

# The energy transition: Decarbonisation, decentralisation and digitalisation

## Key issues for the 58th Parliament

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## Key points

- The national electricity market (NEM) is transitioning from a centralised, fossil-fuel based system to a decarbonised, decentralised and digitalised system. It is managed by a complex regulatory and operational framework that involves state and national bodies.
- The Australian Energy Market Operator's (AEMO) Integrated System Plan (ISP) provides a comprehensive roadmap for achieving net zero by 2050, by which time electricity demand is expected to have at least doubled.
- AEMO forecasts that the transition will require a 9-fold increase in large-scale renewable generation, a 5-fold increase in distributed solar generation, a 3-fold increase in firming capacity and the addition of 10,000km of transmission lines to the existing 40,000km. Most of the additional transmission infrastructure is needed in the next decade.
- Governments and key stakeholders will need to manage the transition in a manner that balances the competing demands of the energy trilemma: security, equity and sustainability.
- Key risks include declining energy affordability, climate change, natural disasters, the geopolitics of energy security, and the rate and scale of required investment in generation, storage and transmission infrastructure.
- A breach of both the NEM reliability standard and the NSW energy security target has been forecast to occur in 2025–26 due to the expected closure of Eraring power station in 2025. The breach will be addressed if anticipated generation, storage and transmission projects are completed according to schedule.
- A significant reform program is being implemented at national and state levels. National reforms include the National Energy Transformation Partnership, the \$20 billion Rewiring the Nation program for transmission investment, and temporary caps on coal and gas prices under the Energy Price Relief Plan.
- Key NSW Government reforms include the NSW Electricity Infrastructure Roadmap, which aims to achieve a capacity target of at least 12 GW of renewable energy generation and 2 GW of long-duration storage by 2030, and the establishment of 5 renewable energy zones (REZs) across the state.

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# 1. Introduction

The Australian electricity system is at the beginning of its fourth transition since 1900. 'Early electrification' of cities, towns and industry from 1900 to 1950 was initially driven by private companies before becoming the responsibility of state electricity commissions. This was followed by a period of 'state development' from 1950 to 2000, during which time the commissions built coal- and gas-fired power plants and hydro-electricity schemes and established interconnections between the states. Each commission delivered generation, transmission, distribution and retail functions. Structural reforms in the 1990s began to separate these functions between corporatised bodies, introduced a uniform approach to the regulation of transmission and distribution networks, and established the national electricity market (NEM) in eastern Australia as a wholesale market for generators. Some jurisdictions also privatised their electricity businesses.<sup>1</sup>

'Market disruption' of this newly restructured electricity system occurred between 2000 and 2020. The 4 most significant disrupters were:

1. Market reforms due to unforeseen and unaddressed issues in the original market design
2. The stagnation of total electricity demand at the same time as the gap between average and peak daily demand grew
3. Multiple policy interventions to address climate change which altered the mix of generating technologies being used and increased the role played by consumers
4. Deployment of solar and wind generation, with significant uptake of distributed rooftop solar systems.

Consequences of these disruptions included a period of unacceptably high electricity prices, a boom in renewable energy investment, retirement of some coal-fired power stations, and world-leading household participation in the electricity system.<sup>2</sup>

The 'decarbonisation' of the electricity system between 2020 and 2050 is expected to profoundly change Australia's energy markets.<sup>3</sup> The NEM will transition from a centralised, fossil-fuel based system where electricity flows in one direction to a decarbonised, decentralised, digitalised system of large- and small-scale renewable generation and storage that facilitates 2-way flows of electricity. Decarbonisation of the NEM is expected to involve the complete replacement of coal-fired generation, and the reduction of gas to a

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<sup>1</sup> D Clarke and P Graham, [Australian electricity transitions 1900 to 2050](#), CSIRO, December 2022.

<sup>2</sup> D Clarke and P Graham, [Australian electricity transitions 1900 to 2050](#), CSIRO, December 2022.

<sup>3</sup> AER, [State of the energy market 2022](#), September 2022.

small but important role in maintaining the reliability of the system.<sup>4</sup> Renewable power will also be a significant driver of the decarbonisation of the economy more broadly due to the electrification of sectors such as transport, buildings and manufacturing.<sup>5</sup> The scale and scope of the fourth transition highlight the importance of ensuring that it is implemented in a manner that balances the competing demands of the energy trilemma: security, equity and sustainability.<sup>6</sup> Significant challenges to meeting the trilemma are emerging, including rising electricity prices,<sup>7</sup> a more costly and longer-term timeframe for the NSW renewable energy zones (REZs) than expected,<sup>8</sup> and a substantial delay and cost-increase for Snowy 2.0.<sup>9</sup>

The decentralisation of the electricity system is occurring at 2 scales. Large coal-fired power stations which have historically produced more than 75% of NSW's electricity are being replaced by smaller solar and wind generators that are distributed across the state.<sup>10</sup> A key challenge facing the transition is the need to expand the transmission network by 25% to connect this renewable generation to the grid.<sup>11</sup> Consumers can now also participate in the production, sale and storage of electricity through new consumer energy resources (CER) such as solar panels, batteries, smart appliances, electric vehicles and smart meters. The increasing affordability and uptake of these digital technologies will enable new forms of consumer participation via products such as virtual power plants<sup>12</sup> and peer-to-peer energy trading<sup>13</sup> (power trading between neighbours).<sup>14</sup> The digitalisation of the electricity system is also critical for enabling the integration of CER into the system so that the NEM operator can maintain a secure and stable grid.<sup>15</sup>

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<sup>4</sup> AEMO, [2022 Integrated System Plan](#), June 2022.

<sup>5</sup> D Clarke and P Graham, [Australian electricity transitions 1900 to 2050](#), CSIRO, December 2022.

<sup>6</sup> T Gotsis et al., [Uranium mining and nuclear energy in New South Wales](#), NSW Parliamentary Research Service, Issues Paper, September 2019, p 5.

<sup>7</sup> AER, [AER releases final determination for 2023-24 default market offer](#) [media release], Australian Government, 25 May 2023, accessed 26 May 2023.

<sup>8</sup> P Sharpe, [Renewable energy](#), *NSW Hansard*, 25 May 2023; L Chung, [NSW government renewable energy projects delayed and more expensive](#), *Sydney Morning Herald*, 25 May 2023, accessed 26 May 2023; B Peacock, [Widespread misreporting of NSW renewable energy zone cost 'blowouts' and delays](#), *PV Magazine*, 25 May 2023, accessed 26 May 2023.

<sup>9</sup> Snowy Hydro, [Snowy 2.0 – project update](#) [media release], 3 May 2023, accessed 26 May 2023; D Mercer, [\\$100m spent on underground mapping before tunnelling woes, Snowy Hydro boss admits](#), ABC News, 23 May 2023, accessed 26 May 2023.

<sup>10</sup> OpenNEM, [New South Wales](#), 2023, accessed 22 May 2023.

<sup>11</sup> AEMO, [2022 Integrated System Plan](#), June 2022.

<sup>12</sup> Energy Innovation Toolkit, [Introduction to virtual power plants](#), Australian Government, n.d., accessed 22 May 2023.

<sup>13</sup> Western Power, [Testing the possibilities of trading power](#), Western Australian Government, 2023, accessed 22 May 2023.

<sup>14</sup> ESB, [All about the Post 2025 project](#), n.d., accessed 22 May 2023.

<sup>15</sup> ESB, [Integration of consumer energy resources \(CER\) and flexible demand](#), n.d., accessed 19 May 2023.

This paper provides an overview of the NEM and its complex regulatory and operational framework. Key trends and risks are identified across the electricity supply chain, from generation, wholesale markets and transmission networks to the energy retail interface between retailers and consumers. Recent and forecast electricity price rises are also explored along with their impact on consumers. Due to a range of emerging trends and risks, in recent years governments have increasingly intervened in energy markets to manage prices, ensure reliability and support the transition to net zero. The paper finishes by outlining the significant reform programs being implemented at national and state levels. This includes the most significant NSW energy reform introduced in recent years – the NSW Electricity Infrastructure Roadmap, which was given effect by legislation passed in November 2020. The roadmap coordinates investment in transmission, generation, storage and firming infrastructure as coal-fired generation plants retire.

The paper does not consider several contemporary energy issues including gas, alternative energy sources such as hydrogen and nuclear power,<sup>16</sup> or the impact of the privatisation of NSW electricity assets. A [glossary](#) of acronyms is included at the end of the paper.

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<sup>16</sup> T Gotsis et al., [Uranium mining and nuclear energy in New South Wales](#), NSW Parliamentary Research Service, Issues Paper, September 2019; L Roth and T Gotsis, [Hydrogen energy](#), NSW Parliamentary Research Service, Briefing Paper 2/2021, June 2021.

## 2. The national electricity market

### 2.1 An intricate system of systems that is neither national nor solely a market

The NEM is an ‘intricate system of systems’ with regulatory, market, policy, infrastructure and commercial components.<sup>17</sup> It is one of the largest interconnected electricity systems in the world covering around 40,000 km of transmission lines and cables, and supplying 9 million customers in Queensland, NSW, the ACT, Victoria, Tasmania, South Australia and parts of the Northern Territory. Western Australia and most of the Northern Territory have their own power systems.<sup>18</sup>

The NEM is also a marketplace through which generators and retailers trade electricity, with each state acting as a price region. Three markets are integrated into the NEM.<sup>19</sup> The **wholesale markets** are where generators sell electricity to retailers through either a spot market or a contract market. The spot and contract markets support the *reliability* of the NEM by ensuring that it has sufficient capacity to meet consumer demand while keeping undelivered energy to an acceptable minimum. Coal, gas and hydro generators produce services like frequency control, inertia and system strength as by-products.<sup>20</sup> These services help maintain the *security* of the NEM. System security relates to the ability of the system to tolerate disturbances such as the unexpected loss of a large generator or transmission lines failing. Wind and solar do not generate these services in the same way, so they must be provided and paid for separately. Sufficient capacity to maintain the security of the system is purchased through 8 ancillary services (FCAS) markets.<sup>21</sup>

Both **transmission and distribution networks** are ‘natural monopolies’ because it makes economic sense for only one entity to provide the service through one set of ‘poles and wires’, rather than having duplicate sets built in parallel. These networks have been split

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<sup>17</sup> AEMO, *2022 Integrated System Plan*, June 2022, p 21. See also: Blueprint Institute, *Untangling the NEM: A policymaker’s guide to the national electricity market*, June 2022.

<sup>18</sup> Australian Government, *Energy innovation toolkit: about Australian energy markets*, n.d., accessed 8 February 2023.

<sup>19</sup> T Gotsis et al., *Uranium mining and nuclear energy in New South Wales*, NSW Parliamentary Research Service, Issues Paper, September 2019, p 11.

<sup>20</sup> *Frequency* is the key measure of the balance between supply and demand. If the frequency of the system rises or falls by too much, either loads or generators may be forced to disconnect as a safety measure. The *inertia* of a system affects the rate of change of frequency. The rotational inertia traditionally provided by large coal and gas-fired power stations provides an instantaneous response to frequency deviations by slowing the rate of change in frequency. *System strength* relates to the ability of a power system to maintain stable voltage levels. See: Blueprint Institute, *Untangling the NEM: a policymaker’s guide to the national electricity market*, June 2022, p 18; ARENA, *System security and reliability*, Australian Government, 2023, accessed 17 May 2023.

<sup>21</sup> AEMC, *Spot and contract markets*, n.d., accessed 8 February 2023; AEMO, *Ancillary services*, 2022, accessed 9 February 2023.

into geographic monopolies across the NEM and are regulated to replicate the incentive properties of a competitive market.

The **energy retail market** enables energy retailers to sell electricity, gas and energy services to residential and business customers.<sup>22</sup>

## 2.2 The electricity supply chain

The NEM electricity supply chain has 5 components (Figure 1). **Generators** produce electricity from renewable (solar, water, wind) and non-renewable (coal and gas) sources. Some renewable sources, such as wind and solar, have variable supply. These variable renewable energy (VRE) sources can only produce electricity when conditions are right.<sup>23</sup> In other words, they are 'non-dispatchable' sources of electricity, where coal and gas plants are 'dispatchable' sources because they can be relied on to operate when needed. Firing capacity<sup>24</sup> such as pumped hydro, batteries (both of which are examples of grid-scale storage) and gas generation can be used when required to increase supply when VRE sources are unable to meet demand. Large-scale generators supply customers via transmission and distribution networks. Smaller consumer energy resources (CER) such as household solar panels or batteries connect directly to the distribution network.<sup>25</sup>

**Transmission networks** provide for the bulk transfer of electricity at high voltages from generators to major demand centres. Transmission network services providers (TNSPs) build, maintain, plan and operate the transmission networks.<sup>26</sup>

**Distribution networks** transport electricity from transmission networks to customers at lower voltages. Distribution network service providers (DNSPs) build, maintain and operate the distribution networks.<sup>27</sup>

Participants in the **energy retail interface** include retailers who sell bundled electricity to residential and business customers. The retail prices offered by retailers reflect wholesale energy, network, environmental and retail costs (see [section 3.3](#)).<sup>28</sup> Alternative energy providers offer products and services such as energy management tools to support demand response (the voluntary reduction or shift in electricity use by customers to help keep the system stable),<sup>29</sup> and may also own solar panels and batteries at a customer's

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<sup>22</sup> AER, [State of the energy market 2022](#), September 2022.

<sup>23</sup> A Lawson, [Variable renewable energy: an introduction](#), Congressional Research Service, 25 June 2019.

<sup>24</sup> Otherwise known as [flexible generation](#) or [flexible dispatchable generation](#), firing capacity is generation that can quickly ramp up or ramp down electricity production as required, unlike coal-fired power stations.

<sup>25</sup> AER, [State of the energy market 2022](#), September 2022, p 13. See also: NSW Climate and Energy Action, [Renewable energy in NSW](#), 2023, accessed 9 February 2023.

<sup>26</sup> AER, [State of the energy market 2022](#), September 2022.

<sup>27</sup> AER, [State of the energy market 2022](#), September 2022.

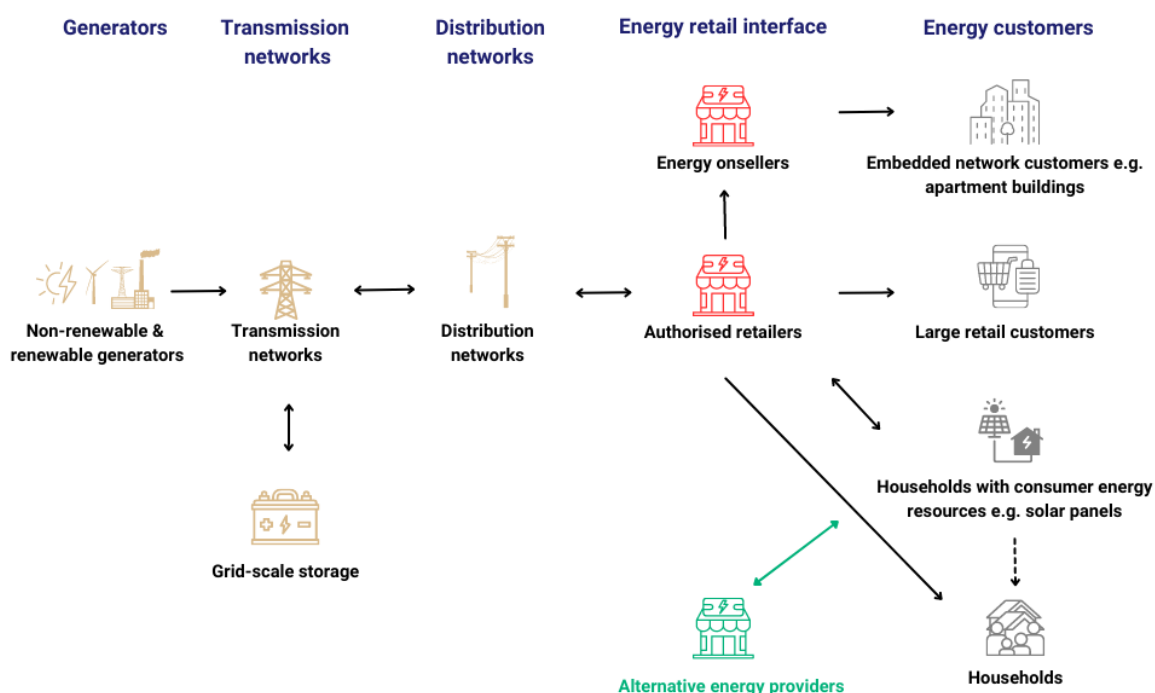
<sup>28</sup> AER, [Default market offers prices 2022-23](#), Final determination, May 2022.

