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Why are power bills higher now than they used to be?

Long-term power bill trends

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Key Points

Gas prices have historically been a key driver of wholesale electricity prices rises. Recently, coal-fired power station outages have also been driving up wholesale prices.

Higher penetration of renewable energy is correlated with lower spot prices, so introducing more renewables into the mix can put downward pressure on prices.

Network costs have risen, but there are opportunities to bring them down through addressing electricity network supernormal profits and reducing peak demand.

Households and businesses could also reduce their energy bills by improving the insulation of buildings, replacing old, inefficient electric appliances with efficient ones, and installing rooftop solar and storage.

Draft benchmark electricity bills have risen by 1-8%

The draft Default Market Offer (DMO) and Victorian Default Offer (VDO), released last week, laid out draft benchmark household power bill rises of 1-8% for the 2025-26 period.

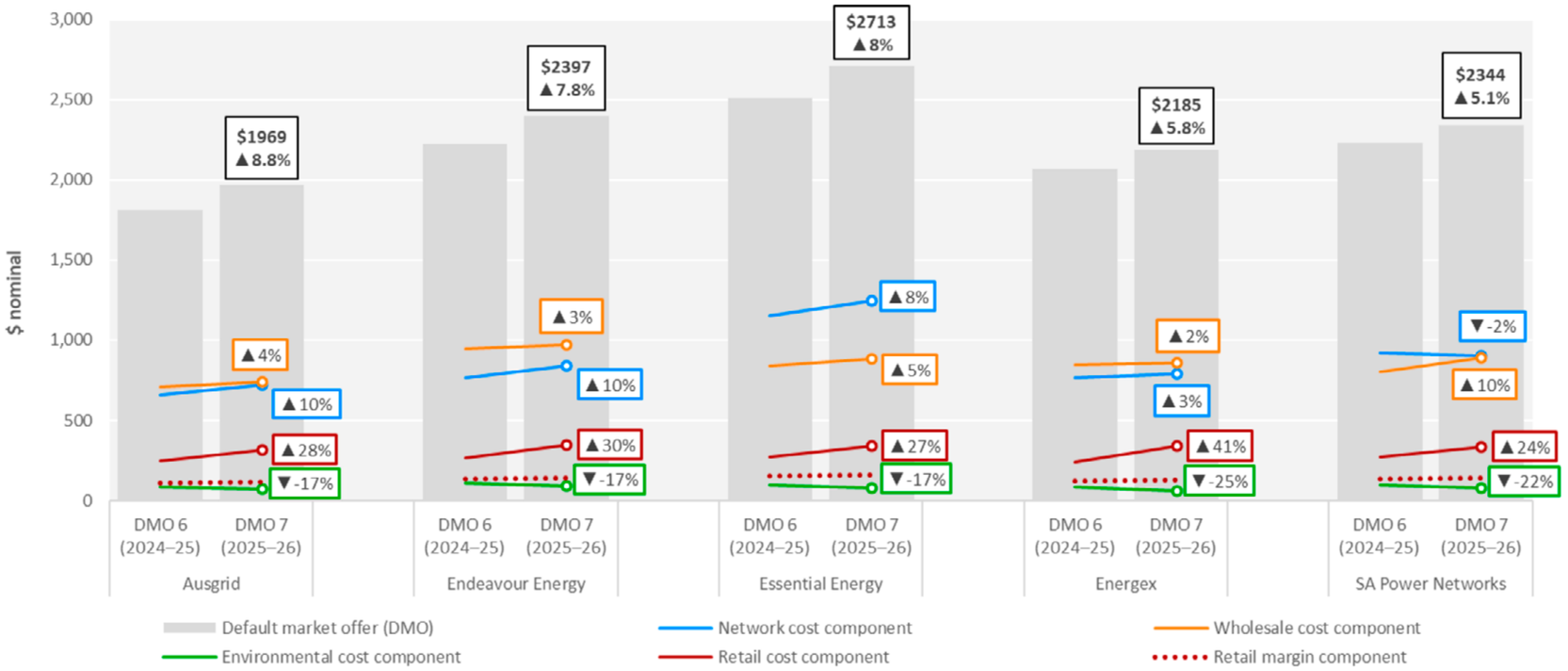
The two largest components of an energy bill are wholesale costs – the cost of generating electricity – and network costs – the cost to transport electricity through the poles and wires. Both components have increased for most customers.

The Australian Energy Regulator (AER) noted that rises in wholesale costs were due in part to various factors such as high demand, coal generator outages, network outages, low solar and wind output or a combination of all factors.

Higher network costs in a number of regions were attributed to inflation, interest rates and network expenditure.

