Energy in Tasmania

Submission to the Legislative Council Inquiry into Energy Prices in Tasmania

Tasmanian Policy Exchange
October 2023

UNIVERSITY of TASMANIA
Ranked #1 in the world for Climate Action

Acknowledgement of Country

The University of Tasmania pays its respects to elders past and present, and to the Tasmanian Aboriginal community that continues to care for Country. We acknowledge the profound effect of colonial settlement on this Country and seek to work alongside Tasmanian Aboriginal communities, respecting their deep wisdom and knowledge as we do so.

The palawa/pakana belong to one of the world's oldest living cultures, continually resident on this Country for 42,000 years.[1] We acknowledge this history with deep respect, along with the associated wisdom, traditions, and complex cultural and political activities and practices that continue to the present.

The University of Tasmania also recognises a history of truth that acknowledges the impacts of invasion and colonisation upon Aboriginal people and their lands, resulting in forcible removal, and profound consequences for the livelihoods of generations since.

The University of Tasmania stands for a future that profoundly respects and acknowledges Aboriginal perspectives, culture, language and history, and continued efforts to realise Aboriginal justice and rights, paving the way for a strong future.

Contributors

This University of Tasmania submission was prepared by the Tasmanian Policy Exchange. The primary authors are Richard Eccleston, Lachlan Johnson, Kimberly Brockman, Robert Hortle, and Sarah Hyslop, drawing on research and expertise from across the University and beyond. We would particularly like to thank Clinton Levitt and Evan Franklin for their contributions.

The views expressed in this submission are the views of the authors and not necessarily the views of the University of Tasmania.

About the Tasmanian Policy Exchange

The Tasmanian Policy Exchange (TPE) was established in 2020 to enhance the University's capacity to make timely and informed contributions to policy issues and debates which will shape Tasmania's future.

The TPE works with government and community partners to identify and address significant issues where the University can make a positive impact on Tasmania's future. It also works with staff from across the University of Tasmania to develop evidence-based policy options and longer-term collaborations.

The TPE's recent policy analysis includes:

- Shaping a strategic partnership for Western Tasmania
- Cutting Tasmania's transport emissions
- Tasmania's greenhouse gas emissions: Annual update
- The Future of Local Government Review

See more at www.utas.edu.au/tpe

[11] Members of the Tasmanian Aboriginal community identify with a range of terms, including palawa, pakana, Pallawah, Aboriginal, Aborigine, Indigenous, Traditional Owners, First Nations, and First Peoples. In this submission, we use the term Tasmanian Aboriginal people and communities, while recognising that there are a number of other ways Tasmanian Aboriginal people may choose to refer to themselves.

Contents

List of Acronyms

Acronym	Definition
ACOSS	Australian Council of Social Services
AEMO	Australian Energy Market Operator
AER	Australian Energy Regulator
AMEX	American Express
BSI	Bass Strait Islands
CCS	Carbon capture and storage
CPI	Consumer Price Index
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DVA	Department of Veterans Affairs
ESI	*Electricity Supply Industry Act 1995* (Tas)
ESOO	Electricity Statement of Opportunities
GWh	Gigawatt hour
kWh	Kilowatt hour
LRET	Large-scale renewable energy target
MAR	Maximum Allowable Revenue
MI	Major industrial
MWh	Megawatt hour
NECF	National Energy Customer Framework
NEM	National Electricity Market
NMR	Notional maximum revenue
NSW	New South Wales
OTTER	Office of the Tasmanian Economic Regulator
PJ	Petajoule
PPA	Power Purchase Agreement
RET	Renewable Energy Target
REZ	Renewable Energy Zone
SRES	Small-scale renewable energy scheme
TRET	Tasmanian Renewable Energy Target
YES	your energy support (Aurora)

Executive Summary

The global climate emergency and geopolitical pressures are driving a rapid transition from fossil fuels to renewable energy sources both in Australia and abroad. This transition requires massive investment in new technology, infrastructure, and systems, and as a result we are experiencing significant energy market volatility, growing price pressures, and increasing infrastructure build costs.

The energy transition and its implications for Tasmanian electricity prices

Tasmania is not immune from these pressures despite significant renewable energy assets. From 2017 to 2022, Aurora Energy's notional maximum revenue (NMR) determination increased by around 30% – twice as fast as inflation – leading to steep electricity price rises for customers.[2] The increase for 2022 alone was 23.5% (see Section 2.1). While we anticipate that Tasmanian retail prices will decline in 2023-24, given growing electricity supply constraints, the price outlook for the decade ahead is challenging.

Providing clean, reliable, and affordable electricity is particularly important because new analysis conducted for this submission finds that in 2021 Tasmania's poorest households proportionally spend over three times as much of their income on energy relative to higher-income households, adding to cost-of-living pressures (Section 3). More generous concessions have reduced the impact of cost pressures on vulnerable households, but this submission argues that more targeted and effective concessions regime is necessary (Section 0). We also argue that the regressive nature of electricity costs with respect to household income highlights the need for a national debate regarding the funding and whether consumers should continue to pay the full cost of nationally significant transmission projects (such as Marinus Link) and the role of other schemes (Renewable Energy Certificates) that are designed to help achieve national emissions reduction targets (Section 0).

Structural factors will determine electricity prices over the longer term

Energy systems and markets are complex, and we believe that the Legislative Council Inquiry into energy prices must consider both the structure of electricity systems and markets (given their implications for prices) *and* state-level processes for setting electricity prices and providing concessions. Focusing on price regulation alone will not provide sustainable price relief if generation and transmission costs continue to increase.

Sections 2 and 3 of this Submission provide an overview of the transition currently underway in the National Electricity Market (NEM) and the implications for Tasmanian electricity prices. Our key findings are summarised below.

The changing national energy system

- While the costs of all energy projects is increasing, on-shore wind and solar are and will continue to be the lowest cost sources of generation, but their variability and a lack of storage capacity are making it increasingly difficult to balance supply and demand in the NEM on a daily basis (Section 0).

[2] Aurora Energy's NMR, determined by the Tasmanian Economic Regulator, is the basis upon which the standing offer price is set. However, given that not all of Aurora's revenue is from retail customers, a small portion of Aurora customers are not on the standing offer price, and a small number of Tasmanians get their power from other retailers, the figure should be understood as indicative only.

- The economic viability and reliability of traditional coal-fired power stations is declining, and in many cases these facilities are being retired ahead of schedule (Section 0).
- At present there is enough cheap renewable generation in the NEM to undercut aging coal plants but not enough to replace them.[3]
- The NEM is facing growing supply constraints and reliability issues. These challenges will continue over the next decade, with Victoria and South Australia being especially vulnerable. This may contribute to increased volatility and rising wholesale prices (Section 0; Section 4).
- National demand for electricity is likely to increase over the coming decade due to the electrification of transport, domestic heating, and industry. AEMO's central forecast is for a 32% increase in demand across the NEM by 2033-34 (Section 4).
- There is an urgent need to increase the speed and scale of investment and delivery of up to 44GW of new generation, transmission, and storage capacity across the NEM to meet emissions reduction and renewable energy targets. In Australia, transmission-related investment of almost $13 billion is required by 2030 while the International Energy Agency forecasts that global investment will have to double over the next decade.
- In the absence of a new cost-allocation model and/or the Commonwealth directly meeting project costs, greater investment in transmission infrastructure may put upward pressure on consumer electricity prices (Section 0).

Implications for Tasmania

- Over 99% of electricity generated in Tasmania in the 12 months to October 2023 was from renewable sources (Section 1).
- On average, the cost of hydroelectric generation (approximately 70% of Tasmania's supply) is greater than for on-shore wind or large-scale solar (Section 0). However, hydro systems are unique in that they can store energy indefinitely and dispatch electricity to the grid when the supply of wind and solar is low and prices are high (Section 0).
- No new commercial-scale renewable energy projects have commenced in Tasmania since the Cattle Hill wind farm in 2018 (Section 0). The state is facing the growing prospect of supply constraints hindering electrification and economic development.
- Electricity demand in Tasmania is likely to increase over the next decade due to the electrification of transport and decarbonisation of industrial processes. AEMO forecasts a 48% increase in demand in Tasmania by 2033 (Section 0).
- There is a strong in-principle case for increasing on-island generation and/or interconnection to meet daytime demand with low-cost wind and solar to preserve hydro capacity for when supply is limited and prices are high. This arbitrage strategy would maximise the return on hydro assets, put downward pressure on wholesale prices and potentially aid climate resilience for water storages in Tasmania (Section 0).
- Increased interconnection (i.e. the 750 MWh Marinus Link proposal) has the potential to reduce prices, improve electricity reliability and supply in Tasmania, and reduce emissions nationally. However, whether consumers benefit from increased interconnection will depend on the final project cost and how these costs are recovered from consumers (Section 0).
- In the absence of increased interconnection, by the mid-2030s Tasmania may have the most expensive renewable electricity in Australia and face increasing reliability and supply challenges

[3] 'Lucky but sooty', *The Economist,* 21/20/2023

to meet demand, placing energy-intensive industries and the jobs and communities they support at risk (Section 0).

Options and priorities for promoting clean, reliable, and affordable electricity

Our submission identifies both short- and medium-term reform options which we believe will help ensure that Tasmanian consumers can access clean, reliable, and affordable electricity over the next decade and beyond. However, as noted above, energy systems are complex and undergoing profound, rapid change. Given this complexity and the limited public data on Tasmanian energy businesses, policies designed to improve the efficiency of Tasmania's energy system and put downward pressure on electricity prices should be subject to extensive consultation and careful consideration of their legal and commercial implications. All significant, structural reforms should be considered by an independent expert review.

We argue that Tasmania's future energy policy should be guided by the following ***key principles***:

- ***Long-term sustainability and cost effectiveness.*** Tasmania needs to establish a decarbonised energy system designed to reliably meet current and future energy needs of Tasmanian households and businesses using the lowest cost mix of renewable energy sources.
- ***Maximisation of returns for Tasmania.*** Initiatives such as producing hydrogen for export or increasing interconnection with the NEM should only be pursued if they benefit Tasmanian taxpayers and electricity consumers by creating premium returns on electricity generated in Tasmania and/or improve Tasmania's access to low-cost renewable electricity.
- ***Certainty for consumers.*** Protection of businesses and vulnerable households from rising electricity prices and price volatility to the greatest extent possible will be of critical importance given the challenging market outlook over the next decade.

We have identified a range of ***short-term policy options*** for consideration:

- ***Review and refine the concession system to better reflect the needs and usage of Tasmania's most vulnerable energy customers.*** This will ensure that concessions better reflect the needs and usage of Tasmania's most vulnerable energy customers. The State Government needs to ensure that concessions are targeted and keep pace with rising prices, and should explore the possibility of replacing the current flat-rate concession system with one proportional to need.
- ***Address Tasmania's high rates of energy debt.*** This would entail a more targeted approach to supporting consumers, including needs-based waiver provisions, and should build on the concessions review suggested above.
- ***Manage volatility for medium-sized businesses on market-exposed contracts.*** These should be more targeted, focusing on limiting or averaging price increases so businesses exposed to the wholesale market can manage their risk. Targeted loan schemes and support programs to subsidise energy efficiency and behind-the-meter generation should be continued.

Looking further ahead, we have also identified a range of ***medium-term structural reform options*** for more detailed consideration by an independent expert review:

- ***Optimal market design.*** Given Tasmania's distinctive energy market structure and the context of wider energy transition in the NEM, it would be timely to consider a range of key issues, including:
  - the optimal mix of hydro generation, new wind and solar, and increased interconnection to the NEM to reliably meet Tasmania's future electricity needs at the lowest system cost;

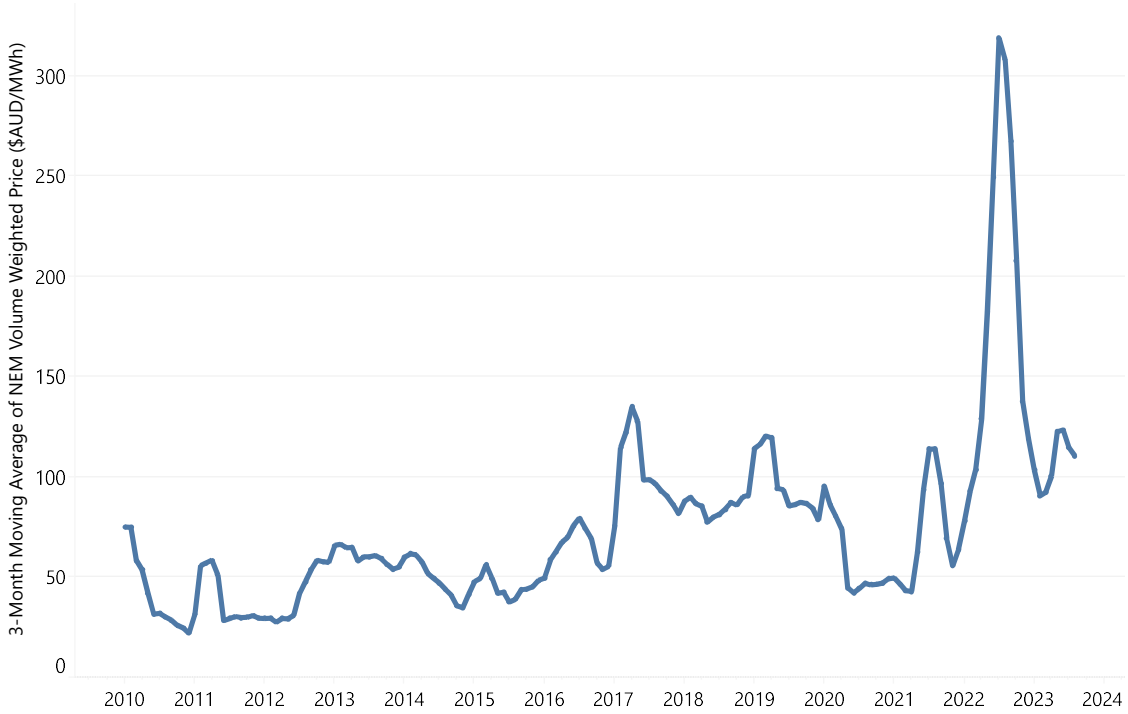
- Hydro Tasmania's role in the wholesale markets, and the opportunities and challenges it presents for investment in new generation projects;
- how Tasmania can establish a competitive and transparent approach to supporting investment in new renewable energy projects given the nature of the Tasmanian market and National Competition Policy; and
- whether there are viable ways to ensure the Tasmanian wholesale price reflects the cost of generation in the Tasmanian system while maintaining interconnection to the NEM as a transitional strategy for the next decade.
- Recognition of Tasmania's renewable energy to support on island manufacturers to be globally competitive through Guarantee of Origin schemes.

- ***The governance of Tasmania's energy businesses.*** An independent review could also be used to examine energy market governance issues, including:
  - the implications of Tasmania's three state-owned energy businesses all reporting to one owner Minister, how this affects the relationships between the three businesses, and whether this compromises their independence;
  - Strategies to increase retail competition or other mechanisms to reduce retail costs; and
  - an assessment of Tasmanian energy business capital management strategies and any implications for electricity prices.
- ***National Reform Priorities.*** While it is beyond the scope of this submission or a Tasmanian Parliamentary Inquiry to propose a comprehensive reform agenda for the NEM, the Tasmanian Government and community should advocate for reforms which more equitably distribute the significant costs associated with decarbonising Australia's electricity system. Specific reforms which could reduce consumer electricity costs include reviewing the funding of Australia's Renewable Energy Certificates and other environmental schemes, and exploring the possibility of sharing the costs of major transmission projects between government and consumers.

