



# **ELECTRICITY PRICE REVIEW**

**HIKOHIKO TE UIRA**

**FIRST REPORT  
FOR DISCUSSION**

**30 August 2018**



**ELECTRICITY PRICE REVIEW**  
**ISBN (ONLINE) 978-1-98-853582-1**  
**ISBN (PRINT) 978-1-98-853583-8**

## Minister's message

We want all Kiwis to enjoy affordable electricity, now and in the years to come.

But right now, there's significant evidence that the market is not working for everyone.

Nearly a third of all households struggle to pay their power bills or spend a large part of their income on power.

We know that in recent years household electricity prices in New Zealand have risen much faster than in countries to which we compare ourselves. We also know that our industrial prices are below the average in those same countries. For people to have confidence in our system, New Zealanders need to know that our electricity market is efficient, delivers fair prices and is working for the good of all New Zealanders. We also need to know that it is capable of responding to the enormous wave of technological change we are facing in the coming years.

I welcome this report as an important first step in helping our electricity system meet the needs of the future.

I want to thank those in the industry who have worked cooperatively on this phase of the review and to urge you to keep engaging with the review to help identify improvements. I also want to encourage consumers to make their voice heard during this next stage of the review.

Together we can ensure affordable electricity for all in the years to come.

**Hon Dr. Megan Woods**

**Minister of Energy and Resources**

## Foreword

The importance of a well-functioning electricity sector cannot be overstated, and as our report makes clear, this importance will only grow as more of our energy needs are met by electricity. Every panel member assisting with this review feels privileged to have had the opportunity to contribute to this first fact-finding phase, and also looks forward to the second phase – development of improvements.

The contributions of those who assisted through their participation in interviews and/or providing written material are gratefully acknowledged. We are especially grateful for the co-operation we received from retailers we approached for data – particularly knowing the amount of effort entailed in assembling such detailed information. It has proved essential to understanding some of the consumer-related issues we have examined. Thank you for your willingness to help.

The advisory panel is indebted to the review's secretariat from the Ministry of Business, Innovation and Employment, and also to Concept Consulting. Thanks also to special advisor Keith Tempest, who brought huge experience in all facets of the industry to our team.

The panel was very conscious of the need to ensure this first report was succinct and easily understood by the public, especially given the underlying emphasis of the terms of reference on consumer fairness and affordability. We thank Peter Riordan from THINKWRITE for his enormous contribution in assisting with the writing of this report.

We can be proud that New Zealand is ranked ninth out of 125 countries in the World Energy Council's Energy Trilemma ranking (measuring security of supply, equity and environmental sustainability), and that we are the only non-European country in the top 10. But we also know there are problems now – especially relating to residential prices – and that more lie ahead.

In the next phase of our review, we look forward to finding ways to address these problems without disrupting all that is working well. In particular, we will look more closely at the ability of the regulatory framework to make the most of the opportunities of emerging technologies. Our hope is that we can do this by constructive engagement and a determination on the part of all participants in the sector to find workable solutions to these problems. In our view, the aim should be to replicate our World Energy Council ranking for a different trilemma – that of fairness, affordability and competitiveness.

**Miriam R Dean CNZM QC**  
**(Chair)**

**Suzanne Chetwin**  
**John Hancock**  
**Peter Harris**  
**Anne Herrington**  
**Sue Roberts**  
**John Small**  
**Lee Wilson**

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# Overview

We have been asked to do four things: examine the state of the electricity sector, report our findings, seek feedback on those findings and recommend improvements to the Government. This report satisfies the first two requirements. The next stage of our review is to seek comment from the industry and the public.

Broadly speaking, we have examined the sector using the measures of competition and efficiency, reliability, fairness and affordability. We have also kept in mind three other considerations: environmental sustainability, the shift to renewable energy, and the impact of innovations in technology. Our report is divided into three parts: *Consumers, Industry, Technology and the regulation*.

## Consumers

They are the heart of the sector and the reason why it exists. Consumers' wish list is short: they want power that is reliable, affordable and fairly priced (and increasingly, we would add, environmentally sustainable).

*Reliability:* Is our power reliable? The short answer is yes. Apart from rare outages, the sector offers a consistent, high-quality supply of electricity. Investment is sufficient to meet demand, so reliability is assured – for now. Four-fifths of demand is already met by renewable generation, and this will help with the move to net zero emissions.

*Affordability:* Is our power affordable? Here we are not doing so well:

- After adjusting for inflation, residential prices are 79 per cent higher than in 1990. Since 2000, New Zealand's residential prices have risen faster than most other OECD countries.
- About 103,000 households spent more than 10 per cent of their income on domestic energy in 2015–16. People in this predicament are in what we call energy hardship. The picture is even worse if housing costs are excluded: the figure jumps to 175,000 households. Worryingly, children are over represented in households experiencing energy hardship.
- A two-tier retail market appears to be developing: those who actively shop around enjoy the benefits of competition, and those who don't pay higher prices. The average gap between the cheapest retailer's price and the incumbent retailer's price has increased by about 50 per cent since 2002, after accounting for inflation. Some households struggle to understand the various plans and how to choose the one that's best for them, and low-income consumers miss out more often on prompt payment discounts – which can be as high as 26 per cent of the bill, and which budgeting and advocacy groups say are really late-payment penalties.

Will things get better or worse? This depends mainly on whether pricing structures stay the same. If they do, lower-income households will bear some of the costs that better-off households will avoid by installing solar panels, which we predict will become more common. The same goes for electric vehicles. Lower-income households will bear a disproportionate share of the cost of building extra network capacity if these vehicles are widely used and recharged during peak hours.

Affordability should generally improve if prices reflect the cost of providing electricity at different times of the day and year, rather than being flat. But some consumers will be hurt by a move to such pricing. Targeted social welfare measures can help reduce energy hardship. But it is clearly a problem the industry, regulators and government must tackle together.

*Fair prices:* Is power fairly priced? Not as fairly as it could be:

- Since 1990, residential prices have risen 79 per cent, while commercial prices have fallen 24 per cent, and industrial prices have risen 18 per cent.<sup>1</sup> Three things have caused this divergence in prices: distribution charges shifted from businesses to households; generation and retailing related charges went up a lot for households; and GST, which only residential consumers ultimately pay, rose from 10 per cent to 15 per cent. Fairness may dictate readjusting some distributors' shared network costs from households to other consumers.
- Retailers don't make it easy to compare prices and contracts, and some consumers find it hard to have a say on matters affecting their monthly bill. Language and cultural barriers, among others, can be factors here. More needs to be done to ensure consumers' voices are heard. Trust in power companies is high, however.
- Prompt payment discounts vary but can be up to 26 per cent of the bill. The loss of such discounts can add substantial penalties for those consumers unable to pay on time.

## Industry

New Zealand's electricity sector ranks highly by world standards. There are, however, areas in need of improvement.

*Generation:* We have concerns about generators' ability to exercise market power when supply is tight. A more effective wholesale contract market would help correct this, and could also mitigate the effects of companies with both generation and retailing arms ('vertical integration'). Much more generation will be needed to support a widespread switch to electric vehicles, and to move businesses from coal and gas-fired boilers to electric technologies. Electrification of the economy could double demand. We think market and industry arrangements can meet the growth in demand, provided there are strong incentives to invest in generation.

*Transmission:* Electrification of the economy will require significant grid investment to accommodate an expansion of renewable energy. This highlights the need for a transmission pricing methodology that ensures the right investments are made in the right place at the right time.

We are not, however, the arbiters of the debate about the merits of proposed transmission pricing methodology guidelines. But we have looked at what the debate can tell us about how reforms are introduced in order to develop guidelines that deliver efficient, durable and fair outcomes.

*Distribution:* We found factors that may hold back distribution efficiency, including outdated distribution pricing structures; the questionable effectiveness of incentives to reduce costs and improve performance; the small size of some distributors; access to meter data; the quality of governance; ageing assets; and short planning horizons.

*Retailing:* Competition has generally increased, but this hasn't benefited all consumers as already noted. Those who don't or can't easily shop around are paying more than they need to. Despite so many new retailers, the big five generator-retailers still have around 90 per cent of the market, suggesting it is still hard for independent retailers to expand. New entrants are unhappy with 'win-back' discounts aimed at drawing back departing customers. The lack of an effective wholesale contract market is another barrier to competition, they say.

We found nothing to suggest grid operator Transpower or distributors are making excessive profits. Nor, based on our analysis to date, have we found evidence to indicate generator-retailer profits are excessive (though we note the lack of sufficiently detailed data means this is not a definitive assessment).

<sup>1</sup> In inflation-adjusted terms.

## Technology and regulation

Our essential questions here were: how will technology advances affect the sector, and does the regulatory framework have the right objectives and achieve them in the right way?

*Technology:* Advances in solar panels and batteries will eventually turn today's one-way flow of electricity from supplier to consumer into a two-way flow. Electric vehicle recharging will also have an impact. Distributors may need to make big investments and reinvent business practices. These technologies will ease the country's transition to a net zero emissions economy, although their introduction will need careful management to avoid undermining the electricity system's resilience and reliability. There is also a risk, as noted, that higher-income households may benefit more at the expense of lower-income households if pricing structures are not changed. But changing price structures will create winners and losers, and this will need careful management. Electrification will push up demand, but is not expected to lead to big price rises.

New technology and the electrification of the economy also offer big opportunities. For consumers, better use of existing infrastructure – such as by charging electric vehicles at off-peak times – will help contain price rises (or even lower prices) and allow fixed costs to be spread more widely. For businesses, electrification will push up demand and the potential for more sales.

*Regulation:* The electricity regulatory framework is generally well positioned. We think fairness and environmental objectives (especially energy hardship and carbon emissions) should not be specific objectives for electricity regulators. They are better retained in the broader regulatory framework. Even so, the electricity regulatory framework has a role to play in more co-ordinated efforts to achieve these important objectives. A more 'joined-up' approach is especially needed between regulators and government agencies to address energy hardship – a task in which the industry also has a role to play. Extending the benefits of competition to all consumers would be a good starting point.

Low fixed charge tariff regulations help some households but raise costs for others and push some further into energy hardship. We think they are poorly targeted at only one type of household in need of help.

We have not identified any gaps or overlaps that warrant altering the functions of the electricity regulators. The only exception is the regulation of access to distribution networks, which is clearly an area in need of attention. However, there may be merit in considering a single regulator for energy if New Zealand's changing energy mix warrants it.

Looking ahead, we expect decarbonisation measures and the electrification of transport to increase demand for electricity, but we don't think this will necessarily lead to big price rises. Emerging technologies have the potential to soak up extra demand and contain price rises – which is why it is so important the regulatory framework allows us to fully exploit the opportunities they present. All these matters we will examine in more detail in the next stage of our review.

# Part one: Introduction



## Our approach

This report is intended to stimulate public discussion about the electricity sector. Reliable, affordable electricity is crucial to New Zealand's economy and way of life. If for no other reason than this, the electricity sector warrants periodic examination. The last ministerial review in 2009 covered similar ground but did not examine certain questions that feature prominently in this review, notably the fairness of electricity prices, the voice of the consumer and advances in technology.

Electricity prices, and specifically the sharp rise in residential bills, prompted the Government to initiate this high level review. The central question we must answer is whether current arrangements ensure the electricity sector is efficient and offering fair prices today while still ensuring sufficient investment for tomorrow's consumers – and simultaneously adapting to environmental and technological changes. There is nothing fundamentally new about this balancing act. But what constitutes 'fair' and 'efficient' entails examination of a variety of often complicated market structures and regulatory controls. Note that the terms of reference refer to fair and equitable prices, but we consider fair and equitable to mean largely the same thing and for simplicity's sake have used only fair.

Furthermore, the challenges facing the sector are different to those confronting it in 2009. The need to ensure supply can meet demand ('security of supply') has not changed, but technological advances and innovative business models are new developments. They require the sector to adapt. Is that happening, and is it happening fast enough? Does the regulatory framework encourage it? These are questions for the review.

Another new element of this review is the transition to a low emissions future. Achieving net zero emissions will require far reaching changes to the way New Zealand meets its energy needs, including a substantial expansion of renewable electricity to reduce dependence on fossil fuels for transport and industrial energy needs. This work is for the Interim Climate Change Commission, not us, but we have been mindful of the impact of climate change on the sector, particularly electricity pricing.<sup>2</sup>

This report forms part of the review's first phase, which is to gather facts and consider industry and public submissions so as to bring into sharp focus any problems in the sector. In part two, we will develop solutions to those problems.