Short-term fluctuations aside, what are the longer-term trends in wholesale and network costs? And are there any opportunities to bring these costs down?

Figure 1: Breakdown of the draft Default Market Offer (DMOs 6 and 7, nominal terms)



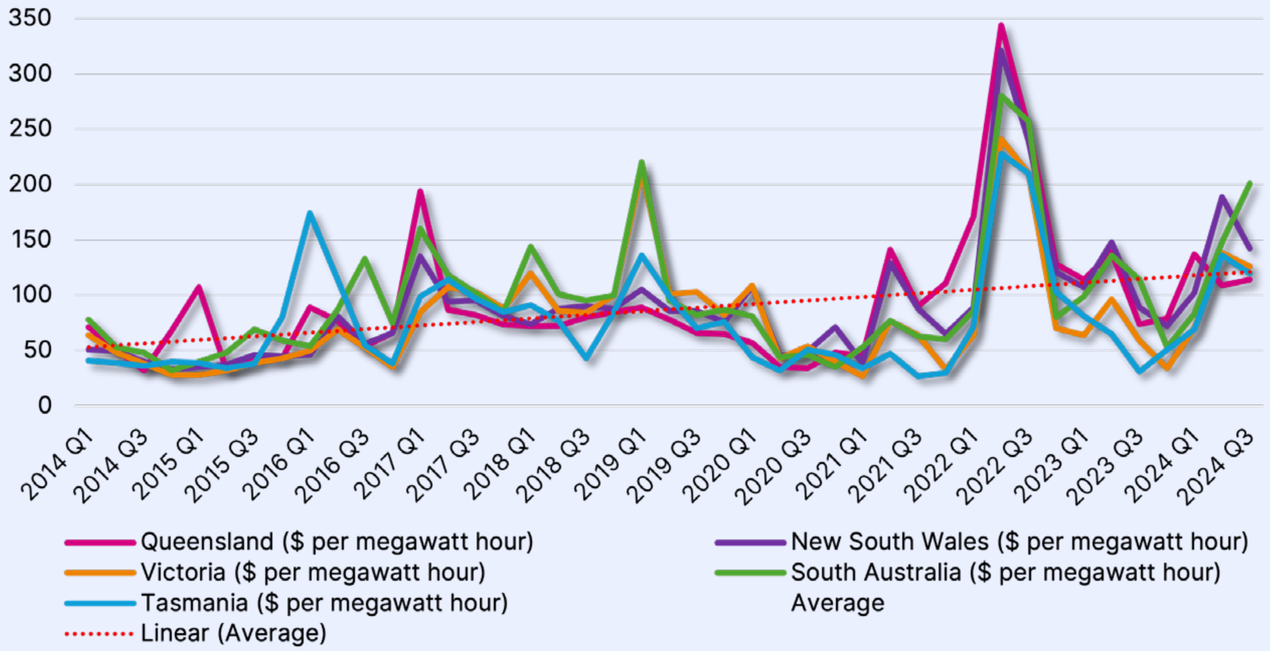
Source: AER. Note: Prices are for residential customers with controlled load.

Wholesale costs

Wholesale costs – the costs involved in generating electricity – make up 31-44% of bills for DMO customers.
Historically, wholesale electricity prices have been rising. Spot prices were about $40-$80 at the beginning of 2014, and $114-$201 in the third quarter of 2024. Wholesale electricity prices have outpaced the Consumer Price Index (CPI), meaning the price rises can't be explained by inflation alone.

What is driving this increase?

Figure 2: Electricity spot prices by region, quarterly volume-weighted average (30 minute)



Source: AER. Note: The trendline is the simple average across regions.

