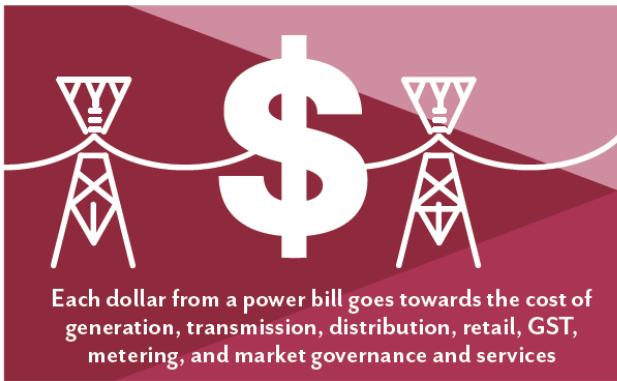
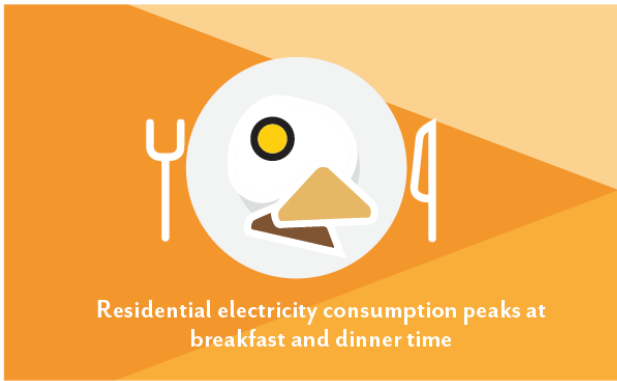
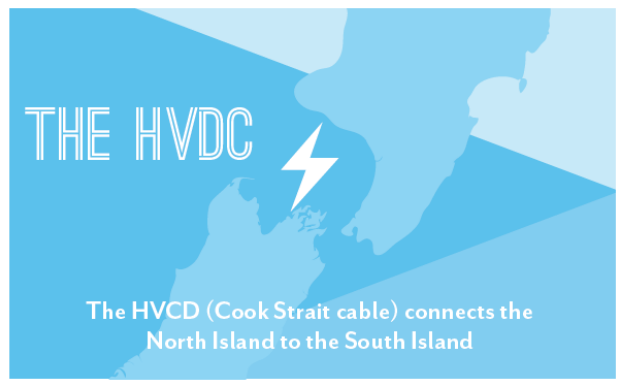
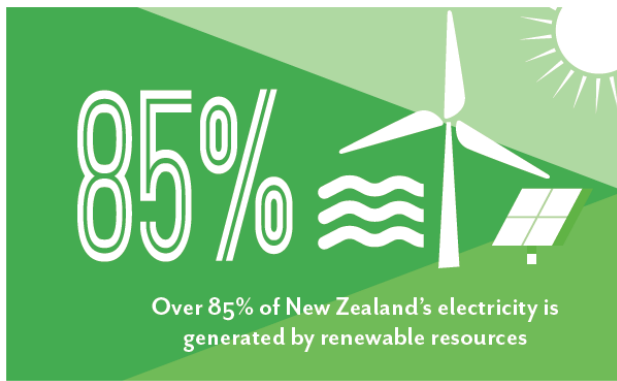




Briefing to the Incoming Minister

October 2017



Sources: Electricity Authority and Ministry of Business, Innovation and Employment

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Section 1: Key upcoming events and key topics

Upcoming events for the Minister

Event	Timing	See page
Approval of new Advisory Group members' fees	Process underway	34

Upcoming events for the Authority

Event	Timing	See page
Authority stakeholder event	31 October 2017	n/a
Release of appropriations consultation	November 2017	6
Release of ACOT consultation paper	November 2017	6
Regulations Review Committee consideration of the Authority's ACOT decision of 6 December 2016	Late 2017/early 2018	7

Consultation on appropriations for 2018/19 and out-years

The Electricity Authority is cost neutral to the Crown; the appropriation funding provided to the Authority is recovered by a levy on industry participants.

We are required by the Electricity Industry Act 2010 (Act) to consult with levy payers on our proposed appropriations for each financial year. We also use this consultation to discuss our proposed appropriation changes for subsequent financial years; to the extent that these are known.

Consultation is planned to take place between mid-November and late-December 2017. In early February 2018 the Authority Board will consider consultation feedback before providing an appropriations request to you in mid-late February 2018.

During the appropriation consultation process the Treasury's central budget setting process will also commence. We will coordinate our input into this process with the Ministry of Business, Innovation and Employment (MBIE), who administer the Authority's appropriations.

Avoided cost of transmission (ACOT)

Distributed generators (DGs) are generators connected to a local electricity distribution network, rather than the national grid. Examples range from rooftop solar panels to larger-scale hydro power stations and wind farms.

Medium and large-scale DGs earn income by supplying electricity to the wholesale electricity market, and they can also receive side payments from distributors. Distributors make these payments because the operation of the DG in their network can avoid distributors paying some transmission charges to Transpower. This is known as an avoided cost of transmission (ACOT) payment. The transmission charges avoided by one distributor are shifted to consumers in other distribution networks.

The effect of the ACOT regime has been to create perverse incentives by rewarding parties for installing generation when and where it would avoid transmission *charges*. The regime has not unambiguously or consistently encouraged DG investment that helped Transpower to avoid or defer transmission *costs*.

DG has been built in locations where it is not needed, simply to take advantage of the ACOT payment. In practice, consumers do not receive significant grid reliability benefits from these investments and they add to future distribution and transmission costs, which consumers end up paying as part of their electricity bills. Also, a noticeable proportion of DG has been diesel-fuelled.

In December 2016, the Authority amended the Electricity Industry Participation Code 2010 (Code)¹ so that ACOT payments will not be made to existing distributed generation that Transpower believes are not needed for it to meet its grid reliability standards. In these cases the ACOT payments are clearly subsidies rather than payments for services.

This change will ultimately lower prices for the consumers who are currently funding these subsidies—the savings could be between \$25 million to \$35 million per year. These savings will

¹ Schedule 6.4 of the Electricity Industry Participation Code 2010 (Code).

result from reducing ACOT payments that fail to deliver any benefit to consumers. This change also provides better investment incentives for developing new DGs.

Under the new ACOT regime, Transpower must identify *existing* distributed generation that is required to meet the grid reliability standards in each of the four transmission planning regions, and provide a report to the Authority on its findings. The Authority will decide, based on Transpower's advice and following consultation, which existing distributed generation will be eligible to receive ACOT payments under the regulated terms.

In regard to *new* sources of DG, Transpower will be responsible for assessing whether the generator assists with avoiding or deferring transmission costs, and it will pay the DG accordingly.

Why are we doing this project?

Over the last eight years, the amount of ACOT payments has increased by 79 per cent. The increase was for two main reasons. More DG was built and being paid and there were more transmission charges to avoid, following a significant expansion of transmission capacity. Perversely, much of the new DG is in areas where transmission capacity was expanded, thereby reducing the need for DG to meet the grid reliability standards. Effectively, prices for New Zealand consumers have increased because they have been subsidising the owners of DG in areas where it isn't needed.

What are the next steps?

On 4 October 2017, the Authority approved a consultation on a proposed list of DG in the lower South Island that Transpower considers is required to meet the grid reliability standards. We expect to release the consultation paper in November 2017. Subject to comments, the Authority will publish a final list of DG that will be eligible to receive ACOT payments. We will provide you a no surprises briefing on the consultation before it is released.

Parliament's Regulations Review Committee is intending to consider the Authority's decisions to revise the ACOT regime

Trustpower has complained to the Regulations Review Committee about the Distributed Generation Code Amendment (ACOT amendment) the Authority made in December 2016. The Independent Electricity Generators Association (IEGA) supported the complaint. We are preparing a submission to present to the new Committee, once it is appointed.

Section 2: About the electricity sector

Sector statistics

Electricity is one of the most capital intensive industries in New Zealand, and one that is vital to all New Zealanders. Almost **\$7 billion** a year is spent on electricity.

There are:

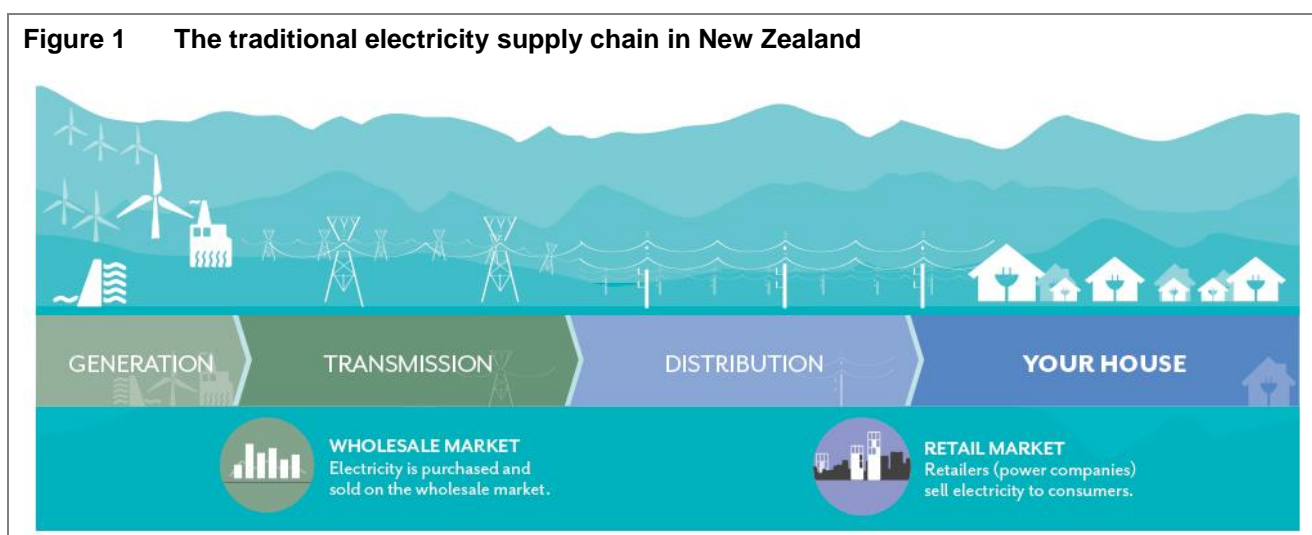
- 1.7 million residential consumers
- 170,000 commercial consumers
- 77,000 agriculture, forestry and fishing consumers
- 41,000 industrial consumers.