<sup>29</sup> ARENA, [Demand response](#), Australian Government, 2023, accessed 17 May 2023.



premises and sell output to the customer. Energy onsellers buy energy from retailers to sell to customers in embedded networks.<sup>30</sup> Embedded networks are private networks typically located in residential developments, shopping centres and caravan parks that supply a range of services including electricity, hot and chilled water and gas.<sup>31</sup>

**Figure 1: Electricity supply chain**



Source: NSW Parliamentary Library 2023. Adapted from: AER, *State of the energy market*, September 2022, p 13; and NSW Climate and Energy Action, *Renewable energy in NSW*, 2023, accessed 27 April 2023.

**Energy customers** include industry, businesses and residential customers. Customers are increasingly taking a more active role in the NEM: some are paid to cut their use of power through demand response,<sup>32</sup> and those with CER such as solar panels and batteries can sell excess energy back to retailers or their neighbours.<sup>33</sup>

<sup>30</sup> AER, *State of the energy market 2022*, September 2022.

<sup>31</sup> NSW Legislative Assembly Committee on Law and Safety, *Embedded networks in New South Wales*, November 2022.

<sup>32</sup> ARENA, *Demand response*, 2023, accessed 9 February 2023.

<sup>33</sup> AER, *State of the energy market 2022*, September 2022.

## 2.3 A complex regulatory and operational framework

In the 1990s, Australian governments engaged in a major energy reform process that culminated with the commencement of the NEM on 13 December 1998.<sup>34</sup> In 2004, the Australian Energy Market Agreement (as amended December 2013)<sup>35</sup> was signed by all Australian governments to establish regulatory and operational frameworks for electricity and gas services, the broad parameters of which remain in place today.<sup>36</sup> The current NEM framework is large and complex, being comprised of national and state bodies, legislation, policies and plans (Table 1).

**Table 1: National and NSW energy bodies**

National
<b>Key bodies</b>
<p><b><a href="#">Energy and Climate Change Ministerial Council</a></b> (ECMC)</p> <ul style="list-style-type: none"> <li>Responsible for development and implementation of national energy reforms</li> <li>Established the <a href="#">National Energy Transformation Partnership</a></li> <li>Oversees national energy bodies</li> </ul>
<p><b><a href="#">Energy Security Board</a></b> (ESB)</p> <ul style="list-style-type: none"> <li>Provides whole-of-system oversight for energy security and reliability</li> <li>Delivers the <a href="#">Post-2025 project</a></li> <li>Annually assesses the <a href="#">health of the NEM</a></li> </ul>
<p><b><a href="#">Australian Energy Market Commission</a></b> (AEMC)</p> <ul style="list-style-type: none"> <li>Makes and amends <a href="#">National Electricity Rules</a> under the National Electricity Law</li> <li>Conducts independent reviews of the NEM</li> <li>Provides market development advice to government</li> </ul>
<p><b><a href="#">Australian Energy Market Operator</a></b> (AEMO)</p> <ul style="list-style-type: none"> <li>Manages electricity system and electricity markets</li> <li>Provides critical planning, forecasting and power systems services and advice</li> <li>Calculates and sets a 10 year <a href="#">energy security target</a> (EST) for NSW</li> </ul>
<p><b><a href="#">Australian Energy Regulator</a></b> (AER)</p> <ul style="list-style-type: none"> <li>Monitors, investigates and enforces compliance with national electricity legislation</li> <li>Regulates transmission and distribution networks by setting maximum revenue</li> <li>Regulates electricity retail markets in all NEM states except Victoria</li> </ul>

<sup>34</sup> S Smith, [Energy futures for NSW](#), NSW Parliamentary Library Research Service, Briefing Paper No. 2/05, 2005.

<sup>35</sup> DCCEEW, [Australian Energy Market Agreement \(as amended December 2013\)](#), Australian Government, 2023, accessed 17 May 2023.

<sup>36</sup> Blueprint Institute, [Untangling the NEM: a policymaker's guide to the national electricity market](#), June 2022, p 27.

### Other energy bodies

[Australian Competition & Consumer Commission](#) (ACCC)  
[Australian Energy Infrastructure Commissioner](#) (AEIC)  
[Australian Renewable Energy Agency](#) (ARENA)  
[Clean Energy Finance Corporation](#) (CEFC)  
[Clean Energy Regulator](#)  
[Department of Climate Change, Energy, the Environment and Water](#) (DCCEEW)  
[Energy Consumers Australia](#)

## NSW

### Key bodies

[AEMO Services](#) (Consumer trustee under the *Electricity Infrastructure Investment Act 2020* (EII Act))

- Long-term planning and facilitation of private investment through [tenders](#)
- Releases an [infrastructure investment objectives report](#) every 2 years
- Monitors and mitigates financial risks to consumers under the [roadmap](#)

[Energy Corporation of NSW](#) (EnergyCo; Infrastructure planner under the EII Act)

- Infrastructure and investment co-ordination and planning
- Strategic planning, technical and regulatory design
- Community and stakeholder engagement

[Independent Pricing and Regulatory Tribunal](#) (IPART; a Regulator under the EII Act)

- Audits and annual reports on key roadmap bodies
- [Monitors](#) prices and competition in energy markets
- Administers [energy sustainability schemes](#)

[Office of Energy and Climate Change](#) (OECC)

- Responsible for [energy program, policy and project](#) development and coordination
- Supports investment in [renewable energy](#)
- Administers [energy social programs](#)

### Other energy bodies

[Electricity Infrastructure Jobs Advocate](#)  
[Energy and Water Ombudsman NSW](#) (EWON)  
[Environment Protection Authority](#) (EPA)  
[Equity Trustees Limited](#) (Financial trustee under the EII Act)  
[Essential Energy](#)  
[GreenPower](#)  
[NSW Chief Scientist & Engineer](#)  
[Renewable Energy Sector Board](#)

Sources: DCCEEW, [Energy ministers](#), 2023, accessed 9 February 2023; Australian Government, [Energy innovation toolkit: About Australian energy markets](#), n.d., accessed 8 February 2023; ESB, [Who is the Energy Security Board?](#) n.d., accessed 9 February 2023; AEMO, [What we do](#), 2022, accessed 9 February 2023; AER, [Our role](#), n.d., accessed 9 February 2023; AEMC, [National energy governance](#), 2023, accessed 9 February 2023; NSW Treasury, [Annual Report 2021-22](#), 2022; NSW Climate and Energy Action, [Entities delivering the roadmap](#), 2023, accessed 10 February 2023; EnergyCo, [Our purpose](#), 2023, accessed 10 February 2023; AEMO Services, [About us](#), 2022, accessed 10 February 2023.

The Energy and Climate Change Ministerial Council (ECMC) is the forum where the Australian, state, territory, and New Zealand governments work together on priority issues and key reforms. The ECMC works closely with Energy Consumers Australia and has oversight of 4 national bodies.<sup>37</sup> The Energy Security Board (ESB) provides whole-of-system oversight for energy security and reliability, and sets direction for the 3 market bodies: the AEMC (rule maker and market development advisor), AEMO (market and system operator) and the AER (economic regulator and rule enforcer).<sup>38</sup> The ESB is comprised of the heads of the AEMC, AEMO and the AER, and is chaired by the head of the AEMC.<sup>39</sup>

The NEM is governed by 3 national energy laws, state and territory legislation, and guidelines, standards and procedures.<sup>40</sup> The 3 national energy laws apply in each jurisdiction under their own laws:

1. The National Energy Law (NEL)
2. The National Energy Retail Law (NERL)
3. The National Gas Law (NGL).<sup>41</sup>

The first 2 laws apply to the NEM, and govern its operation, the regulation of transmission and distribution networks and the retail market, and provide for consumer rights. Each law has its own national energy objective. The National Electricity Objective (NEO) is:

... to promote efficient investment in, and efficient operation and use of, electricity services for the long term interests of consumers of electricity with respect to:

- price, quality, safety and reliability and security of supply of electricity
- the reliability, safety and security of the national electricity system.<sup>42</sup>

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<sup>37</sup> DCCEEW, [Energy ministers](#), 2023, accessed 9 February 2023.

<sup>38</sup> DCCEEW, [Energy ministers](#), 2023, accessed 9 February 2023; Australian Government, [Energy innovation toolkit: about Australian energy markets](#), n.d., accessed 8 February 2023.

<sup>39</sup> ESB, [Who is the Energy Security Board?](#) n.d., accessed 9 February 2023. At its 19 May 2023 meeting, the ECMC decided to dissolve the ESB and establish a new Energy Advisory Panel (EAP) from 1 July 2023. Under the [National Energy Transformation Partnership](#), the EAP will coordinate the advice from the 3 market bodies on issues relating to the security, reliability, and affordability of Australia's east coast energy system. The EAP will include the heads of the 3 energy market bodies and the Energy Commissioner of the ACCC as an observer. ECMC, [Meeting communique](#), 19 May 2023, accessed 24 May 2023.

<sup>40</sup> AEMC, [Regulation](#), 2023, accessed 9 February 2023.

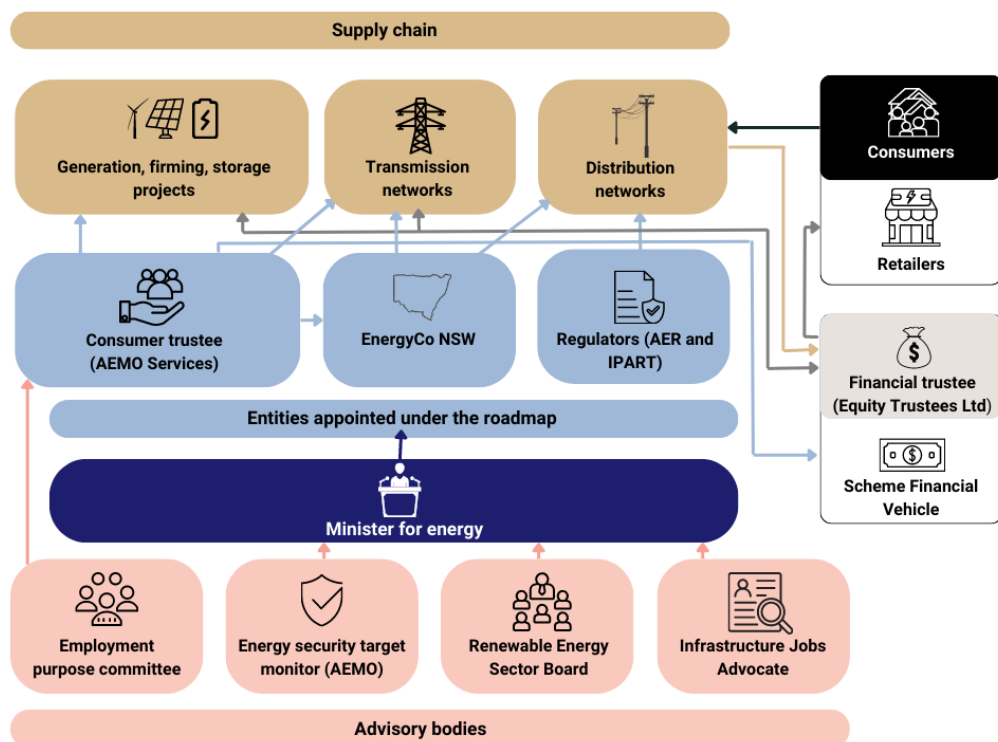
<sup>41</sup> States and territories can make laws about [energy](#) because energy is a 'residual power' under the Australian Constitution. The [national energy laws](#) have been made under the Australian Energy Market Agreement as schedules to South Australian legislation and apply in NSW under the [National Electricity \(New South Wales\) Act 1997](#) and [National Electricity \(NSW\) Law 1997](#); [National Energy Retail Law \(Adoption\) Act 2012](#) and [National Energy Retail Law \(NSW\) 2012](#); and [National Gas \(New South Wales\) Act 2008](#) and [National Gas \(NSW\) Law 2008](#) respectively.

<sup>42</sup> AEMC, [National energy objectives](#), 2023, accessed 9 February 2023.

The [Electricity Supply Act 1995](#) (NSW) regulates network operators, safety and reliability, energy security safeguard schemes, and greenhouse gas emissions. It also provides the minister with a range of powers to deal with an electricity supply emergency.<sup>43</sup>

The NSW Office of Energy and Climate Change (OECC) is responsible for energy policy development and implementation. Key policies include the [NSW Electricity Strategy](#) and [NSW Electricity Infrastructure Roadmap](#) (Figure 2). Established under the [Electricity Infrastructure Investment Act 2020](#) (EII Act), the roadmap aims to coordinate investment in transmission, generation, storage and firming infrastructure as coal-fired generation plants retire.

**Figure 2: The NSW Electricity Infrastructure Roadmap**



Source: NSW Parliamentary Library 2023. Adapted from: NSW Climate and Energy Action, [Entities delivering the roadmap](#), 2023, accessed 10 February 2023.

<sup>43</sup> DPIE, [NSW Electricity Strategy](#), NSW Government, November 2019, p 2.

Eight bodies are involved in implementing the roadmap. The Energy Corporation of NSW (**EnergyCo**)<sup>44</sup> is the infrastructure planner<sup>45</sup> for NSW's 5 renewable energy zones (REZs) (see [section 4.3.1](#)).<sup>46</sup> **AEMO** is the energy security target monitor and sets a 10-year energy security target (EST) for NSW. The EST is designed to ensure sufficient reliable electricity supply is available to meet demand.<sup>47</sup> The AEMO subsidiary, **AEMO Services**, acts as consumer trustee by carrying out long-term planning and facilitation of private investment in electricity infrastructure through a tender process, and monitoring and mitigating financial risks to consumers.<sup>48</sup> AEMO Services has appointed **Equity Trustees Limited** as the financial trustee, with responsibility for administering the Electricity Infrastructure Fund that will help fund long-term energy policy.<sup>49</sup>

Two regulators have been appointed under the EII Act. The Australian Energy Regulator (**AER**) regulates the revenue that new network infrastructure projects can raise by making 5-year revenue determinations.<sup>50</sup> The NSW Independent Pricing and Regulatory Tribunal (**IPART**) will audit and annually report on key roadmap bodies.<sup>51</sup>

The **Renewable Energy Sector Board** has developed a plan for the NSW renewable energy sector to maximise the use of local goods and services in the construction and operation of infrastructure required by the roadmap.<sup>52</sup> The **Electricity Infrastructure Jobs Advocate** advises the minister on strategies and incentives to encourage investment, development, employment, education and training in the energy sector.<sup>53</sup>

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<sup>44</sup> A statutory authority under the [Energy and Utilities Administration Act 1987](#).