Wholesale costs: Ageing coal-fired generators experiencing outages

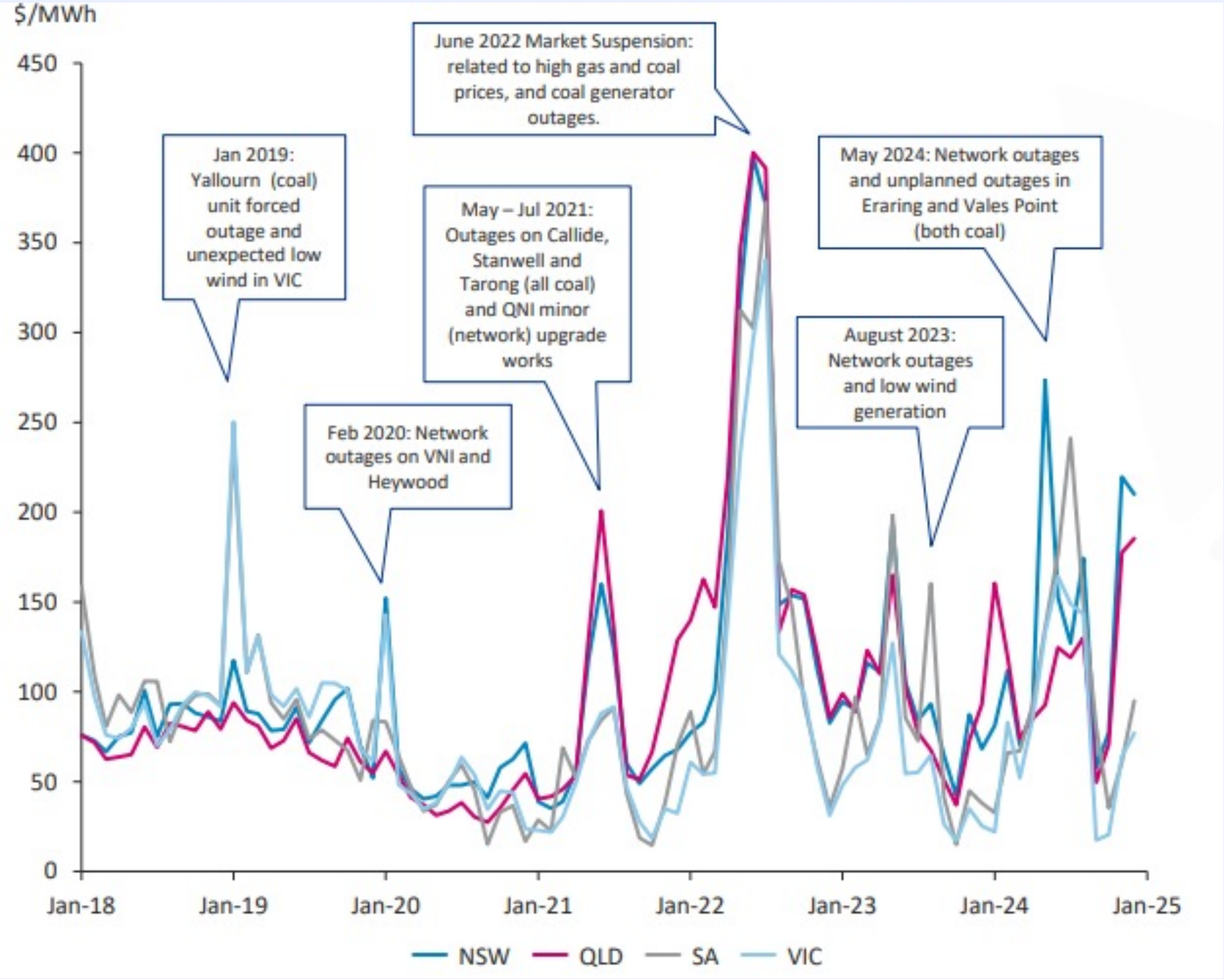
The supply-demand balance in the National Energy Market (NEM), which covers eastern Australia, is a key driver of changes in electricity prices. Periods of oversupply from generation sources relative to demand reduces prices and vice versa due to competitive bidding strategies in the wholesale market.

In mid-2022, a perfect storm of factors sent wholesale electricity prices soaring to record levels. Flooding in the Hunter Valley region limited coal supplies, coal-fired power stations faced outages, global coal and gas prices spiked due to the Russia-Ukraine conflict, and low hydro power availability occurred, all during a high winter energy demand period.

Since 2022, coal generator outages have again reduced supply in the market and driven up prices temporarily. A Baringa report found that coal generators less than 40 years old in Australia have an average availability of 81%, while those older have an average availability of 65%, declining as they age. Baringa identified that most major recent spikes in wholesale prices corresponded with coal generator outages. When coal power plants have outages, more expensive electricity generators usually step in, such as gas, which drives prices upward.

Further, the Australian Energy Market Operator's Quarterly Energy Dynamics Q4 2024 found that lower coal availability combined with higher-priced black coal bids was driving up prices. This highlights the risk of price rises associated with ageing coal-fired power stations, which experience more outages.