### Scope

Our terms of reference require us to consider the entire electricity supply chain.<sup>3</sup> This necessarily includes consideration of its natural monopoly elements (transmission and distribution) as well as competitive elements (generation and retailing). We also look at consumer interests, prices and affordability, as well as technology and the regulatory framework.

Analysis of feedback on this first report will help us prepare our eventual report to the Government. That report will contain final findings about, and recommended improvements to, the structure and conduct of the sector and accompanying regulatory framework. Those findings and recommendations will be suitably broad at the policy level, although not without meaningful detail. We will also be mindful – as our terms of reference require – that any suggested changes to the regulation of natural monopoly networks may have a bearing on the gas sector and international airports, which are also regulated under Part 4 of the Commerce Act 1986.

<sup>2</sup> Interim Climate Change Commission terms of reference.

<sup>3</sup> Electricity Price Review terms of reference.

## Process

Drafting this report was shaped by discussions with many groups, ranging from individual consumers to industry participants. We sought the views of industry organisations, consumer advocacy and budgeting advice agencies and policymakers. Discussions were held early on with the regulators, the Electricity Authority and Commerce Commission. Liaison with the Interim Climate Change Committee and the Productivity Commission (over its inquiry into a low emissions economy) produced useful insights.

We were interested in views on what was working well and what was not, looming challenges, and the suitability of the regulatory environment. Consumers and consumer advocates were asked about their views on the sector. More information on consumer patterns was generated from questions Consumer NZ agreed to add to one of its surveys. For an international perspective, we held discussions with experts from Australia and the United Kingdom who had taken part in recent electricity reviews.

Such discussions were supplemented by evaluation of recent relevant reports and surveys in New Zealand. To establish a solid base of data on the industry, we also carried out a comprehensive analysis of existing data sources, including industry supplied material. We will hold more discussions with interested groups after releasing this report.

## Structure

The body of the report has three parts: *Consumers and prices, Industry and Technology and regulation*. Each part responds to the essential thrust of the terms of reference, as well as other matters raised during discussions with the industry, consumers and regulators in this first phase of our work. As already noted, once this fact finding stage is complete, we will turn to developing solutions to substantiated concerns about the sector.

## Part two: Context

### The electricity system

Electricity is so integral to our daily lives that most of us scarcely give it a moment's thought – until the power goes off in a storm and then we suddenly have a renewed appreciation of its importance. How does this unseen, all-pervading energy reach your light switch, kettle or computer? The following is a short explanation. It is aimed at the general reader, not industry experts. We have also added details about the electricity sector and how it has changed over the years.

To get an idea of its size, here are a few facts about the electricity sector. Households typically meet about 70 per cent of their home energy needs using electricity.<sup>4</sup> Gas, firewood, coal and solar power make up the balance. A survey in 2016 showed average spending on electricity was \$37.70 a week, or less than 3 per cent of the average household budget.<sup>5</sup> But some households were spending much more – at least 10 per cent of their budget.<sup>6</sup>

In the 12 months to June 2017, payments by consumers to electricity suppliers totalled \$7.0 billion, of which \$3.5 billion was paid by residential consumers and \$3.5 billion by industrial, commercial and agricultural consumers.<sup>7</sup> The Crown was paid 23 per cent of that total, or \$1.6 billion, as company tax, dividends and GST.<sup>8</sup>

Getting electricity to the home or workplace involves three steps: generation, transmission and distribution. Generation happens at power stations. Most of New Zealand's stations are hydro-powered (lakes and rivers), but there are also geothermal (underground steam), gas and coal-fired stations, and wind farms.

Moving the power from where it's generated to where it's needed is step two: transmission. The tall, high voltage pylons that march across the countryside and alongside highways perform that function. Altogether, there are nearly 12,000 kilometres of these lines. Collectively, they're called the national grid.

These pylons branch off to big substations, typically on the edge of towns and cities. That's where distribution begins: a web of power lines fanning out across the country's regions to reach virtually every home, shop, office, factory and farm. Some of the country's biggest industrial consumers skip the distribution step and connect straight to the grid.

At the start of this system stretching the length of the country are more than 100 power stations owned by 34 generating companies. In between are a single transmission company (state owned enterprise Transpower) and 29 distributors.<sup>9</sup> At the other end are nearly two million homes and workplaces. And currently, there are about 19,000 solar panel installations in homes.

Thirty six retailers supply electricity to homes. They buy power from the wholesale market and sell it to consumers. Wholesale market prices are volatile. Wholesale prices rise because demand is going up. They can also rise because lakes and rivers feeding hydro stations are low. They go down when there is low demand and plenty of generation is available.

Most retailers don't pass on every rise and fall. Instead, they calculate prices based on what they think those fluctuations will average over the course of, say, the coming 12 months and add on

4 MBIE Energy balance tables, 2016. Households also use energy outside the home for transport (such as buying petrol for the family car). The expected surge in rechargeable electric vehicles will eventually increase home energy.

5 Statistics New Zealand 2016 Household Economic Survey.

6 An illustration of what one dollar of electricity would buy is given in appendix A, Figure 31.

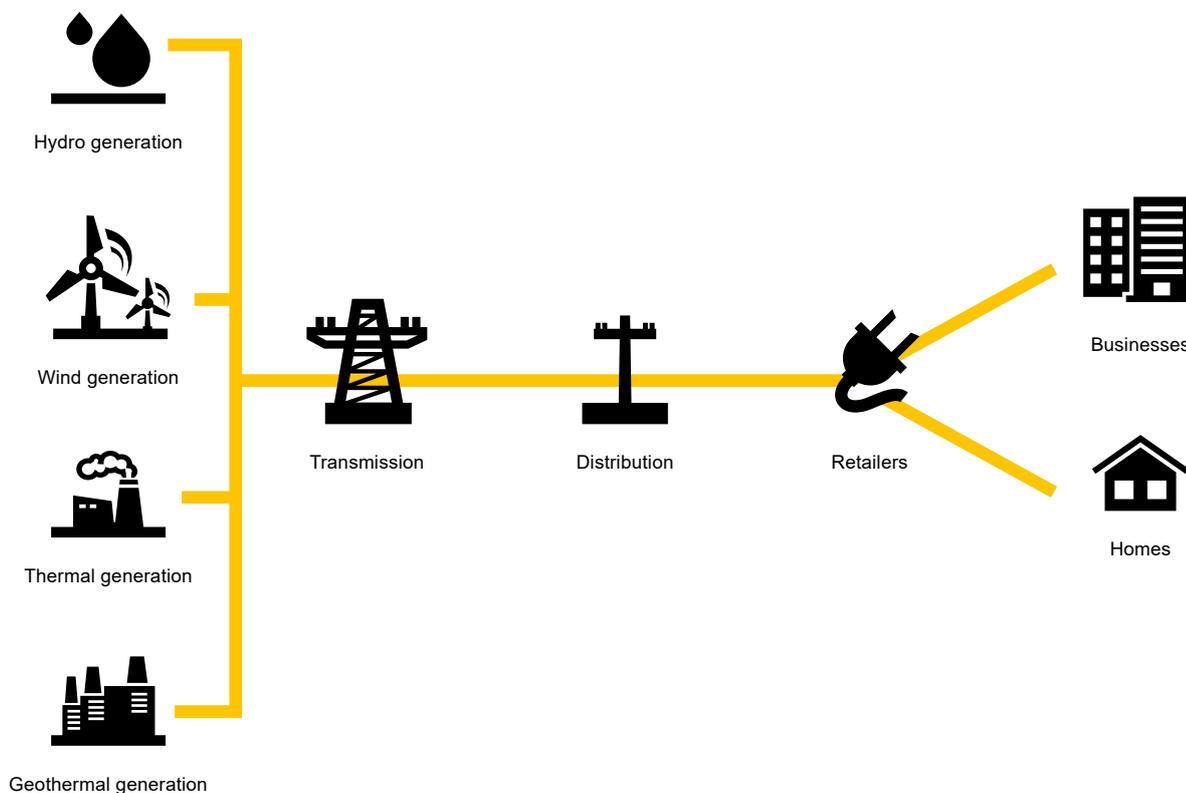
7 Agriculture includes forestry and fishing.

8 Concept Consulting analysis of annual reports and other data for the review.

9 Community trusts or local councils own 23 distributors. Others are privately owned or have mixed ownership.

their profit margin. Several new retailers are taking a different approach, charging consumers the wholesale price – whatever that may be – plus their profit margin. Retailers generally have contracts with distributors to get the electricity they've bought along distributors' lines to their consumers' premises. They also read meters and provide consumer support.

**Figure 1: The electricity system**



The five biggest retailers are also the five biggest generators, accounting for 90 per cent of both markets.<sup>10</sup> These 'vertically integrated firms' are Contact Energy, Genesis Energy, Mercury Energy, Meridian Energy and Trustpower. Small and medium-sized retailers have grown in number in recent years. Many are independent of any generator. Some retailers also offer consumers gas, phone and internet services.

### Demand

Electricity cannot be stored (except, of course, in batteries). Once generated, it has to be used. Generation must therefore exactly match demand, which is constantly going up and down as consumers switch on and off appliances, heaters, computers, machines and a thousand other devices. There are daily and seasonal patterns. Demand is highest on winter evenings when people want to heat their homes. But it can also be high during summer when people turn on air conditioning and farmers irrigate paddocks. These are peak periods.

Consumption is measured in kilowatts used per hour, or kilowatt hours (kWh).<sup>11</sup> An average household uses 7,100 kWh a year. Big consumers such as processing plants and factories measure their consumption in megawatt hours (MWh) or gigawatt hours (GWh). The biggest consumer is Tiwai Point aluminium smelter, which used about 5,000 GWh in 2017.<sup>12</sup>

<sup>10</sup> Electricity Authority data.

<sup>11</sup> One kWh is one thousand Watt hours. For example, a 1 kW heater (a one-bar heater) running for an hour will use 1 kWh of electricity.

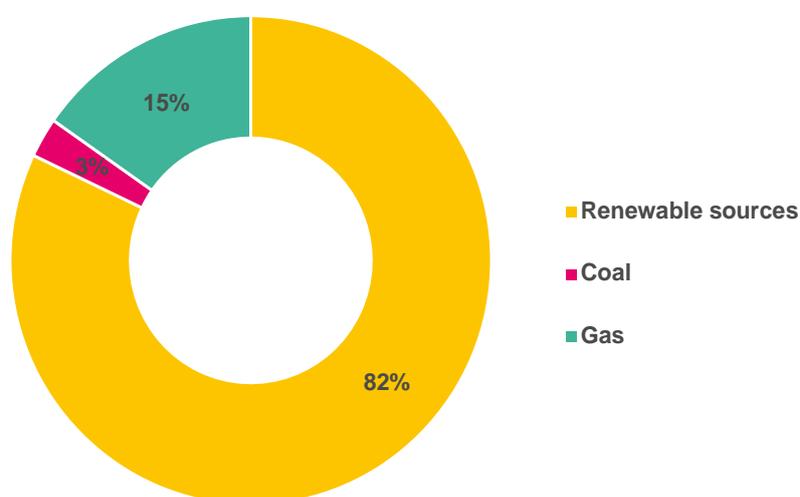
<sup>12</sup> Electricity Authority data.

Total demand in 2017 was more than 39,000 GWh, which grows in line with our population and economic activities such as the volume of goods and services we produce. Helping to push up demand are advances in battery recharging technology. An obvious example of this is the growing popularity of electric vehicles. At the other end of the scale is the growing interest in small-scale solar generation, which may eventually lessen grid demand.

### Energy sources and efficiency

New Zealand is fortunate that about 80 per cent of its electricity comes from renewable sources – water, geothermal and wind. This lessens our reliance on fossil fuels and helps keep down carbon emissions. The remaining 20 per cent comes from natural gas, coal and oil (sometimes referred to as fossil fuels or thermal generation).

**Figure 2: Electricity generation by source**



*Source: Ministry of Business, Innovation and Employment.*

There is one last generation source to mention. Some big consumers, such as pulp and paper mills, generate electricity themselves as part of their own industrial processes. The industry calls this co-generation, and it accounts for 5 per cent of the country's output.

At present, around 55 per cent of homes lack adequate insulation, and such cold, damp housing can harm the health of occupants, whether renters or homeowners.<sup>13</sup> Energy efficiency measures, such as housing insulation and efficient lighting and heating appliances, can help to reduce electricity consumption, cut emissions and improve energy affordability.<sup>14</sup> Improved energy efficiency can have a very real impact. For example, New Zealand's population grew by 27 per cent between 1990 and 2011, yet energy consumption grew by only 16 per cent.<sup>15</sup>

<sup>13</sup> BRANZ, House Condition Survey, 2017. These figures are based on the benchmark for adequate insulation used in Warm Up New Zealand: Healthy Homes.