Introduction

In recent years, the cost of electricity around the globe has increased dramatically and become much more volatile. This is due to the challenges associated with transitioning to renewable energy after 150 years of dependence on fossil fuels, combined with geo-political conflicts affecting oil and gas supply. Australia and Tasmania have not been immune to these pressures (see Figure 1). The rapid retirement of coal-fired power stations combined with the urgent need to invest in new generation, transmission and storage projects has placed unprecedented strain on our ability to provide affordable and reliable electricity. It is in response to these growing price pressures and volatility that the Legislative Council has established an Inquiry into energy prices. The Tasmanian Policy Exchange at the University of Tasmania is pleased to provide this submission to the Inquiry.

Figure 1: Volume-weighted average wholesale electricity price in the national electricity market, 2010-2024



Data source: Open NEM

In addition to this introduction, our submission has five sections. Because Tasmania's particular generation mix and market structure have significant implications for future energy demand and prices, Section 1 provides a brief overview of the distinctive features of Tasmania's energy system. Tasmania's energy system encompasses much more than just electricity, but after a brief overview this section focusses primarily on electricity generation. Tasmania's renewable electricity generation capability is a major asset, but our generation mix and market structure are unusual and have important implications both for our own electricity market and our interaction with the National Electricity Market (NEM).

Section 2 focuses on the factors that influence electricity prices and the processes used to determine regulated prices in Tasmania. This section includes a brief discussion of some of the challenges and opportunities that the Tasmanian electricity industry and consumers will face over the coming

decade, including the all-important transition to renewables in the NEM. We consider the impacts of electricity price rises and volatility on Tasmanian consumers and find that in spite of the caps and concessions currently in place, price increases have far outstripped the Consumer Price Index (CPI) in recent years and are growing as a proportion of Tasmanian household budgets. As noted by the Tasmanian Council of Social Services, electricity prices have risen 22.5% while CPI and wages have grown by 5.5% and 3.9% respectively since July last year.[4] Given the importance of affordable and equitably priced electricity to Tasmanian households and businesses, it is essential that policies are implemented to protect vulnerable consumers during the ongoing transition to renewable energy.

Section 3 considers the outlook for Tasmanian electricity consumers and markets. This analysis highlights the importance of ensuring that both our electricity system and our energy system more broadly are able to adapt to changes underway in the NEM and capitalise on the state's unique potential.

Section 4 presents some state-level policy options for promoting the supply of reliable and affordable clean electricity to Tasmanian households and business in years to come. However, we stress that energy markets are complex and volatile, and are largely shaped by structural economic and national policy factors as well as complex legal and commercial considerations. For this reason, the options raised in this submission and being considered by the Inquiry should be subject to an independent expert review.

[4] TasCOSS (2023). 'Inquiry into energy prices good news for households', Media Release, https://tascoss.org.au/mr-inquiry-into-energy-prices/

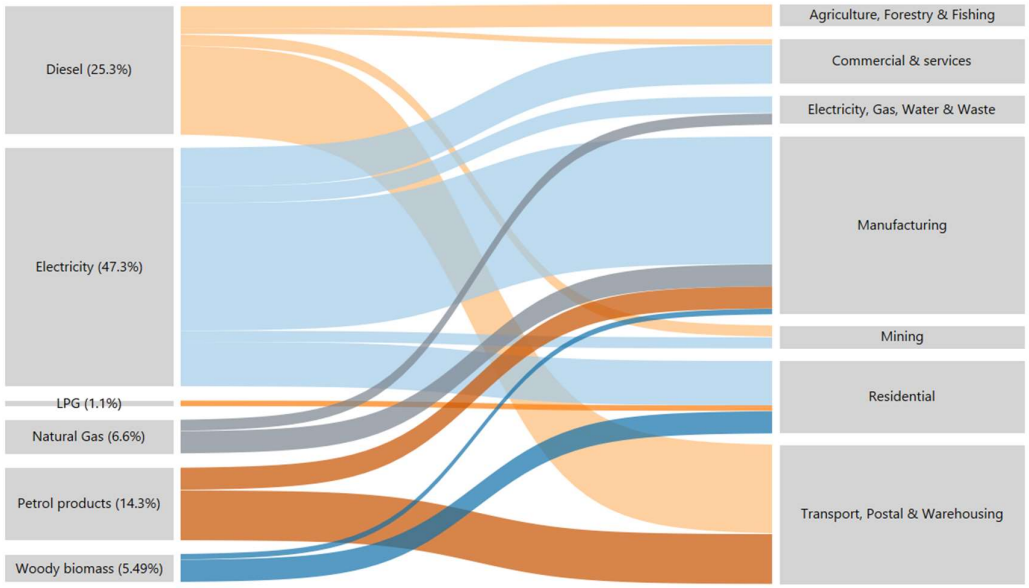
1. Tasmania's energy system

In 2021-22, Tasmanian households, businesses, and other organisations used around 105 petajoules (PJ) of energy or roughly 1.8% of total energy use across Australia (which was just over 5,762 PJ). The state's energy needs are met from a wide range of sources (see Figure 2), including:

- Diesel and petrol (39.5% of total consumption)
- Electricity (47.3% of total consumption – 32% hydroelectric and 15.3% from other sources)
- Gas (liquid natural gas and liquid petroleum gas, 7.7% of total consumption)
- Wind generation (7.1% of total consumption)
- Black and brown coal[5]
- Woody biomass (5.5% of total consumption)[6]

Tasmania's largest energy user by some margin is the manufacturing sector, with four 'major industrial' users responsible for the bulk of this consumption. The second largest user is the transport, postal, and warehousing sector, which relies almost exclusively on diesel and petrol. Households rank third, using around 15% of the State's total energy and some 19% of its electricity.

Figure 2: Energy use in Tasmania, 2021-2022



Data source: Australian Energy Statistics

In most energy systems, there is a strong relationship between combustible fuels (mainly non-renewable ones) and broader energy consumption because electricity is largely generated by fossil fuels. Tasmania's system is unusual because around 99% of electricity generation[7] is from renewable

[5] Coal and aviation fuels are not reported by source in Figure 2 because confidentiality requirements imposed under the *Clean Energy Regulator Act 2011* and the *Privacy Act 1988* prevent publication of information that could allow the attribution of energy or emissions data to individual businesses or facilities.

[6] While some of this is used in manufacturing processes, the large share of woody biomass in Tasmania's energy mix is mostly due to our large number of residential wood heaters.

[7] It is important to distinguish here between electricity generated in Tasmania and electricity consumed in Tasmania. The consumption figure is significantly lower than 99% due to Basslink imports, which complicates our claims to 'self-sufficiency' in renewable electricity (see Section 0).

sources (depending on the season and time of day), mainly derived from hydroelectric plants but with an increasing contribution from wind farms. By comparison, electricity generation in the NEM over the 12 months to October 2023 was only 38% renewable, with the remainder coming from fossil fuels (mostly black coal).[8] However, the extent of decarbonisation varies among states with South Australia achieving 75% renewable generation over the same period.

The need to decarbonise the national energy system (both electricity generation and the direct combustion of diesel, petrol, and gas) to meet emissions reduction targets has at least two implications for the Tasmanian electricity system and prices:

1. Electricity price volatility is likely to increase across the NEM as other states transition to renewable energy generation, creating opportunities and challenges for Tasmania (See Section 1.3); and
2. After years of relative stability, on-island electricity demand in Tasmania will increase significantly over the next decade (AEMO predicts a 48% demand increase) due to the decarbonisation of transport and industrial processes.

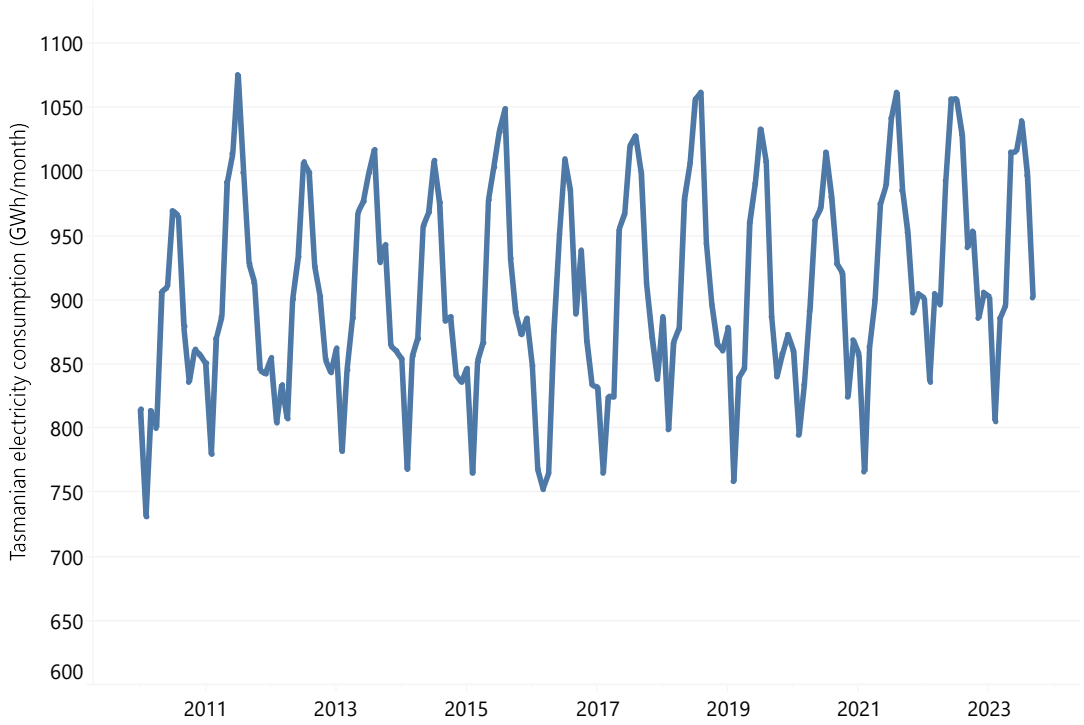
A long-term strategy to provide affordable and reliable electricity in Tasmania must be informed by broader structural changes in energy systems and the NEM.

1.1 Generation: Where does Tasmania's electricity come from?

In 2021-22, Tasmanians consumed 12,222 gigawatt hours (GWh) of electricity (equivalent to 44.4 PJ). The rate of consumption rises and falls in a daily cycle and throughout the year according to demand cycles (see Figure 3), with peak usage occurring in the cold winter months. Because electricity cannot easily be stored at scale, this means that market operators must balance supply and demand across the grid at any given time. This necessitates complex market instruments and, at times, causes significant price volatility.

[8] Open NEM (2023). https://opennem.org.au/energy/nem/?range=1y&interval=1M&view=discrete-time

Figure 3: Demand for electricity in Tasmania, 2010-2023



Data source: Open NEM

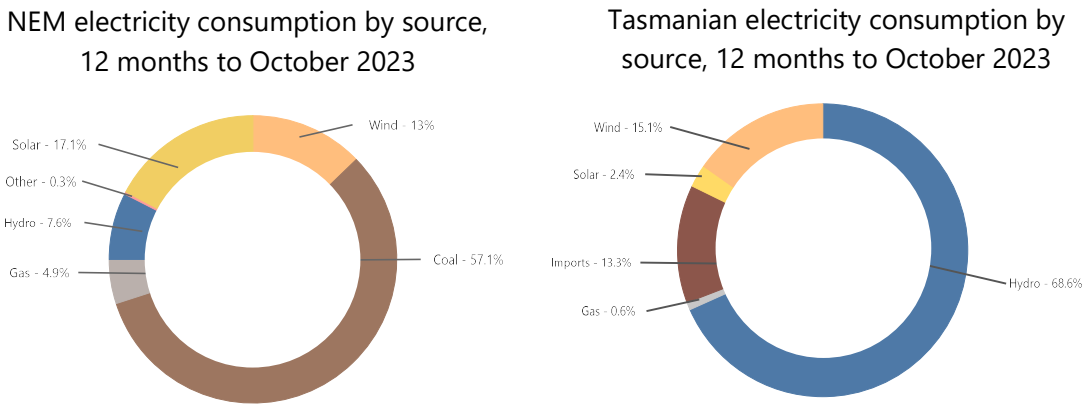
Sources of Tasmanian electricity

Electricity generation in Tasmania is managed by Hydro Tasmania. Over the twelve months to October 2023, 69% of Tasmania's electricity demand was met by hydroelectric generation, 15.3% by wind, 2.5% by rooftop solar arrays, 0.5% by gas, and 13.1% by imports from the NEM via Basslink (see Figure 4). As noted above, the State's electricity generation mix is unusual due to its very high share of renewable sources. While it is frequently claimed that Tasmania is "100 per cent self-sufficient in renewable electricity", the reality is somewhat more complicated.[9] It is true that Tasmania generates enough electricity to power itself on an annual basis, but not all of this electricity is consumed in the State. Indeed, in three out of the past five years, Tasmania has been a net-importer of electricity.[10] This is largely due to the need for reliable supply, but it is also a way to maximise commercial returns to Hydro Tasmania and support emissions reduction nationally.

[9] Barnett, Guy (2020). 'Tasmania surges to 100% renewable energy', Media Release, https://www.premier.tas.gov.au/site_resources_2015/additional_releases/tasmania_surges_to_100_renewable_energy

[10] Tasmania typically exports electricity during the wetter winter months (when hydropower storage is replenished more often) and imports it during the drier months of summer (when storage is lower). Export and import levels also fluctuate depending on the time of day. For instance, Tasmania tends to import electricity during the day (when other renewables are cheaper) and export electricity during the evening and overnight. See Open NEM (2023). https://opennem.org.au/energy/tas1/?range=7d&interval=30m.

Figure 4: Electricity consumption in the NEM and in Tasmania



Data source: Open NEM

After hydro, wind farms are the second biggest source of electricity generation in Tasmania. There are now four commercial scale (>30 megawatt) wind projects within Tasmania (see Table 1).[11] All these wind farms supply power into the NEM but are supported by Hydro Tasmania or Aurora Energy (the state's only regulated offer retailer) through Power Purchase Agreements (PPAs). Due to commercial-in-confidence considerations, very little information is available on the terms of these agreements.

Table 1: Windfarm projects in Tasmania

Project	**Generation capacity**	**Owner**	**Capacity Factor during operation**	**Operational since**	**Average Revenue per megawatt hour (MWh)**
Musselroe	168MW	Hydro Tasmania (25%) and Senhua Clean Energy (75%)	36.8%	2013	$61.69
Cattle Hill	148MW	Goldwind	31.3%	2020	$57.48
Woolnorth	140MW	Hydro Tasmania (25%) and Senhua Clean Energy (75%)	42.2%	2004, expanded in 2008 and 2010	$58.64
Granville Harbour	111MW	Palisade	33.3%	December 2019	$85.94

Data source: OPEN NEM

[11] There are two additional windfarms in Tasmania: Huxley Hill on King Island; and the Flinders Island wind farm. However, these are not commercial scale.

