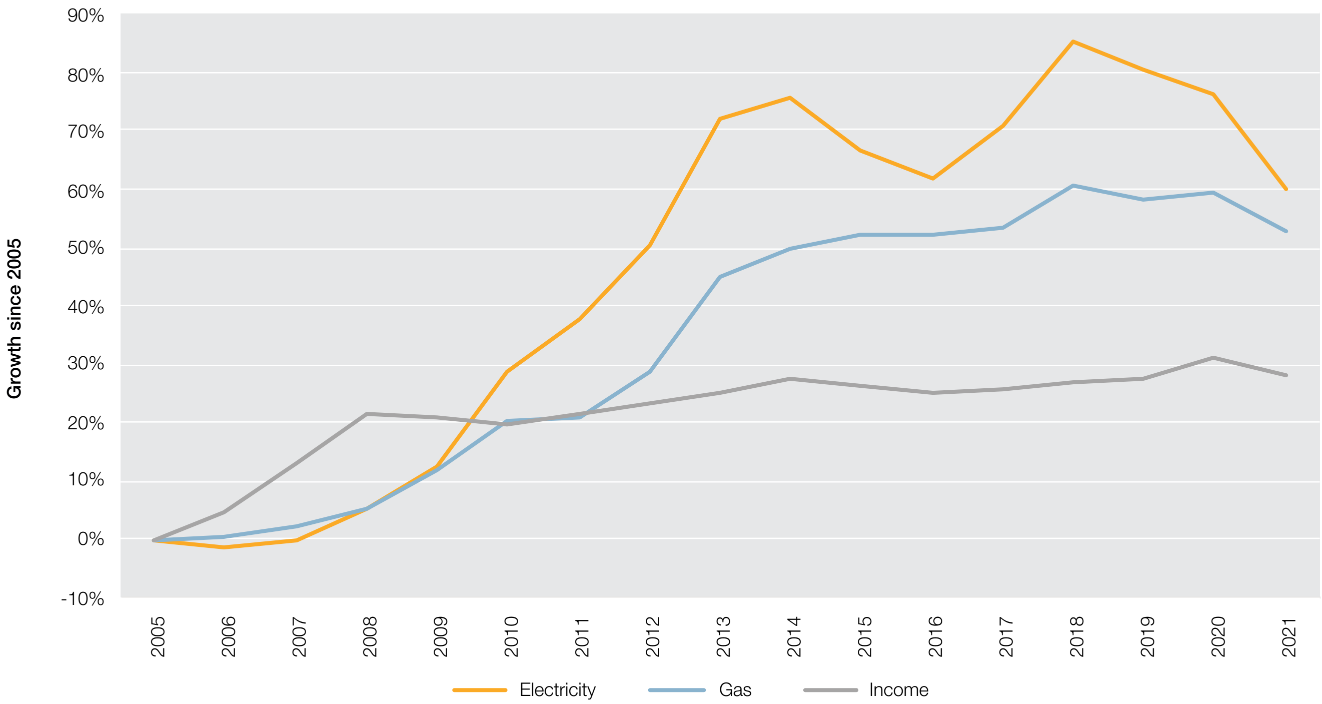
At the start of 2021, subdued energy market conditions drove down the cost of energy. Since then, the impacts of high wholesale prices in 2022 have started flowing through to retail markets and energy bills.

Increased wholesale costs are incorporated in the higher default market offers for 2022–23, which came into effect on 1 July 2022. The DMO is the maximum price an electricity retailer can charge a typical standing offer customer each year. It also acts as a 'reference price' for residential and small business market offers.

Market offers, which are typically adjusted in July, increased to accommodate higher wholesale costs.[5] Bills are likely to increase, commencing from August (for customers with monthly billing cycles) to October 2022 (for customers with quarterly billing cycles). Some customers are not well-placed to absorb these higher prices, with slow wage growth and increasing costs of living reducing their capacity to pay (Figure 1.4).

As a result, we expect energy affordability will decline. This is a major concern, recognising that electricity affordability remains a top cost of living issue for households. We also expect to see consumers' debt levels escalate from late 2022 to early 2023.

Figure 1.4 Energy prices and income



Note: Inflation adjusted.

Source: Electricity and gas index – ABS, Consumer Price Index, various years; income index – ABS, Household Income and Wealth, Australia, various years.

Recent regulatory reforms echo affordability concerns, with the Better Bills Guideline making it easier for consumers to understand how they are charged for energy use and whether they are on the best offer available from their retailer. The AER also recognises that not all consumers are able to shop around for a better deal and that more supports are needed to ensure the energy market is functioning efficiently.

In support of the AER's focus on consumers experiencing vulnerability, the AER is developing its first ever consumer vulnerability strategy, due for release in October. The strategy will be guided by a vision:

› to ensure consumers experiencing vulnerability are offered timely and effective support that works for them and for energy businesses

› to improve energy affordability, help consumers stay connected and reduce energy businesses' cost to serve.

The AER also undertook a range of compliance activities to improve behaviours in the industry to ensure retailers meet their obligations to consumers experiencing vulnerability and help where appropriate. The AER's compliance and enforcement priorities over 2021–22 included a focus on effective identification of consumers in financial difficulty and the offering of payment plans that have regard to the consumers' capacity to pay.