<sup>14</sup> The Energy Efficiency and Conservation Authority is the government agency responsible for improving energy efficiency.

<sup>15</sup> Ministry of Business, Innovation and Employment, Changes in Energy Use New Zealand 1990–2011.

## Evaluating the sector

We have been asked to evaluate the efficiency of the sector and the fairness of prices, taking into account the need for a reliable supply of electricity, technological innovations and environmental sustainability.

Competition and efficiency are established ways of determining whether the electricity sector is working as it should. The assumption is that a competitive market is generally an efficient one and therefore good for businesses and consumers.<sup>16</sup>

We can test whether there are sufficient generators and retailers to ensure competition and choice. There neither is, nor should be, competition in the natural monopoly of transmission: the country could not afford the needless expense of competing transmission grids. Nor should there be any competition in distribution for the same reason.

Thus, the electricity sector has distinctly competitive and non-competitive areas.

Evaluating how these competitive and non-competitive areas interact among themselves and with other areas might be more straightforward if generation, distribution and retailing were watertight compartments. But they are not. Most generators are also retailers, and distributors are becoming increasingly involved in some competitive areas (such as services related to small-scale solar generation).

Reliability is another long established litmus test of a well-functioning electricity sector. Reliable means the lights come on and stay on. This requires enough investment in power stations to meet today's needs, as well as tomorrow's expected needs. This includes a reasonable buffer to insure against variability in hydro and wind generation and plant failures. The transmission and distribution networks must also be capable of handling heavier loads when consumers need more power.

Some commentators predict the electrification of the economy (such as switching from petrol to electric cars) will impose huge demands on our networks and strain their reliability. We agree technology advances and de-carbonisation goals will have an impact on our networks, which is why their impact is part of our review.

We considered the fairness of electricity prices. We examined fairness in terms of the average prices paid by consumers, and also how common costs are shared among consumers. Sudden and steep prices can be unfair, too. More generally, the sector must act in a fair way or risk frequent and poorly designed interventions.

Another consideration is affordability, particularly for vulnerable consumers<sup>17</sup> – whether the structure of prices as well as price rises are having an undue impact on consumers. Still another is environmental sustainability. More and more consumers expect the products they buy and the services they use to be environmentally friendly. What is the sector's performance in this respect, and what would be the impact of greater sustainability on prices? All of these yardsticks have been used in our review.

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<sup>16</sup> Prices are efficient when products and services are produced at the lowest sustainable cost, and no one can be made better off without someone else being made worse off. Inefficient prices tend to deliver inefficient outcomes.

<sup>17</sup> Electricity Authority guidelines define vulnerable consumers as those who: (a) for reasons of age, health or disability, the disconnection of electricity to that domestic consumer presents a clear threat to the health or wellbeing of that domestic consumer; and/or (b) it is genuinely difficult for the domestic consumer to pay his or her electricity bills because of severe financial insecurity, whether temporary or permanent.

## Overseas reviews

Recent electricity reviews have occurred in Australia<sup>18</sup> and the United Kingdom,<sup>19</sup> spurred on by steep and sustained price rises and reliability problems (including, in Australia's case, blackouts). Neither country enjoys access to renewable sources of power to the same extent as New Zealand. This will make their transition away from fossil fuels more painful and expensive. Nor, unlike New Zealand, do they have ample renewable generation resources to meet expected demand growth.

Some common problems are already emerging from both reviews. Many households and small businesses commonly pay 20 per cent more than the cheapest deals available. Vulnerable consumers and low-income households are especially slow to switch retailers to get better prices, and are struggling to pay higher power bills. The reviews are also uncovering a loss of consumer trust in electricity market participants, as well as in corporations and institutions more generally. Both reviews are relevant to our work and we are watching them closely.

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<sup>18</sup> Australian Competition & Consumer Commission, Electricity supply & prices inquiry, July 2018.

<sup>19</sup> The Competition and Markets Authority, Energy Market Investigation, December 2016.

## Part three: Consumers and prices

This part focuses on areas of special interest to consumers. In particular, it examines how they can express their preferences and influence the direction of the sector, how the prices residential consumers pay compare with businesses, and how affordable electricity is for those on lower incomes.

We start with four stories illustrating how households cope with heating their homes and paying their power bills. These are based on interviews with budgeting advisors and consumer advocates and some of the situations faced by real households. These stories focus on affordability, but also highlight potential barriers to consumers participating and having an effective voice in the electricity sector.



### Case studies

#### Grandparents feel burden of family

Mr. and Mrs. N are an elderly couple living in a one-bedroom rental in Porirua. They are so frugal with their power they often turn off the hot water cylinder and don't heat the flat. They frequently have coughs and colds, especially during winter. They know this is not ideal but simply can't afford to use more power. They are wary of asking for advice, and certainly don't want a stranger telling them that what they are doing is wrong. By keeping a tight rein on expenses, foregoing other essentials and paying other bills late, the couple managed to keep up to date with their power bills.

As devoted grandparents, they cannot say no when their mokopuna ask to stay. Before the children arrive, Mrs. N turns the heating up and the hot water back on – and then she takes a deep breath, knowing their power bill will go up. They say nothing to their whānau about the extra cost of their grandchildren staying. The koha helps feed the extra mouths, but the higher power bills have proved too much, and Mr. and Mrs. N have fallen behind with payments. They haven't contacted the power company because they don't want to draw attention to themselves. Recently they came home to discover their power had been disconnected, but are too embarrassed to tell anyone.

#### Solo mum left without power

Ms. Y, a solo mother in her early 20s, rents in South Auckland, earns the minimum wage and gets no help from the father of her young child. Money is very tight, and she had to borrow from credit companies to help pay her bills, including day care. The house she rents is cold and damp, the curtains are threadbare and there is no insulation. She's too scared to ask the landlord to do anything because it might push up her rent. Her debts grew so big she struggled to repay her loans and ended up with a bad credit rating. She missed several power bills after friends told her electricity companies didn't cut off consumers immediately.

But this was not the case for Ms. Y. When she called several other power companies, they refused to connect her because of her bad credit rating. For technical reasons she couldn't sign up for a pre-pay meter. She became worried as winter approached. The only way out was to get a family member to complete the application. Her former partner's sister agreed to help and put the account in her name. This worked until the two women fell out, after which she found her account had been cancelled. Ms. Y tried every electricity company in her area, but again without success. She now has no power and no idea what to do next.

#### Working family feel the squeeze as costs pile up

Mr. and Mrs. Z live in their own home in Christchurch with their four school age children and Mr. Z's father. The couple are both contract workers, so their income varies, and the family budget is always

stretched. They have a big mortgage and four children to feed, clothe and educate. Plus there are the rates bills and higher insurance premiums after the earthquakes. Petrol keeps going up, and grandad's medical bills add to the strain on the finances.

As careful as they are, they find their power bill is always huge during the winter because the house is large, all the heating is electric and grandad is home all day. They know that properly insulating the house and installing heat pumps would make a big difference, but they have no spare cash for such improvements and they can't take out another loan. They've looked at switching retailers but can't find a better deal. They use too much electricity to get any benefit from being on a low fixed charge tariff plan. They don't qualify for income assistance or the new winter energy payment. They are falling further behind with all their bills and can't see how they will make it through winter.

### Young professional couple happy to stay put

Ms. A and Mr. B are young professionals living in Wellington. When they moved into their house the electricity and gas were still connected so they just took over the existing account. They've never really thought about their retailer, but that's mainly because they don't have any reason to contact them. They pay their power bills by direct debit to make sure they get the big prompt payment discount.

Other retailers occasionally approach them to switch, but they never bother. It sounds too much like a hassle – what if something went wrong with the switching or billing process? So they stay with their existing retailer. Ms. A and Mr. B have LED lights and have set aside some money for renovations, but they don't really know what to do to make their house more energy efficient.



## Consumer interests

The consumers' point of view and voice on the sector's direction are key features of this review. We know consumers worldwide are losing trust in institutions and big business. At the same time, they are becoming more concerned that businesses' goods and services are environmentally sustainable. In turn, companies are recognising they have social as well as financial responsibilities.<sup>20</sup>

There is no such thing as a typical consumer, although there are things consumers typically want – a reliable supply of electricity and fair and affordable prices. Until recently, these were the priorities for most consumers. But times have changed. Consumer NZ's 2018 Energy Provider Survey found 44 per cent of households were concerned about the environmental impact of the electricity they used.<sup>21</sup> Companies like Conscious Consumers reflect consumers' growing concerns about businesses supplying goods and services in an ethical and environmentally sustainable way. Similarly, commercial and industrial consumers are looking at ways to lower their emissions. An example is the recently formed Climate Leaders Coalition, a group of 60 businesses committed to reducing their carbon footprint.

The increase in technology and competition has spurred some consumers to take control of their energy needs. Some retailers, for example, have an app allowing consumers to forecast and manage their usage.<sup>22</sup> Some retailers sell electricity at the variable wholesale rate, plus their margin. Other retailers offer consumers the option to buy prepay electricity in a range of dollar values. However, we know from stakeholders that not all consumers have access to the technology to take advantage of such offers.

### What are your views on this assessment of consumers' priorities?

<sup>20</sup> L. Fink of global investment company BlackRock, annual letter to chief executives, January 2018.

<sup>21</sup> Energy provider means retailers only. Consumer NZ's figures were taken from the somewhat concerned and very concerned categories.

<sup>22</sup> Consumers need a smart meter to use these services.

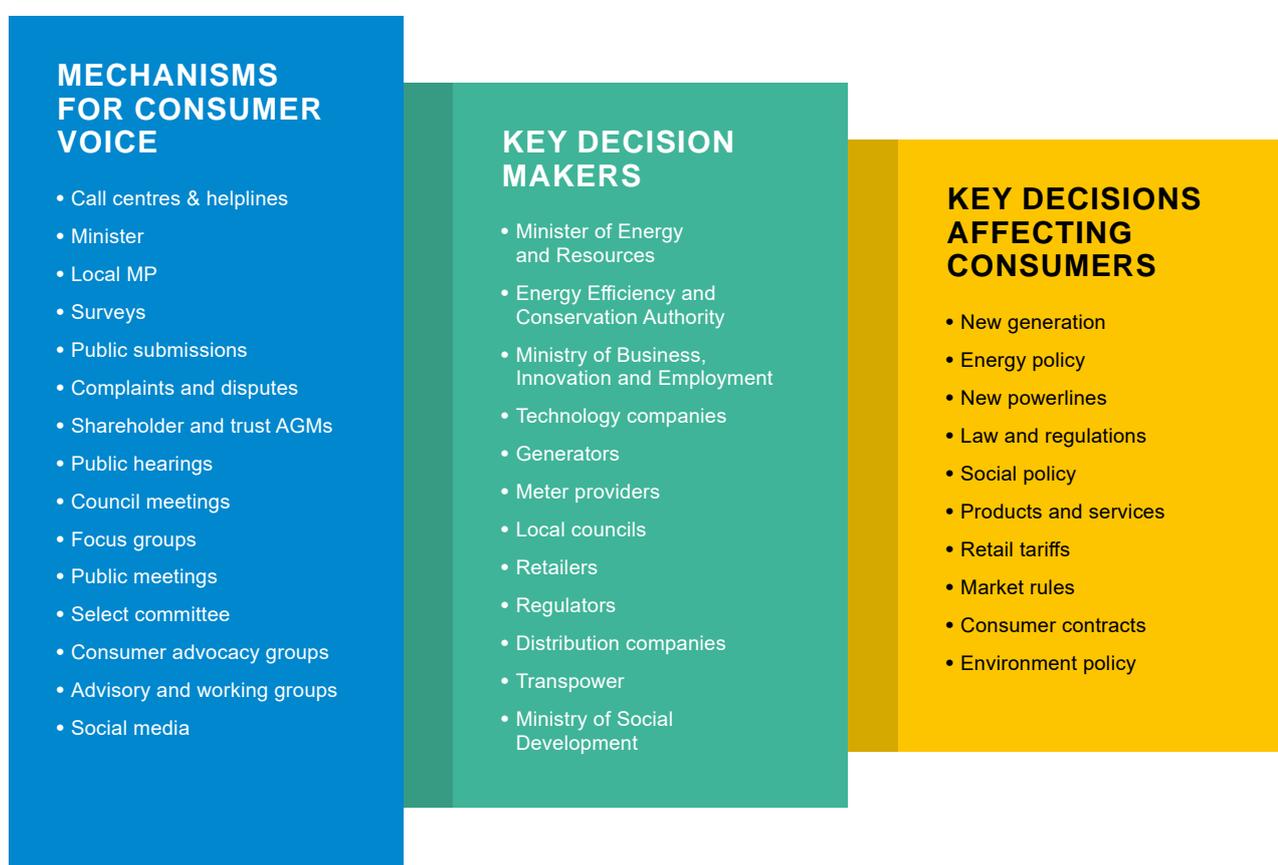
The International Energy Agency's 2017 review of New Zealand's energy policies recommended strengthening consumer participation and representation.<sup>23</sup> Consumer advocacy groups argue the Government needs to provide more financial support to consumer advocacy groups.