1.2 Electricity generation cost effectiveness

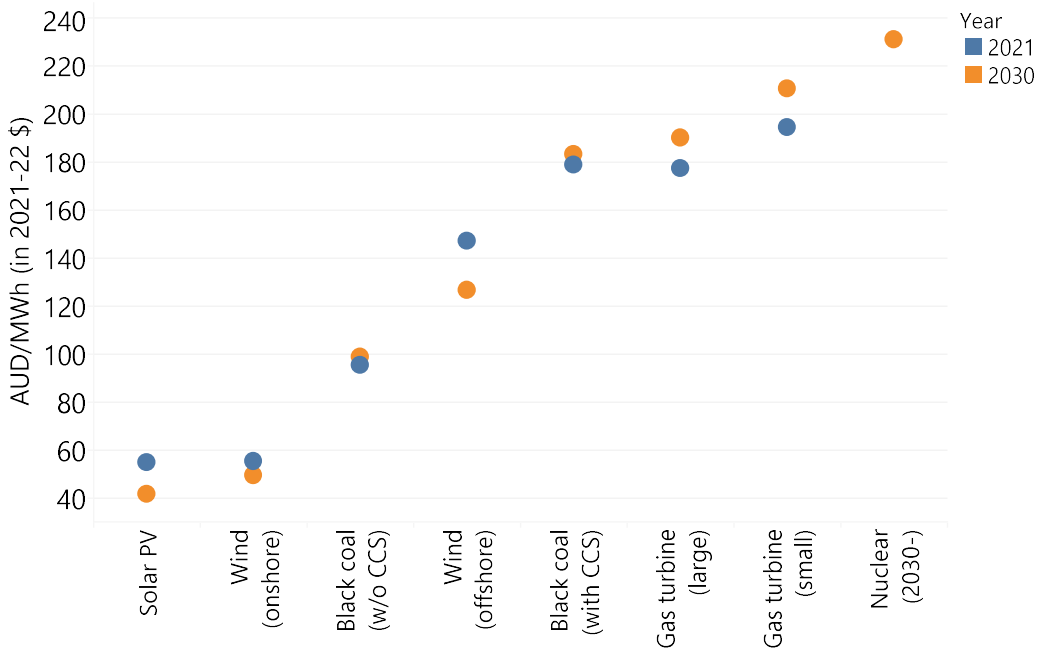
The cost effectiveness of different electricity generation sources is typically compared using what is called the 'levelised cost'. This is the price at which a generation facility needs to sell electricity to break even at the end of its lifetime. Table 2 shows CSIRO's estimated average levelised costs for various electricity generation methods in Australia in 2021. The average levelised cost for large-scale solar and wind generation was significantly cheaper than for fossil fuel-based generation[12]. This remains the case even when factoring in an 'integration cost'[13] of between $25 and $34 per MWh for solar and wind. Notably, the levelised cost of solar and offshore wind generation is expected to fall significantly by 2030, while the levelised costs of coal and gas are likely to increase (see Figure 5). However, as discussed below, generation costs are only one factor which contributes to retail electricity prices.

Table 2: Average levelised cost of different methods of energy generation

Source	Average levelised cost per MWh (2021)
Commercial solar photovoltaic	$54.50
Onshore wind	$55.00
Large scale hydro[14]	$80.00
Coal – no carbon capture storage (CCS)	$95.00
Offshore wind	$147.00
Coal – with CCS	$178.50
Large Gas	$177.50
Nuclear (2030 estimate)	$231.00

[12] The costs of all new energy projects has increased significantly over the past two years with the cost of new wind projects increasing by approximately 30% since the pandemic. The cost pressures will flow through to higher levelized costs.
[13] Integration costs are those associated with linking variable renewable energy sources into the grid. These may "include distribution and transmission networks, short-term balancing services, provision of firm reserve capacity, a different temporal structure of net electricity demand, and more cycling and ramping of conventional plants". They are also known as 'hidden costs' or 'system-level costs'. See Hirth, Lion, Ueckerdt, Falko and Edenhofer, Ottmar (2015). 'Integration costs revisited – An economic framework for wind and solar variability', *Renewable Energy* 74, 925-939 https://neon.energy/Hirth-Ueckerdt-Edenhofer-2015-Integration-Costs-Revisited-Framework-Wind-Solar-Variability.pdf
[14] CSIRO does not produce a levelised cost for large scale hydro generation, but other studies have estimated $80 per MWh.

Figure 5: Levelised cost of electricity generation by source, 2021-2030



Data source: CSIRO 2023

1.3 Pricing in the NEM

The NEM, like most large-scale energy systems, is designed so that market operators estimate demand across the network at a point in time and different generators bid to sell electricity into the market to meet this demand.[15] This establishes a point-in-time wholesale price, or 'spot price', for electricity. In theory, competition among generators should ensure that wholesale prices are as low as possible. Indeed, the creation of the NEM in 1998 led to competition between generators resulting in a decline in both generation costs and consumer prices.[16]

However, pricing in the NEM is becoming more complex as the proportion of electricity generated by renewables increases. This is because the variability of renewable generation complicates the dynamics of supply and demand. For example, the increasing prevalence of solar PV in the grid creates a daily wholesale price cycle known as the 'duck curve'. This term describes how the grid experiences strong supply from mostly solar generation during the day when demand is low, and reduced supply in the evening when demand is high, resulting in price volatility and potentially compromising grid stability. Figure 6 shows that the duck curve for the Californian Electricity Market is intensifying over time as the proportion of solar generation in the system increases, resulting in a six-fold variation in network load between the middle of the day and the evening peak.

[15] For a guide to the NEM see: https://www.blueprintinstitute.org.au/untangling_the_nem

[16] AEMO (2021). 'The National Electricity Market: Fact Sheet', https://aemo.com.au/-/media/files/electricity/nem/national-electricity-market-fact-sheet.pdf

Figure 6: The Californian Electricity Market Duck Curve

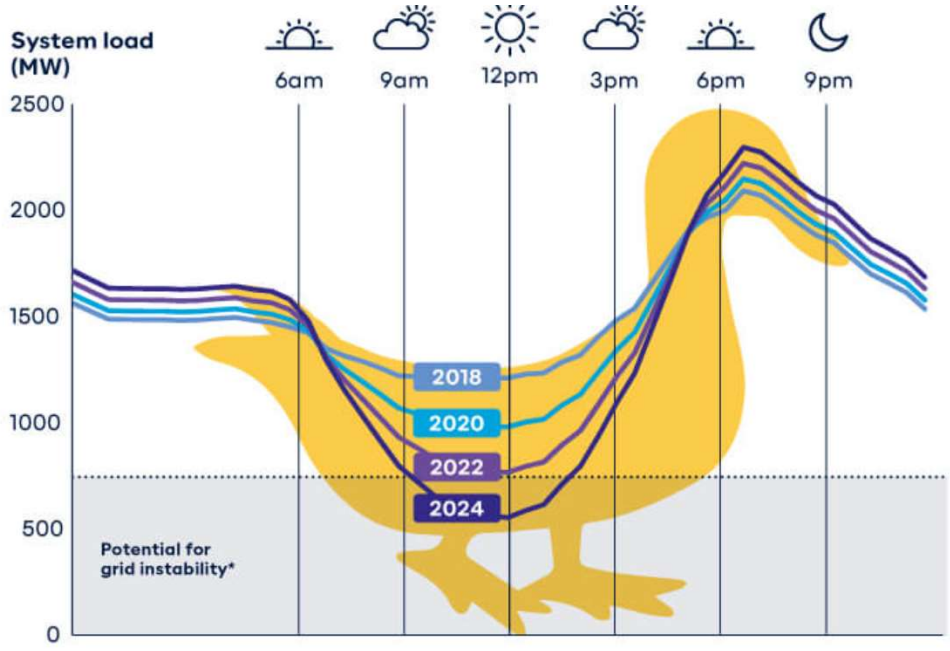


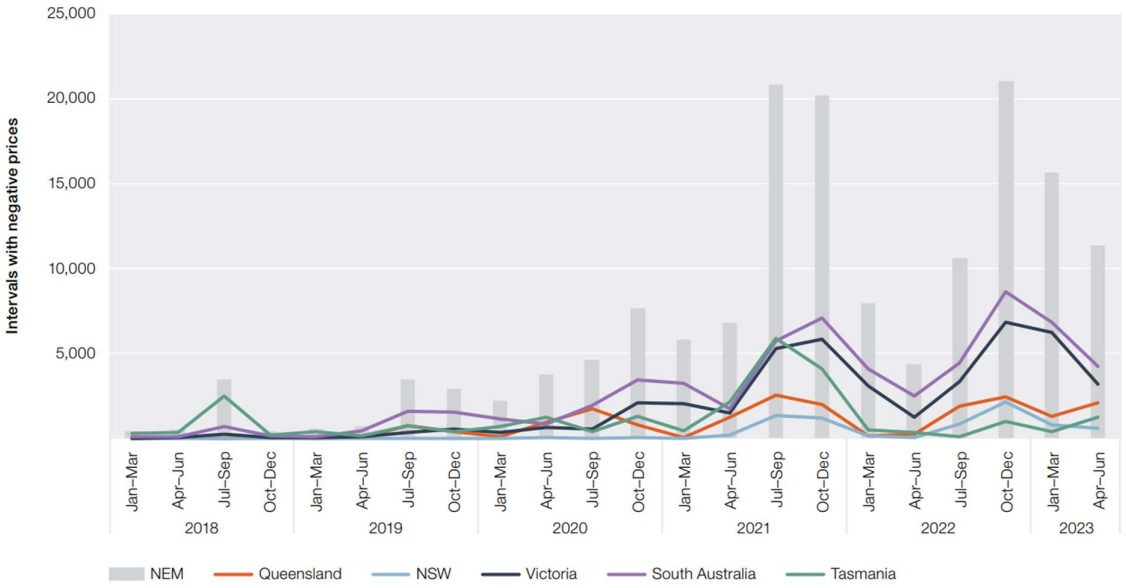
Image source: https://blogs.chapman.edu/gci/2023/05/09/flattening-the-duck-curve/

Similar patterns can be observed in the NEM, where the growing variability of supply has resulted in increased price volatility. For example, in 2022 average wholesale prices in Victoria varied from $10 MWh in the middle of the day to $120 MWh during the evening peak.[17] The supply/demand mismatch in the NEM is such that wholesale prices in the middle of the day are frequently negative, which means that generators who are unable to stop or limit production (such as coal-fired power stations) effectively pay to dispatch electricity into the national grid. In the absence of increased storage capacity and smart demand management, this problem will become more pronounced as the relative cost of renewables falls and their penetration increases. Data from the Australian Economic Regulator (AER) shows that 2022-23 was the fourth consecutive year to set a record for the number of five-minute intervals at a negative price (see Figure 7) – almost three-quarters of all negative price intervals occurred in South Australia and Victoria, where levels of generation from wind and rooftop solar are highest.[18]

[17] Open NEM (2023). https://opennem.org.au/energy/nem/?range=7d&interval=30m&view=discrete-time

[18] It should be noted that relatively few supply contracts apply the spot price directly but most larger business contracts are based on average anticipated wholesale prices using various hedging instruments.

Figure 7: Count of 5-minute prices below $0 per MWh from January 2018 to Jun 2023



Note: Count of 5-minute prices below $0 per MWh. Prices were not settled in 5-minute intervals until October 2021, although prior to this dispatch was determined on 5-minute basis using 5-minute prices.

Source: AER; AEMO (data).

Image source: AEMO NEM Statement of Opportunities

Key Points

- In the 12 months to October 2023, approximately 99% of electricity generated in Tasmania was derived from renewables, compared to 38% across the NEM. Over the same period, approximately 95% of electricity consumed in Tasmania was derived from renewables (75% from hydro, 17% from wind, and 3% from solar), with the remainder coming from on-island gas generation (0.6%) and importation via Basslink.
- Electricity from on-shore windfarms and commercial solar is significantly cheaper to produce than most non-renewable electricity, but the increasing penetration of renewables in the NEM is making pricing more complex and volatile due to their variability (usually reflecting time of day but also seasonality).
- The viability (and capacity at which they operate) of many established coal-fired power stations is under threat because spot prices in the middle of the day are frequently negative. Many operators are bringing forward closures, increasing the risk of supply shortages and peaks in wholesale prices.
- There is an urgent need to invest in both new renewable generation, transmission, storage, and demand management systems to meet national renewable energy and emissions reduction targets while maintaining system reliability.
- The Commonwealth may have to subsidise coal-fired generators over the next five years to ensure supply and system reliability while we develop systems to store renewable energy.
- The availability of low-cost electricity during the day and the acute need for increased energy storage in the NEM has profound implications and provides significant opportunities for Tasmania given our hydroelectric assets

2 Electricity pricing in Tasmania

Electricity prices in Tasmania are regulated by the Office of the Tasmanian Economic Regulator (OTTER) according to rules set out in the *Electricity Supply Industry Act* 1995 (Tas) (*ESI* Act). The purpose of these regulations is to ensure that monopoly or near-monopoly industries (such as the electricity industry) are providing appropriate services and working in the interests of consumers. The main functions of OTTER with respect to the electricity supply industry are monitoring and reporting on the development of competition, and monitoring, regulating, and enforcing the Tasmanian Electricity Code.

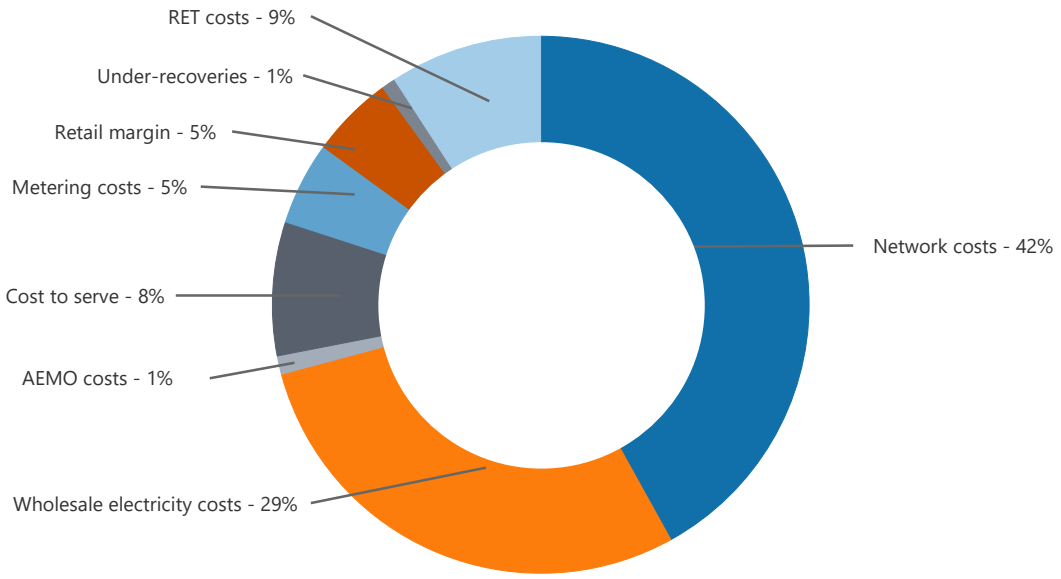
Under this system, the amount Tasmanians pay for electricity varies depending on how much they use and when they use it. In simple terms, there are three basic categories of customer (discussed below), each subject to their own different set of pricing methods.

2.1 Residential Customers and Small Businesses ('Small Customers')

Tasmania's 252,200 residential customers purchase electricity from retailers under annual standard retail contracts. These are regulated by OTTER via the standing offer price, which is revised annually according to the notional maximum revenue (NMR) that the state's only regulated offer retailer (Aurora Energy) is allowed to generate. This means that the electricity prices paid by consumers are effectively capped by Aurora Energy's annual NMR. Business customers that use less than 150MWh of electricity per year (approximately $30,000 at 20c per KWh) also purchase power under standard retail contracts.

Although OTTER has broad discretion in setting the NMR, several of the individual components of Aurora Energy's revenue are either fixed or beyond its control. For example, network charges comprise around 42% of the total cost of electricity and are regulated by the AER (Figure 8 and Table 3). The NMR also includes fixed charges levied by the Australian Energy Market Operator (AEMO) for participation in the NEM and Renewable Energy Target (RET) costs, which together make up just under 10% of the NMR ($52.7m in 2021-22). Most of the remainder comprises generation costs, which are also regulated but under the Wholesale Contract Regulatory Instrument, a separate process to the standing offer price.