<sup>45</sup> NSW Climate and Energy Action, [Entities delivering the roadmap](#), 2023, accessed 10 February 2023.

<sup>46</sup> EnergyCo, [Home](#), 2023, accessed 10 February 2023.

<sup>47</sup> NSW Climate and Energy Action, [Entities delivering the roadmap](#), 2023, accessed 10 February 2023.

<sup>48</sup> AEMO Services, [About us](#), 2023, accessed 28 March 2023.

<sup>49</sup> AEMO Services, [Our partners](#), 2022, accessed 10 February 2023; AEMO Services, [NSW electricity infrastructure tenders](#), Guidelines – Tender Round 1, September 2022.

<sup>50</sup> AEMO Services, [Our partners](#), 2022, accessed 10 February 2023.

<sup>51</sup> IPART, [Annual Report on functions under the Electricity Infrastructure Investment Act 2020 \(NSW\)](#), Report to the Minister, October 2022.

<sup>52</sup> OECC, [NSW Renewable Energy Sector Board's Plan](#), September 2022.

<sup>53</sup> NSW Climate and Energy Action, [Entities delivering the roadmap](#), 2023, accessed 10 February 2023.

## 3. Managing the energy transition

### 3.1 Net zero carbon emissions by 2050

The global energy transition to reach net zero by 2050 will be achieved through 6 technological avenues, the most important of which are renewables, energy efficiency and electrification.<sup>54</sup> The electrification of parts of the economy such as transport, buildings and manufacturing has implications for the scale and timing of the switch from fossil fuels to renewables in the electricity sector. Other drivers of change in the sector include technical innovation, government policies and consumer choice, as well as major externalities such as the geopolitics of energy security, climate change and natural disasters.<sup>55</sup> The global energy crisis that started with Russia's invasion of Ukraine in February 2022 has driven up energy prices, placing increased pressure on the governments managing the transition.<sup>56</sup>

Key energy bodies have observed that the rate of change in Australia is arguably ahead of the global pace.<sup>57</sup> The NEM is transitioning from a centralised, fossil-fuel based system where electricity flows in one direction to a decarbonised, decentralised, digitalised system of large- and small-scale renewable generation and storage that facilitates 2-way flows of electricity.<sup>58</sup> According to AEMO, our energy future will be built on 4 pillars:

1. Low-cost renewable energy<sup>59</sup>
2. Firming technology like pumped hydro, batteries and gas generation
3. New transmission and modernised distribution networks
4. Power systems capable of running entirely on renewable energy.<sup>60</sup>

Australia is well-positioned to make the most of the transition because of its access to abundant wind, solar and hydro resources. Countries with excess low-cost renewable

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<sup>54</sup> IRENA, [Energy transition outlook](#), 2022, accessed 20 February 2023.

<sup>55</sup> AEMO, [2022 Integrated System Plan](#), June 2022; D Clarke and P Graham, [Australian electricity transitions 1900 to 2050](#), CSIRO, December 2022; S McMaugh, [Electricity sector: continuing modernisation](#), *Parliamentary Library Briefing Book*, Commonwealth Parliamentary Library, June 2022.

<sup>56</sup> IEA, [World energy outlook 2022](#), October 2022.

<sup>57</sup> ACCC, [Inquiry into the national electricity market](#), 23 November 2022; AEMO, [2022 Integrated System Plan](#), June 2022; AER, [State of the energy market](#), September 2022; NSW Chief Scientist & Engineer, [Assessment of preparedness of the NSW energy market: 2022/23](#), 7 November 2022.

<sup>58</sup> AEMC, [Unlocking CER benefits through flexible trading](#), Consultation paper, December 2022; AER, [State of the energy market](#), September 2022.

<sup>59</sup> CSIRO, [Renewables remain cheapest, but cost reductions on hold](#) [media release], 11 July 2022, accessed 20 February 2023.

<sup>60</sup> AEMO, [Engineering roadmap to 100% renewables](#), December 2022.

energy will be at a distinct advantage, with options to export the energy, or use it in industrial production or for energy-intensive digital industries.<sup>61</sup>

### 3.2 Trends and risks across the supply chain

The implications of the transition are extensive. AEMO's Integrated System Plan (ISP) for the NEM provides a comprehensive roadmap for achieving net zero by 2050. The 'step change' scenario, which is the scenario most likely to occur, includes a doubling of energy consumption, a 9-fold increase in large-scale renewable generation, a 5-fold increase in distributed solar generation, a 3-fold increase in firming capacity and a major expansion of the transmission network.<sup>62</sup> AEMO also modelled the potential impact of the development of a large-scale hydrogen export industry in Australia, as envisioned by the hydrogen strategies of all 9 Australian governments.<sup>63</sup> Under this scenario, electricity consumption could quadruple by 2050.<sup>64</sup>

Governance, operating and regulatory changes have been implemented to support the roadmap as part of ongoing reform programs at national and state levels (see [section 4](#)).<sup>65</sup> While these reforms have been identified as critical for facilitating the transition, key energy bodies have observed that there is a risk that they will add significant complexity to an already complex system.<sup>66</sup>

The decarbonisation of the electricity system and the economy more broadly will have significant social and economic impacts, none of which will be evenly distributed.<sup>67</sup> A key challenge for governments is building and maintaining social consensus for the changes so that the transition does not lose its social licence – the acceptance granted to the energy industry by the community.<sup>68</sup> Increased focus has been placed on engaging communities as early as possible in the planning process for energy infrastructure such as new transmission lines to minimise land use conflict and ensure that local communities receive

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<sup>61</sup> AEMO, [2022 Integrated System Plan](#), June 2022.

<sup>62</sup> AEMO, [2022 Integrated System Plan](#), June 2022.

<sup>63</sup> See for example: NSW Climate and Energy Action, [NSW Hydrogen Strategy](#), NSW Government, 2023, accessed 17 May 2023; DCCEEW, [Australia's National Hydrogen Strategy](#), Australian Government, 27 April 2023, accessed 17 May 2023.

<sup>64</sup> AEMO, [2022 Integrated System Plan](#), June 2022; D Clarke and P Graham, [Australian electricity transitions 1900 to 2050](#), CSIRO, December 2022.

<sup>65</sup> ESB, [Health of the national electricity market 2022](#), September 2022.

<sup>66</sup> AEMO, [2022 Integrated System Plan](#), June 2022; AER, [Wholesale electricity market performance report 2022](#), December 2022.

<sup>67</sup> D Clarke and P Graham, [Australian electricity transitions 1900 to 2050](#), CSIRO, December 2022.

<sup>68</sup> The Ethics Centre, [Ethics explainer: social licence to operate](#), 23 January 2018, accessed 19 May 2023.



social and economic benefits from energy projects.<sup>69</sup> A related issue is ensuring a 'just transition' for those communities heavily reliant on fossil-fuel related industries.<sup>70</sup>

### 3.2.1 Three key risk areas for the health of the National Electricity Market

Three key risk areas for the health of the NEM have been identified in the literature. The first is that energy affordability is a major concern for consumers. Electricity prices have been rising at the same time as other cost of living expenses and are forecast to rise by up to 24.9% in NSW in 2023–24 (see [section 3.3](#)).<sup>71</sup>

Second, the required rate and scale of investment in generation, storage and transmission infrastructure is unprecedented<sup>72</sup> and must be addressed urgently while minimising costs.<sup>73</sup> Effective coordination of the investment by government bodies is therefore critical as they manage skills, labour and material shortages and address land use planning challenges.<sup>74</sup> Some of these shortages are likely to increase in the near future. As of October 2022, public infrastructure projects across Australia faced a shortage of 214,000 skilled workers. The shortage is forecast to increase by 42,000 in 2023 so that total demand (442,000) is more than double the projected available supply.<sup>75</sup>

Third, energy markets are tightly interconnected but their management as closely related systems is not well coordinated. The ESB has called for an expansion of the scope of energy system planning to cover both the electricity and gas markets and infrastructure.<sup>76</sup> Early steps have been taken to expand AEMO's functions and powers to manage east coast gas adequacy.<sup>77</sup>

### 3.2.2 Generation

AEMO's annual electricity statement of opportunities (ESOO) provides technical and market data for the NEM over a 10-year period to inform planning and decision-making. It includes

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<sup>69</sup> EnergyCo, [NSW Network Infrastructure Strategy](#), NSW Government, May 2023, p 68; AEMC, [Transmission planning reform to improve social licence and boost energy transformation](#) [media release], 4 May 2023, accessed 19 May 2023.

<sup>70</sup> P McCarthy, [Transitioning communities dependent on coal mining in NSW](#), NSW Parliamentary Research Service, Briefing Paper 1/2021, January 2021; D Clarke and P Graham, [Australian electricity transitions 1900 to 2050](#), CSIRO, December 2022.

<sup>71</sup> AER, [State of the energy market 2022](#), September 2022.

<sup>72</sup> D Clarke and P Graham, [Australian electricity transitions 1900 to 2050](#), CSIRO, December 2022.

<sup>73</sup> ESB, [Health of the national electricity market 2022](#), September 2022. See also: A Macdonald-Smith, [Transition to renewables will be much harder than people think: Broad](#), *Australian Financial Review*, 13 March 2023, accessed 17 March 2023.

<sup>74</sup> ESB, [Health of the national electricity market 2022](#), September 2022; NSW Chief Scientist & Engineer, [Assessment of preparedness of the NSW energy market: 2022/23](#), 7 November 2022.

<sup>75</sup> Infrastructure Australia, [Infrastructure market capacity: 2022 Report](#), December 2022, p 12.

<sup>76</sup> ESB, [Health of the national electricity market 2022](#), September 2022.

<sup>77</sup> DCCEEW, [Proposed regulatory amendments to extend AEMO's functions and powers to manage east coast gas supply adequacy](#), 2023, accessed 9 March 2023.

a reliability forecast that identifies forecast reliability gaps in the next 5 years, and indicative forecast reliability gaps in the second 5 years.<sup>78</sup>

The ESOO measures power system reliability by assessing whether sufficient supply resources and inter-regional transfer capability is in place to meet a defined proportion of annual demand in a region.<sup>79</sup> Reliability is assessed against:

- The **interim reliability measure** (IRM) of 99.9994% of annual demand, and
- The **reliability standard** of 99.998% of annual demand.

The IRM was introduced in 2020 in response to the NEM transitioning to being a high VRE power system so that electricity supply remains reliable during the extreme conditions of a 1 in 10-year summer.<sup>80</sup> A forecast reliability gap in the first 5 years of the ESOO 10-year forecast may trigger the retailer reliability obligation (RRO). If triggered, retailers will be required to enter into additional contracts for electricity supply so that they will be able to meet their share of expected future demand.<sup>81</sup>

Increasing levels of low-cost renewable generation have driven wholesale electricity prices downwards, accelerating the closure of coal-fired power stations across the grid. Coal-fired generators have also become less reliable as they age and have changed the way they operate by reducing output or going into stand-by more frequently.<sup>82</sup> Over the next decade, almost 10 GW of thermal capacity is due to withdraw from the NEM. In NSW, this includes the final Liddell units that closed in April 2023 (1,500 MW), Eraring in 2025 (2,880 MW), Vales Point in 2029 (1,320 MW) and Bayswater between 2030 and 2033 (2,640 MW).<sup>83</sup>

A breach of the IRM has been forecast for NSW in 2025–26 due to the closure of Eraring, and a breach of the reliability standard has been forecast from 2027–28 onwards.<sup>84</sup> While reliability outcomes will improve if transmission and firming capacity is delivered according to schedule, AEMO observes that delays to the commissioning of projects are becoming more likely.<sup>85</sup>

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<sup>78</sup> AEMO, [Electricity statement of opportunities](#), August 2022.

<sup>79</sup> AEMO, [Electricity statement of opportunities](#), August 2022, p 17.

<sup>80</sup> AEMC, [Review of the interim reliability measure](#), Draft Report, 9 March 2023, p i. The IRM is due to cease applying to the RRO on 30 June 2025. This AEMC draft report recommends extension of the IRM to 1 July 2028 to align with the commencement of a potential new form of the reliability standard.

<sup>81</sup> Department of the Environment and Energy, [Retailer reliability obligation](#), Australian Government, 2019. Retailers can choose to contract with any formation of generation, such as solar, wind, gas or coal. The contribution each source of contracted generation will make to meeting their obligation depends on how 'firm' the source is.

<sup>82</sup> AEMC, [2021 annual market performance review](#), Final Report, 28 April 2022.

<sup>83</sup> AER, [Wholesale electricity market performance report 2022](#), December 2022.

<sup>84</sup> AEMO, [Update to 2022 electricity statement of opportunities](#), February 2023.

<sup>85</sup> AEMO, [2022 electricity statement of opportunities](#), August 2022.

AEMO Services has forecast that the NSW energy security target (EST) will be breached in 2025–26 and 2029–30 due to these coal-fired power station closures. However, it expects that these breaches will be addressed by the construction of generation, storage and transmission projects that are anticipated or are deemed ‘actionable’ in the ISP.<sup>86</sup>

Risks facing the NEM and NSW energy stakeholders are no longer limited to just the summer period.<sup>87</sup> There have been a greater number of actual and forecast events associated with a lack of reserve energy<sup>88</sup> and maintaining system security has become more costly and challenging due to increasing levels of renewable generation.<sup>89</sup> Work is now underway to prepare the NEM to operate at intervals of 100% renewable power by 2025.<sup>90</sup>

### 3.2.3 Wholesale markets

A market event in June 2022 highlighted some of the emerging trends and risks in the NEM. A perfect storm of supply-side constraints drove electricity and gas wholesale prices to record highs in the second quarter of 2022 (Figure 3). Key factors included high international coal and gas prices, coal supply challenges, high operational demand and generator unavailability. As a result, AEMO took the unprecedented step of suspending the spot market in all NEM regions on 15 June 2022 to ensure a reliable supply of electricity. It also had to invoke the gas supply guarantee<sup>91</sup> for the first 2 instances ever. The NEM market suspension was lifted on 24 June 2022. Market volatility and high spot and contract prices are expected to persist over at least the next 2 years.<sup>92</sup>

In the spot market, generators make offers or bids to supply quantities of electricity in different price bands for each 5-minute dispatch interval. AEMO dispatches the cheapest generator bids first then progressively more expensive offers until enough electricity can be produced to meet demand. The highest priced offer needed to cover demand sets the 5-minute price in each region.<sup>93</sup> Participants can adjust offers through rebidding to reflect changing events such as technical limitations of units, or in response to changing market conditions. While underlying market conditions explained the June 2022 market outcomes to a large degree, the AER investigated whether generator bidding behaviour breached any

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<sup>86</sup> AEMO Services, [Energy security target monitor report](#), October 2022.

<sup>87</sup> NSW Chief Scientist & Engineer, [Assessment of preparedness of the NSW energy market: 2022/23](#), 7 November 2022.

<sup>88</sup> NSW Chief Scientist & Engineer, [Assessment of preparedness of the NSW energy market: 2022/23](#), 7 November 2022.

<sup>89</sup> AER, [State of the energy market 2022](#), September 2022.

<sup>90</sup> AEMO, [Engineering roadmap to 100% renewables](#), December 2022.