## Consumer voice

The electricity sector is complex. This makes it difficult for consumers to understand, and express their views about, all the factors affecting their monthly power bill.

Figure 3, at far right, shows the range of decisions made on behalf of consumers by industry participants and government. Most are inaccessible to the ordinary consumer – market rules and the regulatory framework being examples. The way consumers influence these decisions is shown at far left. The list is a long and familiar one. The list of key decision makers is also long. Engaging with numerous consumer groups can take considerable time and resources, but consumers should have the opportunity to be heard about decisions affecting them.

**Figure 3: Influencing key decisions in the sector**



Source: Ministry of Business, Innovation and Employment.

We were told consumers felt information about the sector, particularly prices, was not clear. Consumer NZ's survey of residential consumers found only 38 per cent of 1,500 respondents believed retailers made it easy to compare prices and contracts.<sup>24</sup>

Some consumers are well represented by groups advocating on their behalf, such as the Major Electricity Users' Group (representing big commercial and industrial consumers) and Grey Power (representing

<sup>23</sup> International Energy Agency, Energy Policies of IEA Countries: New Zealand 2017 Review, IEA Publications, France 2017, p107.

<sup>24</sup> Of the remainder, 35 per cent disagreed, 20 per cent were neutral, and 7 per cent were unsure.

those over 50).<sup>25</sup> But we were told other consumers – particularly lower-income and vulnerable households – felt there weren't member groups advocating to the same extent on their behalf.

Some budgeting services said certain consumers (including migrants, Māori and Pasifika) were less likely to get involved in advocating for change because they were risk averse and didn't want to make a fuss in case it affected their credit rating. Language and cultural differences (notably a deference to authority) were other obstacles to active involvement. Some consumers – again, largely for cultural reasons – felt affronted that someone outside their community would try to influence them regarding their electricity needs.

Smaller businesses face similar barriers to those confronting residential consumers. The Australian Competition and Consumer Commission (ACCC) reached the same conclusion in its recent review.<sup>26</sup> Big commercial and industrial consumers, despite being more informed and having more resources, reported difficulty communicating their needs to distributors and retailers because there were so many of them and each had its own operational practices.

The electricity industry and regulators have been making efforts to work with consumers. The Electricity Networks Association, which represents 27 distributors, recently organised focus groups on possible pricing reform. It also recently held a panel for consumer representatives to discuss consumer views on quality of supply/service measures.

Another example is the work the Electricity Retailers' Association of New Zealand is undertaking with Ministry of Health to improve information for vulnerable and medically dependent consumers.<sup>27</sup> In this work, they have developed their own voluntary standards to ensure retailers comply with the Electricity Authority's guidelines for dealing with such consumers.<sup>28</sup> In addition, the Electricity Authority provides for consumer involvement through representation on its advisory groups. All these measures are commendable, although more remains to be done. In particular, we would welcome more collaboration between retailers and distributors on consumers' interests.

In Australia, there has been an attempt to give consumers a more effective say in the sector. Energy Consumers Australia acts as the national voice for residential and small business consumers. It conducts research and analysis and advocates on behalf of consumers. The Australian Energy Market Operator funds its activities.

In the United Kingdom, the independent consumer body Which? advises and advocates on behalf of consumers in many sectors, including electricity. Users must pay for services, ruling it out for most low-income consumers. Consumer NZ works in a similar way to Which?. Consumer NZ receives some funding from the Electricity Authority and electricity retailers to run Powerswitch.<sup>29</sup> This raises the question about whether Consumer NZ could extend its advice and advocacy roles to help those in energy hardship.

As one stakeholder summed up matters, "some consumers want to engage but can't, some don't know how to and so don't, and some can engage but choose not to."

### **What are your views on whether consumers have an effective voice in the electricity sector?**

<sup>25</sup> Grey Power New Zealand Federation Inc.

<sup>26</sup> Ibid at 18.

<sup>27</sup> Medically dependant consumers are those who rely on medical devices for health reasons.

<sup>28</sup> Electricity Retailers' Association of New Zealand, Better outcomes for those struggling to pay their electricity bills.

<sup>29</sup> Powerswitch is a free service that helps people work out which power company and pricing plan are best for them.

## Consumer trust

Institutions and big businesses around the world are grappling with a loss of trust. The most recent Acumen Edelman Trust Barometer found 59 per cent of New Zealand respondents believed chief executives were mainly motivated by greed, and 44 per cent believed companies that think only of themselves and their profits are bound to fail.<sup>30</sup> Loss of consumer trust was a key reason for conducting the ACCC and the United Kingdom reviews.

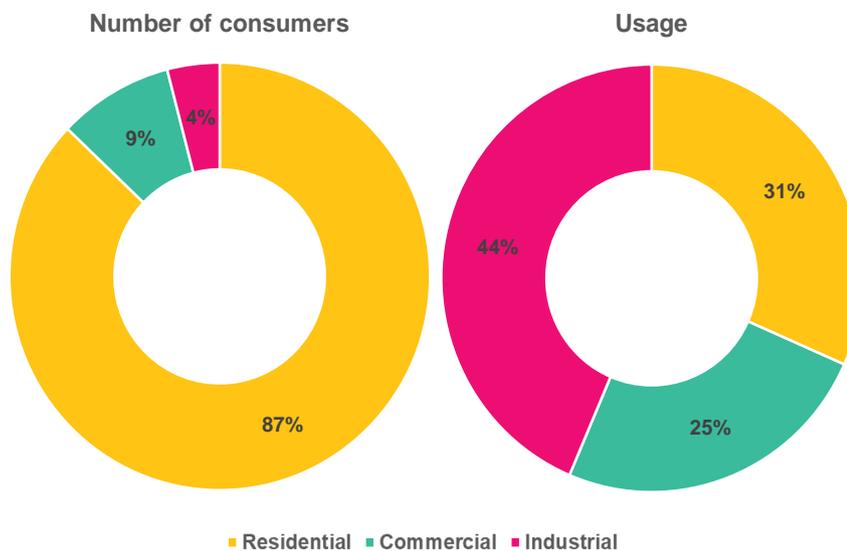
The Consumer NZ survey found 68 per cent of respondents believed they could trust their retailer, and 57 per cent believed their retailer cared about its consumers.<sup>31</sup> In Australia, only 18 per cent of consumers trusted the sector to provide the best services or products for their needs. This shows New Zealand consumers have greater trust in their retailers than in Australia. However, trust is hard to earn and easy to lose. The pace and complexity of technological change risk eroding that trust unless the industry gives this matter priority.

**What are your views on whether consumers trust the electricity sector to look after their interests?**

## Prices

Different consumers have different demands and pay different prices for their electricity. Residential consumers account for more than four-fifths of consumers and about a third of demand. At the other end of the spectrum, the five biggest industrial consumers account for almost a fifth of demand.<sup>32</sup> (See figure 4 for breakdown).

**Figure 4: Electricity consumers and their usage**



*Source: Ministry of Business, Innovation and Employment, Energy in New Zealand data, Industrial includes agriculture, forestry and fishing*

Electricity bills typically include a daily charge, a charge for each unit of energy used (usually in cents)

<sup>30</sup> Acumen Republic, Trust Barometer, 2018.

<sup>31</sup> Of the remainder, 26 per cent were neutral and 18 per cent disagreed.

<sup>32</sup> They are Tiwai Point aluminum smelter, New Zealand's biggest consumer, followed by pulp and paper mills in the Bay of Plenty and the steel mill at Glenbrook. They consumed 17 per cent of electricity produced in 2017.

per kilowatt hour, or c/kWh) and sometimes a metering charge. For our purposes, we converted all these charges into a single unit: c/kWh used. We analysed the total average price paid per unit by consumers, which includes all generating, transmission, distribution and retailing costs.

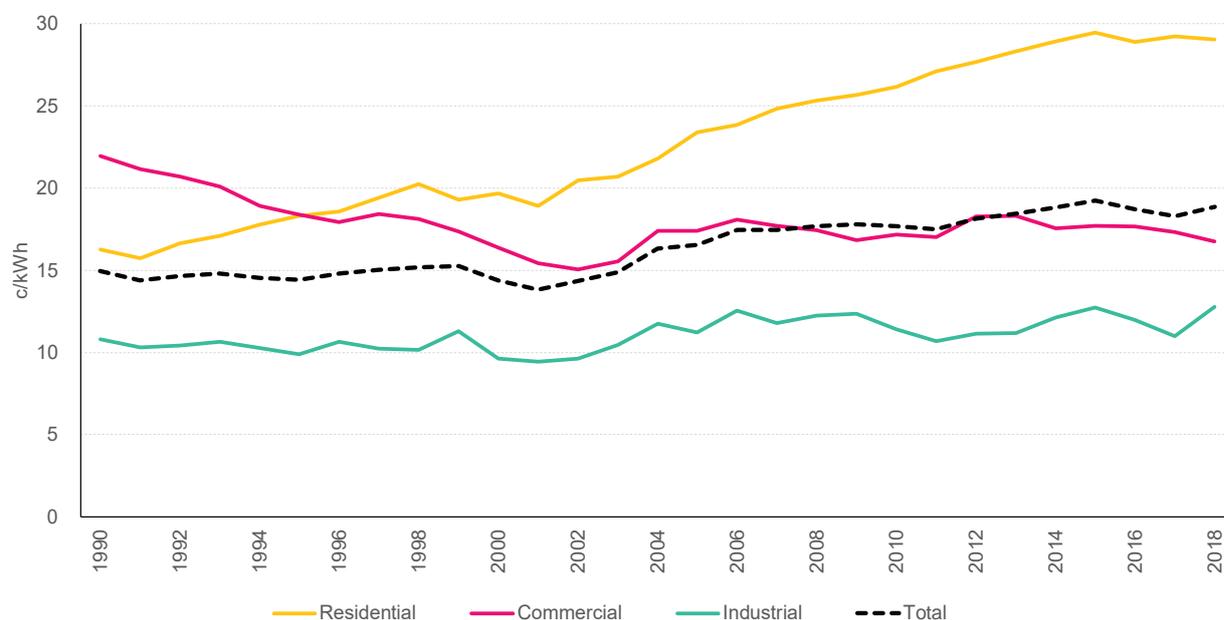
### Price trends

Consumers pay different rates according to whether they are residential, commercial or industrial consumers. Collectively (ignoring inflation), they paid on average 18.9 c/kWh during the 12 months to March 2018 compared with 8.1 c/kWh during the same period in 1990 – an increase of 132 per cent.<sup>33</sup> Even after allowing for inflation, the figure is still 26 per cent, or an average yearly rise of 0.8 per cent (see black dotted line in figure 5).<sup>34</sup> A different picture emerges when we look at each consumer type separately.

As figure 5 shows, prices paid by the three consumer types have diverged markedly. Up to 1990 (not shown in the graph), industrial consumers paid the lowest average prices and commercial consumers the highest. After that date, residential prices rose steeply, while commercial prices kept falling, and industrial prices stayed relatively flat. Specifically:

- Residential consumer prices rose at an average rate of 2.1 per cent a year, and by 2018 were 79 per cent higher than in 1990. Since 2015 they have been relatively flat.
- Commercial prices dropped at an average rate of 1 per cent a year, and by 2018 were 24 per cent lower than in 1990.
- Industrial prices rose at an average rate of 0.6 per cent, and by 2018 were 18 per cent higher than in 1990.<sup>35</sup>

**Figure 5: Average electricity prices between 1990 and 2018**



*Source: Concept Consulting analysis of data from Ministry of Business, Innovation and Employment. All prices are adjusted for inflation and expressed in 2018 dollars using the CPI index for residential prices and the PPI index for commercial and industrial prices. Residential prices alone include GST.*

<sup>33</sup> We took 1990 as the starting point for our analysis because of the distorting effects of using earlier, pre-reform years when significantly different structures were in place in the sector.