Figure 8: Cost component breakdown of Aurora Energy notional maximum revenue (NMR) determination 2021-2022



Data Source: OTTER Standing Offer Price Determinations

Table 3: Components of the standing offer price

Cost Component	Description	Portion of 2021-22 standing offer price
Network costs	Network costs are regulated by the AER. They are paid by Aurora Energy to TasNetworks for the transmission of electricity in Tasmania.	42%
Wholesale electricity costs	Wholesale costs are calculated based upon several factors, primarily the forecast of different load and energy requirements and the wholesale prices. Due to the linkage to the NEM, wholesale prices in Tasmania are closely related to and based upon the Victoria prices. However, they do diverge – particularly where transmissions constraints apply.[19]	29%
Renewable energy target (RET) costs	The Australian Government currently has a Renewable Energy Target (RET) scheme. This scheme creates a guaranteed market for renewable energy and offers tradable certificates. This scheme has two elements: the first is the Large-scale renewable energy target (LRET). This includes larger projects like wind farms. The second is the small-scale renewable energy scheme (SRES). This	9%

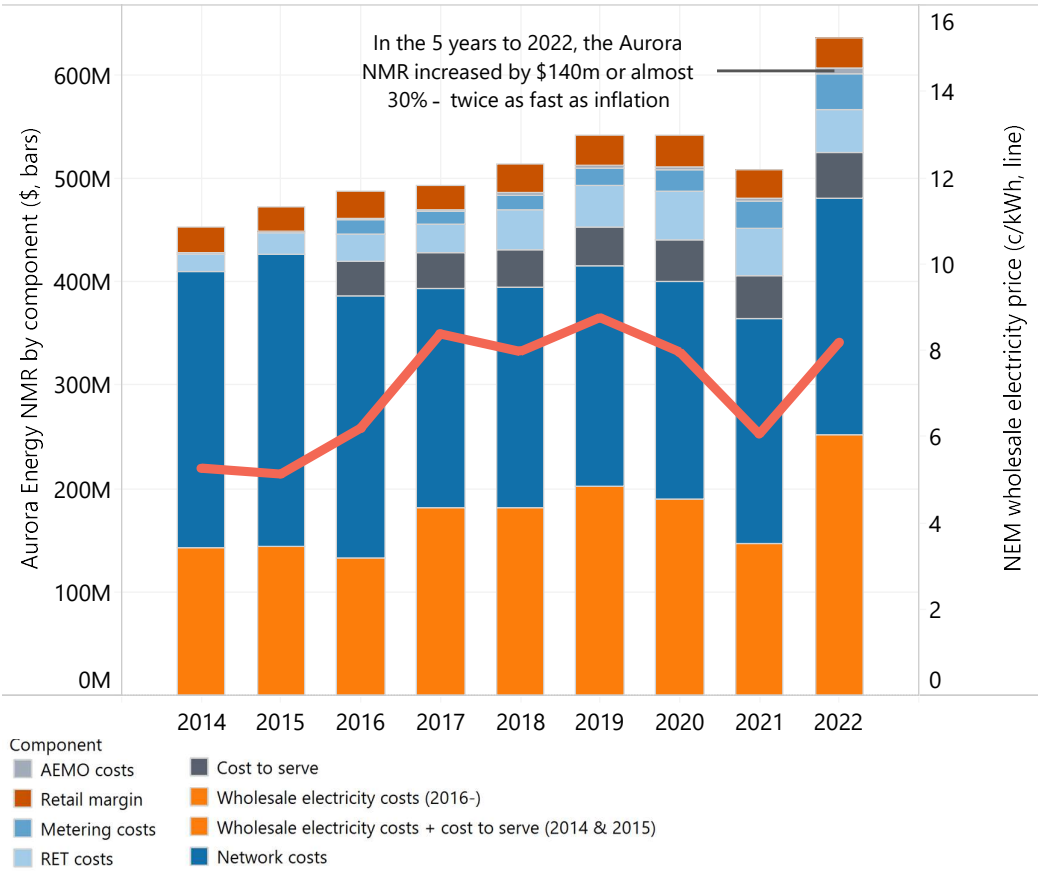
[19] Tasmanian Economic Regulator (2021). *Wholesale Contract Regulatory Instrument*, March 2021, https://www.economicregulator.tas.gov.au/Documents/WholesaleContractRegulatoryInstrumentFinalMarch2021.pdf; Tasmanian Economic Regulator (2022). *Energy in Tasmania Report 2020-21*, March 2022, https://www.economicregulator.tas.gov.au/Documents/Office%20of%20the%20Tasmanian%20Economic%20Regulator%20-%20Energy%20in%20Tasmania%20Report%202020-21.pdf

Cost Component	Description	Portion of 2021-22 standing offer price
	includes rooftop solar panels and solar hot water systems.	
Aurora Energy's retail costs	The retail costs include different services that Aurora Energy is required to provide to consumers and comply with regulation.	8%
Metering costs	This relates to the costs Aurora Energy faces for the installation, maintenance, and reading of meters including metering competition (which was introduced in 2017).	5%
Retail margin	The retail margin aims to compensate Aurora Energy for any risks it faces providing standard retail services to customers, and to cover depreciation.	5%
AEMO costs	The AEMO is a not-for-profit company that manages the electricity systems and markets across Australia.	1%

This 'building block' approach to setting power prices in which transmission, distribution and associated costs are set through regulated processes and the wholesale price (which has been the main driver of price increases) is determined by broader market dynamics has led to the steadily increasing retail electricity prices in Tasmania between 2014 and 2020 before greater volatility in 2021 and 2022 (Figure 9). More specifically:

- The NMR determination increased by around 30% per year between 2017 and 2022 – roughly twice as fast as CPI.
- The wholesale element of the price increased by 38% between 2017 and 2022 (earlier data isn't directly comparable).
- Aurora Energy's NMR fell by 6.7% between 2020 and 2021 before increasing by almost 24% between 2021 and 2022.
- Given the wholesale price has been lower over the course of 2023 the next Tasmanian retail price determination for the 2023-24 financial year is likely to be lower than the 2022 determination subject to network charges and the impact of inflation on distribution.
- Given forecasts of supply constraints in the NEM over the next decade, it is likely that the wholesale prices will remain volatile.

Figure 9: Aurora Energy NMR by year and component and volume-weighted wholesale price, 2014-2022



Data Source: [OTTER Standing Offer Price Determinations]

Because different states and different retailers use different pricing methodologies, it can be difficult to compare the cost of electricity between jurisdictions. Comparisons are further complicated by the fact that Tasmanians use more electricity than the national average due to our cold winters and generally poorly insulated housing stock (Section 3). For this reason, comparisons that focus on the regulated price (the standing offer) can be misleading. It is often claimed that Tasmania has the lowest, or one of the lowest, regulated electricity prices in the nation,[20] but this does not give an accurate indication of what the average Tasmanian actually pays compared with households of similar usage in other places. In Victoria, for example, the regulated price (or 'default offer') is higher than it is in Tasmania but only 15% of households actually pay that price as most are on cheaper plans,[21] likely due to greater competition between a larger number of retailers. In Tasmania, by contrast, some 98% of households pay the standing offer price.[22] In other words, the regulated price

[20] Barnett, Guy (2022). 'Tasmanians get the lowest electricity prices but only scare tactics from Labor', Media Release, https://www.premier.tas.gov.au/site_resources_2015/additional_releases/tasmanians-get-the-lowest-electricity-prices-but-only-scare-tactics-from-labor

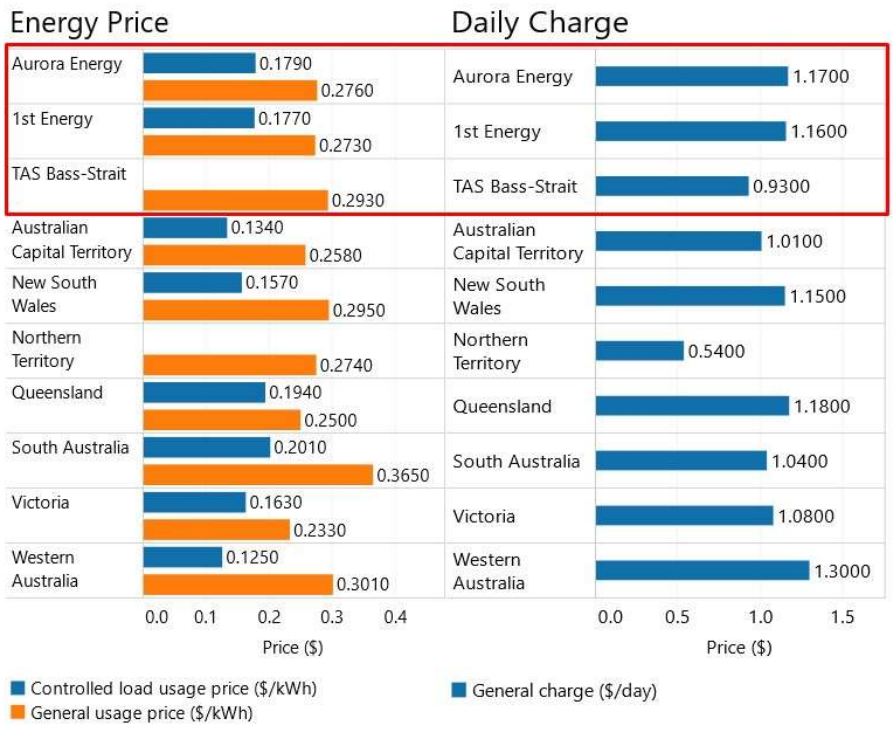
[21] Essential Services Commission (2023). 'Victorian Default Offer 2023:24: final decision', 25 May 2023, https://www.esc.vic.gov.au/media-centre/Victorian-default-offer-2023-24-final-decision

[22] Australian Energy Market Commission (2021). 'Lower electricity prices ahead for Tasmania - Residential Electricity Price Trends 2021: Final Report', November 2021, https://www.aemc.gov.au/media/99060

functions effectively as a 'ceiling' in other jurisdictions but, in Tasmania, it is paid by practically every consumer.

A further consideration is that even though Tasmania's regulated 'time-of-use' (peak/off-peak) tariff is among the lowest of its kind in the country, most customers are still on the Aurora Energy Tariff 31/41 controlled-load price structure. This latter tariff is actually one of the more expensive of its kind nationally (see Figure 10). The result of all these factors is that, while difficult to compare directly, the average Tasmanian household likely pays more money for the same amount of power than a comparable household in most mainland states, or at least those in the NEM. Appendix 1 provides an indication of what a similar electricity customer would be charged by Aurora Energy compared with several representative Victorian retailers.

Figure 10: Electricity prices in representative general usage/controlled load tariffs available to residential customers, per jurisdiction and the BSI



Data source: OTTER Standing Offer Price Comparison Reports

2.2 Large Customers

If a business uses more than 150MWh of electricity a year (equivalent to an annual electricity bill of approximately $30,000), they have two options: they can negotiate retail contracts (for instance with Aurora Energy) without the full suite of protections offered under the National Energy Customer Framework (NECF); or they can purchase via negotiated agreements with Hydro Tasmania. Authorised retailers[23] for the sale of electricity (such as Aurora Energy) can access regulated wholesale electricity prices. Hydro Tasmania is obligated to provide these customers with Approved Financial Risk Contracts, which follow a specific format and pricing under the *ESI Act*. The pricing

[23] Defined under the *Electricity Supply Industry Act 1995.*

methodology and maximum price that can be charged under these contracts is set out by the *Wholesale Contract Regulatory Instrument*. These wholesale agreements allow retailers to purchase electricity, which can then be sold onto consumers (i.e., medium or large businesses) through retail contracts. Alternatively, large consumers may purchase electricity directly through Hydro Tasmania via their rate cards. Electricity prices are not regulated when sold through rate cards, with prices fluctuating on a weekly basis unless long-term contracts are entered.

There are approximately 8,000 Tasmanian businesses on wholesale contracts who are vulnerable to growing volatility in the NEM over the next decade.

2.3 Major Industrials

According to TasNetworks, there are ten transmission-connected facilities in the State, and these were responsible for 57% of all Tasmanian-generated energy usage in 2021. The vast majority of this was consumed by the four 'major industrial' (MI) energy users. Like other large customers, these transmission-connected businesses have the option to purchase power either at the wholesale price or via PPAs with Hydro Tasmania. However, unlike other large users, the MIs enjoy a great deal of market power when negotiating long-term contracts. Their high share of overall demand also means that their consumption plays a vital role in stabilising the grid, which further increases their leverage at the negotiating table. The resulting supply agreements are commercial-in-confidence and the commercial return they provide to Hydro Tasmania remains unknown.

Key Points

- Although comparisons are not straightforward, Tasmanian households and small businesses likely pay more for their electricity than counterparts in other states depending on the tariff (see Appendix 1).
- There are approximately 8,000 Tasmanian businesses on wholesale contracts who are vulnerable to growing volatility in the NEM over the next decade.
- MIs play a significant role in Tasmania's electricity system, not only using a significant amount of electricity (for example, using 57% of Tasmanian-generated energy usage in 2021), but also serving to stabilise the grid.
- Due to their importance, MIs hold significant power when negotiating contracts with Hydro Tasmania, but being commercial-in-confidence, the details are unknown.

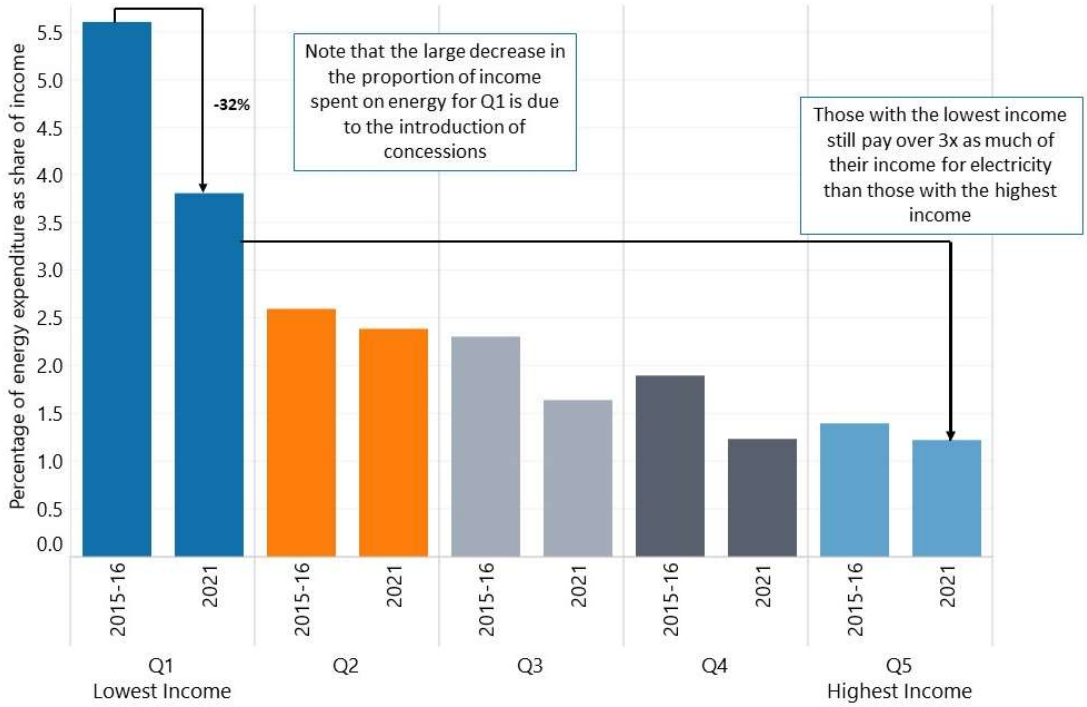
3 Impacts on consumers

With electricity prices increasing at more than twice the CPI since 2014, consumers are unsurprisingly struggling with high electricity bills.[24] This is particularly true for Tasmanians, who typically have higher electricity bills than consumers in other parts of the NEM – despite some of the lowest standing offer prices in the country. There are two reasons for this:

1. Tasmanians use more electricity than mainland households due to the cooler climate and poorly insulated housing.
2. In contrast to other states almost all Tasmanians pay the standing offer price due to a lack of competition in retail pricing (see Section 2.1).