Figure 3: NEM monthly average wholesale electricity prices



Source: Baringa

Wholesale costs:
Dependence on expensive gas-fired plants

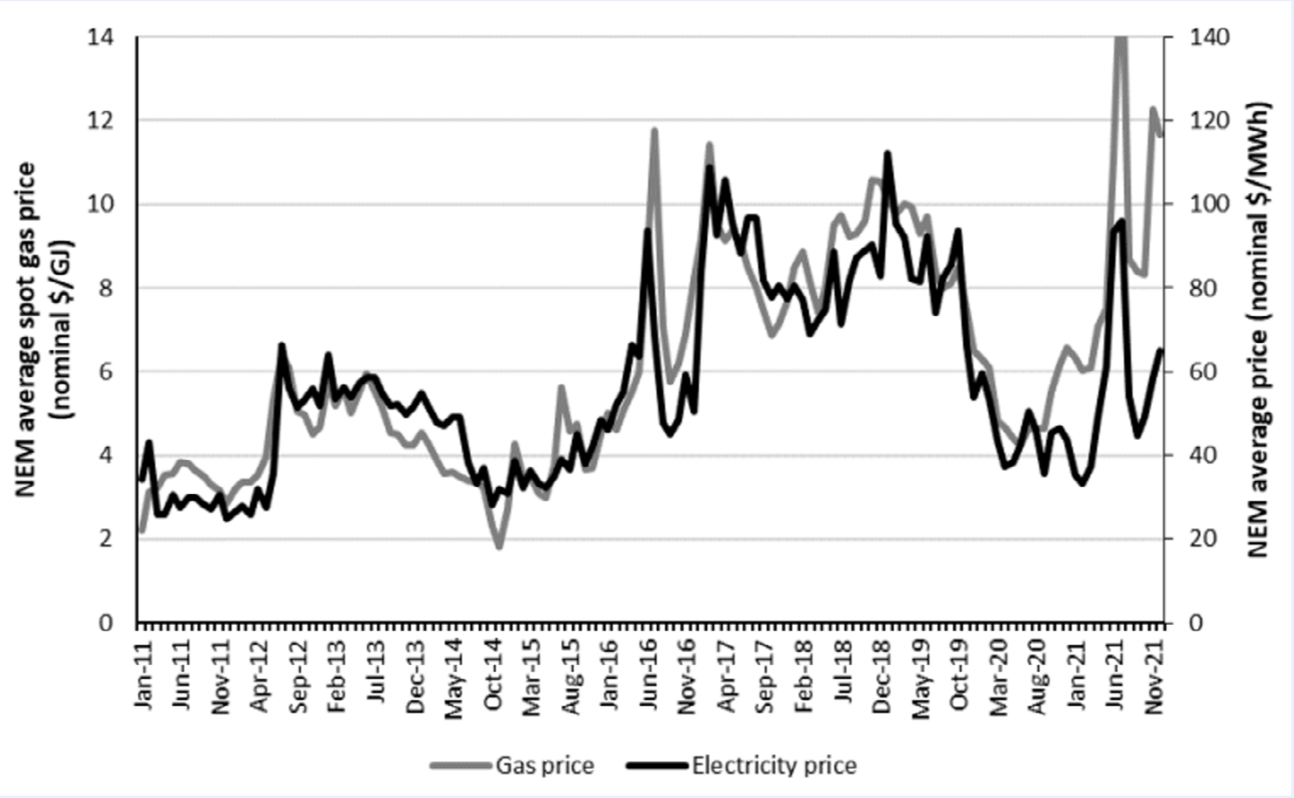
Generation costs have a major influence on wholesale electricity prices, including capital costs and ongoing costs such as maintenance costs and gas and coal fuel costs.

Historically, research has shown that as gas prices rise, electricity prices have also risen. Gas is one of the most expensive forms of electricity generation in the market. As the bidding behaviours of gas generators affect other generators, the cost of gas has a disproportionate effect on power prices. In fact, researchers at Griffith University found that gas prices drove 50-90% of pricing periods in the NEM from 2012 to 2021, directly and indirectly.

"Over the past 11 years, there has been a near-perfect correlation between natural gas prices and electricity prices in Australia's National Electricity Market (NEM), regardless of the underlying supply-demand balance and despite gas plant only operating for a small percentage of the year," the Griffith report said.

It found a correlation of 0.9 between gas and electricity prices in the NEM once extreme scarcity pricing was removed. Other electricity markets also have a strong correlation between electricity prices and gas prices, such as New Zealand (0.67), Texas (0.83) and California (0.84).