<sup>34</sup> Except where otherwise stated, all figures from here on are inflation-adjusted. All adjustments for inflation have been made using Statistics New Zealand's CPI index.

<sup>35</sup> Industrial prices are more volatile because a proportion of industrial users buy their power directly from the spot market where the impact of dry and wet years on hydro-generation makes itself felt.

Some of the price divergence is due to cost differences. For example, residential consumers require more infrastructure to get electricity to their homes, and they tend to use proportionately more electricity at peak times. By comparison, 46 per cent of industrial demand is met by direct connection to the transmission grid and therefore does not incur any distribution charges.

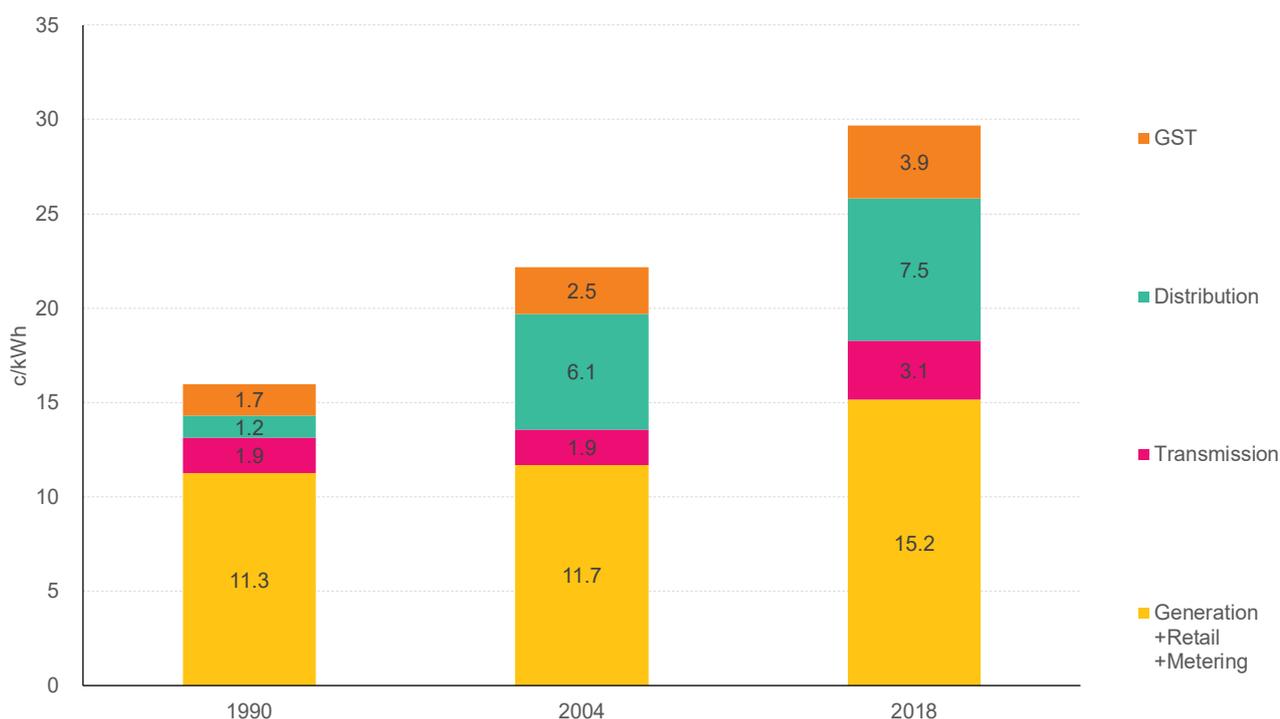
### Make-up of recent price changes

We have focused on why there has been a significant rise for residential consumers. It has not been possible to do the same analysis on commercial and industrial prices because less data is available. Nonetheless, this section provides some explanation of the relative movements of residential, commercial and industrial prices. Figure 6 shows residential prices between 1990 and 2018, with a midway point of 2004.<sup>36</sup>

Electricity bills have four main components – generation, transmission, distribution and retailing costs (and for residential consumers a fifth, GST).<sup>37</sup> Since 1990, three developments have significantly altered the proportionate size of these components:

- the shifting of distribution charges from business consumers to residential consumers
- the large rise in retailing related costs
- the increase in GST from 10 per cent to 15 per cent between 1989 and 2017.

**Figure 6: Changes in composition of residential prices**



*Sources: Trustpower analysis 1990–2004 and Ministry of Business, Innovation and Employment data 1990–2018. Prices are adjusted for inflation and expressed in 2018 dollars. They do not include possible rebates or dividends by distributors or retailers.*

To understand the rise in household prices, we sought to analyse what has happened to each of the components of an electricity bill – the transmission charge, distribution charge, generation charge,

<sup>36</sup> We chose 2004 for data compatibility reasons. Trustpower had analysis on the components of residential prices up to that date, and the Ministry of Business, Innovation and Employment had comparable figures from then onwards.

<sup>37</sup> Non-GST costs are typically bundled together, particularly for residential consumers.

retailing charge and metering charge. The last three of these are combined in figure 6 because we don't have the data to show them separately (figure 6 also shows another component, GST, and its increasing effect on residential prices as the GST rate rose over the years<sup>38</sup>).

A final point: we have not included rebates or dividends in our price analysis because they are payments to some consumers in their capacity as 'owners' of a local network or generator-retailer.<sup>39</sup>

### Transmission charges

Between 1990 and 2004, there was little investment in the national grid, so transmission charges contributed little to residential price rises. Transpower held off making sizeable investments in the belief breakthroughs in solar, wind and other technologies would allow more electricity to be generated close to where it was needed, greatly reducing the need for extra transmission capacity. However, growth in demand in the Auckland region, ageing transmission infrastructure and a growing economy sparked considerable transmission investment between 2005 and 2014.

This investment flowed through to higher transmission charges, which rose substantially. Between 2004 and 2018, they went up 67 per cent, but, being only a small component of the total bill, added just 1.2 c/kWh to residential prices. Note these are average national figures. Transmission charges vary between regions. (See *Transmission*).

### Distribution charges

Before 1990, commercial and industrial consumers typically paid a bigger share of common distribution costs and residential consumers paid a smaller share.<sup>40</sup> This was reversed over time. Shifting costs from businesses to householders was the biggest factor in residential price increases between 1990 and 2018 (a development that began in the early 1980s). During this period, distribution charges for householders rose 548 per cent, while those for commercial and some industrial businesses fell 58 per cent.<sup>41</sup>

The biggest increase took place between 1990 and 2004 when residential distribution charges rose more than 400 per cent, excluding GST. Between 2004 and 2018, residential distribution charges increased a further 23 per cent. We examine whether this shift in the allocation of distribution costs can be justified in *Distribution*, along with urban-rural variations.

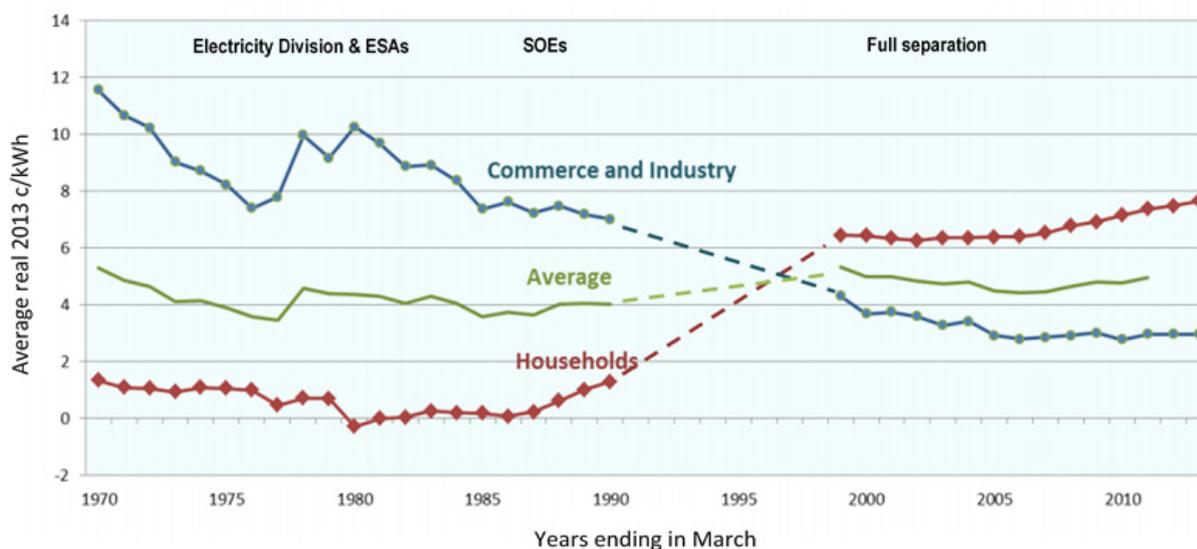
<sup>38</sup> GST was introduced in 1986 at 10 per cent. It increased to 12.5 per cent in 1989, and to 15 per cent in 2010.

<sup>39</sup> Each rebate or dividend scheme has its own rules. Payments are typically made to the person whose name is on the power bill, and consumers may miss out if this is their landlord or rental agency.

<sup>40</sup> Common distribution costs include most of the main power lines and substations in a network area and a distributor's running costs. Some costs are not common, such as those for power lines dedicated to a large factory or connecting some remote consumers.

<sup>41</sup> Excludes the effect of GST changes.

**Figure 7: Household and commercial distribution charges**



Source: Trustpower annual meeting presentation, July 2013. Note: the dotted lines represent missing data for the period 1990 to 1999.

### Generation and retailing charges

Generation and retailing charges rose 1.9 per cent a year between 2004 and 2018. We tried to separate the charges by analysing wholesale contract prices and retailers' annual reports and reported operating costs for the period. We found that, in inflation adjusted terms, wholesale prices were roughly the same in 2018 as they were in 2004. We therefore concluded retailing charges were the biggest component of residential price rises between 2004 and 2018 (3.5 c/kWh, or 30 per cent).<sup>42</sup>

### Make-up of commercial and industrial prices

We have a good picture of commercial and industrial price movements since 1990, but not of the changes in their component parts. By estimating<sup>43</sup> the current composition of these prices (see figure 8), we have been able to make the following observations:

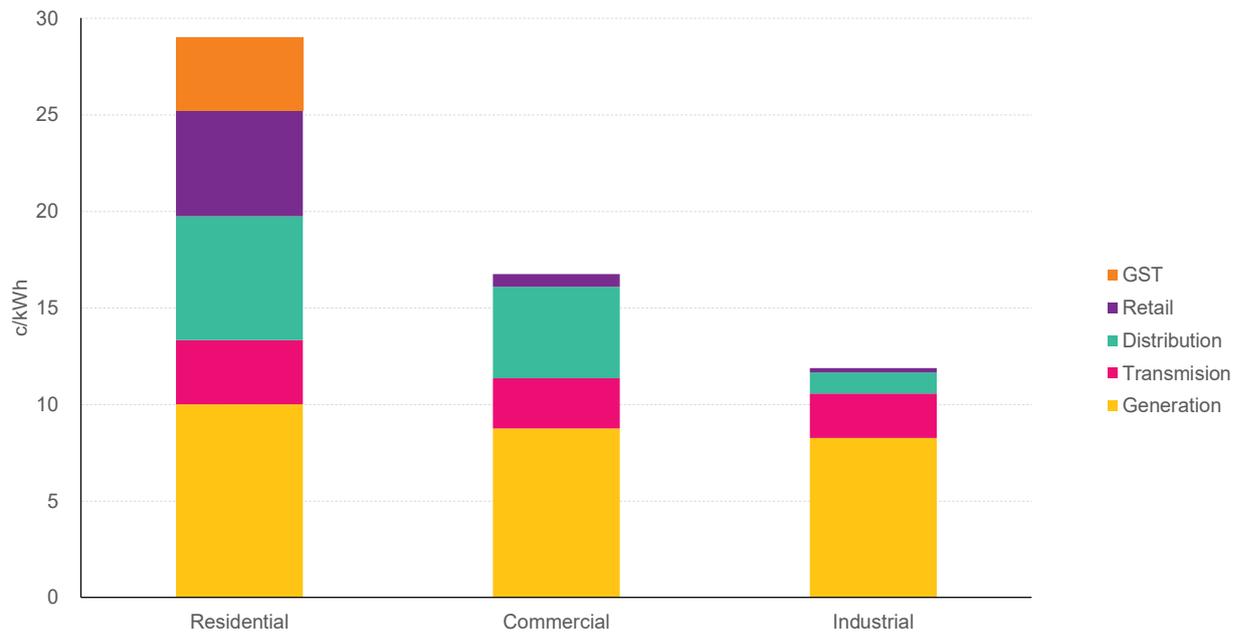
- Neither generation nor transmission charges have changed much between 1990 and 2018.
- Industrial consumers connecting straight to the national grid do not face a distribution charge, while those connected to a distribution network tend to be on a lower-cost, higher-voltage supply.
- Commercial consumers have benefited from the reallocation of distribution costs to residential consumers.
- Retailers largely allocate their overheads on a per consumer, rather than consumption, basis so the c/kWh retail component of commercial and industrial bills is proportionally smaller.<sup>44</sup>
- Commercial and industrial consumers have avoided the amplifying effects of GST and the compounding effects of GST increases.