Lower income households are especially vulnerable to rising electricity prices because, like most essentials, they spend a greater proportion of income on electricity than high income households (see Figure 11).

Figure 11: Share of income spent on energy by income quintile, 2015-16 and 2021



Data Source: 2021 Household Income and Labour Dynamics Australia (HILDA) Survey

Furthermore, in many cases lower income households are unable to improve the energy efficiency of their housing to cut electricity bills. Whilst new homes are required to have a minimum 6-star energy rating, many older homes have much lower ratings (below 3 stars).[25] To improve an already existing home to these standards can be costly and may not be an option at all if a house is being rented.[26] Other solutions include the purchase of energy efficient appliances, however high upfront costs exclude lower income households. There are currently Tasmanian Government schemes that help

[24] Australian Energy Regulator (2023). *State of the energy market 2023*, https://www.aer.gov.au/publications/state-of-the-energy-market-reports/state-of-the-energy-market-2023 p. 234
[25] Ibid.
[26] Finch, A 2022, 'I have done all I can to save energy and I can barely afford the cost of existing', *The Guardian*, 31 Oct 2022

improve energy efficiency within homes, such as the Energy Saver Loan Scheme. However, such concessional loan schemes are more suited to middle income households with greater capacity to service the associated debt.

When electricity prices rise, low households are often forced to choose between other necessities, such as healthcare and food, and powering their homes.[27] Being forced to ration electricity use can have devastating consequences, ranging from reducing the amount households eat to exacerbating existing health problems (such as arthritis), no heating in cold weather, and even death.[28]

3.1 Electricity concessions and rebates

There is a range of electricity concessions and rebates available for low-income households in Tasmania:

- The primary discount scheme is the State Government's **Annual Electricity Concession**, which will provide eligible low-income households with a discount of 172.434 cents per day (approximately $630 annually) in 2023-24.
- In May 2023, in response to the recent rise in electricity costs, the State Government announced the **Energy Price Relief Rebates** scheme – jointly funded with the Australian Government – which will provide eligible Tasmanian households with $250 per year in 2023-24 and 2024-25.
- The **Heating Allowance** is a means-tested payment of $56 per year for eligible pensioners, provided under the *Pensioners (Heating Allowances) Act* 1971.
- The **Life Support Concession** is a daily discount on electric prices for households in which an individual uses an approved life support system, with the concession amount determined by the type of equipment used.
- The **Medical Cooling or Heating Concession** provides households in which an individual has a medical condition that requires the cooling or heating of their main home with a daily concession of 51.648 cents per day (approximately $188 per year).

Eligibility for the various concessions and rebates, and their coverage of Tasmanian households, is provided in Table 4. Despite the availability of these concessions and rebates, many Tasmanian households are nevertheless struggling with the rising cost of electricity. This may in part be due to the fact that electricity prices have increased faster than concession rates, as well as the compounding effect of the rising costs of other essential goods and services. In 2017, the Annual Electricity Concession was 135.208 cents per day (approximately $493.50 per year),[29] covering 24.2% of the estimated annual electricity bill for a medium usage customer ($2,123, based on consumption of 8,310 kWh). By comparison, in 2022 (see Figure 12), the Annual Electricity Concession was 140.740 cents per day (approximately $513.70 per year), which would have covered 23.3% of the estimated annual electricity bill for a medium usage customer ($2,202, based on consumption of

[27] Fry, M. Jane, Farrell, Lisa and Temple, B., Jeromey (2023). 'Energy poverty and food insecurity: Is there an energy or food trade-off among low-income Australians?' *Energy Economics* 123, July 2023, https://www.sciencedirect.com/science/article/pii/S0140988323002293

[28] Dennien, Matt (2019). 'Cold housing under fire after report links deaths', *The Examiner*, 12 August 2019, https://www.examiner.com.au/story/6323666/cold-housing-under-fire-after-report-links-deaths/; Bradford (2023). 'Poorly insulated homes are impacting mortality rates', Bradford, https://www.bradfordinsulation.com.au/designsmart/building-science-insights/poorly-insulated-homes-are-impacting-australian-mortality

[29] Tasmanian Economic Regulator (2017). *Comparison of 2017 Australian Standing Offer Energy Prices*, April 2017, https://www.economicregulator.tas.gov.au/Documents/Standing%20Offer%20Prices%20April%202013%20(13%20976).PDF

8,028 kWh).[30] During the same period the annual electricity bill for 'time of use' tariff customers increased by approximately $200 (based on median usage estimates).[31]

Table 4: Electricity concessions available in Tasmania

Type of Concession	Details and Amount	Eligibility	Coverage
Annual Electricity Concession	A daily concession of 172.434 cents per day (approximately $630 a year) in 2023-24	Pensioner Concession Card (Services Australia or Department of Veterans Affairs [DVA]) Heath Care Card (Services Australia) Immicard (Bridging Visa E)	94,300 households, (approximately one third of Tasmanian households)[32]
Energy Price Relief Rebate	An annual rebate of $250 (paid across two $125 instalments, in the June and September quarters) automatically applied by the retailer. This rebate will occur for two years. This is a partnership between the Tasmanian government and Australian Government to help with the cost of living.	Health Care Card (Services Australia) Pensioner Concession Card (Services Australia or DVA) Seniors Health Card (Services Australia or DVA) Veteran Gold Card Family Tax Benefit A and B Carer Allowance	Up to 140,000 households
Heating Allowance	A yearly payment of $56 (paid twice a year in $28 instalments during May and September).	Available to those who hold a Pensioner Concession Card, and receiving one of a number of pensions	No publicly available data
Life Support Concession	A daily discount for customers who use an approved life support system.	Various from 45.350 to 240.845 cents per day depending on need	No publicly available data
Medical Cooling or Heating Concession	A daily concession of 51.648 cent per day (equating to around $188 per year).	When a medical condition that requires the cooling or heating of their main home and have a Health Care Card or a Pensioner Concession Card.	No publicly available data

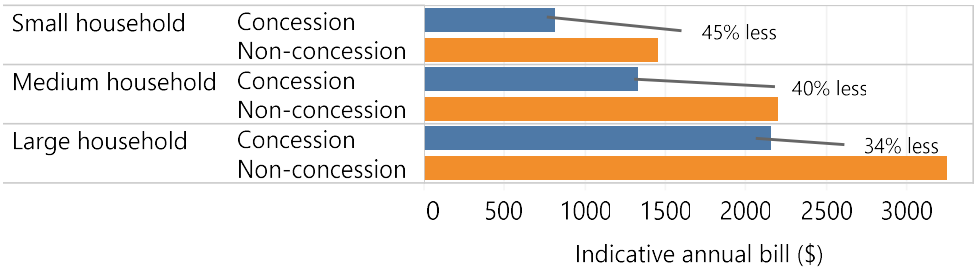
Data source: Tasmanian Government concessions guide

[30] Tasmanian Economic Regulator (2022). 'Typical Customers', https://www.economicregulator.tas.gov.au/electricity/reports/price-comparisons/typical-customers

[31] Tasmanian Economic Regulator (2023). 'Regulated Electricity Prices and Feed-in Tariff Rate to Apply from 1 July 2023', Press Release, https://www.economicregulator.tas.gov.au/Documents/20230621%20Media%20release%20re%20regulated%20electricity%20prices%20and%20~%20in%20tariff%20rate%20to%20apply%20from%201%20July%202023.pdf

[32] This proportion appears to have remained steady since 2014, Renewables, Climate and Future Industries Tasmania (2022). 'Electricity Pricing Intervention: Minute to the Treasurer', 25 May, https://www.treasury.tas.gov.au/Documents/Information%20for%20release%20-%20RTI%20-%20Electricity%20Price%20Capping.PDF; Hydro Tasmania (2018). 'Monitoring of electricity supply in the National Electricity Market", Submission to ACCC, https://www.accc.gov.au/system/files/Hydro%20Tasmania.pdf; Department of State Growth, Tasmanian Government (2014). *Energy Strategy Issues Paper*, https://www.stategrowth.tas.gov.au/__data/assets/pdf_file/0005/90815/Energy_Strategy_Issues_Paper.pdf

Figure 12: Average electricity bill by customer usage in Tasmanian households, concession and non-concession customers, 2022



Data source: OTTER Typical Customers Report 2022

Tasmanian electricity price concessions operate at a fixed rate, either as a yearly or daily rebate. This approach may be creating an equity issue, as it does not account for household circumstances. Because low-income households with high electricity needs[33] receive the same price concessions as those with low energy needs,[34] the rebate might be inadequate for the former and more than sufficient for the latter. For example, ACOSS has calculated that "a fixed concession of $241.63 a year would only cover 7% of the energy bill of a 4-person family in a 3-bedroom home without solar, compared to a single person 2-bedroom home with solar where the same concession covers 63% of the energy bill".[35] As discussed in Section 0, developing concessions which are proportional to consumer need should be considered.[36]

3.2 Business concessions

In addition to the above concessions for individuals, businesses in Tasmania can access both direct subsidies and loan or grant programs designed to improve energy efficiency. Small business customers (that is, those with less than 150MWh of annual electricity consumption), can access the following:

- The **Small Business Energy Bill Relief** program, which provides rebates directly to consumers' bills. The rebate, totalling $650 for the 2023-24 financial year, is provided in two instalments - $325 paid in the September quarter of 2023 and a further $325 in the June quarter of 2024.
- The **Energy Saver Loan Scheme**, which finances efficiency improvements with zero-interest, no-fee loans. Up to $10,000 is available through the scheme and loans are issued for either 1- or 3-year terms.

[33] Potential reasons for this could include a large number of occupants, health conditions that require managed heating or cooling, inability to afford energy efficiency upgrades, or inability to implement efficiency upgrades due to renting.
[34] https://www.accc.gov.au/media-release/households-face-higher-electricity-bills-as-wholesale-price-spikes-flow-through
[35] https://www.acoss.org.au/media_release/overhaul-of-energy-concessions-needed-as-three-million-households-struggle-to-pay-their-energy-bills/
[36] https://www.accc.gov.au/system/files/Inquiry%20into%20the%20National%20Electricity%20Market%20-%20June%202023%20Report.pdf

Large businesses (150MWh+) can access subsidised loans of up to $60,000 to finance energy efficiency improvements. This year, eligible large business customers also received a one-off payment of $20,000 to offset the burden of electricity price rises under the **Large Business Customer Electricity Support Scheme**.

3.3 Energy debt

Tasmania has seen the second highest increase in customers with energy debt in the NEM with a 21% increase between 2018 and 2021, with the amount of debt held by consumers also increasing by 13% to about $1100.[37] In Tasmania, customers with Aurora Energy are able to access the YES (Your Energy Support) team who can set up payment plans, help consumers to lower their power usage, and connect them with a financial councillor.[38] Over the past six months, there has been a 12% increase in the number of customers accessing this hardship program which is mostly comprised of concession customers.[39] OTTER recently reported that 18,806 (7.4%) consumers are experiencing energy debt, with an average debt size of $718.

Tasmanian Energy Dividend Scheme

In August 2023 the Tasmanian Government announced a scheme whereby if Hydro's dividends exceed $100 million pa, 50% of the surplus dividend will be distributed to consumers as a credit on their electricity bill.

The scheme has merit in that it will potentially provide some bill relief, but there are issues that need to be carefully considered:

- The concessions does not appear to be means tested or focus on vulnerable customers
- The sustainability of Hydro's profitability (especially in the absence of Marinus) is uncertain given rising debt and need for greater capital spending on ageing assets
- It will further complicate Tasmania's electricity concession regime when a carefully designed integrated approach would deliver better outcomes.

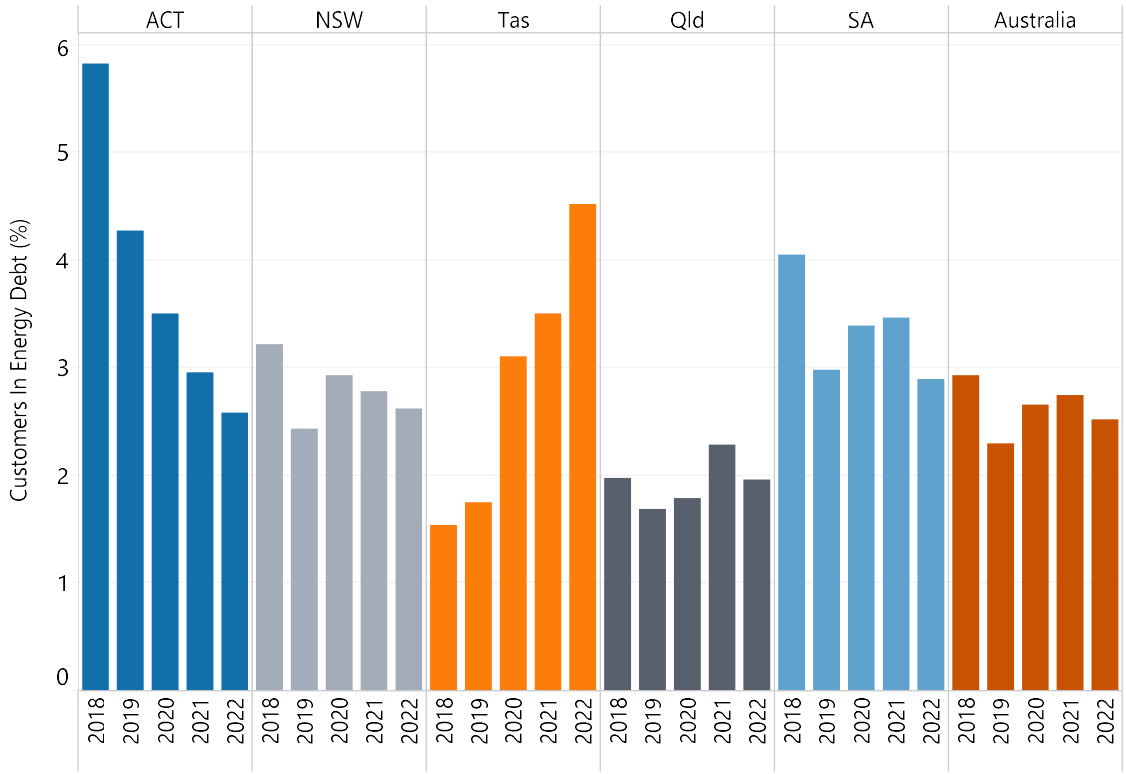
More Tasmanians were in energy debt as of 2022 than those in any other state, and Tasmania is also the only state whose share of customers in energy debt was higher last year than it was five years ago (see Figure 13).