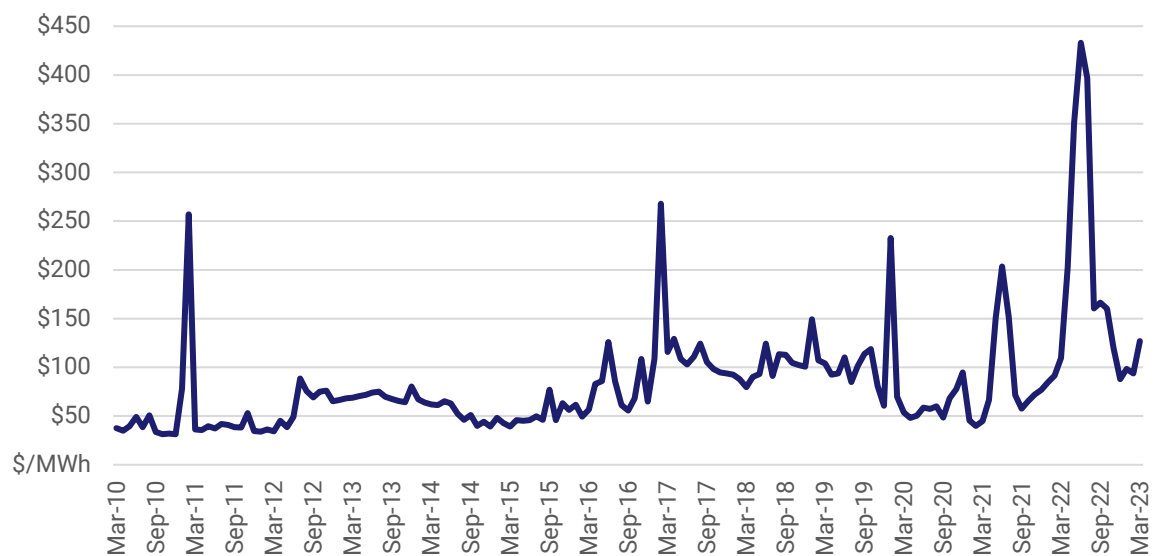
<sup>91</sup> The [gas supply guarantee](#) is a mechanism that facilitates the delivery of gas by industry participants to meet peak demand periods in the NEM.

<sup>92</sup> ACCC, [Inquiry into the national electricity market](#), November 2022 Report, 23 November 2022; AER, [Wholesale electricity market performance report 2022](#), December 2022; AEMC, [2022 annual market performance review](#), 30 March 2023; AEMO, [Quarterly energy dynamics Q1 2023](#), April 2023.

<sup>93</sup> AER, [State of the energy market](#), September 2022.

rules and legislation. The AER found evidence that suggested sustained exercise of market power through economic withholding (offering capacity higher than cost with the intention of increasing prices) and rebidding to influence the price. Neither of these activities are necessarily illegal but may indicate that competition in the market is ineffective. The AER concluded that more analysis and information is needed to understand the drivers of generator behaviour and the magnitude of the impact of the exercise of market power.<sup>94</sup>

**Figure 3: Electricity spot prices in NSW (Volume-weighted, monthly averages, inflation-adjusted, \$/MWh)**



Source: OpenNEM, [NEM](#), 2023, accessed 27 April 2023; RBA, [inflation calculator](#), n.d., accessed 27 April 2023.

Both the AER and the ACCC have found evidence of market concentration in the NEM. A few large participants control a significant portion of generation capacity, with ownership of firming capacity being particularly concentrated.<sup>95</sup> Most large participants are vertically integrated, owning both generation and retail portfolios. This allows them to insure against price risk in the wholesale market but poses a potential barrier to entry and expansion of new participants.<sup>96</sup> The AER has also raised concerns about increased concentration in FCAS markets and reduced liquidity in contract markets.<sup>97</sup> The transformation of the NEM presents an opportunity to achieve greater levels of market competition through the

<sup>94</sup> AER, [Wholesale electricity market performance report 2022](#), December 2022.

<sup>95</sup> AER, [State of the energy market](#), September 2022; AER, [Wholesale electricity market performance report 2022](#), December 2022.

<sup>96</sup> AER, [State of the energy market](#), September 2022.

<sup>97</sup> AER, [Wholesale electricity market performance report 2022](#), December 2022.

diversification of generation types and ownership. However, without careful action by governments, market concentration may increase during the transition.<sup>98</sup>

#### 3.2.4 Transmission networks

The ISP identifies 'actionable' transmission projects that need to be progressed as urgently as possible. Ten thousand kilometres of transmission lines are expected to be added to the existing 40,000km leading up to 2050, with much of it built in the next decade to support the rapid expansion of renewable generation and early closure of coal generation. This will require construction of an average of 570km per year, or 4.1 times the recent historical rate.<sup>99</sup>

Transmission capacity can also be increased by network batteries. For example, the NSW Government is procuring the services of the Waratah Super Battery to increase capacity via a system integrity protection scheme (SIPS) and minor additions to the transmission network.<sup>100</sup> The SIPS is designed to monitor transmission lines and enable the battery to act as a 'shock absorber' in the event of any sudden fault on the transmission system.<sup>101</sup>

The impact of expanding the transmission network on prices and network congestion will have to be carefully managed, especially given these indicators have begun to increase. While network prices have remained low in recent years, upward pressures are expected. Recent high consumer price index (CPI) costs will contribute to increasing costs in 2023 and possibly 2024. The costs of raising equity and debt capital for the purpose of investing in new transmission lines also appear to be increasing.<sup>102</sup> Transmission network congestion affects the capacity of generators to send out power through transmission lines. Congestion can result in higher cost generation capacity displacing lower cost generation, resulting in higher and more volatile prices for consumers. The costs of congestion have more than doubled in the past 2 years,<sup>103</sup> with renewable generators being disproportionately affected.<sup>104</sup>

#### 3.2.5 Energy retail interface

Most retail electricity markets in the NEM, including NSW, have several key characteristics that are reflective of competitive markets. These include a diversity of retailers making

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<sup>98</sup> ACCC, [Inquiry into the national electricity market](#), November 2022 Report, 23 November 2022.

<sup>99</sup> D Clarke and P Graham, [Australian electricity transitions 1900 to 2050](#), CSIRO, December 2022.

<sup>100</sup> EnergyCo, [Draft network infrastructure strategy](#), September 2022. In December 2021, the [Victorian Big Battery](#) commenced operation as the first SIPS battery in the NEM.

<sup>101</sup> AER, [Waratah Super Battery project – SIPS battery service \(contestable\)](#), 17 October 2022, accessed 19 May 2023.

<sup>102</sup> AER, [State of the energy market](#), September 2022.

<sup>103</sup> AER, [Wholesale electricity market performance report 2022](#), December 2022.

<sup>104</sup> P Hannam, [Australian renewable energy struggles to hit grid with one solar farm wasting half its yearly output](#), *The Guardian*, 24 February 2023, accessed 24 February 2023.

offers, intensive marketing activity and customers switching between sellers.<sup>105</sup> However, key indicators suggest that competition is declining in the retail market. Retailer numbers in NSW fell from 40 to 27 between June 2021 and August 2022, there are fewer retail offers in the market, and electricity prices have started trending upwards (see [section 3.3](#)).<sup>106</sup>

The retail market is also entering a period of significant change as it transitions to being a 2-way market underpinned by advances in digital technology. Consumer energy resources (CER) such as rooftop solar photovoltaics (PV), batteries, electric vehicles and smart devices are being adopted and installed at an exponential rate.<sup>107</sup> CER provide consumers with a range of opportunities including producing and storing their own energy, managing their energy consumption, and being paid to provide demand response. Smart meters can help consumers understand their energy use as well as provide retailers with information that may allow them to offer a broader range of products and services, some of which will not involve the sale of the energy.<sup>108</sup> Regulatory reforms are underway to improve the integration of CER into the power system so that AEMO can maintain a secure and stable grid,<sup>109</sup> and to ensure that consumer protection frameworks are updated accordingly.<sup>110</sup> Due to the likelihood that the second of these reform programs may require a substantial period of time to be implemented, in December 2022 IPART recommended that the NSW Government should take on the role of providing ‘high-quality, up-to-date, simple and unbiased information to the public about retail energy offers.’<sup>111</sup>

Vulnerable consumers, including low-income households, renters, and those repaying energy debts, are more likely to be exposed to the risks of the energy transition and to miss out on the benefits.<sup>112</sup> There is therefore an important role for governments in enabling consumers to actively participate in the transition<sup>113</sup> and in ensuring the system delivers equitable outcomes.<sup>114</sup>

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<sup>105</sup> AER, [State of the energy market](#), September 2022, p 201.

<sup>106</sup> IPART, [Monitoring NSW energy retail markets 2021-22](#), Final Report, November 2022, p iii.

<sup>107</sup> AEMC, [2021 annual market performance review](#), Final Report, 28 April 2022.

<sup>108</sup> AER, [Review of consumer protections for future energy services, Options for reform of the National Energy Customer Framework](#), October 2022.

<sup>109</sup> ESB, [Integration of consumer energy resources \(CER\) and flexible demand](#), n.d., accessed 19 May 2023.

<sup>110</sup> AER, [Review of consumer protections for future energy services, Options for reform of the National Energy Customer Framework](#), October 2022.

<sup>111</sup> IPART, [Monitoring NSW energy retail markets 2021-22](#), Final Report, November 2022, p xii.

<sup>112</sup> AER, [Towards energy equity – a strategy for an inclusive energy market](#), October 2022.

<sup>113</sup> ECA, [Supporting demand flexibility in the energy transition](#), 2 March 2023.

<sup>114</sup> AER, [Towards energy equity – a strategy for an inclusive energy market](#), October 2022.

### 3.3 Electricity prices

Electricity prices vary across the 3 NSW network areas: Ausgrid (covering most of Sydney, Central Coast and the Hunter), Endeavour Energy (covering most of South West Sydney and the Illawarra) and Essential Energy (the rest of NSW).<sup>115</sup> The **default market offer** (DMO) set by the AER for each network area is a cap on residential and small business bills that a retailer can charge customers on the standing offer contract. 'Standing offers' are the default offer for customers that have not signed up to a 'market offer' – market offers are all other offers in the market. There is no regulated price cap that determines the maximum retailers can charge customers on a market offer. A customer may be on a standing offer for several reasons, including if they have never switched to a market offer or if they have moved into a premises and have not contacted the existing retailer.

#### 3.3.1 Price trends

A wide range of market offers are available to residential and small business customers. For example, in August 2022, the lowest residential market offer in the Endeavour Energy area was approximately \$1,350 per annum, the highest was approximately \$2,300 per annum,<sup>116</sup> and the median market offer was \$1,789 per annum.<sup>117</sup> Given the size of the range of offers, IPART reports on median market offers when assessing the energy market.

Median market offers rose sharply after June 2022, reaching their highest level in August 2022 in the Ausgrid and Endeavour Energy network areas since IPART began monitoring the market in 2013–14 (Figure 4).<sup>118</sup> Standing offers had been falling since June 2019 before also rising sharply after June 2022. Median market offers approached equality with standing offers due to the large wholesale price increases in early 2022.<sup>119</sup>

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<sup>115</sup> Clean energy reviews, *Which network area are you in?*, n.d., accessed 3 May 2023.

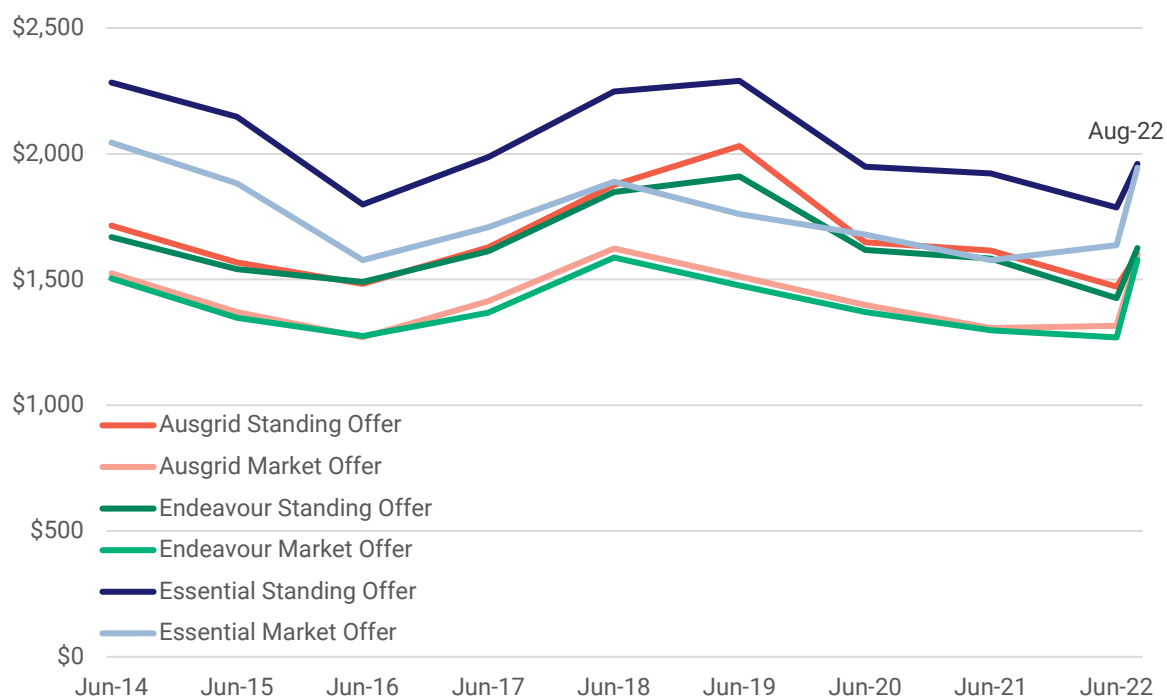
<sup>116</sup> IPART, *Monitoring NSW energy retail markets 2021-22*, Final Report, November 2022, p 119.

<sup>117</sup> IPART, *Monitoring NSW energy retail markets 2021-22*, Final Report, November 2022, p 122.

<sup>118</sup> IPART, *Monitoring NSW energy retail markets 2021-22*, Final Report, November 2022, p 78.

<sup>119</sup> IPART, *Monitoring NSW energy retail markets 2021-22*, Final Report, November 2022, p 101.

**Figure 4: Median retail electricity bills in NSW, June 2014 to August 2022 (adjusted for inflation)**



Source: IPART, [Changes in retail prices over time, Median electricity and gas bills](#), n.d., accessed 1 May 2023.

### 3.3.2 Default Market Offer

Since 1 July 2019, the AER has determined the DMO during May for the upcoming financial year. The DMO objectives are to:

- Reduce unjustifiably high standing offer prices
- Allow retailers to recover the efficient costs of providing services
- Maintain incentives for competition, innovation and investment by retailers, and incentives for consumers to engage in the market.<sup>120</sup>

In May 2023, the AER released final DMO prices for the Ausgrid, Endeavour Energy and Essential Energy network areas, with increases of up to 20.8%, 24.9% and 20.8% respectively for residential bills (Figure 5).<sup>121</sup> Small business DMO prices are set to increase

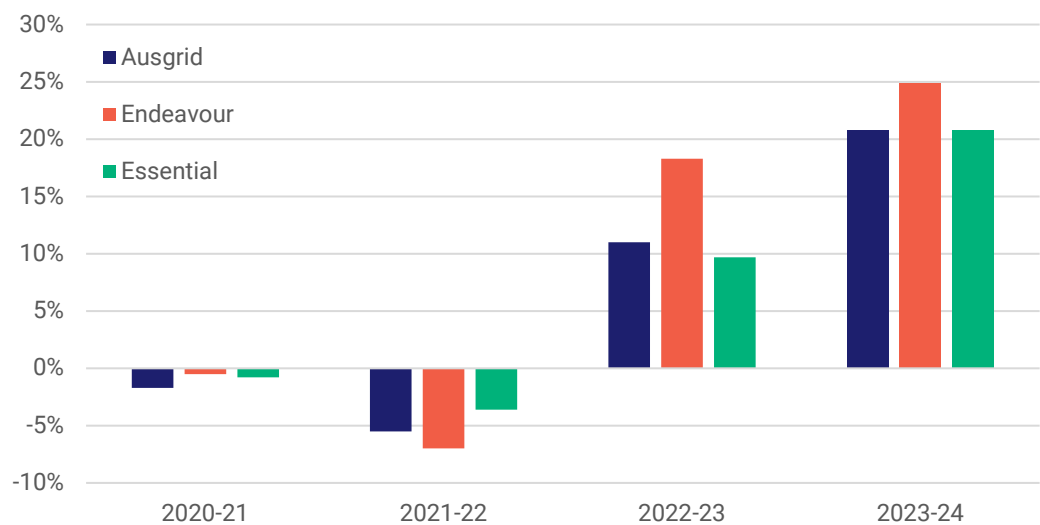
<sup>120</sup> AER, [Default market offer prices 2023-24](#), Final determination, May 2023, p 2.