For the year ending July 2017, **over 80 per cent** of New Zealand's generation comes from renewable sources.

The electricity supply chain

Electricity is traditionally produced by large generation units, transported to consumers via large and interconnected transmission and distribution systems, and sold to consumers primarily by large electricity retailers. Most of New Zealand's electricity is produced by generators distant from where electricity is used, often because of the geographical location of energy sources, for example, rivers used for hydro-generation, geothermal fields or the location of wind generation sites.

Figure 1 summarises the various parts of the traditional electricity supply chain.



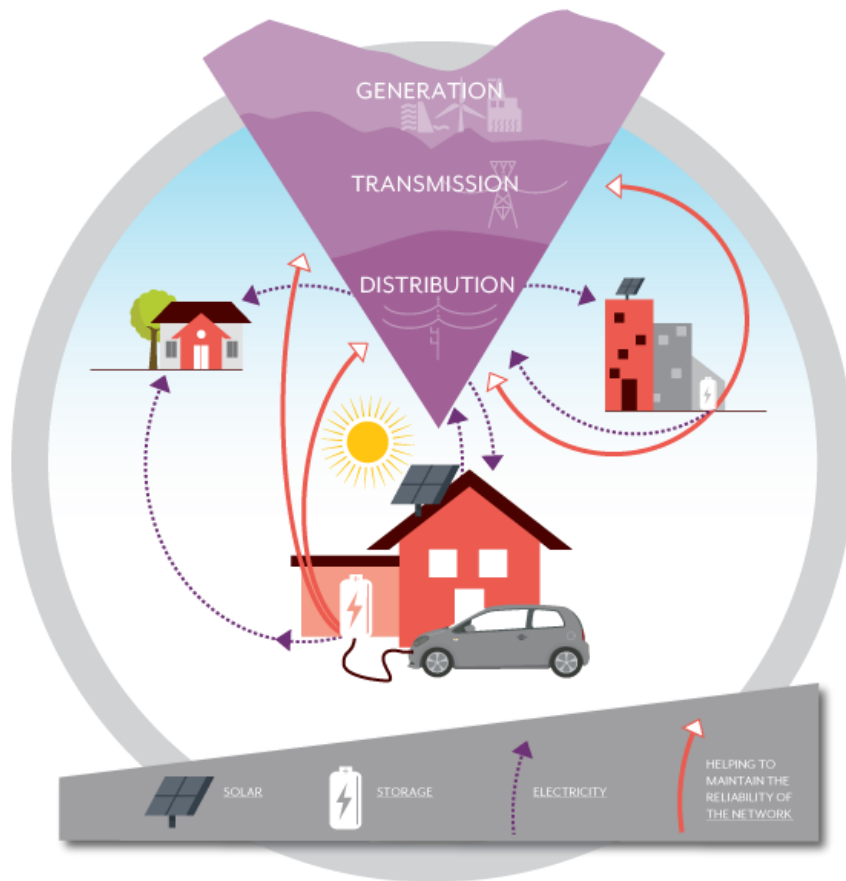
However, this is not an accurate picture of New Zealand's system. Many major consumers also have generation plant. They often take electricity from the grid, but at other times provide electricity to the grid. In addition, there are several major consumers directly connected to the grid rather than to distribution networks. Likewise, many generators are embedded within distribution networks and not directly connected to the grid.

As shown in Figure 2, the electricity industry is moving further away from this linear model to a more dispersed model, where technology and new business models enable smaller-scale consumers and other parties to participate directly in the market.

New technology is beginning to fundamentally alter the traditional supply chain, with rapid growth in the number of consumers producing their own electricity, the emergence of household electrical storage systems (eg, the Tesla Powerwall) and many small networks (called secondary networks) connected to traditional distribution networks. New technology also allows consumers to bypass traditional electricity retailers and buy electricity from other consumers producing their own electricity (often called prosumers), or directly from the wholesale electricity market.

The traditional demarcation between the retail, wholesale, and transport parts of the sector is becoming increasingly blurred. Sections 4 and 5 outline some of the challenges facing the sector, and what we are doing about them.

Figure 2 More participation in the electricity supply chain



Section 3: About us

The Authority was established as an independent Crown entity on 1 November 2010 by the Electricity Industry Act 2010 (Act).

We are required to have regard to Government Policy Statements presented in Parliament by the Minister of Energy and Resources (Minister), but are not required to give effect to them. There are currently no such policy statements.

The Authority is governed by a Board, which is supported by the Chief Executive and approximately 61 staff. Please see Appendix A for more information about the Authority Board and senior leadership team.

Section 15 of the Act sets the following objective for the Authority:

To promote competition in, reliable supply by, and the efficient operation of, the electricity industry for the long-term benefit of consumers.

We interpret our statutory objective as requiring us to exercise our functions in ways that, for the long-term benefit of consumers and New Zealand:

- facilitate or encourage increased **competition** in the markets for electricity and electricity-related services
- encourage industry participants to efficiently develop and operate the electricity system to manage security and **reliability**
- increase the **efficiency** of the electricity industry.

Figure 3 Electricity Authority's statutory objective



The Authority is recognised by international regulators for the innovation and leadership we have shown in reducing barriers to retailer entry and expansion, encouraging consumer participation and managing supply risks with a highly effective wholesale electricity market. Authority Board members and staff are frequently called upon to present to international peers, most recently in Seoul, Sydney, Washington DC, Singapore and Calgary.

Our foundation documents

Our foundation documents are intended to promote regulatory predictability and credibility. They provide consumers, investors and industry participants with a transparent view of how we conduct our work.

Our published foundation documents are:²

- an *Interpretation of the Authority's statutory objective*, which sets out our interpretation of section 15 of the Act
- an *Advisory Group Charter*, specifying our policy on advisory groups and the Security and Reliability Council (SRC)
- a *Consultation Charter*, setting out our policy and processes for consulting interested parties on proposals to amend the Code and other matters, and the Code amendment principles we and our advisory groups will adhere to in considering proposals to amend the Code.

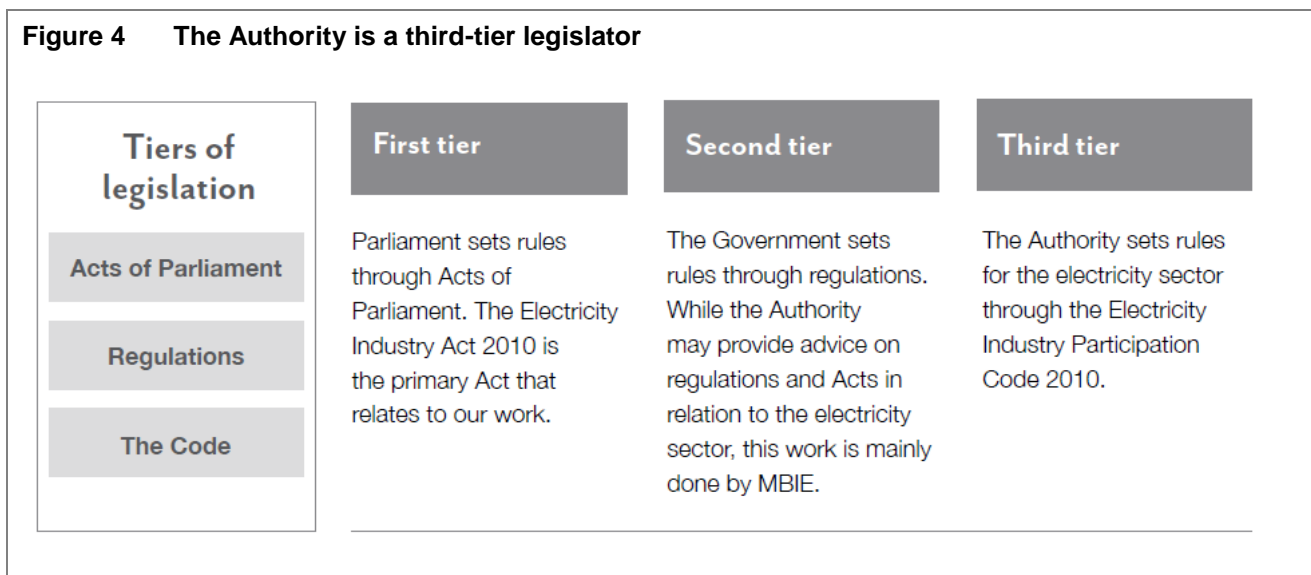
Our regulatory role

We are responsible for providing independent regulation and governance of the electricity industry and oversee the operation of the electricity system and markets.

The Authority is a third-tier legislator; we make changes to the Code and monitor and enforce compliance with the Act, regulations, and the Code. We keep the Minister informed on a 'no surprises' basis.