[37] Australian Energy Regulator (2023). *State of the energy market 2023*, https://www.aer.gov.au/publications/state-of-the-energy-market-reports/state-of-the-energy-market-2023; Seeder, Benjamin (2023). 'Tasmanians spent 3% of salaries on power in 21-22, says Regulator', 12 October, *The Examiner*, https://www.examiner.com.au/story/8384350/tasmanians-have-least-affordable-power-bills-labor/

[38] Aurora Energy (2023). 'Your Energy Support (YES) Program', https://www.auroraenergy.com.au/yes

[39] Aurora Energy (2023), Facebook post 16 August 2023, https://www.facebook.com/auroraenergytas/posts/pfbid0yjqz9mTvsnXyEm2SQDjfEWGN74XoWPF74huCYFipcouYzG12e3cFspz2hHcJk7tGl, accessed 10 October 2023; Australian Energy Regulator (2023). *Quarterly retail performance report, Jan-Mar 2023*, https://www.aer.gov.au/retail-markets/performance-reporting/retail-energy-market-performance-update-for-quarter-3-2022%E2%80%9323

Figure 13: Share of customers in energy debt by state, 2018-2022



Data Source: [AER Annual Retail Markets Report 2021-22]

Key Points

- Lower income households spend a greater proportion (*3) of their income on electricity than higher income households.
- The State Government's Annual Electricity Concession hasn't kept up with rising prices. When introduced in 2017 it covered 24.2% of an average bill but has now fallen to 23.3%. On top of this, over the same period, an annual electricity bill for 'time of use' tariff customers has increased by approximately $200.
- Electricity concessions and rebates all run at a fixed rate, whatever the circumstances of the households, raising considerable equity concerns.
- In terms of energy debt, Tasmanians are doing it tougher than most other states, with a 21% increase in debt from 2018 to 2022.

4 Outlook and opportunities for Tasmania

The outlook for national electricity demand and investment over the coming decade presents considerable opportunities for Tasmania, as well as significant risks. In particular, the transition from carbon-intensive energy sources to renewable electricity will increase the value and importance of Tasmania's renewable generation and storage capacity. It also increases the likelihood of major supply constraints and even power shortages, particularly in Victoria and South Australia.[40]

According to AEMO, investment in new generation and transmission capacity and a major restructuring of markets will be critical: "Over the 10-year outlook, we continue to forecast reliability gaps, which are mostly due to the expectation that 62 per cent of today's coal fleet will retire by 2033".[41] Crucially, the risks that a lack of investment in new generation poses are not limited to the medium-term horizon. The AEMO analysis shows that even if all committed and anticipated generation projects proceed (a big 'if'), Victoria and South Australia will still fall below the level required to maintain the relevant reliability standard this coming summer. NSW will follow by falling short in 2025-26, and Queensland will fall short by 2029-30.

Figure 14: Expected unserved energy, ESOO Central scenario, 2023-24 to 2032-33 (%)

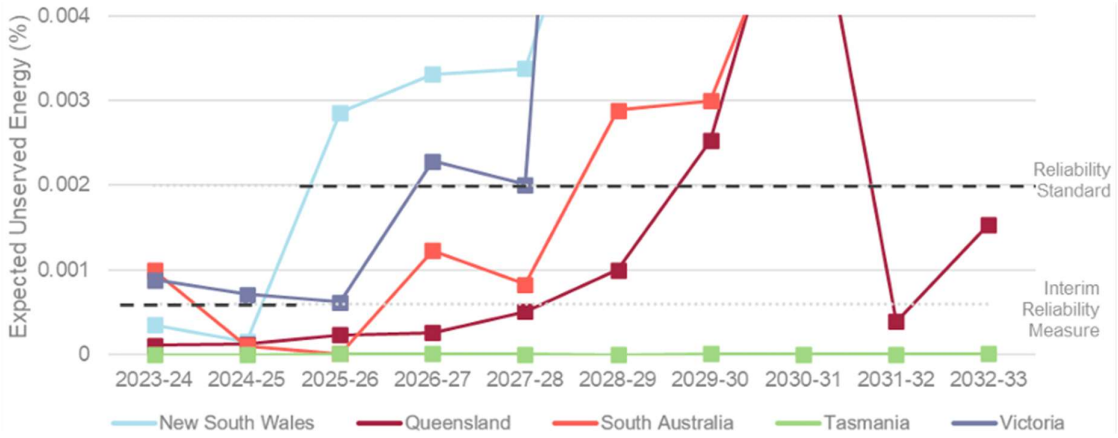


Image source: AEMO NEM Statement of Opportunities (ESOO)

Given this outlook of increasing demand, precarious supply, and uncertain investment, Tasmania's potential contribution to reliable renewable generation capacity, firming, and deep storage, due to its hydro-electric system, will become more important as coal-fired generation retires and the NEM becomes more dependent on renewables.

4.1 Tasmania's future energy system

In order to ensure that Tasmania's energy system can reliably meet on-island demand and is positioned to capitalise on the opportunities afforded by the energy transition, policy should focus on two distinct but interrelated elements.

1. Preserving, where possible, hydroelectric capacity for those times of day and year when it is most valuable; and

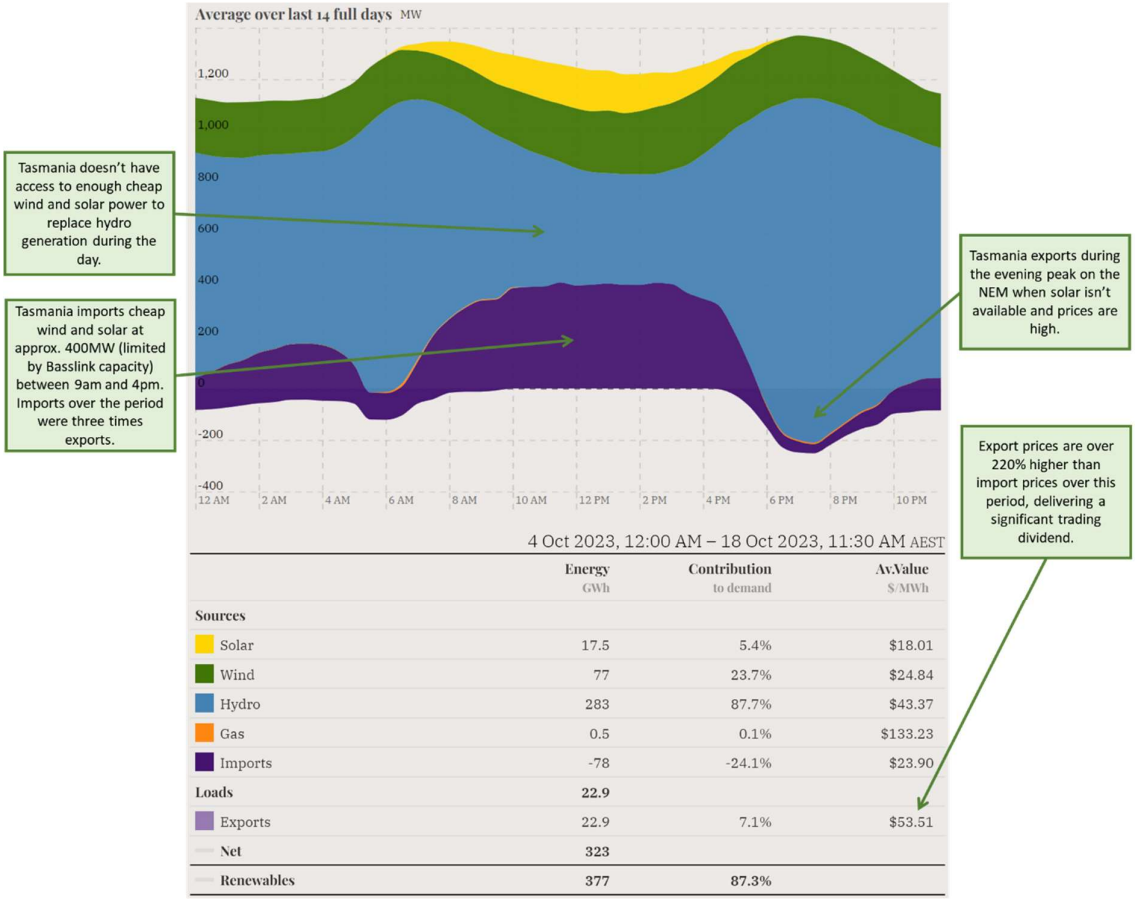
[40] AEMO (2023). 'Urgent and ongoing investment needed to maintain energy reliability', 31 August 2023, Media Release, https://aemo.com.au/en/newsroom/media-release/urgent-and-ongoing-investment-needed-to-maintain-energy-reliability
[41] Ibid.

2. Promoting investment in new renewable generation and/or interconnection plus storage capacity to meet on-island demand during the day when the supply of low-cost wind and solar generation across the NEM is plentiful.

While increased interconnection with the NEM will help maximise the return on Tasmania's hydroelectric assets and support further investment in renewable generation, this strategy should only be pursued if the trading benefits clearly outweigh the costs of increased interconnection. As outlined in Section 0, potential trading benefits will be maximised if there is sufficient supply of low-cost wind and solar generation to meet on-island demand during times of low prices. This will save our more valuable hydro capacity for times when supply is limited in the NEM and prices are highest. As well as maximising returns to Hydro Tasmania (and the Tasmanian public), increased and more diverse renewable supply for on-island demand will reduce the need to rely on imported fossil-fuel generation from the mainland and will enhance Tasmania's energy security by reducing our dependence on hydro generation in a changing climate.

Figure 15 illustrates average daily electricity generation in Tasmania over a two-week period in October 2023. It demonstrates that insufficient local wind and solar generation and constrained interconnection means that hydro (blue in the chart) is the State's primary source of electricity at all times. This is the case even during the middle of the day when demand is low and NEM prices are most likely to be negative.

Figure 15: Tasmania's average daily electricity generation October 4-18, 2023



	Energy GWh	Contribution to demand	AvValue $/MWh
Sources			
Solar	17.5	5.4%	$18.01
Wind	77	23.7%	$24.84
Hydro	283	87.7%	$43.37
Gas	0.5	0.1%	$133.23
Imports	-78	-24.1%	$23.90
Loads	**22.9**		
Exports	22.9	7.1%	$53.51
Net	**323**		
Renewables	**377**	**87.3%**	

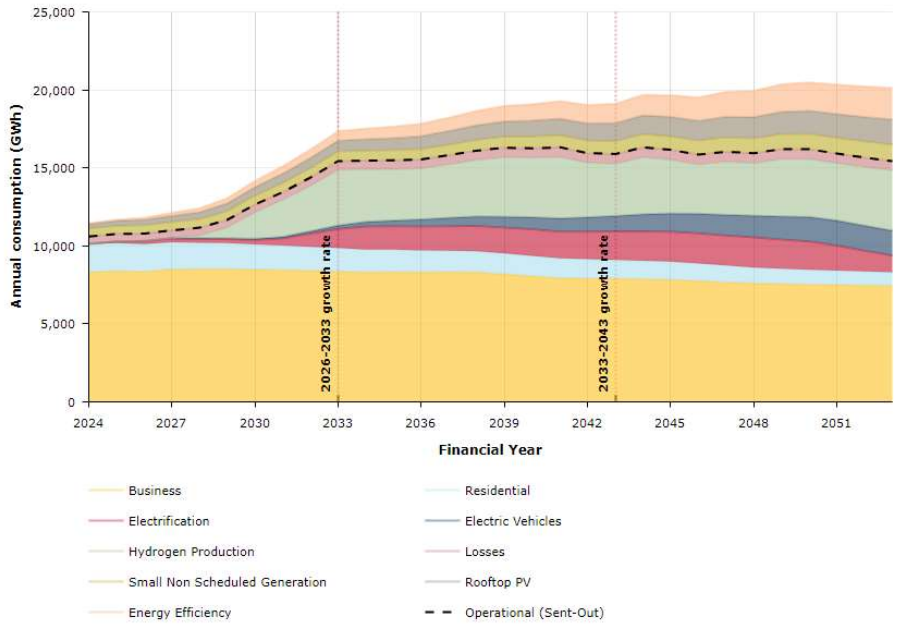
Image source: Open NEM (annotations authors' own)

As a primary principle, Tasmania should not be generating hydroelectricity during the day except in situations of very high demand or supply shortages from other sources (mid-winter).[42] Tasmania's energy strategy should focus on developing sufficient on-island wind and solar generation and/or interconnection or storage to meet this objective. At present, there is a generation shortfall of approximately 800MW, although the capacity of new generation projects to meet this load target will be significantly higher depending on the efficiency factor attained.

4.1 Future electricity demand

Electricity demand in Tasmania is forecast to increase significantly over the next decade, but determining the extent of this increase is challenging. For example, the AEMO *Electricity Statement of Opportunities* (ESOO) model estimates that annual demand in Tasmania is likely to be around 48% higher by 2033 than currently, due to population growth, the electrification of transport and industry and the possibility of establishing small-scale domestically focused hydrogen production (Figure 16). While there is a high degree of uncertainty (hence the need for flexible and response approach), it is clear is that an increased supply of secure and affordable renewable energy will be essential to support the electrification of Tasmanian industries, decarbonise transport, and future-proof Tasmanian jobs. To achieve this, the Tasmanian Government will need an informed, adaptive energy policy focused on the needs of local households and business.

Figure 16: AEMO's 2023 forecast of annual Tasmanian electricity consumption (central scenario)



Note: Annual demand is forecast to increase from 10,600 GWh in 2024 to 15,400 GWh hours in 2034 (48%). This scenario assumes domestically focused H2 consuming 21,60 GWh by 2034

Image source: AEMO NEM Statement of Opportunities (ESOO)

[42] Some Hydro stations are required to operate continuously at reduced capacity to maintain environmental flows in river systems.

4.3 Marinus Link and Tasmanian electricity prices

Marinus Link is a proposed 750 MW high-voltage direct current interconnector that would increase interconnection between the Tasmanian and Victorian electricity transmission systems. As of August 2023 the project is expected to cost between $3 billion and $3.3 billion.

If Basslink serves its full original design life of 40 years,[43] this would increase Tasmania's interconnection capacity with the NEM to 1250 MW, at least until 2046. Combined with pumped hydroelectric energy storage, this would drastically increase Tasmania's ability to provide firming and deep storage for the NEM while eliminating our need to 'waste' precious hydro power during the day when wind and solar is plentiful and cheaper.

Marinus is a complex project that, subject to final project costs and the cost-recovery model ('who pays'), offers the **following potential benefits**:

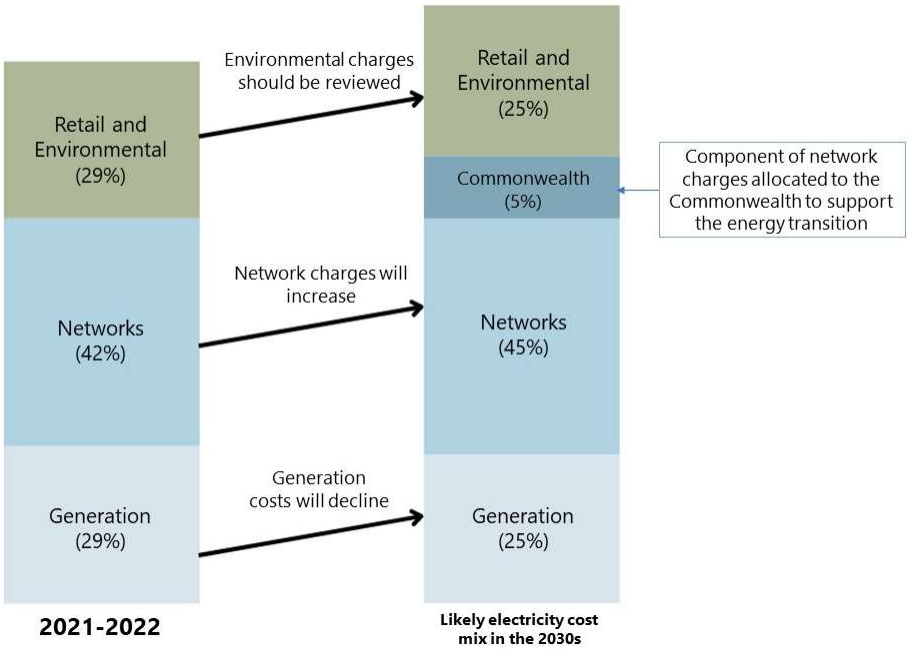
- Maximise downward pressure on Tasmanian wholesale energy prices by increasing the supply of low-cost renewables when wholesale prices are low or negative; (Section 0)
- Increase the return to Hydro Tasmania (and Tasmanian taxpayers) as more hydro capacity can be made available to the NEM to support periods of peak demand or reliability needs, and maximise the opportunities of high prices; (Section 0)
- Support emissions reduction across the NEM by expediting the retirement of coal-fired power stations and reducing reliance on gas generation to meet peak demand;
- Improve energy security and supply in Tasmania, and reduce the likelihood of having to use the gas-fired Tamar Valley Power Station more intensively; and
- Support investment in new renewable generation in Tasmania to meet future demand at the lowest possible cost.