<sup>121</sup> Final DMO prices are released for customers with and without controlled load, with the higher increase or decrease being reported in this paper. [Controlled load](#) is electricity supplied to specific appliances such as hot water systems, usually at a lower rate during off-peak hours.



by between 14.7% and 21.6%. Prior to the announcement of the Energy Price Relief Plan in December 2022 (see further sections [4.2.3](#) and [4.3.7](#)), the AER had estimated that prices could rise by between 35 to 50 per cent.<sup>122</sup>

**Figure 5: Maximum annual residential DMO price increases/decreases, 2020–21 to 2023–24 (nominal)**



Source: AER, [Default market offer prices reports](#), 2020–21 to 2023–24.

The DMO price is set by a building block methodology that includes:

- Wholesale energy costs
- Network costs
- Environmental costs
- Retail costs and DMO allowances.<sup>123</sup>

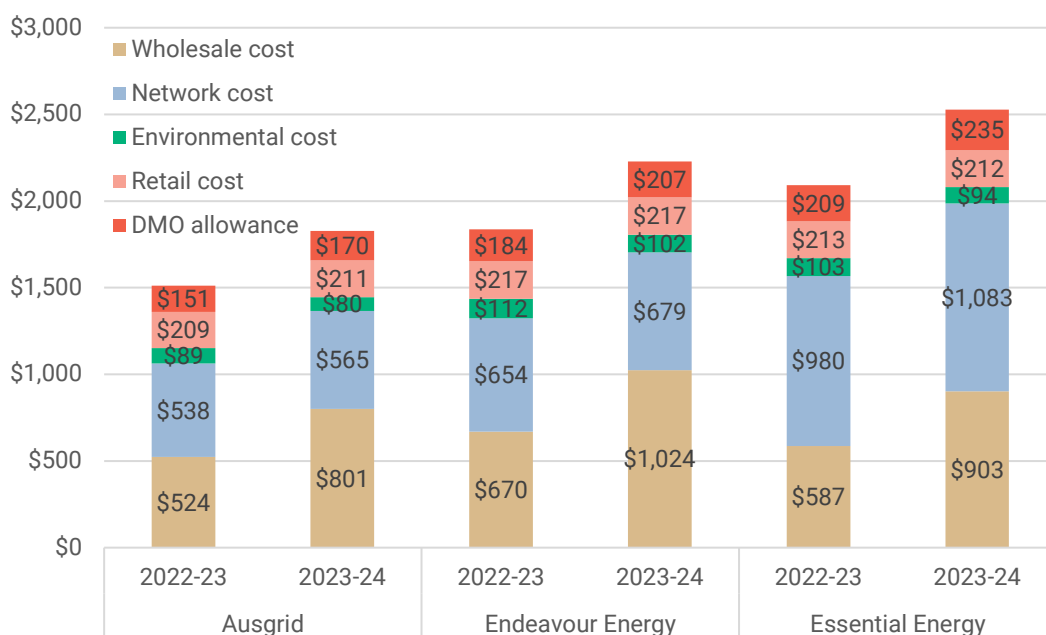
Wholesale energy costs are expected to increase by between 52.8% to 53.8% across the network areas (Figure 6). The Energy Price Relief Plan has reduced electricity prices – contract prices have fallen by approximately 50% since October 2022, but are still \$40/MWh higher than they were at the start of 2022. Expected wholesale prices take into account the more expensive contracts traded before the government intervention, higher coal and gas costs, coal-fired power station reliability issues, the closure of Liddell power

<sup>122</sup> K Ainsworth and R Whitson, [Electricity prices to rise by up to 25 per cent in NSW, south-east Queensland, South Australia and Victoria](#), ABC News, 25 May 2023, accessed 26 May 2023

<sup>123</sup> IPART, [Monitoring NSW energy retail markets 2021-22](#), Final Report, November 2022, p 75.

station in April 2023, and the increasingly ‘peaky’ shape of customer demand due to the increased amount of electricity generated by residential solar PV.<sup>124</sup>

**Figure 6: NSW DMO 2022–23 to 2023–24 price movements by cost component, residential without controlled load (nominal)**



Source: AER, [Default market offer prices 2023–24](#), Final determination, May 2023, p 67. [Controlled load](#) is electricity supplied to specific appliances such as hot water systems, usually at a lower rate during off-peak hours.

The AER includes a DMO allowance to cover retailer profit margin and to enable retailers to meet the DMO objectives, such as incentivising investment, innovation and competition.<sup>125</sup> The DMO allowance is expected to rise in line with the increase in total costs, so that it accounts for 9.3% of the total cost for NSW residential customers (Figure 6) and ranges from 16% to 20% for NSW small business customers.<sup>126</sup> According to the draft determination,<sup>127</sup> a portion of the network cost is attributable to costs to be recovered from electricity consumers for the establishment of renewable energy zones (REZs) in NSW (see [section 4.3](#) of this paper). On 28 February 2023, the AER determined that the total cost to be recovered from electricity consumers in 2023–24 for the establishment of REZs is

<sup>124</sup> AER, [Default market offer prices 2023-24](#), Final determination, May 2023, p 3.

<sup>125</sup> AER, [Default market offer prices 2023-24](#), Final determination, May 2023, p 39.

<sup>126</sup> AER, [Default market offer prices 2023-24](#), Final determination, May 2023, p 44.

<sup>127</sup> The final AER determination did not comment on the contribution of network costs attributable to establishing the REZs.

\$138.14 million.<sup>128</sup> The AER expected that this would account for \$9.78, \$14.33 and \$10.28 of the residential bill for the Ausgrid, Endeavour Energy and Essential Energy network areas respectively.<sup>129</sup>

### 3.3.3 Customer outcomes

The impact of recent and forecast electricity prices will vary by household status. The AER found that, in 2021–22, low-income households on the median market offer pay more than double the proportion of their disposable income compared with average-income households.<sup>130</sup> Further, some low-income households could have been paying up to 10% of their disposable income on electricity in the Essential Energy network area, based on available market offers.<sup>131</sup>

Payment plans are provided to customers who inform the retailer that they are experiencing payment difficulties or are offered by the retailer if they believe the customer is experiencing payment difficulties. Payment plans are intended to allow customers to repay their energy debt in affordable, regular instalments.<sup>132</sup> Hardship programs provide the most appropriate form of assistance to eligible residential customers in ongoing financial difficulty. These customers may not have the capacity to manage their ongoing usage charges, let alone their existing energy debt.<sup>133</sup> While the number of customers on payment plans has remained roughly stable over the last 12 months of available NSW data (46,018 in Q1 2021–22 and 46,782 in Q1 2022–23),<sup>134</sup> the number of hardship customers has risen considerably, from 30,122 in Q1 2021–22 to 39,663 in Q1 2022–23.<sup>135</sup>

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<sup>128</sup> AER, [Default market offer prices 2023-24](#), Draft determination, March 2023, p 12.

<sup>129</sup> The AER [notes](#) that the 3 NSW DNSPs may apply a different approach to allocating costs among customers in their 2023–24 proposed network tariffs.

<sup>130</sup> AER, [Annual retail markets report 2021-22](#), November 2022, p 50.

<sup>131</sup> AER, [Annual retail markets report 2021-22](#), November 2022, p 56.

<sup>132</sup> AER, [Annual retail markets report 2021-22](#), November 2022, p 72.

<sup>133</sup> AER, [Annual retail markets report 2021-22](#), November 2022, p 77.

<sup>134</sup> AER, [Retail energy market performance update for Quarter 1, 2022-23](#), 20 December 2022, Schedule 3 – Quarter 1 2022-23 retail performance data.

<sup>135</sup> AER, [Retail energy market performance update for Quarter 1, 2022-23](#), 20 December 2022, Schedule 4 – Quarter 1 2022-23 retail performance data.

## 4. Increasing government intervention in the market

### 4.1 Urgent action needed

Government intervention in energy markets, through either ownership or regulation, has increased in recent years to manage prices, ensure reliability and support the transition to net zero, as well as respond to a lack of private investment. These interventions all have a measure of risk, including the possibility that they result in excessive or inefficient investment, or discourage private investment.<sup>136</sup>

AEMO has identified several priority actions needed to implement the ISP, many of which require significant market involvement by government:

- More generation, storage and transmission projects need to progress urgently to 'committed' status<sup>137</sup>
- 'Actionable' transmission projects must be immediately progressed
- Commencement of design and planning work for other transmission projects and REZs
- Community support and social licence needs to be secured for generation, storage and transmission investments
- Social licence also needs to be secured for more active coordination of CER by AEMO. This will involve greater engagement between consumers, retailers, networks and other market participants
- Increased coordination between governments and stakeholders to manage supply chains and alleviate potential constraints
- Urgent action to enable the NEM to operate at intervals of 100% renewable power by 2025.<sup>138</sup>

The ISP identifies potential mechanisms that governments could adopt to facilitate the transition. These include providing investment, underwriting or finance for infrastructure projects; regulatory reform; and improved recognition of the impact on landholders and communities of hosting the infrastructure.<sup>139</sup> National and NSW reform programs and

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<sup>136</sup> AER, [Wholesale electricity market performance report 2022](#), December 2022.

<sup>137</sup> AEMO, [Update to 2022 electricity statement of opportunities](#), February 2023. A project becomes committed if it meets 5 commitment criteria: land, contracts, planning, finance and construction. For example, a proponent must have obtained all planning consents, construction approvals, connection contracts and licences. AEMO, [NEM generation information February 2023](#), 16 February 2023.

<sup>138</sup> AEMO, [2022 Integrated System Plan](#), June 2022, p 15.

<sup>139</sup> AEMO, [2022 Integrated System Plan](#), June 2022, p 15.

recent developments designed to improve energy reliability, security, affordability and sustainability address these priority actions amongst other objectives.

## 4.2 National developments

### 4.2.1 Energy market body reforms

The ECMC has oversight of the reform package released by the ESB in October 2021 – the Post 2025 Project. The Post 2025 Project was a holistic examination of the NEM to identify what should change to meet the needs of consumers in a future of diverse sources of non-dispatchable generation, demand response, storage, and consumer energy protection.<sup>140</sup> Four reform directions were proposed by the ESB, accepted by energy ministers, and continue to shape a work program<sup>141</sup> for the energy market bodies that stretches out to 2027:

1. **Resource adequacy through the transition:** critical to ensuring reliable and affordable energy as the power system continues its transition to lower emissions and new technologies
2. **Essential system services and scheduling and ahead mechanisms:**<sup>142</sup> building a stronger power system that can keep the lights on as change happens
3. **Integration of consumer energy resources and flexible demand:** unlocking opportunities for households and businesses to make energy choices that suit them such as shifting consumption to off-peak periods, installing more efficient appliances and investing in their own locally based generation or storage
4. **Transmission and access:** providing networks to meet future needs including connection of renewables, at the lowest possible cost.<sup>143</sup>

Other ongoing energy market body reforms include the ESB's Data Strategy reforms to improve data access and sharing,<sup>144</sup> the AEMC's review of the regulatory framework for metering services (which has recommended a target of 100% smart meter coverage by

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<sup>140</sup> ESB, [All about the Post 2025 project](#), n.d., accessed 27 March 2023.

<sup>141</sup> AEMO, [NEM reform implementation roadmap](#), 2022, accessed 27 March 2023.

<sup>142</sup> Scheduling mechanisms are mechanisms designed to improvement procurement of system services such as [inertia and system strength](#), and to coordinate the use of system services to keep the power system stable. An 'ahead market' will operate separately to the spot market to co-optimize the purchase and deployment of energy and system services. The spot market is a 'real-time market' for energy. The [ahead market](#) takes in bids and offers for energy and system services and produces a schedule of price and quantities for delivery of those services ahead of real-time. ESB, [Post-2025 market design, Final advice to energy ministers](#), Part A, 27 July 2021, p 28

<sup>143</sup> ESB, [All about the Post 2025 project](#), n.d., accessed 27 March 2023.

<sup>144</sup> ESB, [Data Strategy](#), n.d., accessed 28 March 2023.

2030),<sup>145</sup> and 2 AER reviews focused on improving consumer protections<sup>146</sup> and simplifying the retail regulatory market framework.<sup>147</sup>

#### 4.2.2 Powering Australia plan

First announced in June 2022,<sup>148</sup> the Australian Government's Powering Australia plan consists of a package of programs across multiple industry sectors designed to create jobs, cut power bills and reduce emissions by increasing renewable energy.<sup>149</sup> Key initiatives include the National Energy Transformation Partnership (NETP) signed with all the states and territories and Rewiring the Nation.

The NETP was jointly established by the Australian, state and territory energy ministers on 12 August 2022.<sup>150</sup> A range of priority actions were agreed to:

- **Introduction of an emissions objective into the National Energy Objectives.** A bill<sup>151</sup> to legislate introduction of the objective is due to be agreed upon in the second quarter of 2023<sup>152</sup> with amendments expected to take effect by September 2023.<sup>153</sup> However, the objective may make very little material difference in the short to medium term unless market rules are changed to enable the AER to take the objective into account when making regulatory decisions.<sup>154</sup>
- **Co-design of a First Nations clean energy strategy with the National Indigenous Australians Agency and the First Nations Clean Energy Network.**<sup>155</sup>
- **Identifying and declaring transmission to be of national significance to progress the timely delivery of critical projects and ensure better community consultation.** The Australian Government's Rewiring the Nation program will provide \$20 billion in low-cost finance for transmission investment. The first 2 projects funded under the program were announced in October 2022 and include VNI West (Victoria to NSW

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<sup>145</sup> AEMC, [Review of the regulatory framework for metering services](#), 2023, accessed 27 March 2023.

<sup>146</sup> AER, [Review of consumer protections for future energy services](#), n.d., accessed 27 March 2023.

<sup>147</sup> AER, [Review to simplify the retail market regulatory framework](#), n.d., accessed 27 March 2023.

<sup>148</sup> A Albanese and C Bowen, [Joint media release: stronger action on climate change](#) [media release], Australian Government, 16 June 2022, accessed 27 March 2023.

<sup>149</sup> DCCEEW, [Powering Australia](#), Australian Government, 2023, accessed 27 March 2023.

<sup>150</sup> DCCEEW, [National Energy Transformation Partnership](#), Australian Government, 12 August 2022, accessed 27 March 2023.

<sup>151</sup> DCCEEW, [Consultation on proposed legislative changes to incorporate an emissions reduction objective into the national energy objectives](#), Australian Government, 20 December 2022, accessed 27 March 2023.

<sup>152</sup> ECMC, [Energy and Climate Change Ministerial Council Meeting communique](#), 24 February 2023, accessed 27 March 2023.

<sup>153</sup> ECMC, [Meeting communique](#), 19 May 2023, accessed 24 May 2023.

<sup>154</sup> G Parkinson, ["No time to waste:" networks warn of delays for EVs, rooftop solar and batteries](#), *Renew Economy*, 17 February 2023, accessed 27 March 2023.