A key focus for our work on setting the rules is to promote a 'level playing field' for all electricity market participants, including for new and potential entrants.

Figure 4 The Authority is a third-tier legislator



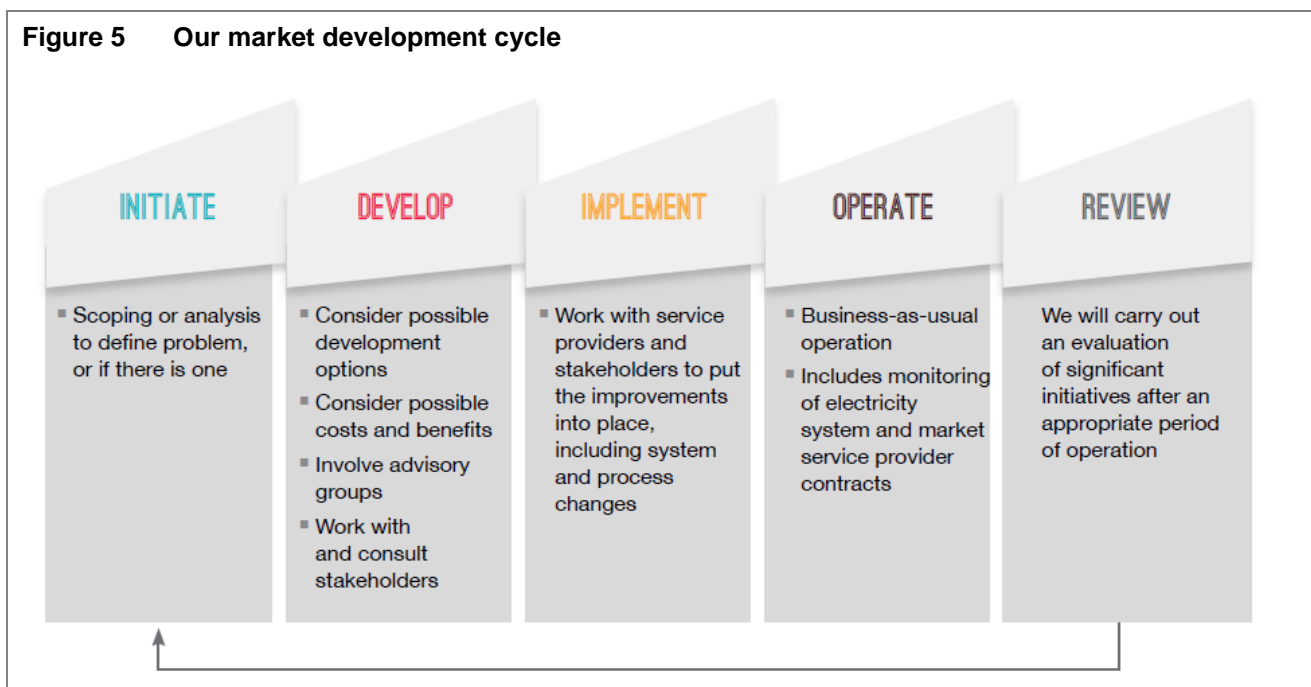
² Available at www.ea.govt.nz/about-us/strategic-planning-and-reporting/foundation-documents/

There are several regulations relating to our functions, which are administered by MBIE³.

Market development

Our market development work focuses on promoting the competitive, reliable and efficient operation of the electricity system and markets.

We have two key tools at our disposal to develop the market: amending the Code and introducing market facilitation measures.⁴ As new technology and a greater diversity of business models enters the market, we are likely to find that market facilitation measures will be better instruments for pursuing desired outcomes than Code amendments.



The Code sets out industry participants' obligations across the supply chain: generation, transmission, distribution, retailing and the hedge market⁵.

Working with stakeholders and advisory groups

The Authority uses advisory groups to draw on industry and consumer expertise to minimise the risk of unintended consequences occurring from our initiatives. Advisory groups make recommendations to the Board and they are strongly encouraged to make consensus recommendations to provide clear guidance. Although they often make a substantial contribution to many Authority initiatives, in our experience, it is often difficult for advisory groups to reach consensus on highly contentious issues, particularly issues that are likely to have material positive effects on some participants and material adverse effects on others.

³ For example, the Electricity Industry (Enforcement) Regulations 2010 and the Electricity Industry (Levy of Industry Participants) Regulations 2010.

⁴ Market facilitation measures include non-Code initiatives such as guidelines or model arrangements or working directly with participants to pursue desired results.

⁵ The hedge market refers to the buying and selling of financial contracts to manage the risk of price movements in the spot market. The spot market is where electricity is bought and sold.

We decided to re-orient our advisory groups in 2016/17 because new technology and business models are increasingly blurring the traditional demarcation between retail, distribution, transmission and wholesale market activities. Further details are available in Appendix B.

We also receive significant input from industry stakeholders through our consultation processes, and input from our contracted service providers, who have a major role in implementing Code amendments.

Once a Code amendment has been adopted by the Authority we work closely with the industry and our service providers to implement the changes effectively and efficiently.

Enforce compliance

We focus on ensuring the Act, the regulations made under the Act, and the Code are accurately and consistently applied. We have a proportionate, risk-focused compliance framework. While participants are obliged to report breaches, we also investigate issues and trends to identify breaches and their causes. What we learn from our compliance function also feeds into participant education, and how we identify and resolve on-going or systemic issues.

Our electricity litigation fund appropriation ensures we can participate in litigation effectively and without delay. It allows us to defend cases against the Authority and take enforcement action under our *Enforce compliance* function.

Monitor, inform and educate

Our market monitoring, information and education work focuses on making data, information and tools available, and improving awareness and understanding of how electricity markets function. Making data available is also a key means of supporting innovation. We monitor market behaviour and performance in respect to innovation, which includes new technologies and business models. We also monitor market behaviour and performance in respect to security and reliability.

Our market analysis function improves understanding by identifying behaviours that may be inconsistent with our statutory objective. It also provides appropriate feedback into our market development work. We may also undertake reviews of any matters relating to the electricity industry that are requested by the Minister under section 18 of the Act.

We commenced a consumer education programme in 2015/16 and continue to make relevant information available to consumers. We also have an ongoing commitment to participant education, including providing information on the operation of the Code, the market and market systems and processes, through workshops, training, publications and the web.

Operate the electricity system and markets

We are responsible for the day-to-day (real-time) efficient and reliable operation of the electricity system and markets. We oversee the operation of the electricity system and markets through contracts with service providers⁶:

- **Transpower** manages the day-to-day operation of the electricity system as the system operator.

⁶ More information about service providers is included in Appendix A.

- **NZX** provides pricing, clearing and settlement, reconciliation, wholesale information and trading services. We are currently finalising a contract with NZX to provide a new extended reserve manager role.
- **Jade** operates a registry that facilitates the switching of customers from one retailer to another.
- **Transpower**, through its subsidiary **Energy Market Services (EMS) Limited**, provides the financial transmission rights (FTR) manager service.

Supporting the operation of the markets includes the following functions:

- maintaining the register of industry participants
- granting individual exemptions to the Code, where justified
- investigating and resolving alleged undesirable trading situations
- performance oversight of security policy and operation, including approving or declining security of supply policies and plans proposed by the system operator
- carrying out responsibilities for supply shortage declarations
- supporting the Security and Reliability Council.

Other roles in the electricity sector

We are one of several agencies with distinct roles in the electricity sector. We work closely with these other agencies, as listed below:

- The **Ministry of Business, Innovation and Employment (MBIE)** is the policy adviser to the Government. Its role includes advising on Acts and regulations. MBIE also has a monitoring role in respect to the Authority.
- The **Commerce Commission** regulates monopoly suppliers of electricity lines services under the Commerce Act 1986. All electricity businesses serving residential consumers are subject to the Fair Trading Act.
- **Utilities Disputes Ltd (Utilities Disputes)** deals with complaints between consumers and retailers. Utilities Disputes is funded by member companies, but is otherwise independent of the industry.
- The **Energy Efficiency and Conservation Authority (EECA)** works to improve the energy efficiency of New Zealand's homes and businesses and encourage the uptake of renewable energy.

Clarifying our role

Do we set electricity prices?

We promote competition so that electricity prices are reasonable. We don't set the prices paid by consumers, or regulate how much money power companies earn.

Do we give advice to consumers?

We run the What's My Number website to help consumers decide which power company is best for their circumstances. We don't give advice about which power company they should choose.

Do we resolve consumer complaints?

Utilities Disputes is responsible for helping consumers to resolve complaints with their utilities provider, such as their retailer. We provide some consumer-focused information on our website.

Do we decide when or where to build new infrastructure?

We work to ensure market participants can make well-informed investment decisions. The companies who own infrastructure, such as power stations or power lines, are the ones who decide when or where to build new infrastructure.

Do we set lines charges?

Distribution and transmission charges are sometimes shown separately on power bills. The Commerce Commission regulates the overall level of charges levied by 17 of 29 distribution companies and by Transpower. We approve the method Transpower uses to allocate its revenue requirements to its customers, and set voluntary pricing principles for all distributors to use in deciding how to allocate their revenue requirements to their customers.

Do we favour specific types of generation?

Our work is neutral in relation to promoting, discouraging, subsidising or taxing one type of generation source, such as hydro or wind, over another.

Do we favour different types of technology?

We work to reduce operational costs, and barriers to new technologies and business models entering the market. We don't favour any specific type of technology, such as solar panels or batteries, over others.

Funding and the levy

We are funded from Vote: Business, Science and Innovation.