<sup>42</sup> So little data was available on metering charges that we did not attempt to separate this component, which is inherently a very small part of consumers' bills.

<sup>43</sup> Estimating the breakdown of charges required making a number of assumptions on factors such as the wholesale electricity price and cost-to-serve for different customer types.

<sup>44</sup> The consumption of the average household is 13 per cent of that of an average commercial user, and only 5 per cent of that of the average industrial user.

**Figure 8: Estimated breakdown of charges by consumer type**



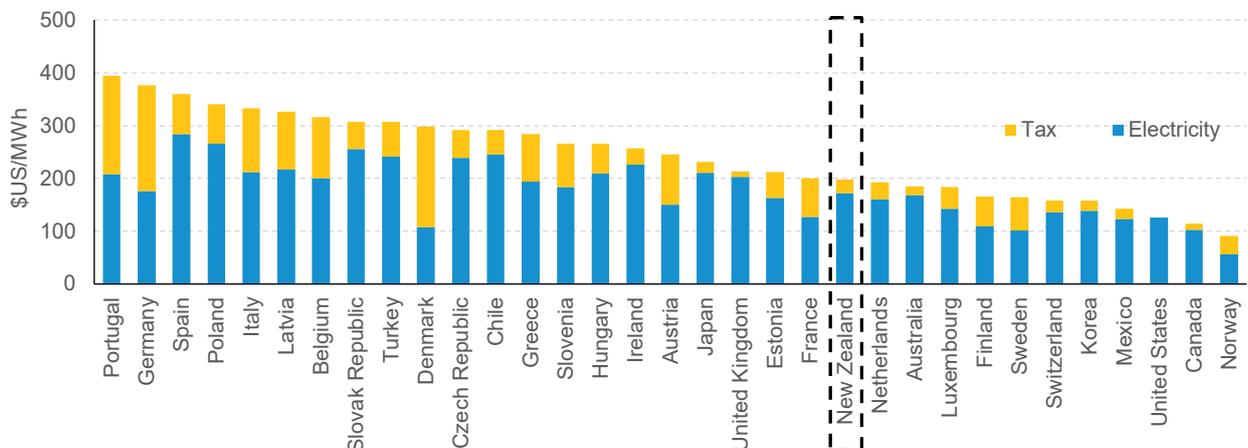
Source: Concept Consulting analysis. Residential prices are included for comparison purposes.

**What are your views on this assessment of the makeup of recent price changes?**

### How prices compare internationally

Figure 9 shows New Zealand’s average residential price was in the lower half of all OECD countries in 2016, and that the tax component was among the lowest.

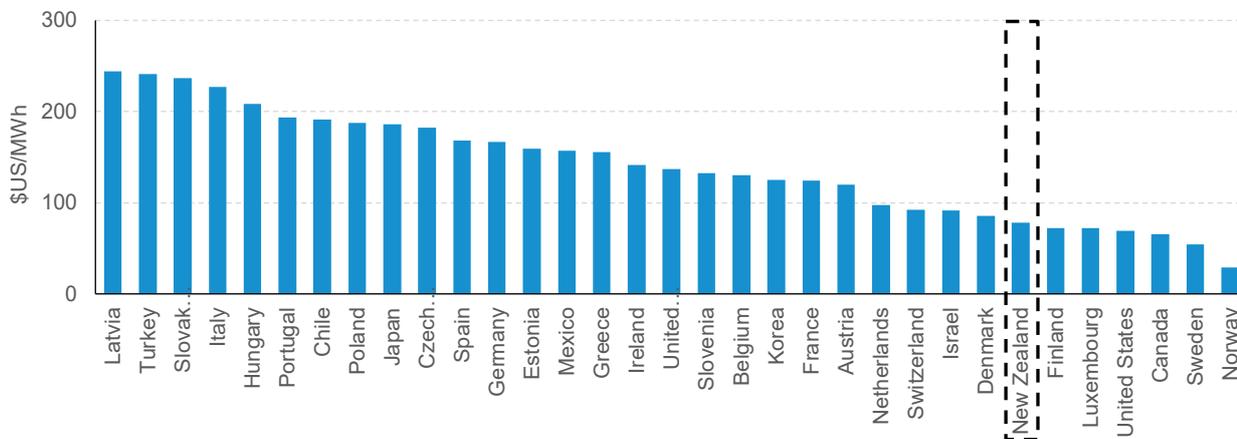
**Figure 9: Residential electricity prices in OECD countries**



Source: Ministry of Business, Innovation and Employment tables of OECD data. Figures are US dollars converted at purchasing power parity

New Zealand's industrial consumers enjoy an even greater price advantage compared with overseas industrial consumers. Figure 10 shows New Zealand's industrial prices were in the lowest quarter of OECD countries in 2015.

**Figure 10: Industrial electricity prices in OECD countries**



Source: Ministry of Business, Innovation and Employment tables of OECD data. Figures are US dollars converted at purchasing power parity.

The change in prices over time relative to other countries also differs between residential and industrial consumers. Since 2000, New Zealand's residential prices have risen faster than residential prices in most OECD countries, whereas New Zealand's industrial prices have risen at a slower rate than industrial prices in most OECD countries.

**What are your views on this assessment of how electricity prices compare internationally?**

**Outlook for prices**

The move from petrol to electric vehicles and the use of electricity rather than coal in industry will significantly increase demand for electricity, requiring sizeable investment in more generation, transmission and distribution infrastructure. We don't know how big the increase in demand will be, but we do know this extra demand will not necessarily lead to major price rises:

- New Zealand has abundant renewable energy sources, including wind and geothermal power, that are considered world-class.<sup>45</sup>
- The cost of wind, solar and battery technology is likely to keep falling.<sup>46</sup>
- Charging electric vehicles at off-peak times will avoid the need for major network investment, lowering average network charges.

How prices are structured may change, however. For example, whether electricity is used at peak or off-peak times may play a greater, or even primary, role in the calculation of prices. (See *Distribution*).

**What are your views on the outlook for electricity prices?**

<sup>45</sup> For example, see Meridian Energy, A Generator-Retailer View of the Future, Meridian Energy presentation to 2018 Wind Energy Conference.  
<sup>46</sup> For example, see International Renewable Energy Agency, Renewable Power Generation Costs in 2017, and Blakers, A et al., Meeting Australia's Paris greenhouse commitment at zero net cost, Australian National University, November 2017.

## Affordability

We've looked at the challenges of generating and getting power to consumers. But many households can't afford to use that power to maintain a healthy home. The consequences can be serious. Some people may reduce their heating, which can result in unacceptable living conditions and significant health costs. They may scrimp on food, transport and clothing to pay their power bills. They are also more at risk of disconnection, which adds to their financial difficulties.

There has been extensive research into the problem of energy hardship and various ways have been devised to define and measure it.<sup>47</sup> Many relate the cost of energy to household income – for example, households in energy hardship cannot afford to heat their homes adequately, or afford other basic energy services, like sufficient hot water. A common measure of energy hardship is when a household spends more than 10 per cent of its income on energy.<sup>48</sup> However, income versus expenditure measures don't capture every energy hardship situation because some households may under spend on electricity for reasons we explain later.

### Extent of the problem

Statistics New Zealand's surveys in 2013 and 2016 showed a significant proportion of households faced energy hardship, especially among the lowest 20 per cent of households by income.<sup>49</sup> More specifically, the results showed 6.1 per cent of households (103,000 households) spent more than 10 per cent of their income on domestic energy in 2015–16. Of these, 86,000 were low-income households. The picture is even worse if housing costs are excluded: 175,000 households spent more than 10 per cent of their household income, after paying for housing, on domestic energy. Of these, 121,000 are low-income households. Worryingly, children were over represented in households experiencing energy hardship.<sup>50</sup> This measure of energy hardship fell between 2012–13 and 2015–16, although our analysis shows energy hardship grew significantly between the late 1990s and early 2010s.

Consumer NZ's Energy Provider Survey 2018 further confirms low-income households are more likely to experience energy hardship than higher-income households. Some of the results are shown in figure 11. The lowest-income households (those earning less than \$50,000) are twice as likely as the highest-income households to have to cut back on heating to the extent their home is not as warm as they would like.

They also report more instances of difficulty paying their energy bills. This could include missing out on a prompt payment discount, borrowing from family and friends, or having their power cut off. The proportion of low-income households reporting such financial difficulties is higher than for any other income group. Many of these households report facing such difficulties more than once in the previous year.

A recent Salvation Army survey of 1,000 respondents found 45 per cent had gone without home heating in the previous year because of the cost of power, and 10 per cent had used the oven or stove to heat the home during the last winter.<sup>51</sup>

47 See, for example: Hills, J (2012), Getting the measure of fuel poverty: final report of the Fuel Poverty Review, CASE report, 72, Centre for the Analysis of Social Exclusion, London School of Economics and Political Science; and Howden-Chapman, P et al. (2012), Tackling cold housing and fuel poverty in New Zealand: A review of policies, research, and health impacts, Energy Policy 49, pp134–142.

48 Energy here means electricity, gas and firewood. This is Statistics New Zealand's definition of household energy, as used in its consumer price index (CPI). Electricity is one of the more highly weighted components of the CPI. The weighting as at the September 2017 quarter was 3.62 per cent of the CPI. That is, for every \$100 spent by households on goods and services, \$3.62 went on electricity.

49 Statistics New Zealand, Investigating different measures of energy hardship in New Zealand, 2017.

50 Ibid at 49.

51 Salvation Army press release, One in two go without heating due to cost, survey finds, July 2018.

But it is important to note not all low-income households are in energy hardship; some low-income households may have low living costs and low energy needs, and therefore do not have energy affordability problems. This is in contrast to some middle-income households that have large or extended families, high living costs and high energy needs, and that struggle to keep up with paying big power bills every month. The factors behind affordability are explored later in this section.

Household incomes have risen faster on average than household costs in the past decade (35 per cent compared with 16 per cent).<sup>52</sup> However, several factors suggest this has not been so for many households, particularly low-income households.