<sup>155</sup> DCCEEW, [First Nations clean energy strategy](#), Australian Government, 2023, accessed 27 March 2023.

Interconnector West) between Victoria and NSW.<sup>156</sup> These projects will be coordinated by a newly established Rewiring the Nation Office (RTNO), which will partner with the Australian Energy Infrastructure Commissioner (AEIC) and state, territory and local governments on new transmission projects and regulatory reforms, and will focus on strengthening community engagement, social licence and benefit sharing for transmission.<sup>157</sup>

- **Cooperation on plans for generation and storage adequacy, demand evolution, and workforce, supply chain and community needs.** A key development in this area is the announced Commonwealth capacity investment scheme (CIS), an underwriting scheme offered in all jurisdictions that will only be available to projects using zero emissions dispatchable generation and storage technologies and will be integrated with existing state schemes such as the NSW Electricity Infrastructure Roadmap to avoid duplication.<sup>158</sup> Other relevant initiatives include plans to:
  - Develop a national energy workforce strategy to address workforce needs (including opportunities for First Nations peoples), supply chain management, and domestic manufacturing and on-shoring opportunities for the energy transformation<sup>159</sup>
  - Develop a national energy performance strategy to improve energy efficiency across residential, commercial and industrial sectors<sup>160</sup>
  - ‘Supercharge’ the next ISP, due in 2024, by integrating system planning across the gas and electricity sectors<sup>161</sup>
  - Develop a national renewable energy supply chain action plan to identify potential opportunities to alleviate supply chain pressures (such as procurement bundling), address vulnerabilities in national capabilities, support recycling and resource recovery and explore, in coordination across governments, opportunities to support local economies and job outcomes across regional communities.<sup>162</sup>

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<sup>156</sup> DCCEEW, [Delivering priority transmission projects](#), Australian Government, 2023, accessed 27 March 2023.

<sup>157</sup> ECMC, [Energy and Climate Change Ministerial Council Meeting communique](#), 28 October 2022, accessed 27 March 2023.

<sup>158</sup> ECMC, [Energy and Climate Change Ministerial Council Meeting communique](#), 8 December 2022, accessed 27 March 2023.

<sup>159</sup> ECMC, [Energy and Climate Change Ministerial Council Meeting communique](#), 28 October 2022, accessed 27 March 2023.

<sup>160</sup> DCCEEW, [National Energy Performance Strategy](#), Australian Government, 2023, accessed 27 March 2023.

<sup>161</sup> ECMC, [Energy and Climate Change Ministerial Council Meeting communique](#), 28 October 2022, accessed 27 March 2023.

<sup>162</sup> ECMC, [Energy and Climate Change Ministerial Council Meeting communique](#), 8 December 2022, accessed 27 March 2023.

- **Collaboration on energy security management, including cyber security and fuel availability.** This will involve updating the Australian Energy Security Cyber Security Framework and proactively managing emerging energy system risks in areas such as climate resilience and cyber security of consumer energy resources.<sup>163</sup>

#### 4.2.3 Energy Price Relief Plan

The Australian Government's October 2022 Budget expected electricity prices to rise by 20% in late 2022, with a further 30% increase in 2023–24.<sup>164</sup> In response, the Australian, state and territory governments agreed to the Energy Price Relief Plan in December 2022. Under the plan, the Australian Government has placed a temporary cap on gas prices, and the NSW and Queensland Governments placed temporary caps on coal prices (see [section 4.3.7](#)). The governments also committed to the capacity investment scheme and announced establishment of a jointly funded energy bill relief fund in 2023.<sup>165</sup>

#### 4.2.4 Energy and Climate Change Ministerial Council strategic priorities

In February 2023, the ECMC agreed to 5 strategic priorities for the coming 12 months:

1. Transforming Australia's energy system to align with net zero while providing more affordable, secure, and reliable energy to Australians, (including improving regulatory certainty and efficiency for, and accelerating delivery of, dispatchable renewable energy, storage and nationally significant transmission projects)
2. Efficiently and effectively contributing to the achievement of all Australian emissions reduction targets
3. Investing in Australia's adaptation and resilience to climate change
4. Empowering and comprehensively engaging with Australia's regions and remote communities, including First Nations, on the pathway to decarbonisation and Australia becoming a renewable energy superpower
5. Delivering a coordinated and strategic approach to achieving improvements in energy productivity across the economy.<sup>166</sup>

The February 2023 communique also announced that the NSW Government was working with energy market bodies to develop an orderly exit mechanism for coal-fired power stations.<sup>167</sup>

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<sup>163</sup> ECMC, [Energy and Climate Change Ministerial Council Meeting communique](#), 28 October 2022, accessed 27 March 2023.

<sup>164</sup> Australian Government, [Budget October 2022-23, Budget Strategy and Outlook](#), Budget Paper No. 1, 25 October 2022, p 57.

<sup>165</sup> Albanese, [Energy Price Relief Plan](#) [media release], 9 December 2022, accessed 27 March 2023.

<sup>166</sup> ECMC, [Meeting communique](#), 24 February 2023, accessed 27 March 2023.

<sup>167</sup> ECMC, [Meeting communique](#), 24 February 2023, accessed 27 March 2023.



At the 19 May 2023 ECMC meeting, the council heard about the progress made on the 5 strategic priorities and decided to dissolve the ESB and establish a new energy advisory panel (EAP) from 1 July 2023. The EAP will coordinate the advice from the 3 market bodies on issues relating to the security, reliability, and affordability of Australia's east coast energy system. It will include the heads of the 3 energy market bodies and the Energy Commissioner of the ACCC as an observer.<sup>168</sup>

#### 4.2.5 Budget 2023-24

The Australian Government's 2023–24 Budget invested an additional \$4 billion in the Government's plan to make Australia a 'renewable energy superpower'. Key reforms include:

- Establishing a national capacity investment scheme to 'unlock at least \$10 billion of new investment and 6 GW of dispatchable power by de-risking investments in priority generation and storage projects'
- Support for electrification of housing and the economy through programs such as the \$1.3 billion household energy upgrades fund and \$310 million in tax relief for energy performance upgrades under the small business energy incentive
- Establishing the Net Zero Authority with a focus on regions, industries and workers that have 'traditionally powered Australia's economy'. It will work to ensure that workers are supported as they transition to new opportunities and to enable meaningful participation by First Nations Australians.<sup>169</sup>

### 4.3 NSW developments

The 2018 NSW Transmission Infrastructure Strategy had 3 objectives: increase NSW connectivity to other states through new transmission lines; establish 3 'energy zones' in the New England, Central West and South West areas; and improve the regulatory approval process for new transmission by reducing the time required.<sup>170</sup> In November 2019, the NSW Government released its Electricity Strategy in response to rising prices, increasing grid congestion, rapid uptake of CER and the upcoming retirement of coal-fired power stations. The strategy reconstituted the Energy Savings Scheme as the Energy Security Safeguard<sup>171</sup> to accelerate deployment of energy efficiency technologies and peak demand reduction

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<sup>168</sup> ECMC, [Meeting communique](#), 19 May 2023, accessed 24 May 2023.

<sup>169</sup> Australian Government, [Budget 2023-24: building a clean energy future](#), 2023. DPC, [A new national Net Zero Authority](#) [media release], Australian Government, 5 May 2023, accessed 26 May 2023

<sup>170</sup> NSW Climate and Energy Action, [NSW transmission infrastructure strategy](#), NSW Government, 2023, accessed 28 March 2023.

<sup>171</sup> NSW Climate and Energy Action, [Energy Security Safeguard](#), NSW Government, 2023, accessed 28 March 2023.

technologies, introduced the EST, and committed to a pilot of the 3 renewable energy zones (REZs) in the Central West.<sup>172</sup>

In November 2020, the NSW Parliament passed the [Electricity Infrastructure Investment Act 2020](#) (EII Act) which gave effect to the [NSW Electricity Infrastructure Roadmap](#) (Figure 2).<sup>173</sup> The roadmap coordinates investment in transmission, generation, storage and firming infrastructure as coal-fired generation plants retire. It aims to achieve a capacity target of at least 12 GW of renewable energy generation, and 2 GW of long-duration storage by 2030.<sup>174</sup>

#### 4.3.1 Renewable energy zones

REZs are the modern equivalent of a power station. They combine new renewable electricity generation (such as solar and wind farms), storage (such as batteries and pumped hydro), and transmission infrastructure.<sup>175</sup> By March 2023, the NSW Government had declared 5 REZs under the EII Act (Figure 7) in the Central-West Orana, Hunter-Central Coast, Illawarra, New England and South West regions.

A REZ declaration appoints EnergyCo as the infrastructure planner for the REZ and sets out the intended network capacity and infrastructure that will make up the REZ.<sup>176</sup> For each REZ, EnergyCo is engaged in extensive strategic planning and technical and regulatory design, coordination of investment and infrastructure projects, and development of community-focused policies and programs (Figure 8).<sup>177</sup> AEMO Services acts as consumer trustee by carrying out coordinated planning of long-term investment, running competitive tenders to facilitate this investment, and authorising REZ transmission infrastructure.<sup>178</sup>

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<sup>172</sup> DPIE, [NSW Electricity Strategy](#), NSW Government, November 2019.

<sup>173</sup> M Kean, [Electricity Infrastructure Investment Bill 2020](#), *NSW Hansard*, 10 November 2020.

<sup>174</sup> EnergyCo, [The electricity infrastructure roadmap](#), NSW Government, 2023, accessed 28 March 2023. [Section 44\(3\)](#), *Electricity Infrastructure Investment Act 2020*.

<sup>175</sup> EnergyCo, [Renewable energy zones](#), NSW Government, 2023, accessed 28 March 2023.

<sup>176</sup> EnergyCo, [Illawarra Renewable Energy Zone](#), NSW Government, 2023, accessed 28 March 2023.

<sup>177</sup> EnergyCo, [What's involved in a renewable energy zone?](#) NSW Government, 2023, accessed 28 March 2023.

<sup>178</sup> AEMO Services, [About us](#), 2023, accessed 28 March 2023.

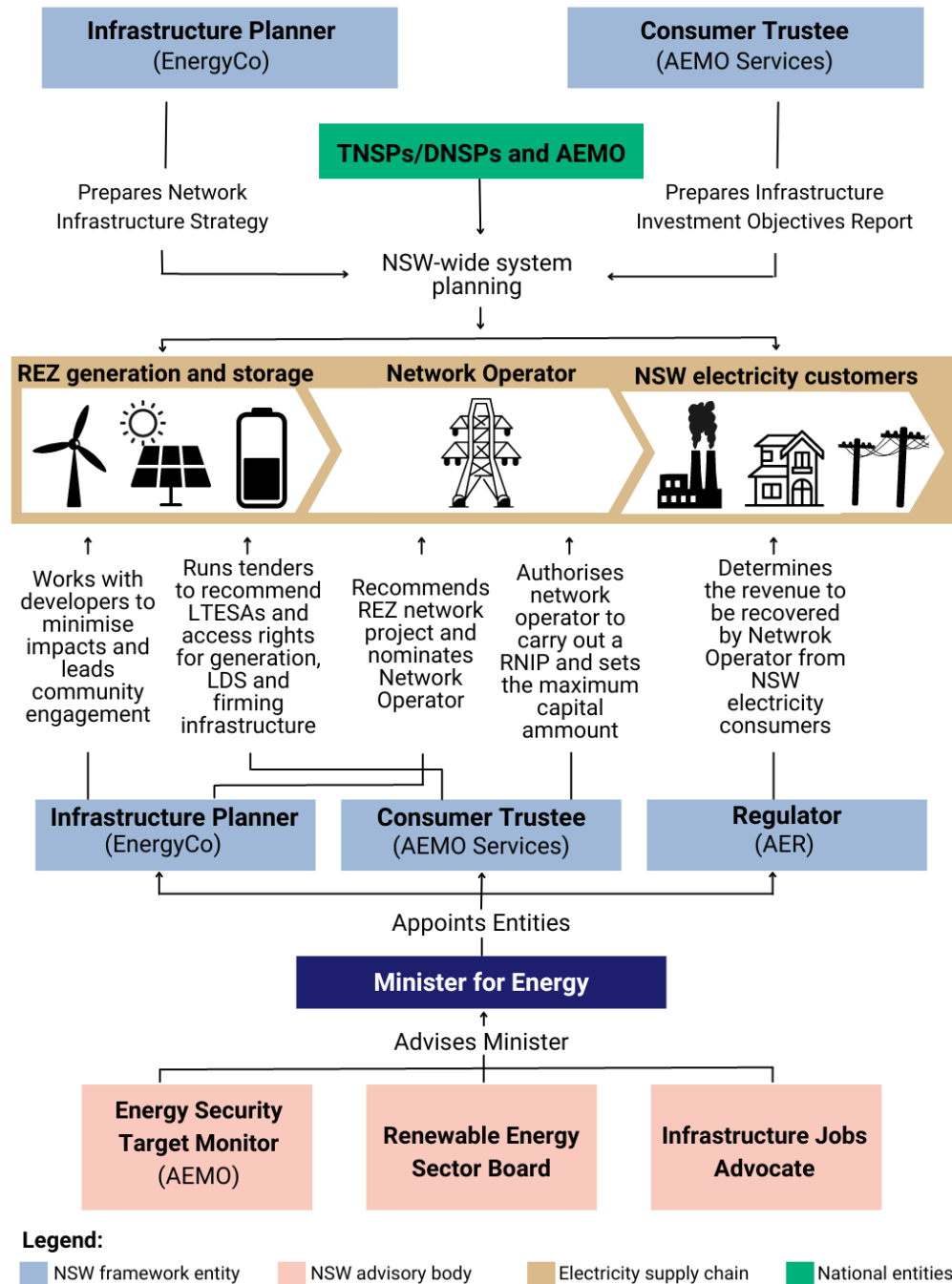
Figure 7: Renewable energy zones in NSW



Source: EnergyCo, [NSW Network Infrastructure Strategy](#), NSW Government, May 2023, p 58.

\* Network infrastructure delivered through Transgrid's ISP projects EnergyConnect, HumeLink and VNI West

**Figure 8: NSW framework for coordinating the delivery of generation, storage and transmission infrastructure**



Source: NSW Parliamentary Library 2023. Adapted from: EnergyCo, [Draft network infrastructure strategy](#), NSW Government, September 2022, p 15.

### 4.3.2 Strategic planning

Part 6 of the EII Act establishes the electricity infrastructure investment safeguard (the safeguard).<sup>179</sup> The safeguard consists of 3 infrastructure investment objectives, a biannual infrastructure investment objectives (IIO) report prepared by AEMO Services that contains a 20-year infrastructure development pathway and a 10-year tender plan, and the ability to conduct tender processes to award long-term energy service agreements (LTESAs) if they are required to meet the development pathway.<sup>180</sup> The 3 infrastructure investment objectives are (Figure 9):

1. Construction of generation infrastructure that is necessary to minimise electricity costs for NSW electricity customers (12 GW)
2. Construction of long-duration storage (LDS) infrastructure that is necessary to meet the reliability standard (2 GW)
3. Construction of firming infrastructure that is necessary to meet the EST and the reliability standard.<sup>181</sup>

#### 4.3.2.1 Infrastructure Investment Objectives Report

In December 2021, AEMO Services released the 2021 IIO Report. The report set a 20-year development pathway for the construction of generation and long-duration storage infrastructure, and a 10-year tender plan for LTESAs to give effect to the development pathway.<sup>182</sup> A December 2022 update added 380 MW of firming infrastructure to the development pathway to address the forecast gap in firm capacity required to meet the EST that will result when the Eraring coal-fired power station closes in 2025.<sup>183</sup>

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<sup>179</sup> [Part 6, Electricity Infrastructure Investment Act 2020.](#)

<sup>180</sup> M Kean, [Electricity Infrastructure Investment Bill 2020](#), NSW Hansard, 10 November 2020.