Figure 4: NEM under-cap electricity prices vs gas prices

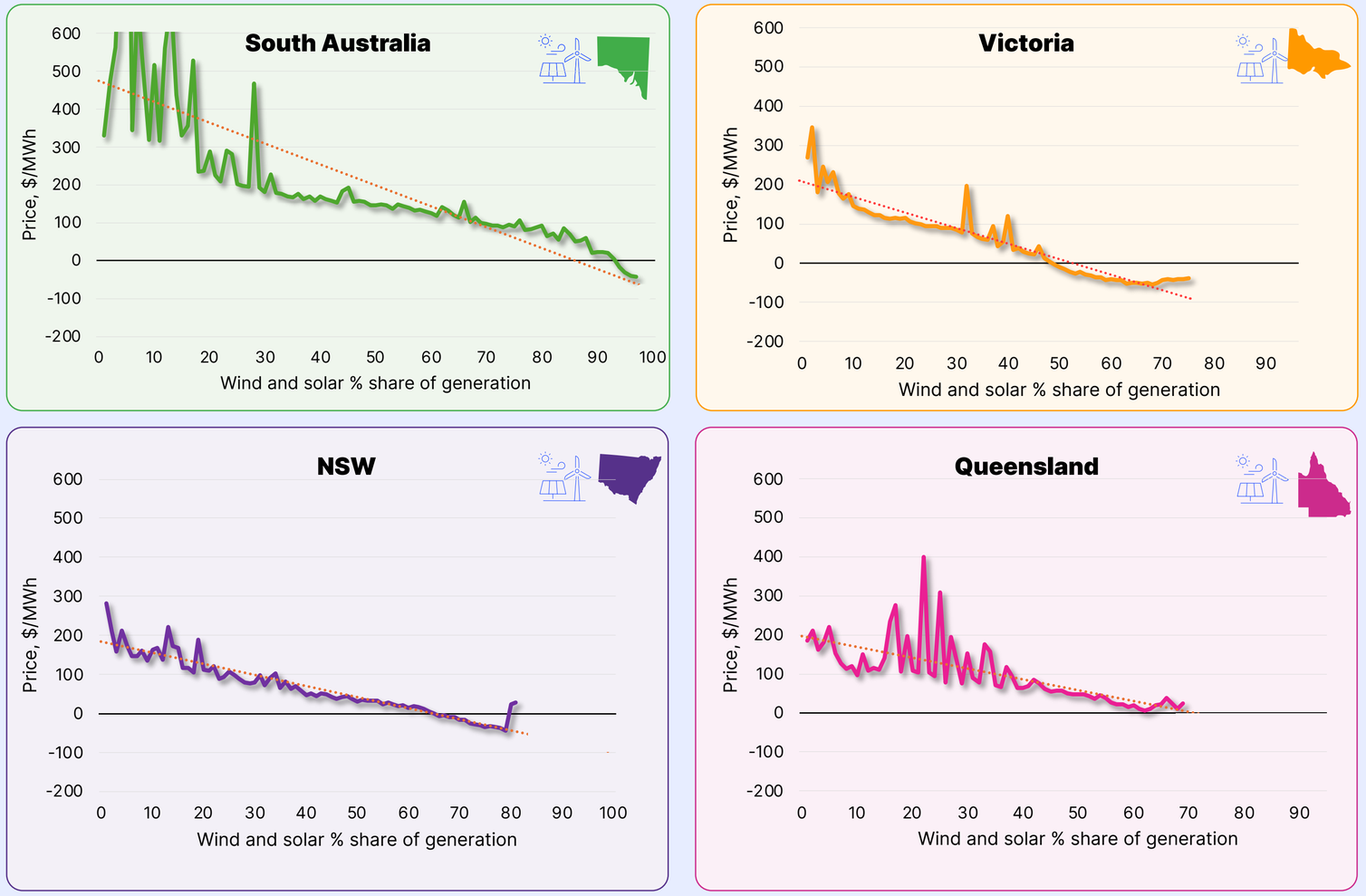


Source: Griffith University. Note: Monthly averaged NEM-wide, volume-weighted, under-cap electricity prices compared with average daily gas prices, ex-ante, on the NEM short-term trading market (STTM).

The study also found that higher output from renewable generation, lower gas usage and less opportunity for participants to exercise market power reduce the influence of gas prices on electricity prices.

While gas prices have eased from their 2022 peaks, they remain elevated from historical levels, meaning electricity prices are still subject to the effects of high gas prices.

Figure 5: Renewables share of power generation across NEM states (2014-2024)



Sources: IEEFA analysis of AEMO data

Wholesale costs: Renewables have been driving down prices

Periods of higher renewables penetration are highly correlated with low spot prices (Figure 5). Renewables have no fuel cost, so they bid into the wholesale spot market at very low prices. This would suggest that increasing renewables penetration, and reducing the reliance on gas-powered generation, would support wholesale price reductions.

Network costs: Upward pressure on costs, but opportunities for bill savings

Network costs, which involve transporting electricity through poles and wires, make up 33-48% of bills, and are the second key component in a power bill alongside wholesale costs.