The Crown is reimbursed for the Authority's costs through a levy on industry participants. The levy also funds EECA's electricity efficiency programme. The levy is administered by the Authority in accordance with detailed formulae set out in the Electricity Industry (Levy of Industry Participants) Regulations 2010.

The Act prevents the Authority from charging service fees, which is in contrast to many other comparable regulators in New Zealand and overseas. The Authority would like to charge fees in certain circumstances to enhance the efficiency of the electricity industry.

Section 4: Results for consumers

As noted earlier, section 15 of the Act requires the Authority to promote competition in, reliable supply by, and the efficient operation of, the electricity industry for the long-term benefit of consumers.

At the highest level we ask the following outcome-related questions:

- **Will the lights stay on?**
- **Are prices reasonable?**
- **Do consumers have choice?**
- **Is innovation occurring?**

Will the lights stay on?

New Zealand has a high proportion of hydro-electric generation, but a relatively low level of storage capacity in its hydro lakes. This means that our electricity supply can be vulnerable in 'dry years'. The Authority implemented several key regulatory initiatives in 2011 to address security of supply issues.

These initiatives were tested during one of the driest six months on record in 2012 and a further moderate dry spell in the summer months of 2013. Hydro lake levels were carefully managed in both cases, with the risk of power outages remaining well below 1 per cent.

More recently, in winter 2017 South Island hydro lakes began to track well below average due to many months of very dry weather in the lower South Island, coupled with low levels of wind generation due to lower than normal wind speeds. However, the 'dry year' was over before the end of winter, and our preliminary view is the electricity market worked effectively to manage an extremely low inflow sequence. Our market performance team is undertaking a review of the 2017 dry winter—market performance reviews provide stakeholders with a robust assessment of what went well and any lessons that may improve outcomes in future dry events.

For all three events—2012, 2013 and 2017—there were no calls for public savings campaigns and no lobbying through the media for ad hoc measures to suppress spot market prices. Most importantly, New Zealand consumers could be confident they would enjoy an uninterrupted electricity supply despite very low hydro inflows in two of the three events.

The reliability of supply for individual consumers also depends on the reliability and resilience of the national transmission system and local distribution networks. The national grid has 99.97 per cent average service availability. This means, on average, consumers lose electricity supply for less than three hours per year. Of course, some experience much longer outages in some years, and others experience no outages for many years.

Most of the transmission and distribution system has spare capacity built into it, particularly if it is supplying a large number of consumers. For most cities and towns, the transmission system is built for an 'N minus 1' scenario. This means the largest transmission asset can fail and the system will still provide power to the areas it serves. But outages can happen if two or more assets fail at the same time. It's like having a spare tyre in your car. Most car owners only ever carry one spare tyre.

If they have one flat tyre, they can change it and carry on with their day. If they have two flat tyres, they might have to wait for their car to be road worthy again.⁷

In most cases the spare capacity is enough to cope with accidents and unpredictable events. On the odd occasion there can be an extraordinary event—examples include someone shooting pylon insulators and a plane crashing through multiple transmission circuits. The cost of reducing risks like this is often high.

Overall, the New Zealand electricity system and markets are well-placed to further evolve to deal with any risks arising from rapid adoption of technologies, such as electric vehicles and rooftop solar generation. Some of the new technologies (eg, batteries and smart energy management systems) will actually reduce risks because they will make demand response easier and lower cost for consumers. Climate change initiatives, if they're not very carefully developed and managed, can also disrupt the effective management of electricity system risks. Appendix C provides an overview of recent experiences in Australia and explains why the same problems are unlikely to occur in New Zealand.

Are prices reasonable?

Electricity prices are made up of two main components: **energy** and **lines**.

The energy component covers the proportion of costs associated with generation and retail services. This is the competitive part of the market, which the Authority oversees. The inflation-adjusted price for the energy component is the same as it was seven years ago, as competition for consumers appears to be placing significant pressure on generator-retailers to control costs and innovate.

Over the last seven years, most of the price increase has come from increases in transmission and distribution costs—collectively known as lines charges. The lines component covers the costs of transmission and distribution services, which are currently monopoly services and so are regulated by the Commerce Commission.

Internationally, New Zealand's residential retail prices are 11th lowest of 32 OECD countries—lower than Australia, France and the United Kingdom.⁸ We surveyed consumers in New Zealand, Australia, Alberta and Texas, and found that New Zealand consumers were most likely to be approached by retailers, and 92 per cent said it was easy to switch retailers—the highest in the survey. This suggests that competition for consumers is keeping energy costs down.

Some households pay spot market prices for their electricity

Spot market prices change every half-hour and can vary depending on very short-term supply and demand conditions. On average, spot prices are typically higher during winter than summer.

Most retailers buy electricity from the spot market (at spot prices that vary every half-hour) but sell electricity to consumers at prices that are fixed for a year or longer. However, we now have five

⁷ The transmission system serving Auckland is built for an 'N minus two' scenario, which means the two largest transmission circuits can fail and the system will still provide power to Auckland.

⁸ Note it is a myth that NZ has the highest retail electricity prices in the OECD. The myth has arisen from some parties misinterpreting statistics produced by Geoff Bertram in 2012 or 2013.

electricity retailers selling electricity to residential customers at the spot price⁹. Although these customers may at times pay less for electricity on average than they would on a traditional retail contract (for example, during times of abundant hydro storage), they carry the risk of having to pay higher prices at other times.

While their customers might be happy with lower prices for most of the time, they could still be caught off-guard by periods of higher prices. If the spot price were to suddenly spike, or be at elevated levels for several months during a dry year, it may cause an unwelcome increase in the power bill for consumers on spot-priced deals. If the increased prices are significant or prolonged this could result in complaints by affected customers, which could be picked up by the media.

Flick Electric Limited (Flick) and Paua to the People Limited (Paua) are two of the most well-known retailers offering spot prices to household consumers. Both retailers explain the risks of being on a spot contract to their customers, and Flick provides a tool to notify their customers when prices increase substantially above normal levels so that they can choose to reduce demand if they wish. Flick entered the market in August 2014 and, at the end of September 2017, had around 21,600 customers. Paua had around 700 customers at the end of September 2017.

Ecotricity Limited has been operating for a few years and announced in September this year it is offering spot prices to consumers. Two new entrants to the retail electricity market this year—EcoSmart and ID Power—are also offering spot prices to their customers.

We are working to educate consumers and the media about these new products. This is particularly important as we expect accelerated innovation in the electricity sector in the next few years. We have published information on our website, such as, “Is a spot price contract right for me?” and “How could spot prices affect my bill?”¹⁰ We also undertook a project in 2016/17 entitled *Spot prices and risk for consumers*. The aim was to consider arrangements for explaining spot price risk to mass-market consumers, especially to residential consumers exposed to the spot market. We have since introduced a market facilitation measure outlining our expectations on retailers offering spot price products to residential consumers.¹¹

Longer-term electricity prices

The electricity futures market is one of several electricity hedge markets operating in New Zealand. The futures market sets prices for standardised contracts for up to four years ahead. Electricity retailers often monitor futures prices when setting their prices for commercial and industrial customers. They also take into account broad trends in futures prices when setting their prices for residential and small commercial consumers.

Futures contracts, and other hedge contracts, allow buyers and sellers to efficiently manage the price risks they face on the spot electricity market. This can help facilitate market entry for new retailers and generators. The volume of futures contracts traded in the market reached record levels in the last few months, most likely driven by effects of the recent dry winter period.

⁹ Spot prices apply for the energy used. There are also distribution and transmission prices, plus a charge to cover retailer costs.

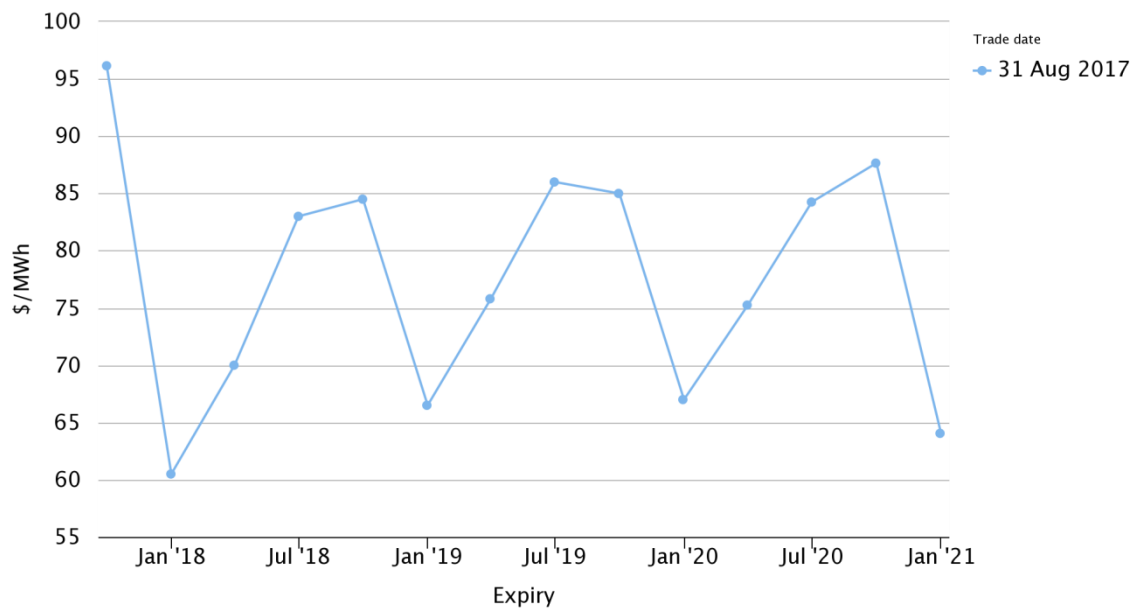
¹⁰ See www.ea.govt.nz/consumers/my-electricity-bill/is-a-spot-price-contract-right-for-me/ and www.ea.govt.nz/consumers/my-electricity-bill/is-a-spot-price-contract-right-for-me/how-could-spot-prices-affect-my-bill/.