<sup>181</sup> [S 44\(2\), Electricity Infrastructure Investment Act 2020.](#)

<sup>182</sup> AEMO Services, [2021 Infrastructure Investment Objectives Report](#), December 2021, p 3.

<sup>183</sup> AEMO Services, [2022 Infrastructure Investment Objectives Report](#), December 2022, p 3.

**Figure 9: Infrastructure investment objectives and eligible infrastructure**

		INFRASTRUCTURE INVESTMENT OBJECTIVES			
INFRASTRUCTURE	DEFINITION	Overall Objectives			
		Minimum objective (volume/capacity target)	Minimise electricity costs for NSW customers	Meet reliability standard	Meet the energy security target
Generation	Generation from a renewable energy source $\geq$ 30MW	12GW constructed by the end of 2029	✓	N/A	N/A
LDS	Storage able to be dispatched at registered capacity for $\geq$ 8hrs, & scheduled by AEMO in the central dispatch process	2GW constructed by the end of 2029	N/A	✓	N/A
Firming	Firm capacity scheduled by AEMO in the central dispatch process	None	N/A	✓	✓

Source: NSW Parliamentary Library 2023. Adapted from: AEMO Services, [2022 Infrastructure Investment Objectives Report](#), December 2022, p 18.

#### 4.3.2.2 Network Infrastructure Strategy

In May 2023, EnergyCo released its Network Infrastructure Strategy (NIS). The strategy:

1. Provides a 20-year strategy for the coordinated development of network infrastructure to deliver REZs and other supporting infrastructure to meet the IIO development pathway and broader objectives of the EII Act
2. Provides network infrastructure options (NIOs) for consideration in the IIO Report to help optimise the development of generation, storage and network infrastructure
3. Identifies potential NIOs for recommendation to AEMO Services or the minister for energy
4. Investigates the status of NSW's energy resources as well as opportunities to inform the IIO, joint network planning, and potential government policies<sup>184</sup>
5. Identifies a range of regional development, employment, training and social infrastructure opportunities designed to ensure that host and First Nations

<sup>184</sup> EnergyCo, [NSW Network Infrastructure Strategy](#), NSW Government, May 2023, p 18.

communities receive economic and social benefits from the network infrastructure projects.<sup>185</sup>

The NSW Government is also exploring options for small-scale distribution network upgrades and storage projects that would improve electricity affordability and reliability in the short term while the large-scale REZ and PTIP (priority transmission infrastructure project) network projects are being built.<sup>186</sup>

AEMO Services modelled 4 scenarios for inclusion in the NIS that represent a range of market conditions, 3 of which were included in the final strategy.<sup>187</sup> The strategy did not take a position on the likelihood of any of these scenarios:

1. **Central scenario:** there is rapid, coordinated, economy-wide action to transition from fossil fuels to renewable energy to help limit global temperature rise to below 1.8°C, in line with the step change scenario in the 2022 ISP. Wholesale electricity and scheme costs are lower than under transmission delay scenario and higher than under coal exit by 2030 and strong electrification scenario.
2. **Transmission delay scenario:** the core assumptions are as for the central scenario, but large network projects (with capital cost above \$1 billion) are delayed due to development, construction and/or supply chain disruptions. As both generation and network infrastructure are being developed less efficiently, wholesale and scheme costs rise compared to the central scenario, although emissions are similar.
3. **Coal exit by 2030 and strong electrification scenario:** the ambition in this scenario is to limit global temperature increases to 1.5°C compared with pre-industrial levels. This would see all NSW coal-fired power stations exit the market by 2030, followed by strong growth in demand across the NSW economy from transport, industry and households all switching to electricity, and from new hydrogen electrolyzers. New generation and network infrastructure is accelerated, leading to significantly lower wholesale electricity costs and emissions. Additional short-duration batteries support the existing mix of capacity and provide dispatchable capacity to meet the reliability standard.<sup>188</sup>

Under the central scenario, by 2040 the power system is forecast to comprise 34 GW of large-scale renewable capacity, 13 GW of large-scale storage and firming capacity, 18 GW of rooftop solar and 11 GW of small-scale batteries (Figure 10). This additional generation capacity far exceeds the existing network capacity. Network capacity is different to generation capacity, being a measure of the maximum amount of electricity that can be

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<sup>185</sup> EnergyCo, [NSW Network Infrastructure Strategy](#), NSW Government, May 2023, p 68.

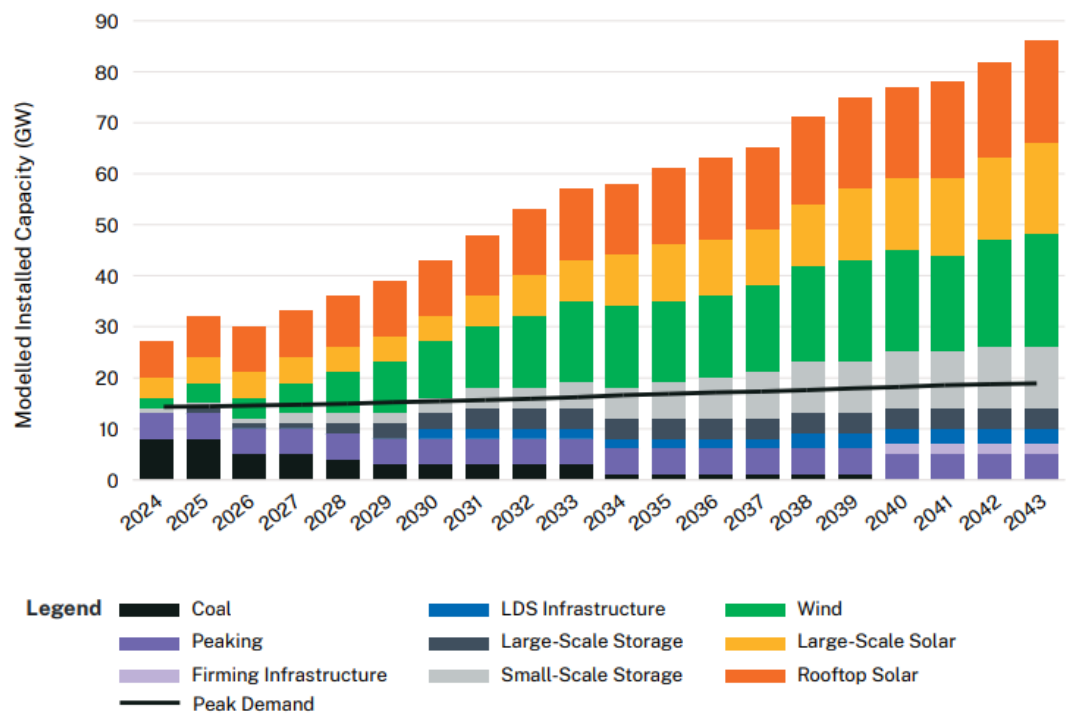
<sup>186</sup> EnergyCo, [NSW Network Infrastructure Strategy](#), NSW Government, May 2023, p 13.

<sup>187</sup> The fourth strategy (Early Coal Exit) was not considered to be sufficiently different from the Central scenario.

<sup>188</sup> EnergyCo, [NSW Network Infrastructure Strategy](#), NSW Government, May 2023, p 76.

transmitted from one point of a network to another without exceeding its operating constraints.<sup>189</sup> The strategy proposes adding between 14 GW and 24 GW of network capacity over the next 20 years.

**Figure 10: Forecast expansion of new NSW generation storage and firming capacity (central scenario)**



Source: EnergyCo, [NSW Network Infrastructure Strategy](#), NSW Government, May 2023, p 6.

Note: 'Peaking' refers to peaking gas-fired power stations that primarily operate during times of high demand.

The additional network capacity would be delivered by 3 categories of NIOs (Table 2 and Figure 7):

1. **Deliver now NIOs:** to be built as quickly as possible for delivery by 2033 at the latest to secure NSW's future energy supply before the announced retirement of coal-fired power stations
2. **Secure now NIOs:** would be likely to be needed in the 2030s to add further network capacity, in case there are earlier closures of coal-fired power stations and potential delays to other network projects

<sup>189</sup> EnergyCo, [NSW Network Infrastructure Strategy](#), NSW Government, May 2023, p 20.



3. **Plan for the future NIOs:** may be needed in the 2030s to support the economy-wide electrification of transport, industry and domestic appliances needed to reach net zero emissions.

**Table 2: REZ network capacity increases to be delivered by network infrastructure options**

	Deliver now	Secure now	Plan for the future
<b>Total REZ network capacity added</b>	<b>14 GW</b>	<b>3.6 GW</b>	<b>6.4 GW</b>
Central-West Orana	4.5 GW	2.3 GW	3.5 GW
New England	6 GW	0.8 GW	1.5 GW
South West <sup>1</sup>	2.5 GW	-	-
Hunter-Central Coast	1 GW	0.5 GW	1.5 GW
Illawarra		Not modelled <sup>2</sup>	
<b>Preliminary cost estimates<sup>3</sup></b>	<b>\$7.8 billion</b>	<b>\$1.5 billion</b>	<b>\$3.0 billion</b>

Source: Adapted from: EnergyCo, [NSW Network Infrastructure Strategy](#), NSW Government, May 2023, p 24.

Notes: 1. South West REZ transfer capacity is delivered through ISP projects. The cost has not been included here as this capacity will be delivered through Project EnergyConnect, HumeLink and the Wagga Wagga to Dinawan section of VNI West.

2. Not modelled due to early-stage development of Illawarra REZ at the time of modelling for the strategy. The Illawarra REZ has an intended network capacity of 1 GW and NIOs will be considered in the next strategy.

3. Estimates are Class 5b accuracy (i.e. +/- 50%) and for development and construction costs only (excluding finance, generator connection and system strength costs). This provides a comparable basis with estimates for projects under the National Electricity Rules. The total cost for a REZ also includes finance, generator connection and system strength costs at typically an additional 70% to 110% of development and construction costs. Generator and storage proponents that hold access rights will contribute connection and system strength costs. All values are in real 2021 Australian dollars.

The same 3 categories have been applied to related network augmentation projects to support the NSW network (Table 3).

**Table 3: Key network augmentations to meet energy security targets and to support REZ development**

	Deliver now	Secure now	Plan for the future
<b>Total REZ network capacity added</b>	<b>5.9 GW</b>	-	<b>10.5 GW</b>
Hunter transmission project (PTIP)	5 GW	-	6 GW <sup>1</sup>
Waratah Super Battery Project (PTIP)	0.9 GW	-	-
Southern Sydney Ring <sup>3</sup> (TBC)	-	-	4.5 GW
<b>Preliminary cost estimates<sup>2</sup></b>	<b>\$1.9 billion</b>	-	<b>\$4.0 billion</b>

Source: Adapted from: EnergyCo, [NSW Network Infrastructure Strategy](#), NSW Government, May 2023, p 24.

Notes: 1. This is an indicative capacity that has been derived from early power system analysis studies. More detailed investigation is required to determine scope and timing.

2. Estimates are Class 5b accuracy (i.e. +/- 50%) and for development and construction costs only (excluding finance, generator connection and system strength costs). This provides a comparable basis with estimates for projects under the National Electricity Rules. The total cost for a REZ also includes finance, generator connection and system strength costs at typically an additional 70% to 110% of development and construction costs. Generator and storage proponents that hold access rights will contribute connection and system strength costs. All values are in real 2021 Australian dollars.

3. The Southern Sydney Ring may be delivered under the National Electricity Rules or under the EII Act.

The deliver now NIOs and network augmentation projects are projected to cost a total of \$9.7 billion (in 2021 dollars). These preliminary estimates have a 50% error margin, that is, the projects could cost somewhere between \$4.9 billion and \$14.6 billion. The estimates cover development and construction costs only, excluding finance, generator connection and system strength costs. The total preliminary estimate for all NIOs and augmentation projects is \$15.6 billion (in 2021 dollars), and with the 50% error margin could cost somewhere between \$7.8 billion and \$23.4 billion. EnergyCo is in the process of designing each NIO through detailed stakeholder engagement. It will then recommend a network solution to AEMO Services for authorisation.<sup>190</sup>

Several benefits of proceeding with the proposed network investments are identified in the strategy. These include:

- Reducing greenhouse gas emissions

<sup>190</sup> EnergyCo, [NSW Network Infrastructure Strategy](#), NSW Government, May 2023, p 23.

- Placing downwards pressure on electricity prices by connecting low-cost renewable energy sources to the grid
- Net benefits for consumers with a present value of \$10.6 billion over 20 years
- Regional social and economic benefits including the creation of thousands of construction and operations jobs for regional communities and up to \$265 million in community enhancement funds by 2042
- Insurance against market events such as earlier than expected closure of coal-fired power stations.<sup>191</sup>

#### 4.3.3 Long-term energy service agreements and access rights

The first generation and long-duration storage tender commenced on 4 October 2022.<sup>192</sup> Sixteen projects were shortlisted in January 2023 representing more than 4.3 GW of generation and long-duration storage.<sup>193</sup> The successful bidders were announced on 1 May 2023: 3 renewable generation projects with a capacity of 1,395 MW and a long-duration storage battery. The minimum prices guaranteed for the successful bidders are well below the levelised cost of energy<sup>194</sup> (below \$35/MWh for solar and below \$50/MWh for wind). Community benefits of these projects include employment outcomes for First Nations people and 'careful and creative' site selection.<sup>195</sup> A tender for firming infrastructure commenced on 3 April 2023.<sup>196</sup> A tender for long-duration storage and generation capacity of 2,500 GWh and for access rights to the Central-West Orana REZ Access Scheme will also be held in the second quarter of 2023.<sup>197</sup>

LTESAs have been designed to provide revenue certainty for private investors. An LTESA is an options contract that offers generation, storage and firming projects the right to access minimum cash flows in the event of unexpectedly low electricity prices.<sup>198</sup> The minimum cash flows would be paid to the LTESA holder by the Scheme Financial Vehicle (SFV)

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<sup>191</sup> EnergyCo, [NSW Network Infrastructure Strategy](#), NSW Government, May 2023, p 26.

<sup>192</sup> AEMO Services, [First generation and long duration storage tender opens for NSW Electricity Infrastructure Roadmap](#) [media release], 4 October 2022.

<sup>193</sup> AEMO Services, [Consumer trustee shortlists high-quality projects in roadmap inaugural tender](#) [media release], 27 January 2023.

<sup>194</sup> The levelised cost of electricity is an electricity generation technology comparison metric. It represents a calculation of the total unit costs a generator must recover to meet all its costs including a return on investment. According to the latest draft report, onshore wind (\$63-\$80/MWh) and solar PV (\$48-\$70/MWh) are the lowest cost generation technologies by a significant margin. When the costs of integrating VRE into the grid are also taken into account, onshore wind and solar PV remain the lowest cost new-build technology. P Graham et al., [GenCost 2022-23: consultation draft](#), CSIRO, December 2022.

<sup>195</sup> AEMO Services, [AEMO Services nation leading tender and contract design delivers for NSW](#) [media release], 1 May 2023.

<sup>196</sup> AEMO Services, [AEMO Services launches competitive tender for firming infrastructure and demand response](#) [media release], 3 April 2023.

<sup>197</sup> AEMO Services, [Tenders](#), 2023, accessed 30 March 2023.