Through 2021, both electricity and gas retail markets continued to attract new entrants and mid-sized (Tier 2) retailers maintained market share. In 2021 the proportion of small customers on market contracts increased and customer switching rates also increased. This suggests small customers were more engaged in the market. However, prolonged high wholesale prices may strain smaller retail market participants and adversely impact the level of retail competition. Tier 1 retailers may regain market share through acquisitions of smaller retailers or through the Retailer of Last Resort scheme, where they may absorb customers from retailers exiting the market.

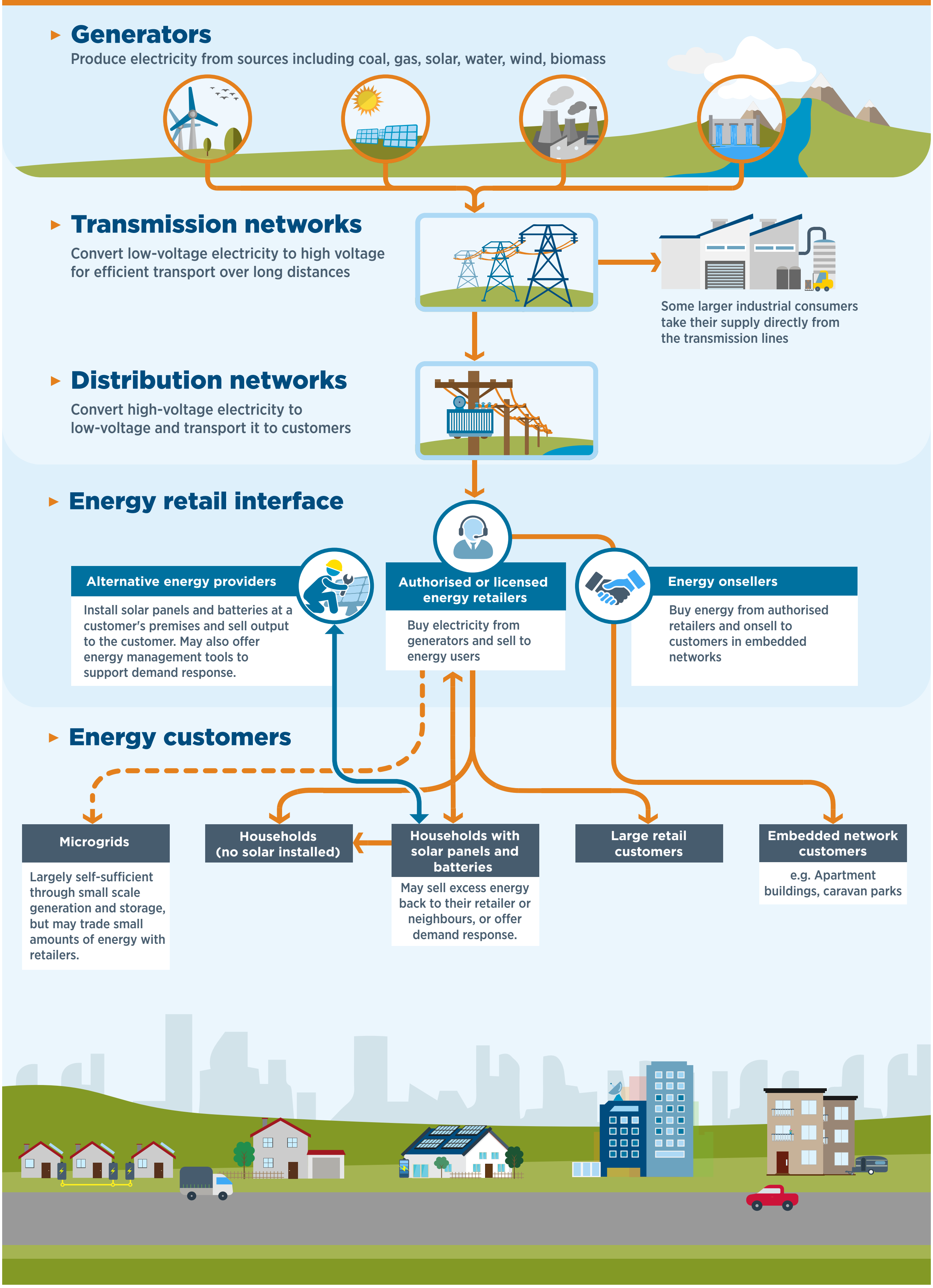
5 Anyalysis of offers for the July 2022 period will be included in the 2022 Annual retail performance report, due in November 2022.

Between May and September 2022, 8 retailers failed, which triggered Retailer of Last Resort (RoLR) processes. This number is significantly above normal, with only 4 retailer failures between 2016 and 2019. Following these failures, the AER transferred customers in each case to a new retailer to ensure the continued supply of essential energy services. The combined customer base of these retailers was almost 22,000, mostly small customers.[6] The AER has raised concerns regarding instances of retailers actively shedding customers as a way of avoiding incurring losses from high wholesale costs, possibly obtaining windfalls from selling lucrative energy contracts that are no longer needed.[7]

6 Retailers include Weston Energy Pty Ltd, Pooled Energy Ltd, Enova Energy Pty Ltd, Apex Energy Holdings, Power Club Limited, Mojo Power East, Social Energy Australia Pty Ltd and Elysian Energy Pty Ltd.

7 Australian Financial Review 'Energy retailers investigated for $100m hedges', 7 July 2022.

Infographic 1 – Electricity supply chain



Infographic 2 – Gas supply chain