¹¹ See www.ea.govt.nz/operations/retail/retailers/spot-market-expectations-on-retailers/

Figure 6 shows settlement prices on the Australian Securities Exchange (ASX) quarterly baseload futures contracts at Otahuhu (Auckland); these are the most traded contracts on the NZ futures. Plotting the futures prices for a particular type of contract creates a forward price curve. This curve represents the market's view on the level of spot electricity prices in the future—taking into account information such as future security of supply levels, demand growth and potential new generation build.

The forward price curve has a seasonal pattern, with prices typically lower over the summer period (when demand is lower and inflows from snow-melt and rain fill up the hydro lakes), and higher over the winter period (when demand increases due to colder temperatures), requiring more expensive thermal generation to be operated.

Figure 6 Forward price curve at Otahuhu



Source: www.emi.ea.govt.nz/r/azcre

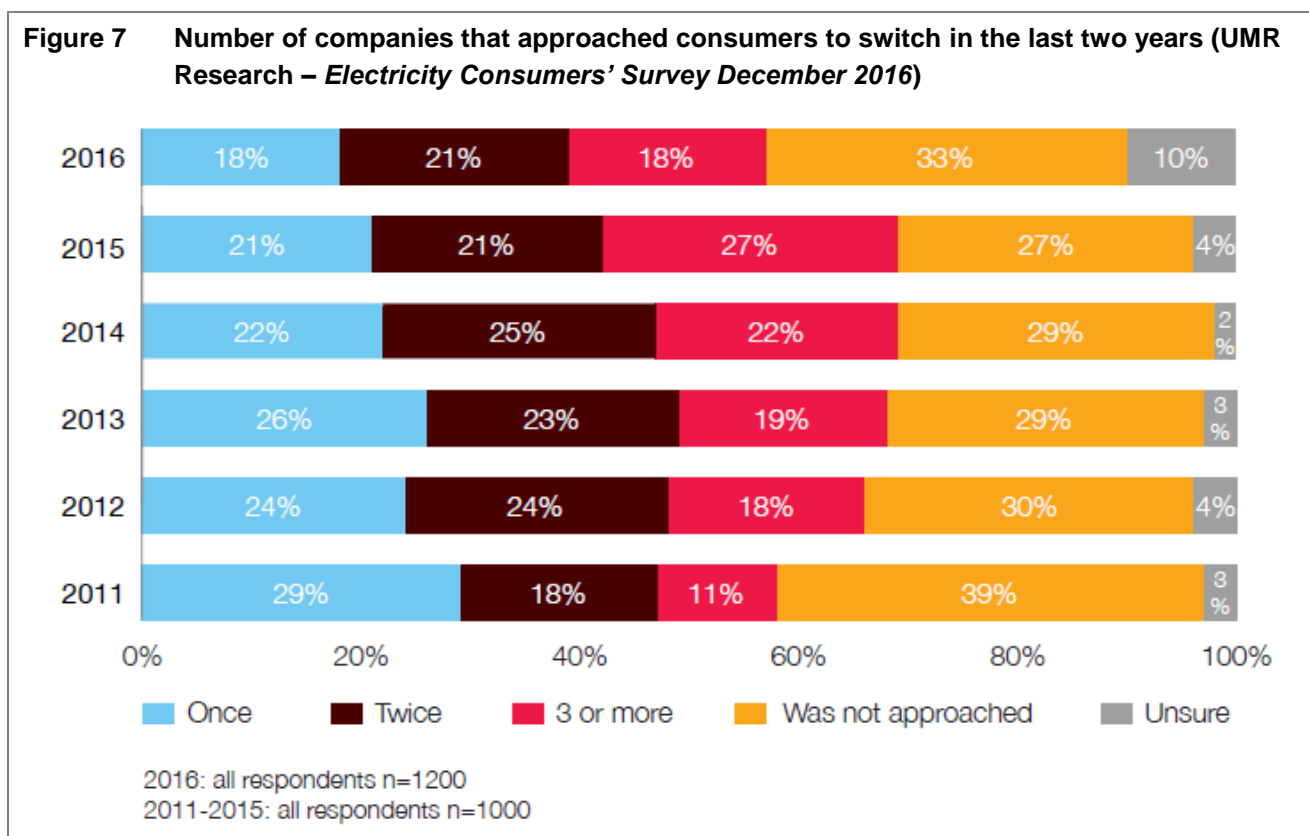
emi.ea.govt.nz/r/azcre

Do consumers have choice?

We run the *What's My Number* marketing campaign, which aims to provide consumers with information about their ability to switch power companies, the ease of switching, and potential savings.

New Zealand has one of the highest switching rates in the world. In 2016, consumers switched electricity retailers 414,544 times. High switch rates, however, are not a robust indicator of competition. For example, a low switch rate arising from retailers offering very similar tariffs would also be consistent with intense competition by retailers.

The Authority surveys consumers annually, asking them how many times they have been approached in the last two years by a different electricity retailer to switch to them. This survey measures how proactively retailers are competing for customers. Figure 7 shows the number of consumers who have been approached by retailers from 2011 to 2016. This is a measure of retailer behaviour in the market.



At the end of August 2017 there were 40 retail brands on offer to consumers around the country. These brands were backed by one of 29 retail parent companies. This is a new high. Between 1 September 2011 and 31 August 2017, 20 retail parent companies entered the market and 3 retail parent companies exited the market.

The market share for small and medium sized retailers has increased since 2009 and continues to grow. Small and medium retailers now serve more than 10 per cent (or 218,000) of customer connections. Even though there are 100,000 new connections in the market since August 2011, the largest five retailers have lost market share.

Retailers are offering innovative pricing plans, pre-pay electricity options, and bundled product offerings to their customers. Consumers have more choice than ever, and retailers are focused on providing greater flexibility to their customers.

Is innovation occurring?

When we talk about innovation, we want to know if suppliers are developing new services and pricing plans to deliver greater value to consumers. Innovation gives consumers more options to do what they want to do.

Greater competition in the retail market is resulting in greater innovation. New retailers entering the market and existing retailers creating new and innovative offerings are signs of healthy competition. New retailers can help raise consumer awareness about options, and incentivise existing retailers to offer competitive prices and improve their services. Innovative retailers seek to better understand their customers and invest in new technologies and new partnerships to provide more value to their customers.

We are seeing more innovation as retailers are increasingly using a variety of media and marketing techniques to target specific audiences. Likewise, business models are changing to offer more value to groups of consumers.

Examples of innovation in the electricity industry

Pricing and bill risk	Information services	Pricing to elicit demand response	New products	Transaction savings
<ul style="list-style-type: none"> • Bill smoothing • Pre-pay • 'All you can eat' pilot • Fixed term contracts • Spot pricing 	<ul style="list-style-type: none"> • Real-time usage monitoring • Real-time price alerts • Bill & usage comparison • Weekly billing • No call centres 	<ul style="list-style-type: none"> • Spot pricing • Time-of-use pricing • 'Free hour of power' • Market-based solar buy rates • Electric vehicle charging rates 	<ul style="list-style-type: none"> • Install and service household generation and storage • Peer-to-peer retailing 	<ul style="list-style-type: none"> • Bundled bills (electricity, gas, telecoms, TV) • E-billing • Electronic customer relationship management

The rollout of smart meters has enabled much of this innovation. As at 31 August 2017, 76 per cent of New Zealand's electricity connections have smart meters—and an increasing number of innovative electricity retailers are relying on this technology to deliver new customer services.

New Zealand's rollout of smart meters is unique around the world in that it is being managed competitively by electricity retailers without any cost to Government or consumers. Government mandated approaches have been adopted in most other countries with smart meters, which have often led to much higher costs and some rollouts have stalled. Australia is adopting New Zealand's approach in this area because of the successful rollout here.

Section 5: Our strategic direction and work programme

In June 2017, we published our *Statement of Intent 2017–2021* (SOI). The SOI sets out our long-term strategic intentions for a four-year period. In June 2017 we also published our *2017/18 Statement of Performance Expectations* (SPE). Our SPE outlines our plan for the 2017/18 financial year to help us deliver the outcomes we seek. In July 2017 we published our 2017/18 work programme, which sets out our projects and their key deliverables for the financial year. These documents are available on our website¹², or we can provide copies if required.

Figure 8 Our strategic framework (October 2017)



¹² See www.ea.govt.nz/about-us/strategic-planning-and-reporting/

Our journey so far

We were established on 1 November 2010. Our initial focus was to complete and implement changes required by section 42 of the Electricity Industry Act 2010. This included a focus on improving reliability of supply and on retail market competition. We created the What's My Number campaign, which had an immediate and ongoing impact.

In the following years we focused on continuing to enhance retail and wholesale market competition, and establishing more efficient pricing of transmission and distribution services. In 2016/17 we shifted our strategic focus due to potential security of supply issues and developments in new technologies. We decided to re-orient our work programme structure and presentation. We also decided to re-orient our advisory groups, because new technology and business models are increasingly blurring the traditional demarcation between retail, distribution, transmission and wholesale market activities.