Firstly, income has not increased as substantially for some households, especially those dependent on benefits. Leaving aside the winter energy payments, they receive only CPI adjustments, so their increases have simply kept pace with broad based measures of inflation in the past decade (16 per cent).<sup>53</sup>

Secondly, living costs have risen faster for low-income households than other households over the past decade. Low-income households spend proportionately more of their income on power, accommodation and food, the prices of which have risen more sharply than many other categories of spending.<sup>54</sup> Low-income households spend on average 8.5 per cent of their income on energy compared with 3.8 per cent for high-income households.<sup>55</sup>

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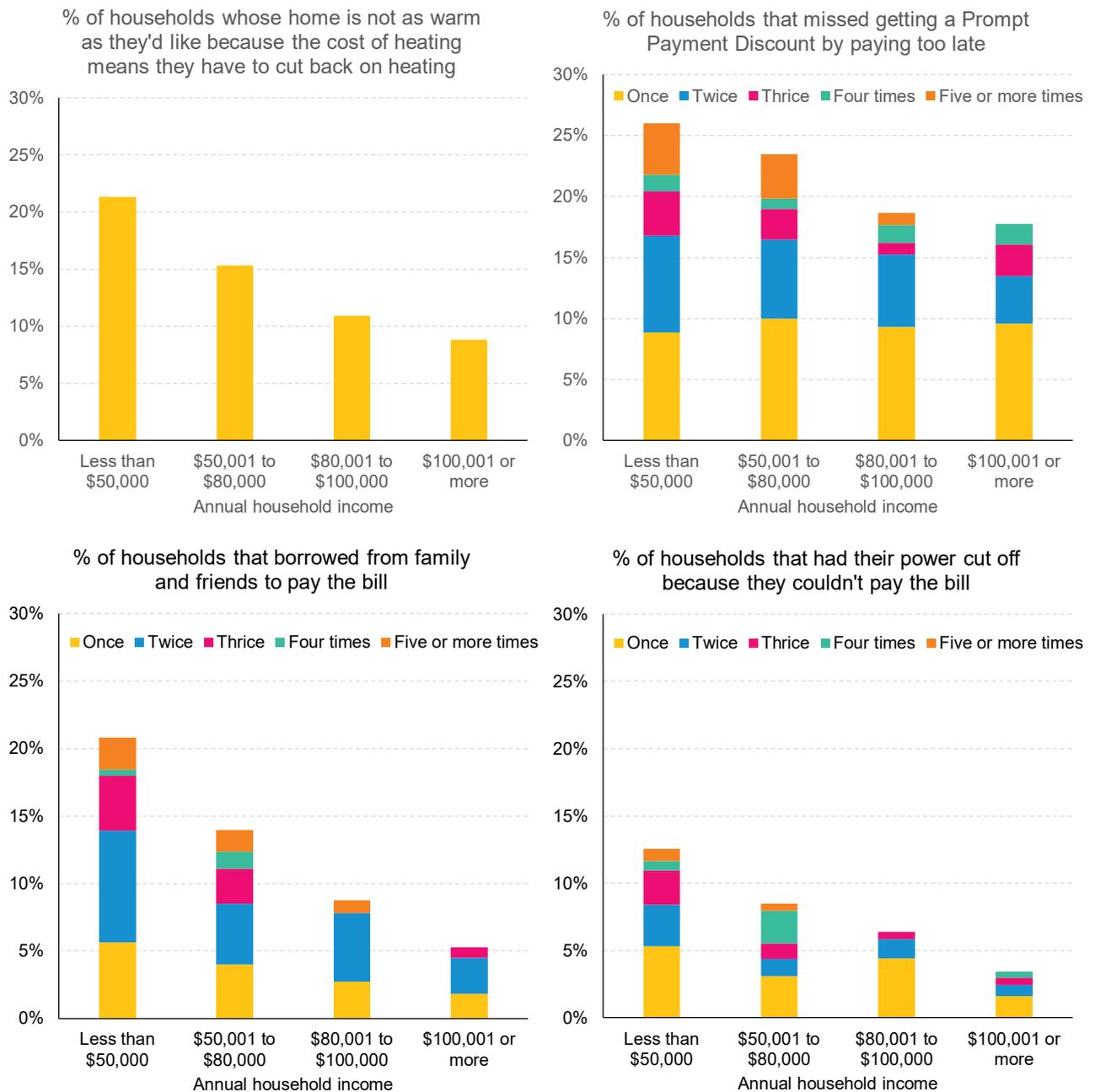
52 Household Labour Force Survey and CPI.

53 Ad hoc policy changes such as the Families Package and Child Material Hardship Package have increased incomes for beneficiary families above inflation.

54 Statistics New Zealand's Household living costs price indexes show household living costs have risen 20 per cent for the poorest 20 per cent of households since 2008 (when data collection began), but only 13 per cent for the wealthiest 20 per cent. Household living-costs price indexes for June 2008 to March 2018.

55 The household energy component of the CPI (electricity, gas and firewood) rose 33 per cent between June 2008 and March 2018, compared with 17 per cent for the CPI itself. However, average household electricity costs have declined slightly in the past few years, which may partly explain the small reduction in some income versus expenditure measures of energy hardship between 2012–13 and 2015–16. Proportions of expenditure spent on household energy are for 2017 and are from the Household living costs price indexes.

**Figure 11: Indicators of energy hardship**



Source: Consumer NZ. Consumer NZ had five income brackets. For this analysis we have combined the top two income brackets ('\$100,001 to \$150,000' and '\$150,001 or more') because the sample size for the top income bracket was small.

Affordability was a central focus of the ACCC review, which found the situation was unacceptable and unsustainable. It said high prices had put enormous strain on household budgets and business viability.<sup>56</sup> It also said consumers in hardship and facing socioeconomic barriers to effective engagement with the sector were unlikely to benefit fully from competition. It has recommended a package of changes to improve protections and help for vulnerable consumers.

**What are your views on this assessment of the size of the affordability problem?**

<sup>56</sup> Ibid at 18.

## Variations in affordability

Two households may have the same low income but markedly different energy costs and degrees of energy hardship. Factors for this variation can include size and location of the home, amount of insulation, number, age and health of occupants, efficiency of heating devices and how much time people spend at home. All these factors affect how much electricity a household needs to maintain a healthy home, irrespective of income level.

Households can also pay widely different prices for a variety of reasons, which we have grouped into four categories:

*Price:* The range between the cheapest and most expensive retail price has grown significantly, so the cost of not shopping around can be big. There can also be considerable variations between regions, particularly in relation to distribution pricing. In the most extreme example we found, customers in the most expensive network area are paying almost three times as much as the cheapest network area for a household using 8,000 kWh a year.<sup>57</sup> A last factor is a lack of competitive prices for some consumers on pre-pay meters, which often come with extra costs (fees for installation, inspections, topping up and closing accounts).

*Consumers:* Low-income consumers are more likely to face language, education and internet access barriers that can make it hard for them to understand the various plans and choices. They also more frequently miss out on prompt payment discounts because they are on tight budgets. Budget advisors and other consumer advocacy groups argue prompt payment discounts are really late payment penalties.

*Retailers:* Retailers tend not to target low-income households when trying to attract new consumers. Also, they often reject low-income consumers because of poor credit histories and previous disconnections. Budget advisory groups say this is a significant problem and that some low-income consumers struggle to find any retailer prepared to accept them. Unlike in Australia and the United Kingdom, in New Zealand there is no retailer of last resort to ensure that electricity continues to be provided to consumers. Finally, there are higher charges for paper based billing and for non direct-debit payment methods.

*Regulation:* Low fixed charge tariff plans have cut bills for many low-income, low use households, but raised them for low-income, high use households most likely to be in energy hardship. (See *Regulation*).

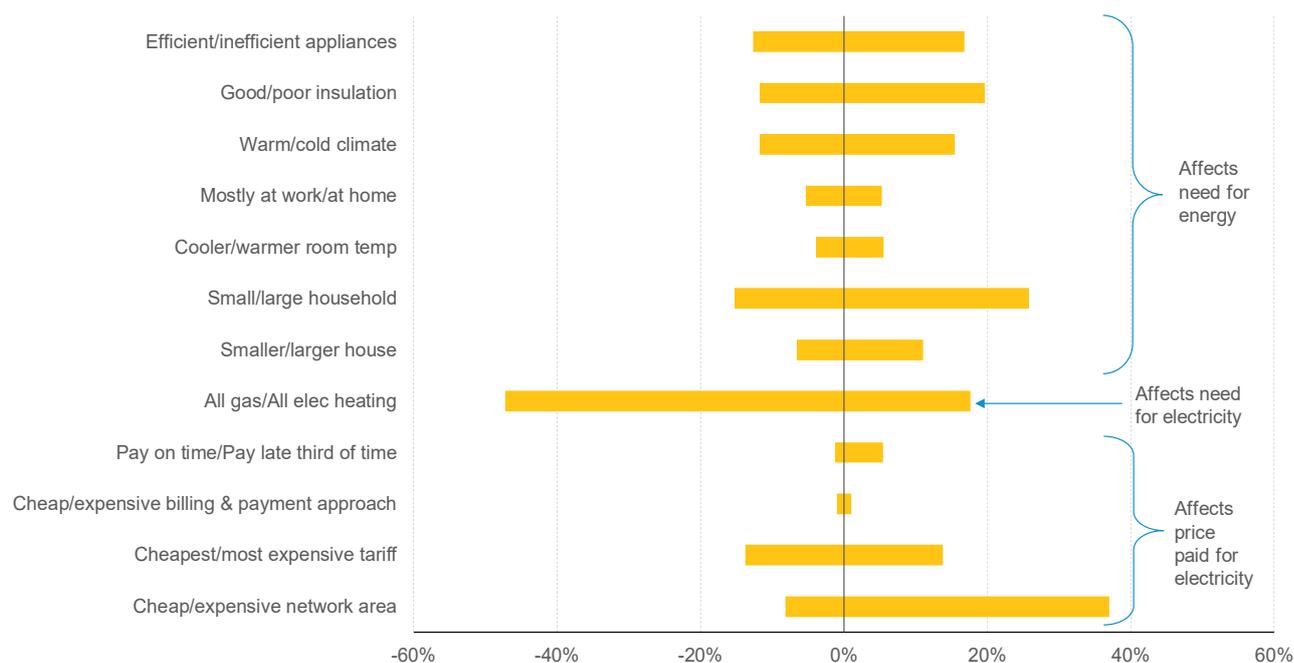
Figure 12 illustrates the impact of these factors on how much electricity households use and how much they pay for it, relative to an average household's average price. Some of the poorest 10 per cent of households could be paying up to \$3,000 a year more than others in the same income category.<sup>58</sup> Among the key factors for this (shown by the size of the bars either side of the centre line) are the size of the household, whether the household is in a cheap or expensive network area, and the level of home insulation.

In summary, affordability is a real problem and needs targeted measures to fix it.

<sup>57</sup> Concept analysis of Ministry of Business, Innovation and Employment, Quarterly Survey of Domestic Energy Prices.

<sup>58</sup> Concept Consulting report for Electricity Networks Association, Options for assisting customers in energy hardship, 2017. Analysis suggests the price difference could possibly be as high as \$3700, depending on assumptions regarding decile classification and electricity consumption in low-income households.

**Figure 12: Impact of factors affecting consumption and price**



Source: Concept Consulting analysis.

**What are your views of this assessment of the causes of the affordability problem?**

**Outlook for affordability**

Is electricity likely to become more unaffordable for some consumers, or will matters improve? One way to answer this question is to look at possible factors altering households' relative cost of electricity:

*Solar panels:* Most low-income households cannot afford to install solar panels, but current price structures mean they will have to pick up the portion of distribution and retailing charges that owners of solar panels will avoid by reducing their consumption. (See *Distribution*).

*Electric vehicles:* Again, low-income households cannot currently afford them, but they will bear a disproportionate share of the cost of expanding network capacity if such vehicles are widely used and recharged during peak hours.

*Price structures:* Prices that reflected the cost of producing electricity at different times of the day and year would improve affordability in the long term but would create winners and losers. The changes would not necessarily work to the benefit of low-income households, as the experience of consumers of The Lines Company in the King Country makes abundantly clear. It switched from consumption based prices to peak demand based prices. Many consumers found it difficult to manage the complexity of the new price structures and were left with sharply higher bills. Also, winter bills would increase, making it still harder for low-income consumers to stay within their budgets.<sup>59</sup>

<sup>59</sup> Most retailers offer so-called 'smooth pay' plans to help even out the seasonal highs and lows in consumers' consumption. Prices are the same as those offered in their standard plans.

*Housing improvements:* A general upgrade in housing would benefit some low-income households. Such an upgrade could come from: building code changes to improve the energy performance of new buildings (which would affect them directly, for example, if they move into new state housing); retrofitting insulation through initiatives by agencies such as the Energy Efficiency and Conservation Authority; and requiring landlords to install ceiling and floor insulation, where practicable.<sup>60</sup>

*Welfare payments:* There could be further social welfare measures, such as enhancements to the winter energy payment, to help reduce energy hardship for those eligible.<sup>61</sup>

Affordability is clearly a problem the industry, regulators and government must tackle together.

**What are your views of this assessment of the outlook for the affordability problem?**

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<sup>60</sup> Ceiling and underfloor insulation will be compulsory in all rental homes from 1 July 2019 where it is reasonably practicable to install. See: [www.tenancy.govt.nz/maintenance-and-inspections/insulation/](http://www.tenancy.govt.nz/maintenance-and-inspections/insulation/). Changes to the Residential Tenancy Act 1986 will make it explicit that landlords do not have to supply curtains or heaters.

<sup>61</sup> This payment was introduced on 1 July 2018 to help those with heating costs over the winter months.

## Part Four: Industry

This part examines the supply side of the electricity sector. We first look at the competitive elements, that is, generation and retailing. We also examine the pluses and minuses of vertical integration. We then examine the monopoly elements of the industry, that is, transmission and distribution.

Note that some retailing related material is based on analysis of the billing data of nearly two million residential and small business consumers. Nine retailers sent us this data, much of it received in August when we were finalising this report. We will publish more detailed analysis in our second report, and we may also publish analysis of specific issues before then. Retailers supplied the data in a form that protected consumer privacy.