To understand the cost of the networks to electricity users, we can look at the revenue the network businesses earn from customers. Distribution and transmission annual network revenue has increased from $10 billion in 2006 to $13 billion in 2023, peaking at $18 billion in 2015 during a period of overinvestment. In 2023, distribution network revenue made up about 80% of total revenue while transmission was 20%.

The draft DMO and VDO included higher network costs for households in all regions except South Australia. Key drivers of the increases are inflation and interest rates – which lead to a higher rate of return for the network businesses – and network expenditure – including for example transmission costs in NSW and Victoria, and storm-related costs in Queensland.

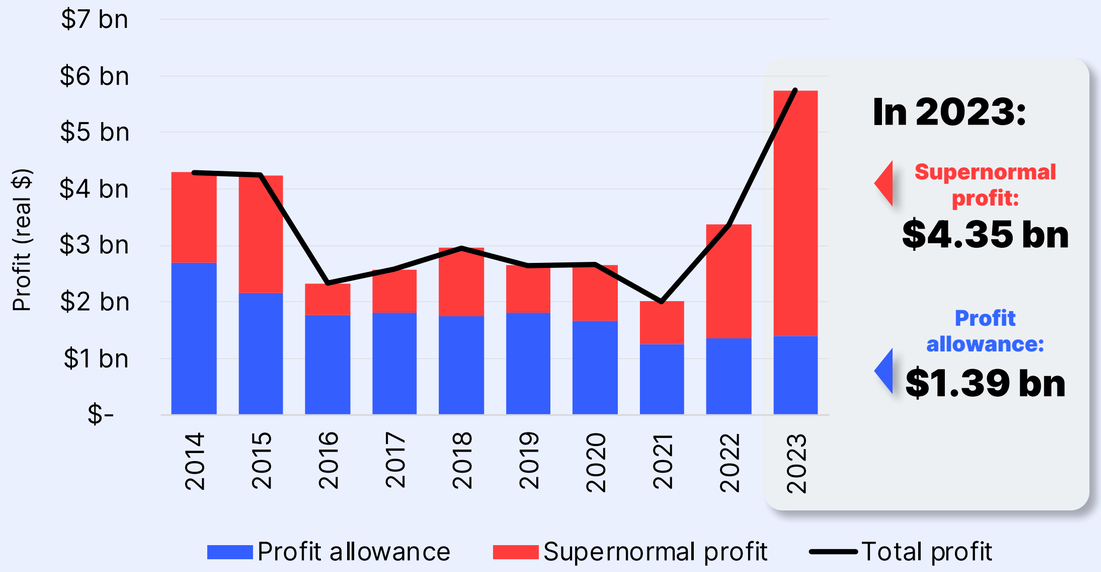
Is there any opportunity to reduce network costs?

The AER determines the revenue network businesses can recover from customers each year. It is based on a level of return (the weighted average cost of capital – made up of return on debt and return on equity) on a network's Regulatory Asset Base (RAB), with an allowance for depreciation, tax and operating costs.

As previous IEEFA research explored, the value of the RAB per customer is higher than 2006 levels while network utilisation is lower, suggesting the asset base may still be oversized relative to 2006. The Australian Competition and Consumer Commission (ACCC) recommended a write-down of network assets in 2018 due to overinvestment leading up to FY2014-15, which the ACCC estimated could deliver an annual saving to consumers of $100. This hasn't been completed – though other regulatory changes have been made which stemmed the overinvestment at the time. In 2021, the AER stated, "consumers will continue to pay for overinvestment in network assets from 2006 to 2013 for the remainder of the economic lives of those assets, which may be up to 50 years".

Questions around the size of the RAB aside, AER data shows that the actual return on equity network shareholders are receiving is consistently higher than the target, or the "allowed" return on equity. This means the profit to shareholders is higher than the required target level of profit deemed reasonable by the AER. IEEFA has calculated that this amounts to $15 billion of "supernormal profits" from 2014 to 2023, on top of $17.6 billion "allowed" profits (Figure 6).

Figure 6: Estimated electricity network profits (2014-2023)



Source: IEEFA Analysis

Key drivers of the difference between the actual and allowed return on equity in 2023, according to the AER, were:

- Lower than expected debt costs
- Incentive schemes driving additional profits
- Operating expenditure (opex) and capital expenditure (capex) lower than forecast
- Inflation rate variations

Of these, the AER has found inflation to be main culprit driving the additional returns in recent years. Annual network revenue is adjusted for inflation, but IEEFA deduces that some of the main costs of the network businesses, particularly debt servicing costs and labour costs, are not tracking inflation – meaning network businesses are being overcompensated.