Looking ahead

The New Zealand electricity system and markets are well-placed to accommodate new technologies and new ways of doing business. Unlike Australia and the United Kingdom, for example, most New Zealand households have smart meters, our wholesale electricity market has effective locational pricing and different types and sources of generation have largely been competing on a level playing field. New Zealand also has a comprehensive emissions trading scheme applying to the energy sector.

These features provide opportunities for parties to adopt new technology in ways that benefit consumers and the electricity system; in this regard our main focus is to reduce barriers to new technologies and ways of doing business (see **Programme A** below) and improve pricing of monopoly lines businesses (**Programme C**). These features also provide a sound basis for further evolving the regulatory arrangements to deal with risks arising from the rapid adoption of new technologies (**Programme D**). The Authority has five market development work programmes, which are aligned with the key strategies shown in Figure 8 on page 22.

A summary of our work programme framework

Programmes	Strategies
A: Evolving technologies and new business models Reduce inefficient barriers to the development and use of evolving technologies and business models across the supply chain.	Reduce barriers
B: Consumer choice and competition Promote competition and empower consumer choice in the retail market.	Improve consumer participation
C: Pricing and cost allocation Promote more efficient pricing in markets and for monopoly services.	Improve price signals
D: Risk and risk management Promote efficient management of electricity sector risks.	Increase flexibility and resilience
E: Operational efficiencies Increase the efficiency of electricity market operations.	Enables all of our strategies

Programme A is focused on removing any unwarranted barriers to market entry, expansion, exit, innovation and technological change. This includes increasing the scope for competitive provision of support services to distribution and transmission businesses. We are working to improve consumers' access to and participation in markets, and help consumers and other parties obtain accurate information when they want it.

Programme C is focused on creating the conditions for more efficient prices in the market, and ensuring price-related information is readily available. As new and evolving technologies and business models empower consumers, we are increasingly focused on how various components in the electricity supply chain are priced. We want to make sure electricity pricing encourages people to use technology in a way that brings long-term benefits to consumers and New Zealand. For this reason, we are reviewing the guidelines for transmission pricing, and we are encouraging distributors to adopt more service-based and cost-reflective pricing for their services. We discuss both of these projects in more detail below. We are also considering refinements to spot market pricing.

Programme D covers initiatives to promote efficient management of risks. For example, if rooftop solar was rapidly installed—and if electricity distribution networks were not well-prepared for this event—then local distributors may adopt ad-hoc rules and methods to ration a household's ability to inject surplus solar electricity into their networks. Similarly, the rapid uptake of electric vehicles could create a risk of insufficient generation in some parts of the national grid for brief periods of time. Both of these risks are very unlikely to occur if the right pricing structures are in place and, in reality, it would take many years for these risks to eventuate. They are certainly not imminent risks.

Nevertheless, to prepare for these possibilities, we are further developing the hedge market to provide new products for market participants to manage price risks, and provide better price signals about future supply risks and more options for parties to respond in ways that address those risks. Similarly, we are focused on making it easier for industry participants, including local electricity networks, to respond to changing market conditions.

Transmission pricing review project

The Authority is reviewing the current transmission pricing guidelines which set the way transmission charges are determined. Many stakeholders agree that the current transmission pricing guidelines are not fit for the future and need to change.

The Commerce Commission decides the overall revenue Transpower can charge for its regulated transmission services, which was \$917m in 2015/16, and will rise to \$977m by 2019/20. The Authority approves Transpower's methodology to allocate that revenue among its transmission customers—the transmission pricing methodology (TPM). The Authority also sets high-level transmission pricing guidelines that the TPM must be consistent with.

The Authority has undertaken a comprehensive review of transmission pricing over the last six years and identified significant problems. In essence, the current charges are not linked to the services delivered or the costs to deliver those services. This ultimately results in higher prices for consumers because it inadvertently encourages transmission customers to make wasteful investments. A more efficient TPM has the potential to encourage better investment decisions and deliver hundreds of millions of dollars of benefit to New Zealanders.

This is a complex and contentious project as it covers the allocation of nearly \$1 billion per year. There will be 'winners' and 'losers' from any change, and some parties have strong, vested interests to oppose any changes. The project has involved extensive analysis and fulsome

consultation with stakeholders, including 17 formal consultation rounds, and several forums and workshops. There has been one unsuccessful legal challenge, and future challenges are likely.

In May 2016, the Authority proposed new TPM guidelines, and refined that proposal in December 2016. In April 2017 we uncovered significant errors in the independent cost benefit analysis provided by consultant Oakley Greenwood. While this was an unfortunate setback, our priority is to ensure we have the right information to make the right decisions in the interests of consumers. We are assisting the new Authority Board members to get up to speed on the project before they consider the next steps. At this stage the impact on the overall timeline is unclear.

Why are we doing this project?

The current TPM is unsustainable because it sends the wrong price signals to transmission users, resulting in wasteful investment, and produces odd outcomes. For example, most of the expensive upgrades to the national grid were made to deliver more transmission reliability and lower electricity prices to upper North Island consumers. But consumers in the lower South Island are now paying significantly more in transmission charges.

The current TPM penalises remote communities as they often have to pay for large transmission assets, despite often having low levels of reliability. In contrast, large cities receive much higher levels of reliability from transmission assets that are paid for by all New Zealand consumers, including those in remote regions. Also, slow-growing and declining regions end up paying for the upgrades for fast-growing regions.

The current TPM also discourages the development of South Island generation relative to North Island generation, which means that cheaper South Island generation is not developed—raising costs to the economy. This works against the Government's climate change mitigation goals, as virtually all new sources of South Island generation are renewable. Moreover, the current TPM encourages the development of distributed generators, including diesel plants, to avoid using the grid.

Any proposals for revising or keeping the TPM are highly contentious. However, many stakeholders agree with the Authority's proposal to replace two of the current charges in the TPM with an area-of-benefit charge and a residual charge. The main objection from most Auckland stakeholders is not about whether an area-of-benefit charge should be adopted, but about whether it should be applied only to future transmission investments or also to existing investments.

What are the next steps?

Transpower has recently consulted with stakeholders on whether to conduct an operational review of the current TPM. We see this as complimentary to the Authority's review.

Under an operational review, Transpower can submit a proposal to the Authority for a variation to the TPM. Unlike the TPM review that the Authority is currently undertaking, the operational review cannot amend the guidelines that set the TPM. Transpower has previously conducted an operational review whilst the Authority has been reviewing the TPM guidelines and we were able to accommodate it within our work and we expect to do so again.

The operational review is likely to focus on technical and less-controversial areas, described as 'house-keeping matters'. The Authority supports an operational review as it may produce early benefits for consumers, and we will continue working closely with Transpower.

We will provide a briefing and further updates on timing when we are in a position to do so.

Distribution pricing review project

The Authority is actively encouraging distributors and retailers to adopt prices that are based on the actual services provided and reflect the costs to supply those services. In other words, it's about consumers only paying for what they actually get, at the cost of getting it.

New Zealand distribution services are monopolies, so the Commerce Commission regulates how the majority of distributors determine their revenue. One of the Authority's roles is about how each distributor allocates its revenue requirements amongst its customers—this is called distribution pricing. We currently facilitate this by setting voluntary pricing principles, which help distributors decide how to set these prices.

New technologies and innovations are giving consumers more choice and are transforming the ways they use electricity. But if more efficient distribution prices aren't adopted, New Zealand could forgo a significant portion of the benefits from new technologies and innovations. More importantly, consumers could face a 30 per cent increase in their distribution charges over the next 10 years if the current approach is retained (as distributors will look to recover lost revenue from, for example, more consumers installing solar panels). In the longer term, many communities could suffer a significant loss in the value of the distribution assets they own (via community trusts).

We believe industry participants should lead this process because each distributor faces a unique set of circumstances. Submissions on our November 2015 consultation paper¹³ demonstrated widespread agreement that distribution prices need to change. At the Authority's request, by 1 April 2017 nearly all distributors provided roadmaps for reforming their distribution prices (see the Electricity Network Association's (ENA) website¹⁴).

The importance of ensuring distribution pricing structures are more efficient was re-affirmed in submissions on our July 2017 consultation about enabling mass participation. The clear message from industry and innovators looking to enter the market is that more efficient distribution pricing is critical for New Zealand to take advantage of new technology and change. More efficient distribution pricing has the potential to facilitate faster adoption of electric vehicles, battery storage, and greater consumer use of automatic demand management tools.

Many distributors are already considering their current and future pricing. The ENA has been working on distribution pricing reforms since late 2014. The ENA, the Electricity Retailers' Association of New Zealand, and their members are learning to work more closely with stakeholders to understand what their customers want. Distributors and retailers need to thoroughly consider the shift to more efficient pricing, as they must communicate well with consumers to explain any changes.

As the industry moves towards more efficient distribution pricing, some distributors and retailers have expressed the need for more clarity about the Electricity (Low Fixed Charge Tariff Option for Domestic Consumers) Regulations 2004¹⁵ (the LFC Regulations). MBIE administers and amends the LFC Regulations and the Authority enforces the LFC Regulations. In May 2017, the Minister of Energy and Resources requested MBIE to review the LFC Regulations.

¹³ www.ea.govt.nz/development/work-programme/pricing-cost-allocation/distribution-pricing-review/consultations/#c15642

¹⁴ www.ena.org.nz/news-and-events/news/new-pricing-roadmaps-published/

¹⁵ The objective of the LFC Regulations is to assist low-use consumers and encourage energy conservation, while also regulating distributors in a way that enables retailers to provide low fixed charge pricing options.

Why are we doing this project?