The project also involves risks and could potentially put upward pressure on Tasmanians' electricity prices in the short-term, depending on the final project cost and proportion of this cost which consumers pay via the Maximum Allowable Revenue (MAR) determination. The **key risks** include:

- Even with concessional finance, under the established 'consumer pays' cost-allocation methodology, the increased network costs may exceed wholesale price benefits (see Figure 18).
- The impact on consumers remains uncertain as the formal revenue ruling process conducted by the AER for determining project costs to be recovered from consumers and the distribution of these costs among states is unlikely to be decided until late 2024.
- While it is possible lower cost solutions for storing and dispatching renewable electricity at scale may be developed over the operating life of Marinus, they aren't currently available and we can't rely on them.

[43] Parliament of Tasmania Public Accounts Committee (2023). 'Hydro Tasmania and the termination of the Basslink Services Agreements', 9 June 2023, https://www.parliament.tas.gov.au/__data/assets/pdf_file/0028/70795/Public-Hearings-9-June-2023-Minister-Barnett.pdf

Figure 17: Indicative representation of the likely change in the composition of energy costs over the next decade



On balance, given the urgent need to reduce energy emissions and the absence of alternative, proven technology that can provide the long-term storage of Tasmania's hydroelectric system, we believe the Marinus Link has merit. The 2022 AEMO *Integrated Service Plan* (ISP) identified Marinus Link as a priority project that can deliver benefits to electricity consumers in Tasmania and beyond while improving system reliability and supporting emissions reduction across the NEM. However, as noted above, there are risks to consumers which must be understood and addressed.

4.4 A new approach to 'who pays' for nationally significant transmission projects

Given the current cost pressures facing large-scale transmission projects globally, we believe the established approach whereby electricity consumers pay for the entire cost (noting how concessional finance from 'Re-Wiring The Nation' reduces this cost) of nationally significant transmission projects, should be reassessed. Instead, cost recovery should be shared between consumers (the MAR), as per the current cost allocation framework, and the Commonwealth. The public policy rationale for this approach is:

- Nationally significant transmission projects (as identified by AEMO) have dual policy goals: ensuring electricity supply to customers (a private benefit); and the attainment of national emissions reduction objectives (a public benefit). *Should electricity consumers be paying for emissions reduction in the absence of a carbon tax?*
- The project costs and financial risks associated with large-scale transmission projects are uncertain. *Given this uncertainty, is it appropriate that consumers carry most of the financial risk?*
- From an equity perspective, the burden of electricity costs is already regressive, with our analysis demonstrating that the poorest 20% of Tasmanian households proportionally spend three times as much income on electricity relative to wealthier households (Section 3). In contrast, the distribution of Commonwealth taxation is moderately progressive, providing a more equitable funding base for new large-scale transmission projects.

- There are precedents for this approach. In recognition of the urgency of the energy transition and the need to promote cross-jurisdictional projects, the European Commission funds up to 30% of priority transmission projects under the Trans-European Networks program.[44]

The Counterfactual: What if Tasmania 'disconnected' from the NEM?

Given the global energy transition and emerging trends in the Australian energy system, it is instructive to explore the counterfactual scenario and assess the medium-term implications of Tasmania establishing a more independent, less interconnected electricity system. Key observations include:

- By the mid-2030s (by which time the NEM will be mostly renewable), the relative cost of Tasmanian electricity may be more expensive than the mainland given the costs of large-scale wind and solar relative to hydro.
- The absence of interconnection would prevent Hydro Tasmania maximising return from hydro assets.
- Unless major industrials close, Tasmania is likely to have constrained electricity supply hindering the broader decarbonisation agenda and the viability of existing and future industries.
- Less or no interconnection with the mainland would boost claims of Tasmania being 100% renewable in the short term although as emissions factors decline across the NEM in the 2030s this will be less of an issue.
- It is likely that the gas-fired Tamar Valley Power Station would have to operate more intensively to meet future demand undermining Tasmania's renewable energy credentials.
- It would enable Tasmania to decouple from NEM wholesale prices (although these are likely to be lower than Tasmania by the mid-2030s).
- It would remove any financial and consumer risks associated with cost overruns on the Marinus Link project.

Doing nothing is an active choice and on balance we believe that 'disconnecting' Tasmania from the NEM is likely to result in higher long-term electricity prices and constrained supply. It would also likely result in the loss of energy intensive industries and associated employment from Tasmania.

Can Tasmania leave the NEM and maintain interconnection?

An alternative scenario is for Tasmania to leave the NEM for pricing purposes yet retain interconnection via Basslink and, from the late 2020s, Marinus Link. While this approach should ensure that Tasmanian wholesale prices are aligned with generation costs within the Tasmanian generation system there are likely to be a number of legal and commercial complications. If Tasmanian wholesale prices were lower than in the Victorian region of the NEM it would likely discourage investment in new renewable projects. In 2021 the Tasmanian Department of Treasury and Finance conducted a review into Tasmania's wholesale energy pricing framework and concluded that 'as a result of the improved pricing environment in the National Electricity Market and the feedback received from stakeholders during the review, the Government has determined that it will not seek to make changes at this time.' Whether this approach is still appropriate given changing market conditions should be examined by an independent review into Tasmania's energy system.

[44] European Parliament (2023). 'Financing the Trans-European Networks', Fact Sheet, https://www.europarl.europa.eu/factsheets/en/sheet/136/financing-the-trans-european-networks

We believe a new national approach to cost allocation for nationally significant transmission projects will be required to protect vulnerable consumers and ensure community and state government support for such projects. Similarly, the extent to which consumers should pay for other climate related incentives, such as Renewable Energy Certificates and feed-in tariffs, should be subject to a national review.

4.5 Community engagement and benefit sharing

Renewable energy projects are experiencing growing community resistance around the world and Tasmania is no exception. In additional to environmental and visual amenity impacts there are that many renewable energy projects fail to deliver long-term benefits to host communities and in some cases have a detrimental impact on local housing markets and exacerbate workforce shortages. In the absence of more considered and effective strategies these social license issues are likely to intensify undermining efforts to decarbonise the economy. It is therefore vital that community concerns are address and that new renewable energy can be delivered in a way that minimises impact while delivering an unambiguous benefit to host communities and energy consumers.

The key element of building broad-based community support for renewable energy projects and the broader energy transition if a clear and easy-to-understand value proposition to the Tasmanian community explaining why we need increased renewable generation and transmission. As outlined above, it will be important to build greater awareness of the need for new renewable energy projects to support both existing and emerging industries in Tasmania, to put downward pressure on wholesale prices and to support emissions reduction in Tasmania and beyond. In short, these projects are about meeting Tasmania's future needs and effective climate action rather than establishing Tasmania as net exporter of energy or meeting arbitrary generation targets.

Having established a clear case as to why new projects are required and how they will befit the state more structured and collaboration and engagement with communities is required to minimise impacts (See 3.6 below) and that host communities receive enduring benefit from the projects. To this end, the AER has recently developed a more structured, formalised approach to addressing social license issues via benefit sharing.[45] Applying these insights to a more collaborative and inclusive approach in Tasmania would likely entail several elements:

- ***Community co-design.*** Extensive and genuinely collaborative engagement with communities at all stages of the development process will ensure that local concerns are heard and validated, helping to avoid costly and divisive contestation in later project phases. This engagement should include not merely planning and amenity issues but also workforce and staffing arrangements, environmental impact, and whole-of-life project management considerations.
- ***Long-term dividends.*** One challenges the renewable energy developments pose, especially in rural and regional areas, is that their local economic benefit is typically very short lived and ongoing employment once operational is extremely limited. The construction phase of wind and solar farms, for example, typically employ a large number of (often non-resident) workers but relatively few ongoing workers, which often distorts the local labour market and puts pressure on housing and other community infrastructure. Embedding community benefit over a longer period of time via investment in local housing and infrastructure or via ongoing dividend arrangements can help to mitigate the 'boom-and-bust' nature of some renewable energy developments on local communities. In the regional Tasmanian context where there are acute

[45] Australian Energy Regulator (2023). 'Social licence for electricity transmission projects', https://www.aer.gov.au/networks-pipelines/guidelines-schemes-models-reviews/social-licence-for-electricity-transmission-projects

housing shortages proponents should develop models which don't exacerbate housing pressures during the construction phase and contribute to community housing supply over the longer term.

- ***Rating and tax arrangements that support host communities.*** Another challenge with many renewable generation projects is that they are not subject to royalties and often do not attract rating or tax burdens commensurate to their economic output. In some jurisdictions where development occurs on leased land, this issue is related to the classification of wind turbines or solar arrays as removeable chattels rather than fixed capital improvements, which limits the ability of local councils to rate their 'actual' value. Developing innovative models for redistributing the economic benefit of large-scale renewables projects to local communities via remittances or regional partnership programs may help to address these issues.

4.6 A credible Renewable Energy Zone framework

The Tasmanian Government is committed to developing its Renewable Energy Coordination Framework. This Framework aims to establish defined Renewable Energy Zones (REZs), that are considered appropriate for new renewable energy infrastructure development, after having considered existing land uses, environmental and heritage values, proximity to transmission infrastructure and quality of the wind or solar resource. Developing a best practice and credible REZ framework should help attract investment, expedite approvals and enhance community support for renewable energy projects.

We support the Tasmanian Government's commitment to establishing a REZ framework but believe that the approach could be further refined and needs to be accelerated.

Design principles that should underpin the framework need to include, but not be limited to:

- Maximise co-location with existing energy infrastructure and proximity to market.
- Maximise social and economic net benefits to host communities.
- Minimise environmental and cultural heritage impacts and safeguard endangered species and culturally significant sites and landscapes.

Based on best practice international models (see EU Renewables Grid Initiative) it essential that REZs are co-designed with communities and based on a robust, agreed method and objective, verified data (as opposed to subjective scoring) while applying a strategic environmental assessment approach.[46] More specifically, the experience in other jurisdictions highlights the importance of working with First Nations communities minimise or eliminate any cultural heritage impacts and to establish clear setback buffers around settlements (>10km best practice), national parks or other sensitive sites.

In combination, making a clear case as to why additional renewable generation and transmission is required in Tasmania; ensuring projects deliver long term benefits to all Tasmanians and host communities in particular and implementing a best practice REZ framework to ensure that development is contained to the most appropriate locations within the state should help address community opposition to renewable projects.

[46] https://renewables-grid.eu/; https://www.edo.org.au/edos-12-principles-for-renewable-energy-transition-projects/

Key Points

- Not all renewable energy is created equal. Tasmania's hydroelectricity is not cheap but it stands alone among renewables because it can be stored and dispatched when wind and solar generation are limited. Maximising the return on hydroelectric assets will be important for Tasmania's future, as will strategically expanding of supply of renewable energy from wind and solar generation.
- If a sound case can be made, Tasmania may be well placed to support other jurisdictions within the NEM, such as South Australia and Victoria, as they transition to renewables and deal with projected variability in supply.
- It is difficult to predict Tasmania's future energy needs, although it is clear that we will need a significant increase to decarbonise industries, transport and future-proof Tasmanian jobs.
- Marinus Link could improve energy security and supply to Tasmania, push prices down, and support emissions reduction across the NEM. However, there are risks that will need to be carefully navigated with Tasmanians' best interests in mind.
- Whether consumers benefit from increased interconnection will depend on the final project cost, and how much of this is recovered from consumers. We argue that cost recovery should be shared between consumers and the Commonwealth.
- There is an urgent need to ensure the community has a better understanding of how additional renewable electricity generation and transmission is required to support emission reduction and employment and industry in Tasmania and is likely to put downward pressure of wholesale prices.

5 Options and priorities for clean, reliable, and affordable electricity

As noted above, Australia's energy markets are becoming increasingly complex as the transition to renewable energy generation gathers pace. Following more than a decade of inconsistent and reactive climate and energy policy at the national level, consumers and the NEM now face the prospect of higher power prices and greater system instability.

Tasmania is well-placed to capitalise on the energy transition and the emerging 'new normal' of a more dynamic and unpredictable NEM – but there will be challenges. Historical investment in renewable hydroelectric generation infrastructure means that we are less exposed to supply constraints caused by the rapid decline of coal-fired power. However, Tasmania is not entirely immune from growing market volatility and rising prices. This submission has identified a set of priorities that we believe should be considered to protect Tasmanian business and households from volatility and rising prices in the short term, and capitalise on low-cost renewable generation in the medium term.

5.1 Short-term priorities

Although Tasmania has comparatively low regulated prices for electricity on some tariffs and pricing structures, high consumption means that increasing prices put significant pressure on many Tasmanian households. The burden of rising bills on vulnerable consumers noted in TPE's HILDA analysis, and reinforced by our nation-leading rates of energy debt, is particularly concerning. To ensure that all Tasmanian consumers – especially low-income households – are protected from rising prices and volatility in the NEM, the following short-term priorities should be considered.

Short-term priority 1: Review and refine the concession system to better reflect the needs and usage of Tasmania's most vulnerable energy customers

Although the current concession arrangements are making a difference, many low-income households are still forced to ration their usage.[47] The State Government should ensure that the value of concessions keeps pace with rising prices and explore the possibility of replacing the current flat-rate concession system with one that is proportional to energy use.

Short-term priority 2: Address Tasmania's high rates of energy debt

This would entail a more targeted approach to supporting consumers, including needs-based waiver provisions. This should build on the review of concessions suggested above.

Short-term priority 3: Manage volatility for medium and large businesses on market-exposed contracts

Small businesses and households in Tasmania are mostly protected from short-term wholesale price volatility by the NMR process, and very large 'transmission-connected' businesses are protected by low-cost, long-term PPAs. However, there are approximately 8,000 medium and large business customers who do not fit these categories and are exposed to the wholesale market and associated price volatility. These medium to large Tasmanian businesses have benefited from one-off $20,000 payments under the Large Business Customer Electricity Support Scheme, but given the likelihood of ongoing wholesale price volatility over the next decade, the State Government should consider an ongoing, targeted business concession scheme which smooths annual price increases.

[47] Killick, David (2023). 'Tasmania's cost of living: Power price rise a cruel blow for battlers, says pensioner Fran Spears', *Mercury*, 1 July 2023, https://www.themercury.com.au/news/tasmania/tasmanias-cost-of-living-power-price-rise-a-cruel-blow-for-battlers-says-pensioner-fran-spears/news-story/d5c90fa43dac2817821ddc2428b7c30c

5.2 Medium-term priorities

While it is important to take immediate action to mitigate the impact of rising prices and debt on vulnerable Tasmanians, there are broader structural issues that need to be addressed. To this end, we have identified three medium-term priorities, the first two of which could be enacted through and independent expert review of Tasmania's energy system, policy, and operators. Such a review would ensure we can fully capitalise on our renewable electricity assets in the context of the energy transition.