This suggests several aspects of the electricity network economic regulation regime could be adjusted to bring profits to reasonable levels and bring bills down for energy users.

The $15 billion of supernormal profits was calculated by IEEFA assuming the RAB is efficient – meaning that if inefficiencies in RAB levels were included, supernormal profits would be even higher. Governments and the AER should focus on tightening economic regulation to curtail network supernormal profits, to ease bill pressure on consumers.

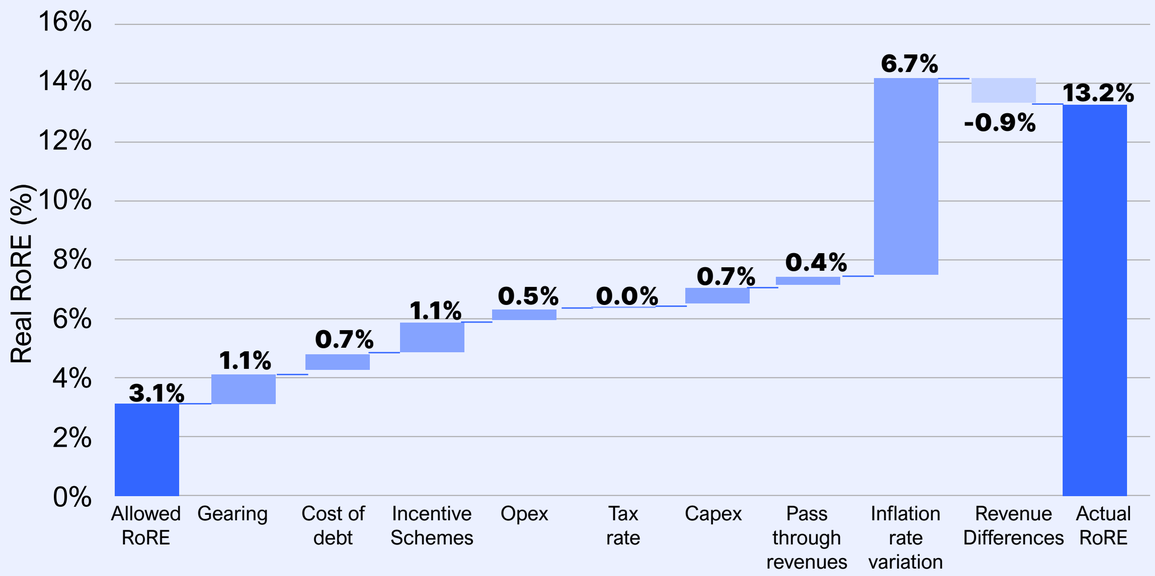
Further, amid transmission delays and cost overruns, keeping new transmission projects to budget is key to preventing any unnecessary spikes in network costs, and to enabling wholesale price reductions through connection of additional low-cost renewables in a timely manner.

It is also important to consider how to drive efficiency in the distribution network, which makes up about 80% of network revenues each year. Recently, a number of distribution networks have proposed capex increases of 20% or more, raising a risk of future over-investment.

Electricity networks are built to cater for periods of extreme peak demand – generally, hot summer days with high air-conditioner load. There is a concern that as demand for electricity grows, so will demand in these peak periods, requiring even more network infrastructure to be built. However, there are untapped opportunities to reduce the impacts of high peak demand that could avoid those costs, and even save consumers money.

They include measures IEEFA has analysed, such as flexible hot water heating, using more flexible smart air-conditioners, energy efficiency and charging batteries or electric vechicles during the solar period for use in the evening. These measures would also help smooth out increasingly volatile intraday wholesale spot price patterns and deliver more resilience into the electricity system.

Figure 7: Detailed contributions to real RoRE - electricity NSPs - 2023



Source: AER, PTRM and electricity financial performance model (confidential version).