<sup>198</sup> AEMO Services, [2021 Infrastructure Investment Objectives Report](#), December 2023, p 18.

appointed by the NSW Government.<sup>199</sup> The contracts can be up to 20 years for generation projects and up to 40 years for long-duration storage projects.<sup>200</sup>

Projects must be granted an access right to connect to new infrastructure in a REZ. The allocation and rules around access rights are governed by the access scheme of a REZ.<sup>201</sup> Access schemes are designed to enable active coordination of network, generation and storage investment. Each scheme will:

- Govern the volume of projects that may be granted access rights, and the terms and conditions of those rights
- Provide increased certainty around curtailment risks for generation and storage projects while maintaining an efficient level of infrastructure utilisation. Curtailment is any action that reduces the amount of electricity generated to maintain the balance between supply and demand<sup>202</sup>
- Streamline connection processes for projects.

The access schemes are also intended to provide benefits for local and First Nations communities by distributing access fees revenue for community and employment purposes, mitigating cumulative impacts and strategically managing land use considerations.<sup>203</sup>

#### 4.3.4 Transmission infrastructure

Part 5 of the EII Act<sup>204</sup> establishes a network infrastructure projects framework for the planning, development, construction and cost recovery of network infrastructure projects. It gives the NSW Government greater control over the planning and investment processes for network infrastructure projects.<sup>205</sup> The framework establishes 2 NSW regulatory pathways<sup>206</sup> (Table 4):

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<sup>199</sup> EnergyCo, [Long-term energy service agreements](#), NSW Government, 2023, accessed 29 March 2023.

<sup>200</sup> AEMO Services, [Financing the NSW energy transition](#), An open letter to the finance industry from Paul Verschuer, Executive General Manager, 7 March 2023.

<sup>201</sup> AEMO Services, [Tenders](#), 2023, accessed 29 March 2023. Under [Part 4](#) of the EII Act, the minister may declare an access scheme that applies to all or part of a REZ.

<sup>202</sup> T Kury, [What is curtailment? An electricity market expert explains](#), *The Conversation*, 22 June 2022, accessed 30 March 2023.

<sup>203</sup> EnergyCo, [Access schemes](#), NSW Government, 2023, accessed 29 March 2023; OECC, [South West Renewable Energy Zone Access Scheme](#), Position Paper, NSW Government, March 2023, p 55.

<sup>204</sup> [Part 5, Electricity Infrastructure Investment Act 2020](#).

<sup>205</sup> EnergyCo, [Draft network infrastructure strategy](#), NSW Government, September 2022, p 17.

<sup>206</sup> NSW Climate and Energy Action, [Regulatory framework](#), NSW Government, 2023, accessed 13 April 2023.

1. **REZ network infrastructure projects (RNIPs):** distribution or transmission infrastructure that provides network capacity for a declared REZ, for example, the Central-West Orana transmission project<sup>207</sup>
2. **Priority transmission infrastructure projects (PTIPs):** non-REZ transmission infrastructure projects in NSW and identified in the most recent ISP published by AEMO, for example, the Waratah Super Battery.<sup>208</sup>

Each regulatory pathway allows for selecting network infrastructure projects and appointing a network operator (the recommendation and authorisation process), calculating their prudent, efficient, and reasonable capital costs (the transmission efficiency test (TET)) and determining the overall costs that can be recovered from consumers (the determination process). Infrastructure projects determined under a national regulatory pathway are subject to the regulatory investment test for transmission (RIT-T) instead of the TET (Table 4).

The 2022–23 NSW Budget established a transmission acceleration facility (TAF) to accelerate the delivery of new transmission projects. Over the next 10 years, the government projected that it would expend \$2.6 billion in capital and \$425 million through the facility, and fully recover these funds from private investors. The maximum projected impact on net debt was expected to be \$1.2 billion after taking account of the progressive repayment of proceeds.<sup>209</sup> Projects to be funded first include the Waratah Super Battery, Central-West Orana REZ, New England REZ and Hunter Transmission Project.<sup>210</sup>

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<sup>207</sup> EnergyCo, [Central-West Orana transmission project](#), 2023, accessed 6 April 2023.

<sup>208</sup> EnergyCo, [Waratah Super Battery](#), 2023, accessed 6 April 2023.

<sup>209</sup> NSW Government, [NSW Budget 2022-23: Budget Paper No. 1 Budget Statement](#), 2022, p 6 – 1; NSW Government, [NSW Budget 2022-23: Budget Paper No. 3 Infrastructure Statement](#), 2022, p 2 – 46.

<sup>210</sup> NSW Climate and Energy Action, [NSW response to closure of Eraring Power Station](#), NSW Government, 19 February 2022, accessed 12 April 2023.

**Table 4: Regulatory pathways for delivering transmission infrastructure projects in NSW**

	Need identification	Option selection	Cost recovery
<b>NSW projects</b>			
<b>REZ network infrastructure projects (RNIPs)</b>	Transmission or distribution infrastructure to support generation and storage within a declared REZ (may be identified in the ISP)	EnergyCo makes assessments about project matters, including project options and a network operator to carry out the project  Recommends preferred project and network operator to AEMO Services (RNIP) and Minister (PTIP)	The AER makes a revenue determination following authorisation by AEMO Services or direction by minister
<b>Priority transmission infrastructure projects (PTIPs)</b>	Transmission infrastructure to address a likely breach in the NSW energy security target (must be identified in the ISP)	As above	The AER makes a revenue determination following authorisation or direction by minister
<b>National projects</b>			
<b>Actionable ISP projects</b>	Network infrastructure identified in the ISP to address transmission constraints, such as interconnectors	The TNSP/DNSP selects credible project options and acts as the proponent for the project	The AER makes revenue determination under Chapter 6A of the NER (including actionable-ISP regulatory investment test for transmission (RIT-T))
<b>Other projects initiated by transmission or distribution network service providers (TNSPs or DNSPs)</b>	Network infrastructure identified in the ISP or by TNSPs/DNSPs to maintain operation of the existing network	As above	The AER makes revenue determination under Chapter 6A of the NER (including RIT-T or regulatory investment test for distribution)

Source: Adapted from: EnergyCo, [Draft network infrastructure strategy](#), NSW Government, September 2022, p 18.

#### 4.3.5 NSW Renewable Energy Sector Board's Plan

The EII Act requires the NSW Renewable Energy Sector Board to develop a plan for the NSW renewable energy sector. Published in September 2022, the recommendations of the plan must be taken into account by the energy minister and AEMO Services when exercising

their functions under the Act. The board has also directed recommendations to EnergyCo because it will be appointing the network operator of each REZ.<sup>211</sup>

The plan contains 2 sets of recommendations. The first set relate to maximising the use of local content and workers for generation, storage and network projects. Key recommendations include:

- For applicants seeking an LTESA, access right or to become a network operator, the eligibility criterion should be expanded to require submission of an industry participation plan (IPP). The IPP should cover matters such as supply chain inputs, employment, skills and knowledge transfer, and the already-mandatory First Nations participation plan.<sup>212</sup>
- Assessment of each application should use minimum requirements as well as stretch goals for local content, and examine the value for money for NSW from the overall economic and social benefits the bid will bring.<sup>213</sup>
- Develop a framework for monitoring, reporting and compliance that ensures commitments are implemented. This should include an annual ministerial report to parliament on matters not required under the EII Act such as how workers in fossil-fuel industries have been able to transition to renewable energy jobs and opportunities created for trainees and apprentices in the renewable energy sector.<sup>214</sup>

The second set of recommendations relate to building up the capacity and capability of the NSW renewable energy sector, under 3 themes:

1. Long-term planning for local content, jobs and skills. Examples include establishing a NSW Government policy for local content, jobs and skills in the sector, establishing an end-of-life industry for the sector, and ensuring a coordinated inter-regional approach to infrastructure delivery.
2. Supply chain development. Examples include reducing barriers for small and medium enterprises and First Nations businesses, building the capacity of the local manufacturing sector, coordinating development of the battery energy storage system industry, and supporting development of an offshore wind industry.
3. Skills and training. Examples include facilitating workforce redeployment for workers affected by the transition, developing a sector-specific skills and training

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<sup>211</sup> OECC, [Renewable Energy Sector Board's Plan](#), NSW Government, 2022, p 15.

<sup>212</sup> OECC, [Renewable Energy Sector Board's Plan](#), NSW Government, 2022, p 29.

<sup>213</sup> OECC, [Renewable Energy Sector Board's Plan](#), NSW Government, 2022, p 31.

<sup>214</sup> OECC, [Renewable Energy Sector Board's Plan](#), NSW Government, 2022, p 46.

strategy, and improving employment and economic participation opportunities for underrepresented groups.

#### 4.3.6 Community-related policies

Several community-related policies were finalised in 2022. The Minister for Energy issued a set of First Nations guidelines written to enable genuine consultation with First Nations communities during the implementation of the roadmap.<sup>215</sup> These general guidelines will be supplemented by 5 region-specific guidelines, with the Central-West Orana guideline being the first released in March 2023.<sup>216</sup> The purpose of these guidelines is to increase the employment and income opportunities for First Nations communities.

The Strategic Benefits Payment Scheme (SBP Scheme) was announced in October 2022. It is available to all private landowners who host new transmission infrastructure that is part of a REZ network infrastructure project, priority transmission infrastructure project or project identified in the ISP. Previously, private landowners received a one-off compensation payment under the [Land Acquisition \(Just Terms Compensation\) Act 1991](#) that includes the market value of the land, loss due to severance and disturbance, and reasonable costs and expenses. Under the SBP Scheme, private landowners will now also receive \$200,000 in 2022 dollars, to be paid out in annual instalments over 20 years once the relevant project is operational.<sup>217</sup>

#### 4.3.7 Electricity prices

The NSW Government offers 6 energy rebates and one crisis support scheme as part of its energy social programs (ESP) support for over 900,000 NSW households experiencing difficulty paying electricity and gas bills.<sup>218</sup> In 2021–22, the government allocated \$297 million to the ESP, up from \$291 million in 2019–20.<sup>219</sup>

In December 2022, the NSW Government introduced a temporary cap on the price of coal for NSW power stations as part of the national Energy Price Relief Plan to reduce power prices.<sup>220</sup> Under amendments made to the [Energy and Utilities Administration Act 1987](#), the Premier declared a coal market price emergency from 22 December 2022 to 30 June 2024,

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<sup>215</sup> NSW Climate and Energy Action, [First Nations guidelines](#), NSW Government, 2023, accessed 17 April 2023. These guidelines are a statutory requirement under [s 4\(1\)](#) of the EII Act.

<sup>216</sup> OECC, [First Nations guidelines: increasing Central-West Orana income and employment opportunities from electricity infrastructure projects](#), NSW Government, August 2022.

<sup>217</sup> EnergyCo, [Strategic Benefits Payment Scheme](#), NSW Government, 2023, accessed 17 April 2023.

<sup>218</sup> OECC, [NSW energy social programs COVID-19 impact report](#), NSW Government, March 2023; NSW Climate and Energy Action, [Find an energy rebate](#), NSW Government, 2023, accessed 3 May 2023.

<sup>219</sup> OECC, [NSW energy social programs COVID-19 impact report](#), NSW Government, March 2023, p 18.

<sup>220</sup> A Albanese, [Energy Price Relief Plan](#) [media release], 9 December 2022.



and the Minister for Energy issued directions to coal mines and coal-fired power stations.<sup>221</sup> The directions to coal mines require suppliers to:

- Set a price cap for coal sold to power stations under a new supply agreement at or below AU\$125 per tonne, unless a higher price is approved by the minister under advice from the AER
- Accept offers to supply coal to a power station if made on reasonable terms
- Reserve a proportion of future coal production to supply NSW power stations
- Prioritise the delivery of coal to power stations with low stockpile levels.

Power stations must maintain a stockpile of coal that is more than expected demand for the next 30 days.<sup>222</sup>

#### 4.3.8 Election commitments

In the lead up to the NSW 2023 general election, the Coalition made several energy-related election commitments including:

- A \$1.5 billion clean energy superpower fund comprising the existing \$1.2 billion transmission acceleration fund (TAF)<sup>223</sup> and a \$300 million increase to the TAF's maximum limit, as well as \$23 million to start regulatory reforms to expand the legislation behind the Electricity Infrastructure Roadmap to cover community energy resources (CER)<sup>224</sup>
- \$500 million in energy bill relief for families for the 6 months from July to December 2023.<sup>225</sup>

Labor also made several energy-related election commitments:

- Create the NSW Energy Security Corporation to accelerate investment in renewable energy with a \$1 billion investment from the Restart NSW fund<sup>226</sup>
- \$448 million in energy bill relief for families in 2023–24.<sup>227</sup>

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<sup>221</sup> NSW Climate and Energy Action, [NSW coal market price emergency](#), NSW Government, 2023, accessed 17 April 2023.

<sup>222</sup> OECC, [Overview of NSW Government's approach to the coal market price emergency](#), NSW Government, 2 March 2023.

<sup>223</sup> Otherwise known as the transmission acceleration facility.

<sup>224</sup> NSW Parliamentary Budget Office, [Clean energy superpower fund](#), 20 March 2023.

<sup>225</sup> NSW Parliamentary Budget Office, [Energy bill relief for NSW families](#), 20 March 2023.

<sup>226</sup> NSW Parliamentary Budget Office, [Renewable energy fund](#), 20 March 2023.

<sup>227</sup> NSW Parliamentary Budget Office, [Energy relief fund](#), 20 March 2023.

## Glossary of acronyms

Acronym	
ACCC	Australian Competition and Consumer Commission
AEIC	Australian Energy Infrastructure Commissioner
AEMC	Australian Energy Market Commission
AEMO	Australian Energy Market Operator
AER	Australian Energy Regulator
ARENA	Australian Renewable Energy Agency
CEFC	Clean Energy Finance Corporation
CER	Consumer energy resources
CIS	Capacity investment scheme
CPI	Consumer price index
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DMO	Default market offer
DNSP	Distribution network service provider
DPC	Department of the Prime Minister and Cabinet
EAP	Energy Advisory Panel
ECA	Energy Consumers Australia
ECMC	Energy and Climate Change Ministerial Council
EII Act	<i>Electricity Infrastructure Investment Act 2020</i>
EnergyCo	Energy Corporation of NSW
EPA	Environment Protection Authority
ESB	Energy Security Board
ESOO	Electricity statement of opportunities
ESP	Energy social programs
EST	Energy security target
EWON	Energy and Water Ombudsman NSW
FCAS	Frequency control ancillary services
GW	Gigawatt
IEA	International Energy Agency
IIO	Infrastructure investment objective
IPART	Independent Pricing and Regulatory Tribunal
IPP	Industry participation plan

IRENA	International Renewable Energy Agency
IRM	Interim reliability measure
ISP	Integrated System Plan
LDS	Long duration storage
LTESA	Long term energy service agreement
MW	Megawatt
MWh	Megawatt hour
NEL	National Electricity Law
NEM	National electricity market
NEO	National Electricity Objective
NERL	National Energy Retail Law
NETP	National Energy Transformation Partnership
NGL	National Gas Law
NIO	Network infrastructure option
NIS	Network Infrastructure Strategy
OECC	Office of Energy and Climate Change
PTIP	Priority transmission infrastructure project
PV	Photovoltaics
RBA	Reserve Bank of Australia
REZ	Renewable energy zone
RNIP	REZ network infrastructure project
RIT-T	Regulatory investment test for transmission
RRO	Retailer reliability obligation
RTNO	Rewiring the Nation Office
SBP	Strategic Benefits Payment Scheme
SFV	Scheme financial vehicle
SIPS	System integrity protection scheme
TAF	Transmission acceleration fund
TET	Transmission efficiency test
TNSP	Transmission network service provider
VNI West	Victoria to NSW Interconnector West
VRE	Variable renewable energy

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