Medium-term priority 1: Optimal market design

Given Tasmania's distinctive energy market structure and the context of wider energy transition in the NEM, it would be timely for the independent expert review to consider a range of key issues in this area, including:

- the optimal mix of hydro generation, new wind and solar, and increased interconnection to the NEM to reliably meet Tasmania's future electricity needs at the lowest system cost;
- Hydro Tasmania's market power, its role in wholesale markets, and whether it is crowding out investment in new generation projects;
- how Tasmania can establish a competitive and transparent approach to supporting investment in new renewable energy projects; and
- whether there are viable ways of establishing a Tasmanian wholesale price while maintaining interconnection.

Medium-term priority 2: The governance of Tasmania's energy businesses

An independent review could also be used to examine energy market governance issues, including:

- the implications of Tasmania's three state-owned energy businesses all reporting to one owner Minister, how this affects the relationships between the three businesses, and whether this compromises their independence;
- whether Aurora Energy should be established as the sole retail provider, with a mandate to deliver electricity at the lowest possible cost with appropriate concessions; and
- an assessment of Tasmanian energy business capital management strategies and any implications for electricity prices.

Medium-term priority 3: National reform priorities

While it is beyond the scope of this submission or a Tasmanian Parliamentary Inquiry to propose a comprehensive reform agenda for the NEM, the Tasmanian Government and community should advocate for reforms which more equitably distribute the significant costs associated with decarbonising Australia's electricity system. Specific reforms which could reduce consumer electricity costs include reviewing the funding of Australia's Renewable Energy Certificates and other environmental schemes, and exploring the possibility of sharing the costs of major transmission projects between government and consumers.

6 References

Archer, Elise (2022). Building Ministers' Meeting, Media Release, https://www.premier.tas.gov.au/site_resources_2015/additional_releases/building-ministers-meeting

Aurora Energy (2023), Facebook post 16 August 2023, https://www.facebook.com/auroraenergytas/posts/pfbid0yjqz9mTvsnXyEm2SQDjfEWGN74XoWPF74huCYFipcouYzG12e3cFspz2hHcJk7tGl, accessed 10 October 2023

Aurora Energy (2023). 'Your Energy Support (YES) Program', https://www.auroraenergy.com.au/yes

Aurora Energy & Goldwind Australia (2017). 'Aurora Energy and Goldwind announces agreement for Wild Cattle Hill Wind Farm', Media Release, 6 June 2017

Australian Competition and Consumer Commission (2023). Inquiry into the National Electricity Market, June 2023 Report, 2 June 2023, https://www.accc.gov.au/system/files/Inquiry%20into%20the%20National%20Electricity%20Market%20-%20June%202023%20Report.pdf

Australian Council of Social Service (2022). 'Overhaul of energy concessions needed as three million households struggle to pay their energy bills', Media Release, https://www.acoss.org.au/media_release/overhaul-of-energy-concessions-needed-as-three-million-households-struggle-to-pay-their-energy-bills/

Australian Energy Market Commission (2021). Residential Electricity Price Trends 2021: Final Report, November 2021, https://www.aemc.gov.au/media/99060

AEMO (2021). The National Electricity Market: Fact Sheet, https://aemo.com.au/-/media/files/electricity/nem/national-electricity-market-fact-sheet.pdf

AEMO (2023). NEM Electricity Statement of Opportunities (ESOO). https://aemo.com.au/en/energy-systems/electricity/national-electricity-market-nem/nem-forecasting-and-planning/forecasting-and-reliability/nem-electricity-statement-of-opportunities-esoo

AEMO (2023). 'Urgent and ongoing investment needed to maintain energy reliability', 31 August 2023, Media Release, https://aemo.com.au/en/newsroom/media-release/urgent-and-ongoing-investment-needed-to-maintain-energy-reliability

Australian Energy Regulator (2023). *Annual retail markets report 2021–22*, https://www.aer.gov.au/retail-markets/performance-reporting/annual-retail-markets-report-2021%E2%80%9322

Australian Energy Regulator (2023). *Quarterly retail performance report*, Jan-Mar 2023, https://www.aer.gov.au/retail-markets/performance-reporting/retail-energy-market-performance-update-for-quarter-3-2022%E2%80%9323

Australian Energy Regulator (2023). 'Social licence for electricity transmission projects', https://www.aer.gov.au/networks-pipelines/guidelines-schemes-models-reviews/social-licence-for-electricity-transmission-projects

Australian Energy Regulator (2023). *State of the energy market 2023*, https://www.aer.gov.au/publications/state-of-the-energy-market-reports/state-of-the-energy-market-2023

Barnett, Guy (2020). 'Tasmania surges to 100% renewable energy', Media Release, https://www.premier.tas.gov.au/site_resources_2015/additional_releases/tasmania_surges_to_100_renewable_energy

Barnett, Guy (2022). 'Tasmanians get the lowest electricity prices but only scare tactics from Labor', Media Release, https://www.premier.tas.gov.au/site_resources_2015/additional_releases/tasmanians-get-the-lowest-electricity-prices-but-only-scare-tactics-from-labor

Blueprint Institute (2022). *Untangling the New: A policymake'rs guide to the National Electricity Market. https://www.blueprintinstitute.org.au/untangling_the_nem*

Bradford (2023). 'Poorly insulated homes are impacting mortality rates', Bradford, https://www.bradfordinsulation.com.au/designsmart/building-science-insights/poorly-insulated-homes-are-impacting-australian-mortality

Chapman University (2023). 'Flattening the Duck Curve', 9 May 2023, https://blogs.chapman.edu/gci/2023/05/09/flattening-the-duck-curve/

Dennien, Matt (2019). 'Cold housing under fire after report links deaths', The Examiner, 12 August 2019, https://www.examiner.com.au/story/6323666/cold-housing-under-fire-after-report-links-deaths/

Department of State Growth, Tasmanian Government (2014). *Energy Strategy Issues Paper*, https://www.stategrowth.tas.gov.au/__data/assets/pdf_file/0005/90815/Energy_Strategy_Issues_Paper.pdf

Environmental Defender's Office, '12 Principles for renewable energy transition projects' https://www.edo.org.au/edos-12-principles-for-renewable-energy-transition-projects/

Essential Services Commission (2023). 'Victorian Default Offer 2023:24: final decision', 25 May 2023, https://www.esc.vic.gov.au/media-centre/Victorian-default-offer-2023-24-final-decision

European Parliament (2023). 'Financing the Trans-European Networks', Fact Sheet, https://www.europarl.europa.eu/factsheets/en/sheet/136/financing-the-trans-european-networks

Finch, A 2022, 'I have done all I can to save energy and I can barely afford the cost of existing', *The Guardian*, 31 October 2022

Fry, M. Jane, Farrell, Lisa and Temple, B., Jeromey (2023). 'Energy poverty and food insecurity: Is there an energy or food trade-off among low-income Australians?' *Energy Economics* 123, July 2023, https://www.sciencedirect.com/science/article/pii/S0140988323002293

Hirth, Lion, Ueckerdt, Falko and Edenhofer, Ottmar (2015). 'Integration costs revisited – An economic framework for wind and solar variability', *Renewable Energy* 74, 925-939 https://neon.energy/Hirth-Ueckerdt-Edenhofer-2015-Integration-Costs-Revisited-Framework-Wind-Solar-Variability.pdf

Hydro Tasmania (2018). 'Monitoring of electricity supply in the National Electricity Market", Submission to ACCC, https://www.accc.gov.au/system/files/Hydro%20Tasmania.pdf

Hydro Tasmania (2023). 'Wind power', https://www.hydro.com.au/clean-energy/our-power-stations/wind-power

Killick, David (2020). 'Only six responses to request for submissions for Tasmanian politicians' pay-rises', *Mercury*, 28 December 2020, https://www.themercury.com.au/news/tasmania/like-an-atm-government-accused-of-cash-raid/news-story/5fd48ff1909d3d341402342b8637b588

Killick, David (2023). 'Tasmania's cost of living: Power price rise a cruel blow for battlers, says pensioner Fran Spears', *Mercury*, 1 July 2023, https://www.themercury.com.au/news/tasmania/tasmanias-cost-of-living-power-price-rise-a-cruel-blow-for-battlers-says-pensioner-fran-spears/news-story/d5c90fa43dac2817821ddc2428b7c30c

Melbourne Institute (2021). *Household Income and Labour Dynamics Australia (HILDA) Survey*

Open NEM (2023). https://opennem.org.au/energy/nem/?range=1y&interval=1M&view=discrete-time

Open NEM (2023). https://opennem.org.au/energy/nem/?range=7d&interval=30m&view=discrete-time

Open NEM (2023). https://opennem.org.au/energy/tas1/?range=7d&interval=30m

Parliament of Tasmania Public Accounts Committee (2023). 'Hydro Tasmania and the termination of the Basslink Services Agreements', 9 June 2023, https://www.parliament.tas.gov.au/__data/assets/pdf_file/0028/70795/Public-Hearings-9-June-2023-Minister-Barnett.pdf

Renewables, Climate and Future Industries Tasmania (2022). 'Electricity Pricing Intervention: Minute to the Treasurer', 25 May, https://www.treasury.tas.gov.au/Documents/Information%20for%20release%20-%20RTI%20-%20Electricity%20Price%20Capping.PDF

Renewables Grid Initiative, https://renewables-grid.eu/

Seeder, Benjamin (2023). Tasmanians spent 3% of salaries on power in 21-22, says Regulator, 12 October, *The Examiner*, https://www.examiner.com.au/story/8384350/tasmanians-have-least-affordable-power-bills-labor/

TasCOSS (2023). 'Inquiry into energy prices good news for households', Media Release, https://tascoss.org.au/mr-inquiry-into-energy-prices/

Tasmanian Economic Regulator (2013). *Comparison of 2013 Australian Standing Offer Energy Prices*, April 2013, https://www.economicregulator.tas.gov.au/Documents/Standing%20Offer%20Prices%20April%202013%20(13%20976).PDF

Tasmanian Economic Regulator (2021). *Wholesale Contract Regulatory Instrument*, March 2021, https://www.economicregulator.tas.gov.au/Documents/WholesaleContractRegulatoryInstrumentFinalMarch2021.pdf

Tasmanian Economic Regulator (2022). Energy in Tasmania Report 2020-21, March 2022, https://www.economicregulator.tas.gov.au/Documents/Office%20of%20the%20Tasmanian%20Economic%20Regulator%20-%20Energy%20in%20Tasmania%20Report%202020-21.pdf

Tasmanian Economic Regulator (2022). 'Typical Customers', https://www.economicregulator.tas.gov.au/electricity/reports/price-comparisons/typical-customers

Tasmanian Economic Regulator (2023). Regulated Electricity Prices and Feed-in Tariff Rate to Apply from 1 July 2023, Press Release, https://www.economicregulator.tas.gov.au/Documents/20230621%20Media%20release%20re%20regulated%20electricity%20prices%20and%20~%20in%20tariff%20rate%20to%20apply%20from%201%20July%202023.pdf

Appendix 1: Indicative comparison between Victorian and Tasmanian market prices

Provider	Daily Supply Charges (cents/day)	Consumption (cents/kWh)	Feed-in-Tariff Policy (cents/kWh)	Quoted per year amount	Fees, Charges, and Incentives	Notes
Tasmania (assuming 25.1 kWh/day)						
CovaU	126.39	16.85 (off-peak) 36.20 (peak)	10.869	2,470	Incentive: Guaranteed discount on total usage of 5% Move-in/connection fee: $64.09 (special meter read fee, passed on from distributer) Disconnection fee: $100.97 Reconnection fee: $100.97 Cheque dishonour fee: $9.50 Direct debit dishonour fee: $9.50 Credit card fees apply	
Aurora Energy	126.39	16.85 (off-peak) 36.20 (peak)	10.869	2,580	Incentive: Direct debit discount $20.00 Move-in/connection fee: $100.97 Late payment fee: $9.50 Disconnection fee: $100.97	No option for monthly billing - only every 3 months Plan prices are fixed
1st Plus	126.28	16.83 (off-peak) 36.19 (peak)	10.869	2,580	Incentive: $50 in rebates over 12 months ($25 on the sixth month, and $25 on the 12th month) Move-in/new connection fee: $100.97 Disconnection fee: $100.97 Cheque dishonour fee: $15 Direct debit dishonour fee: $7.50	
Energy Locals	95.00	19 (off-peak) 32 (peak)	10.869	2,670	Move-in/New connection fee: $100.97 Yearly membership fee: $197.88 Credit card payment fee: 0.81% Late payment fee: $16.00 Disconnection fee for moving out of premises: $100.97 Direct debit dishonour fee: $10	Note: this estimate takes into account the $197.88 membership fee
Victoria						
Tango	108.9	19.42	4.9	1,580	Payment processing fee: 0.6% of bill (Visa or Mastercard if they incur a fee) and 0.75% (if American Express [AMEX]).	Requires payment details, as well as

Provider	Daily Supply Charges (cents/day)	Consumption (cents/kWh)	Feed-in-Tariff Policy (cents/kWh)	Quoted per year amount	Fees, Charges, and Incentives	Notes
					Dishonour or reverse payment fee: $7.50 Disconnection fee: $45.52 No exit fees	monthly electronic bill and direct debit.
Pacific Blue	108.9	19.42	4.9	1,580	Payment processing fee: 0.6% of bill (Visa or Mastercard if they incur a fee) and 0.75% (if AMEX). Dishonour or reverse payment fee: $7.50 Reconnection fee: 44.85 Disconnection fee: $45.52 No exit fees	10-day cooling off period 0% green power No contract term Requires payment details, as well as monthly electronic bill and direct debit
CovaU	91.05	23.84	4.9	1,600	Incentive: Unconditional (13%) of usage – discount applied to energy usage charges. Disconnection fee: $45.52 Reconnection fee: $44.85 Special meter read fee: $36.87 Direct debit dishonour fee: $9.50 Credit Card payment processing fee (debit and credit: 0.73% of bill (via Aus post) 0.8% of bill Cheque dishonour fee: $9.50 Payment processing fee (Aus post): $3.00 Paper bill fee: $1.75	10-day cooling off period 0% green power No contract term Requires appropriate metering and installation configuration
Momentum Energy	114.07	20.02	5.40	1,630	Disconnection fee: $45.52 Reconnection fee: $44.85 Cheque dishonour payment fee: $9.50 Credit (or debit) card payment processing fee: 0.53% of bill	Payment details required
Ovo energy	104.39	22.55	7.00	1,650	$100 welcome credit ($8.34/month towards your bill) Connection fee: $57.60 Disconnection fee: $45.52 (from distributer) Incentive: 3% interest gained on credit balances (after monthly charged considered)	Contract term (until November 1st 2024), then switches to the default offer.

Provider	Daily Supply Charges (cents/day)	Consumption (cents/kWh)	Feed-in-Tariff Policy (cents/kWh)	Quoted per year amount	Fees, Charges, and Incentives	Notes
						Payment details are required Plan prices are fixed
AGL	91.05	22.67	4.9	1,710	Incentive: $75 sign up credit (on your first bill) Reconnection fee: 44.85 (when changing retailer, reconnection, etc.,) Disconnection fee $45.52 Payment processing fee (when paying at Aus Post): 0.49% of Bill Paper fee: $1.75 Over the counter fee (when paying at Aus Post): $3.20 Payment Processing fee (when paying via Visa debit card): 0.14% Payment processing fee (when paying via Visa credit card): 0.65% of bill Payment processing fee (Mastercard credit cards): 0.77% of bill Payment processing fee (Mastercard debit card): 0.33%	

Note: This information was sourced using the government compare energy websites (for Victoria and Tasmania). This is based on a 2–3-person household located in the city (Melbourne and Hobart), with no gas connection.