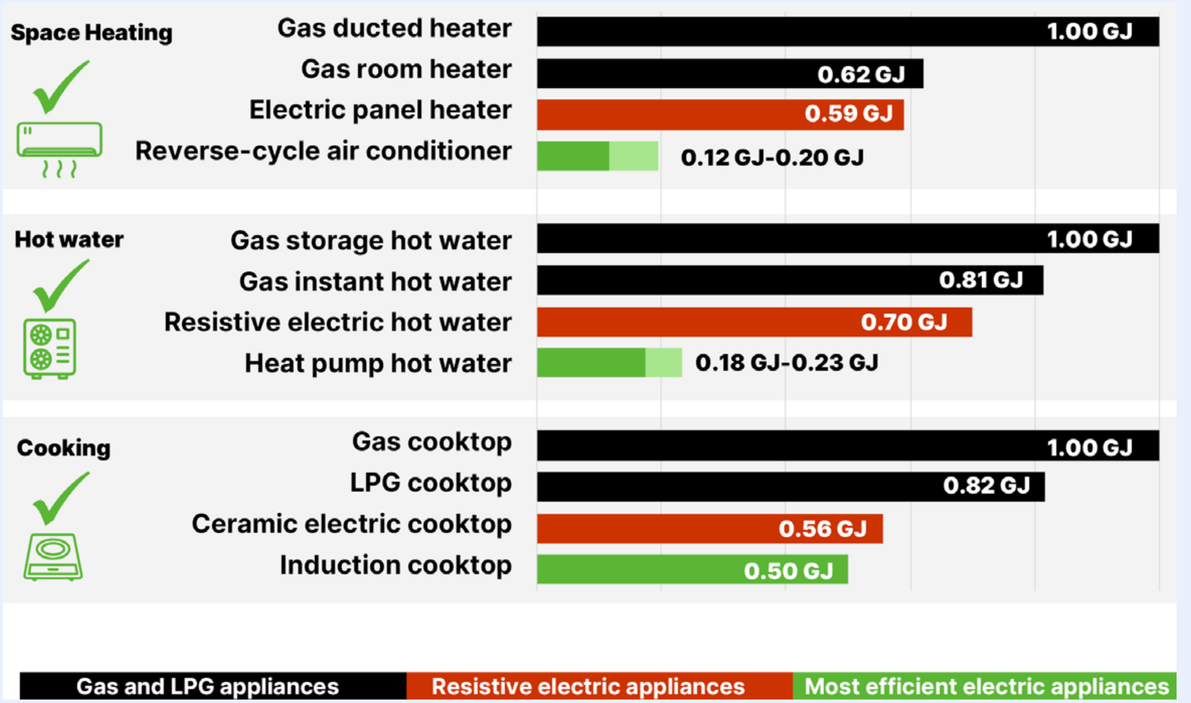
Reducing energy consumption from the grid can also lower bills

Reducing wholesale and network prices is one way to lower bills for households and businesses. Another important method within their control is to reduce their energy consumption from the grid. This can be done by switching to efficient electric appliances. Efficient electric appliances, such as heat pump hot water systems, use about a third of the power inefficient appliances consume to do the same job.

Better insulation can also help households reduce their electricity demand. Climateworks has found that Australian households could save up to $2,200 a year on energy bills by upgrading homes built before 2003 with better insulation and electrifying appliances and heating.

Further, rooftop solar can dramatically reduce bills for consumers, particularly if paired with batteries and energy management strategies to shift energy consumption into the solar period to make the most of the abundant solar resource.

Figure 8: Relative energy consumption by type of appliance



Source: IEEFA Analysis

Environmental, retail and other costs

Retail and other costs are a smaller component (11-16%) of household bills. These costs have increased significantly - by 20-41% for DMO customers. The AER attributed this to increased spending on acquiring and retaining customers, bad and doubtful debt (unpaid bills), and smart meter costs (installation, maintenance and IT).

Environmental costs are the smallest component of power bills at 3-4% of the DMO price. These have decreased for all customers, which the AER attributed to decreases in renewable energy target scheme costs.

Conclusion

Reliance on expensive, gas-fired power generation has been a key driver of energy bill rises over the long term. Reducing this reliance on gas generation can put downward pressure on wholesale electricity prices. Meanwhile, relying on ageing coal-fired generators for longer could expose Australian consumers to the risk of more frequent outages, driving up wholesale prices.

Increasing penetration of renewables is correlated with lower wholesale prices, suggesting greater abundance of renewables can support lower wholesale prices, and lower power bills.

With upward pressure on network costs from interest rates and inflation, IEEFA research shows many possible network cost efficiencies are already within reach. This can be achieved through tighter regulation of network businesses to bring profits to reasonable levels, and encouraging low-cost consumer energy measures that reduce network build requirements.

Meanwhile, households and businesses can lower their power bills by reducing their energy demand from the grid through measures such as:

Replacing old, inefficient appliances with efficient ones

Improving the insulation of their buildings

Installing rooftop solar, and maximising solar consumption with batteries and demand flexibility

Measures such as these could help spare consumers future DMO price increases and provide much sought-after cost of living relief.

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The Institute for Energy Economics and Financial Analysis (IEEFA) examines issues related to energy markets, trends and policies. The Institute's mission is to accelerate the transition to a diverse, sustainable and profitable energy economy.
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About the Author

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