More efficient distribution pricing has the potential to facilitate the adoption of new technologies that can reduce costs for consumers by reducing distribution costs. This is particularly the case for battery and demand control technologies. More efficient distribution pricing also has the potential to remove the current artificial stimulus for the installation of photovoltaic distributed generation (solar panels), which increases costs for other consumers and contributes little to reducing carbon emissions because they crowd out cheaper sources of renewable electricity, such as wind generation. As discussed above, failure to reform distribution prices could result in a 30 per cent increase in distribution charges over the next 10 years, which could cause a 10 per cent increase in (total) residential retail bills over the next 10 years.

What are the next steps?

The initial roadmaps published by distributors are a good first step but there is still work to do. We will consult on the voluntary distribution pricing principles and the associated information disclosure guidelines later in the 2017/18 financial year, and monitor progress.

Reporting on progress

We published our *2016/17 Annual Report* on 3 October 2017. We understand that the Minister will table the report on the second day of the meeting of the new Parliament.

During 2017/18 we will provide four-monthly reports on progress against the SPE, any matters raised in letters of expectations, and other matters covered in the Output Agreement¹⁶. We will provide you with a draft of our 2017/18 annual report as part of our final four-month report¹⁷.

We publish a work programme¹⁸ at the start of each financial year. This is not a statutory requirement, but we do so in the interests of transparency and to enhance stakeholder engagement. Our work programme lists the purpose and deliverables for key projects. The primary audience is stakeholders from the industry and consumer representatives. We publish four-monthly reports on progress against the work programme. The work programme and reports are provided to you for information.

¹⁶ We agreed an enduring output agreement with the previous Minister in June 2015 and can provide a copy if needed.

¹⁷ Our annual report is available at www.ea.govt.nz/about-us/strategic-planning-and-reporting/annual-report/

¹⁸ Our work programme is available at www.ea.govt.nz/about-us/strategic-planning-and-reporting/our-work-programme/

Section 6: Litigation

The Electricity litigation fund appropriation enables the Authority to participate in litigation effectively and without delay. The fund is accessed in accordance with specific criteria, which are listed in the output agreement.

The list below shows the cases the litigation fund is currently covering:

- On 31 August 2016, Vector Limited and Entrust filed declaratory judgment proceedings in the High Court at Wellington, naming the Authority as the defendant. They sought a declaration that the Electricity Industry Act 2010 (Act) does not permit the Authority to amend the Code to require distributors to offer a default distribution agreement (DDA) containing core terms prescribed by the Authority and operational terms consistent with principles and policies set by the Authority.

On 31 July 2017 the High Court rejected Vector and Entrust's arguments that the Authority does not have the power to introduce a DDA. The Court found the Authority has a broad power to amend the Code, reflecting its central role as market regulator.

On 25 August 2017, Vector and Entrust advised they are appealing the High Court decision to the Court of Appeal on the grounds the High Court misinterpreted the Act. A hearing in the Court of Appeal would be expected in six to nine months' time.

- In March 2017, City Financial Investment Company (New Zealand) Limited complained to the Rulings Panel regarding a number of breaches of the Code that City Financial had alleged against Transpower.

The Authority had previously considered the alleged breaches and decided not to take further action on them under regulation 11 of the Electricity Industry (Enforcement) Regulations 2010. This was because, with one exception, none of the alleged breaches established a prima facie case. The Authority decided to take no action on the remaining breach because it was very minor.

On 9 June 2017, the Rulings Panel decided to adjourn its consideration of the complaint until the High Court released its decision on another similar case. On 19 June 2017, the High Court delivered its judgment on that similar case, agreeing with the Authority's view that the Rulings Panel had no jurisdiction to hear the complaint.

On 16 August 2017, City Financial initiated proceedings in the High Court in Wellington against the Authority and Transpower. The main proceeding is an application for judicial review of the Authority's decisions not to pursue complaints that Transpower had breached the Code, and Transpower's conduct that gave rise to the decisions.

Appendix A: Board, leadership team and organisational structure

Our Board

The Authority Board comprises between five and seven members appointed by the Governor-General. Members hold office for a term of up to five years and may be reappointed.

Current Authority members are:

- Dr Brent Layton (Chair) and Susan Paterson, both reappointed for terms of five years that expire on 1 November 2020
- Allan Dawson and Sandra Gamble, both appointed for terms of five years that expire on 18 April 2022
- Mark Sandelin and Lana Stockman, both appointed for terms of five years that expire on 6 June 2022.

Dr Brent Layton (Chair)



Brent is a former senior fellow and chief executive of the New Zealand Institute of Economic Research.

He has been a director or chair of organisations in sectors as diverse as banking and finance, health, scientific research, electricity, food processing, transport and information technology. He is a former member of the Board of Transpower and of M-co, the company that established the New Zealand electricity market in 1996.

As a consultant, prior to joining the Authority, Dr Layton's work spanned macro and microeconomics and corporate finance. Much of his work involved regulatory economics and responses to regulatory change. At various times he advised the Major Electricity Users Group, most of the major generators and retailers, a number of the major industrial users of electricity and the Commerce Commission.

In 2009, Dr Layton chaired the Ministerial Review of the performance and governance of the electricity market.

Susan Paterson ONZM



Susan is a pharmacist and MBA graduate from London Business School.

She has senior management experience in a number of companies in New Zealand, and during a decade in the USA and Europe, where she was also a strategy consultant with Boston-based Index Group.

Susan was project director for the Wholesale Electricity Market Development Group in the early 90s, a director of EECA and spent over eight years on the Transpower Board from 1999.

Susan has 17 years' board experience and holds a number of directorships and board positions.

Allan Dawson



Allan is the current Customer Manager for New Zealand Trade and Enterprise.

He was formerly the Chief Executive for the Independent Market Operator in Western Australia, and the Energy Market Company in Singapore, and worked on the development of New Zealand electricity industry rules and arrangements in the 1990s.

He has chaired the Association of Power Exchanges, and two bodies in Western Australia: the Market Advisory Committee for the Wholesale Electricity Market and the Gas Advisory Board.

He brings strong governance, leadership, communication and relationship management skills, and experience in roles that directly interface with energy regulators.

Sandra Gamble



Sandra is currently a non-executive director, with roles as an Independent Advisor to the Audit and Risk Committee at Sydney Metro, and Director of the Woodville Alliance, as well as Chair of its Audit and Risk Committee.

She was formerly the General Manager for Business Strategy and Resilience for the Sydney Water Corporation, where she held various committee, Chair and Executive Convenor positions, and a director of Save the Children Australia.

She is an electrical engineer with significant experience working in the energy and water sectors, and brings strong leadership, communication and relationship management skills.

Mark Sandelin



Mark is a Partner at law firm MinterEllisonRuddWatts. He has over 30 years' experience as a commercial litigator.

He also has significant corporate governance experience having served on the MinterEllisonRuddWatts Board for 16 years (6 years as Executive Chair). Mark is also Deputy Chair of Fairway Resolution Ltd which is a crown owned entity. He is Deputy Chair of Auckland Grammar School and has been on the Board for the past 7 years.

Lana Stockman



Lana has recently returned to New Zealand from Australia, where she was Vice President Regulation at Aurizon Network, a top-50 ASX listed company offering rail and road based freight and infrastructure solutions. She was also a General Manager at Energy Australia, a board member of the Electricity Retailers Association of Australia, and a member of the Ministerial Advisory Council on smart meters in Victoria.

Lana also has experience in the New Zealand electricity industry,

including as an advisor to the Electricity Authority and its predecessor. She is degree qualified in both engineering and finance and coupled with a broad energy market experience, brings fresh thinking, and strong leadership, communication and relationship management skills.

Board committees

The Board has three committees: the Audit and Finance Committee, the Compliance Committee and the System Operations Committee.

The Audit and Finance Committee advises on the quality and integrity of the Authority's financial reporting, including managing the relationship with the external auditor. It also considers whether appropriate governance, policies and operating processes are in place to identify and manage risk, and oversees and assesses the internal audit process. Members are Mark Sandelin (Chair), Susan Paterson, Allan Dawson and Lana Stockman.

The Compliance Committee makes decisions on alleged breaches of the Act, various regulations and the Code. It determines appropriate enforcement responses, whether settlements should be approved or further investigation undertaken and makes recommendations to the Board regarding the laying of formal complaints with the Rulings Panel and instigating prosecutions. Members are Susan Paterson (Chair), Sandra Gamble and Allan Dawson.

The System Operations Committee oversees the performance monitoring of the system operator, identifies any emerging system security risks and addresses any other matters relating to the system operator's obligations under the Code. Members are Sandra Gamble (Chair), Allan Dawson, Mark Sandelin and Lana Stockman.

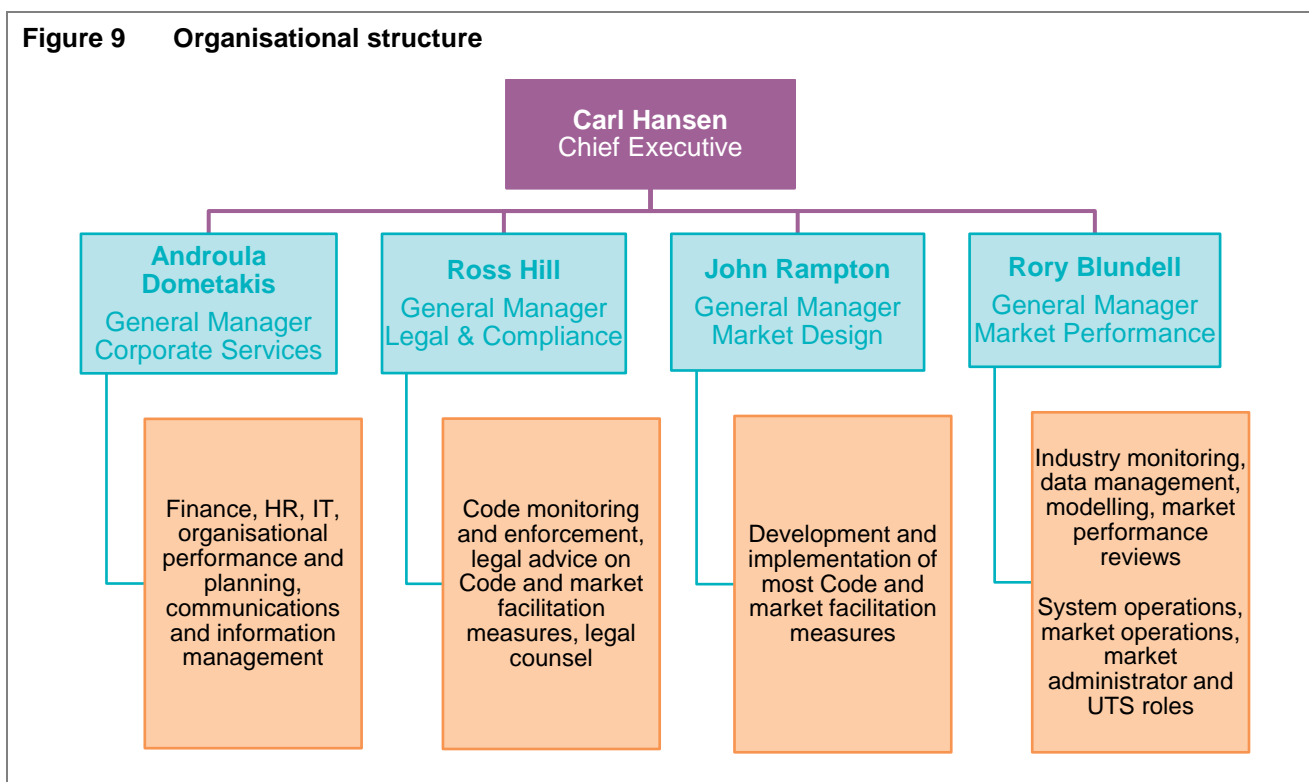
Organisational structure and management

Chief Executive: Carl Hansen



Carl Hansen has been Chief Executive of the Electricity Authority since it was established in November 2010. Previously, Carl was involved in the evolution of the New Zealand electricity market as a senior executive and director, independent adviser and economist.

He has chaired sector technical and advisory groups and acted as principal adviser to a number of industry bodies. Carl spent almost a decade with market services company M-co, originally as Chief Economist and then as Chief Executive.



Our statutory functions

Section 16 of the Act sets out our functions. Broadly, these are to:

- register industry participants
- develop and administer the Code
- monitor and enforce compliance with the Code, Act and the Electricity Industry (Enforcement) Regulations 2010 (Regulations)
- facilitate market performance through information, best-practice guidelines, and related services
- undertake sector reviews

- act as Market Administrator and contract with market operation service providers
- promote consumer switching
- monitor sector performance against the Authority's statutory objective.

Section 18 of the Act requires us to carry out reviews at the written request of the Minister on any matter relating to the electricity industry. The Authority has completed one report requested under section 18: the inquiry into the Penrose substation fire of October 2014¹⁹.

Service providers

The **system operator** manages the real-time operation of the power system in a manner that avoids undue fluctuations in frequency and voltage. The system operator gives instructions as to when and how much electricity to generate so that supply constantly matches demand. The system operator publishes the generator dispatch schedules, and provides security of supply forecasting, monitoring and emergency management functions. The system operator also provides ongoing security monitoring and emergency management. The system operator can seek funds from the Authority's security management appropriation for:

- increased monitoring and management responsibilities during a security situation
- planning and running an official conservation campaign.

Wholesale market participants use the **wholesale information and trading system (WITS)** to transfer information, such as uploading bids and offers.

The **reconciliation manager** allocates volumes of electricity to generators and purchasers based on metering information supplied by participants.

The **pricing manager** calculates and publishes final prices, which the clearing manager uses to calculate invoices.

The **clearing manager** invoices and settles physical electricity sales and purchases. It also maintains prudential security requirements.

The **registry** is a database of every customer point of electricity connection. It enables customer switching and contains key information for the reconciliation process.

The **FTR manager** runs regular auctions of financial transmission rights, which are a locational hedge product.

The Authority is currently the **market administrator**, providing several operational and administrative services to the market. However, we are in the process of devolving some of the responsibilities to service providers.

We are working with the **extended reserve manager** (NZX Limited) and the system operator to develop and deliver the new extended reserve regime. The extended reserve manager will develop and run the process to select the blocks of load that are to be used as extended reserve.

¹⁹ The report is available at www.ea.govt.nz/monitoring/enquiries-reviews-and-investigations/2014/section-18-review-of-auckland-power-outage-5-october-2014/

Appendix B: Rulings Panel, SRC and advisory groups

Rulings Panel

The Act continues the Rulings Panel (the industry dispute resolution and disciplinary body established under the Electricity Governance Regulations 2003) and sets out its membership, functions and funding arrangements. The Governor-General appoints panel members. The Rulings Panel is Peter Dengate Thrush (Chair), Geraldine Baumann (Deputy Chair), Susan Roberts, Nicola Wills and John O'Sullivan.

Security and Reliability Council (SRC)

The Act sets requirements to establish the Security and Reliability Council and other advisory groups. The Act requires the Authority to publish a Charter on advisory groups. The charter was published on 14 February 2011. The Security and Reliability Council provides independent advice to the Authority on the performance of the electricity system and the system operator and reliability of supply issues. Members are Mike Underhill (Chair), Nigel Barbour, Barbara Elliston, Marc England, Vince Hawksworth, Anne Herrington, Bruce Turner, Guy Waipara and Erik Westergaard.

Advisory groups

Advisory groups comprise members from the industry and consumer representatives. They provide input to market development activities, particularly at the early investigation and analysis stages²⁰.

During the 2016/17 financial year, the Authority had two standing advisory groups: the Wholesale Advisory Group (WAG) and Retail Advisory Group (RAG). In December 2016, the Authority Board decided to replace the RAG and WAG with two new advisory groups: the Innovation and Participation Advisory Group (IPAG) and the Market Development Advisory Group (MDAG). We appointed IPAG and MDAG members on 17 October 2017. We disestablished the RAG and WAG following the completion of their respective work plans.

The IPAG will focus on issues specifically related to reducing inefficient barriers to new technologies and business models, and consumer participation. The Authority appointed Lindsay Cowley as chairperson for a three-year term starting 1 June 2017. IPAG will have between five and eight members comprising people with an interest and expertise across the electricity sector, new and evolving technologies and business models, and consumer choice and competition.

The MDAG will focus on further evolving the 'machinery' of the electricity market. The Authority appointed James Moulder as chairperson for a three-year term starting 1 June 2017. MDAG will also have between five and eight members comprising people with deep experience and interest in the electricity sector.

Additional advisory and technical groups

From time to time other advisory and technical groups have been established. Information about these groups is available in the Annual Report and on our website.

²⁰ Information about advisory and technical groups is available at: www.ea.govt.nz/development/advisory-technical-groups/

Appendix C: Lessons from Australia

New Zealand uses water to generate about 60% of our electricity—which is high compared to most countries. Hydro-based generation is more versatile than nearly all other forms of electricity generation. One major advantage is that hydro (and thermal) generation help maintain power system stability following large unpredictable events on the power system. It provides momentum/inertia (in the form of a large spinning mass) which helps counteract the effects of any power system event. Fast-acting interruptible load²¹ provides a similar service and helps to provide system security following a large event. This type of load automatically switches off when it senses that the power system is under stress, helping to counteract the magnitude of the system event.

A lot of newer forms of renewable generation technologies, such as photovoltaics (PV) and wind generation, do not have much inertia. This means that power systems with lots of wind and PV generation are less resilient when system events occur (unless there is extra reserve generation or fast interruptible load made available to the system).

Australia has experienced issues with its power system over recent years. Government climate-based policies and incentives have resulted in a large uptake of PV solar panels and substantial wind generation. South Australia, being sunny and with reasonable wind resources, has seen a lot of PV and wind generation installed. This surge in these forms of renewable generation has led South Australia to retire thermal generation, meaning there is less inertia/momentum on the power system. This issue was highlighted during the 2016/2017 summer when the power system in South Australia suffered many large events, including a total blackout in Adelaide and the wider South Australian region.

The Council of Australian Governments Energy Council's *Independent Review into the Future Security of the National Electricity Market* (also known as the Finkel Report) has highlighted the many issues faced in Australia. One key observation is that the Australian electricity markets have failed to keep pace with rapid changes in technology. For example, the electricity market design could have compensated for decreased inertia by introducing reserve or inertia markets, as we have in New Zealand. These changes would have helped incentivise fast interruptible load products to help counteract large system events. Another observation is the Australian wholesale electricity market rules are broadly based across the entire National Electricity Market, rather than being tailored to suit the power system characteristics of the individual states.

In New Zealand the situation is different. Our market design has evolved around our power system characteristics and, although we share some of the risks that Australia faces, our market design has evolved to handle these risks. For example, our wholesale market design ensures that reserve generation and fast acting interruptible load are always available to prevent a cascade black system event. This, and high levels of hydro generation, means our power system can reliably support increases in both wind and PV technology.

²¹ Interruptible load is load offered to the instantaneous reserve market to be interrupted when certain system events occur.