### Generation

Strong competition is perhaps the vital ingredient in an efficiently operating market. Power must be reliable – both now and in the future – as well as competitively priced. For this reason, in examining the competitiveness of generators, we have also considered how generators' investment in plant has affected pricing. We have looked, too, at the effect on pricing of generators' need to be more environmentally sustainable.

Hydro-generation dominates the electricity system, making drought the greatest risk to the reliable supply of power. The limited storage capacity of the main hydro lakes makes it necessary to carefully coordinate hydro-generation and other generation sources when droughts loom. This coordination takes place through the electricity wholesale spot market, where generators sell power to retailers and big industrial consumers.

In earlier years, some generators and wholesale buyers adopted risky buying and selling strategies that drained reservoirs, forcing public conservation campaigns. These happened in 2001, 2003 and 2008. Regulatory changes in 2010 have hopefully put an end to the over-reliance on such campaigns. In 2012, water flows into South Island reservoirs were at their lowest levels on record, yet a reliable supply was maintained without any conservation campaign.

#### Generators' performance

How efficiently generators invest in generation is one aspect of determining overall efficiency. Power stations are expensive to build and operate, so it is important to build those types of station that produce electricity at the lowest cost per unit first.<sup>62</sup> Performance has been good on this front. New power stations have mostly been built in order from cheapest to most expensive. This contrasts with the period before generation competition in the mid-1990s when comparatively high cost investments were made ahead of cheaper alternatives. This indicates competition among generation developers has disciplined costs.

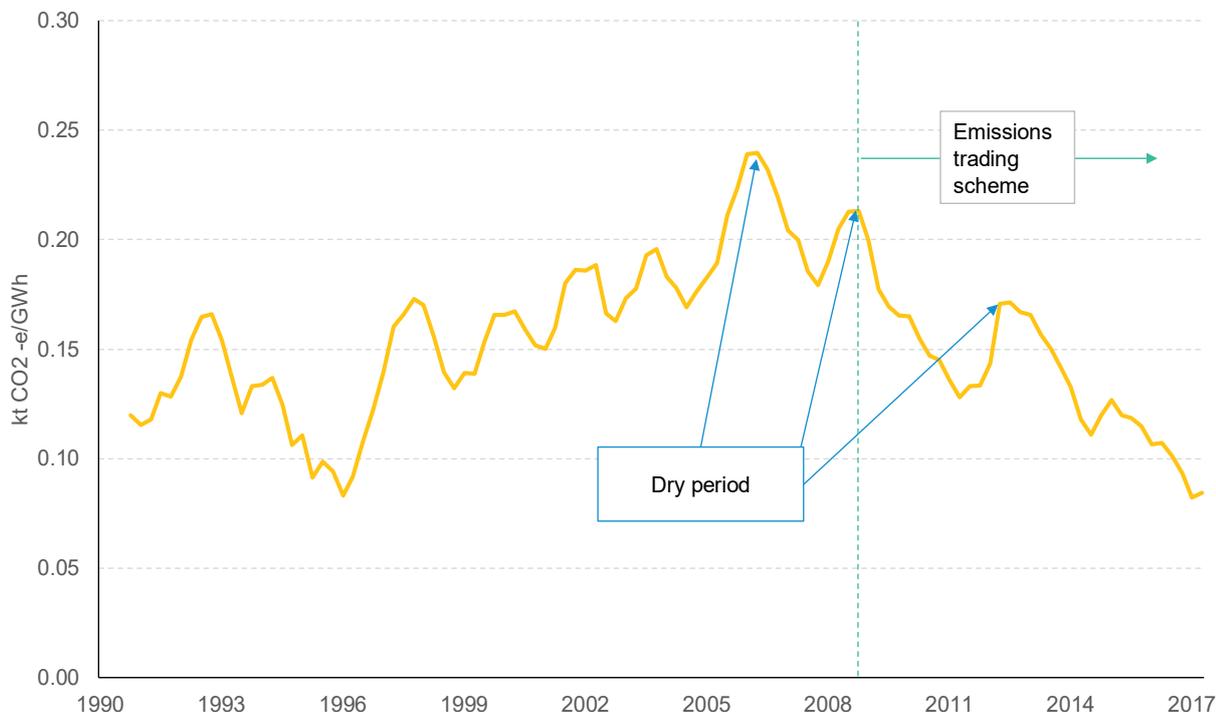
The timing of investment needs to match the growth in power demand, ensuring a sufficient buffer to maintain reliable supply, but not so large a buffer that there is wasteful investment. The evidence from Transpower's monitoring of the security of electricity supply shows competition has delivered sufficient new investment to maintain reliable supply. Again, performance in this regard has been better than before the mid-1990s.

Generators' carbon emissions are very low by international standards and have been falling steadily over the past decade (see figure 13). Much of the underlying credit is due to the country's

<sup>62</sup> Generators have the choice of building stations with different price tags because of their location, capacity, fuel type or construction cost. Choosing, for whatever reason, a more expensive option over the cheapest one will raise the per unit cost.

overwhelming reliance on hydro-generation. However, the further drop in emissions over the past decade reflects a switch from coal to gas-fired generation and the construction of wind farms and geothermal plants. This switch has been due to a mix of factors, including the introduction of a carbon price through the New Zealand Emissions Trading Scheme and steady reductions in the cost of building wind and geothermal plants.

**Figure 13: New Zealand’s carbon emissions per unit of power**



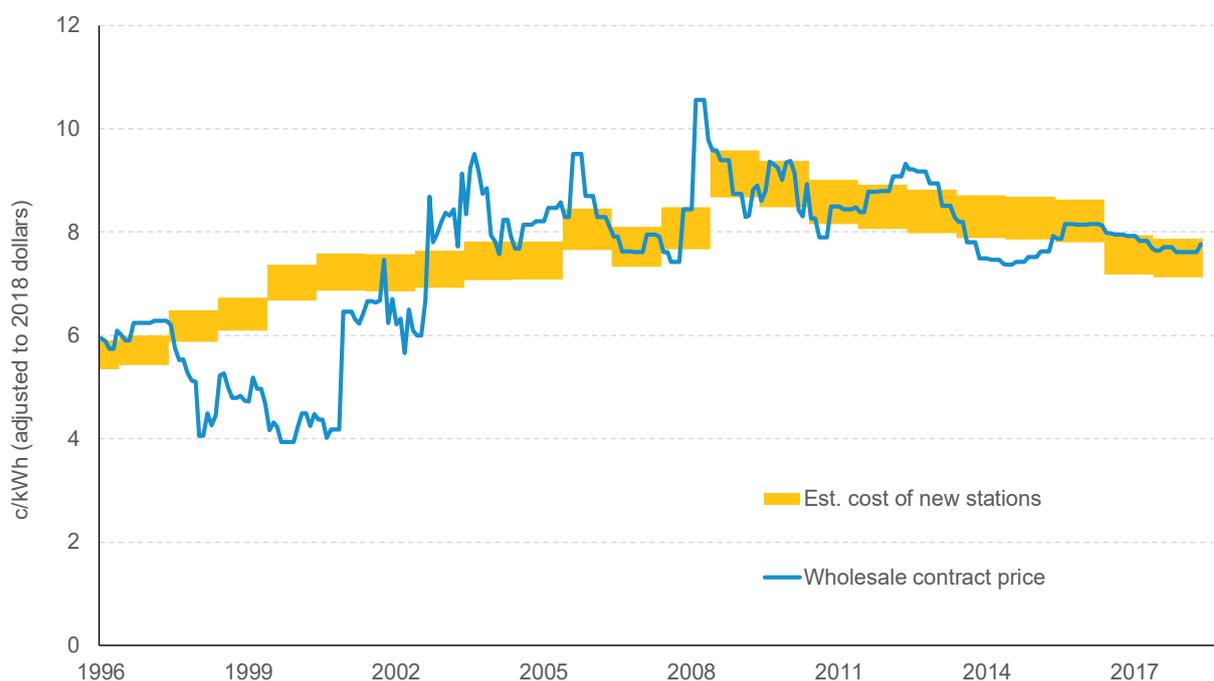
Source: Concept Consulting analysis of Ministry of Business, Innovation and Employment data.

To assess whether pricing is efficient in the generation sector, we compared the price for a retailer of buying power (the wholesale contract price) with the cost of building new power stations.<sup>63</sup> This type of comparison has been the benchmark commonly used in many electricity markets to assess the efficiency of wholesale electricity pricing. An alternative approach is to compare electricity spot prices with half-hourly generation costs (called short-run marginal costs). That approach is more complex to apply and requires significantly more information. The results can also be sensitive to the methodology and assumptions used to estimate short-run marginal costs.

Contract prices that were above costs on a sustained basis would suggest weak competition among generators, and that the entry, or threatened entry, of new generators was not restraining prices. On the other hand, prices that were well below costs on a sustained basis would suggest looming problems with reliability of supply because new investment would not be able to keep pace with demand. The comparison suggests competition has been effective in restraining prices. Figure 14 shows how wholesale prices have moved broadly in line with the cost of adding more capacity. Importantly, there is no evidence contract prices have been above costs on a sustained basis in recent years.

<sup>63</sup> See technical paper for a discussion of this pricing analysis, including limitations and caveats.

**Figure 14: Wholesale contract prices versus cost of building new power stations**



Source: Concept Consulting analysis. Prices and costs are adjusted for inflation and expressed in 2018 dollars.

That said, generators have exercised market power by, for example, sharply raising prices in the spot market for brief spells.<sup>64</sup> The threat of extra generation investment does not restrain prices in these situations. Instead, wholesale electricity buyers typically use short-term contracts to avoid being exposed to such price spikes, which, although short lived, can be exceedingly expensive. The short-term contracts market acts as a sort of insurance against such exposure, making it important that it functions effectively. (See *Vertical integration*).

Overall, the generation sector is delivering reliable supply, low and falling emissions, and wholesale prices that are reasonable compared to costs of building new power stations. However, we have some concerns about short-term market power.

### What are your views on this assessment of generation sector performance?

#### Barriers to generation competition

New Zealand has 34 generators, which suggests relatively low barriers to generation competition.<sup>65</sup> The five biggest generators – which are also the biggest retailers – account for around 90 per cent of electricity production capacity, compared with 98 per cent in 1990.<sup>66</sup> Smaller generators typically

<sup>64</sup> See, for example, the letter from the Electricity Authority to Meridian, May 2017.

<sup>65</sup> By generator, we mean any organisation with at least one plant capable of generating more than 1MW. By barriers, we mean factors that inhibit the entry or expansion of generators.

<sup>66</sup> Contact Energy, Genesis Energy, Mercury Energy, Meridian Energy and Trustpower.

do not have a retail business. Instead, they rely on the contract market to sell their power.<sup>67</sup> Smaller generators often cite the limited depth of the contract market as the key factor inhibiting their expansion or new generation entry. (See *Vertical integration*).

Another potential factor affecting competition and future generation is the fate of 'virtual asset swap' agreements between Genesis, Mercury and Meridian that were the result of the last ministerial review of the industry. These agreements, signed in 2010, expire in 2025. They made the companies more geographically balanced by ensuring each had physical or contractual access to substantial generation in both islands. Previously, each retailer was largely confined to the one island where it owned generation, reducing competition. The volumes involved are significant (equivalent to demand of about 150,000 residential consumers) making it important to assess whether the agreements should continue after 2025.

### What are your views of this assessment of barriers to competition in the generation sector?

#### Outlook for generation

The key challenge is the potential need to build a lot of new generation. This will be necessary if decarbonisation of the economy results in a widespread switch to electric vehicles, and a move by businesses from coal and gas-fired boilers to electric technologies. Projections by Transpower<sup>68</sup> and the Productivity Commission suggest a future doubling of electricity demand by 2050.<sup>69</sup>

This raises the question of whether current market and industry arrangements can meet this level of demand. We think the short answer is yes, provided strong incentives to invest in generation are maintained.

The Productivity Commission sponsored analysis of the lowest-cost way to achieve net-zero emissions for the economy and the level of electrification needed to achieve this. The results indicated new wind, geothermal and solar power generation could meet the big rise in power demand by 2050. The stable or falling cost of these technologies means significant electricity price rises are unlikely. Indeed, continued reductions in wind and solar power technology costs may even result in falls in the generation component of electricity prices in the longer term.

The analysis for the Productivity Commission indicated the proportion of generation from renewable sources would rise from about 85 per cent to about 95 per cent by 2050.<sup>70</sup> A small amount of thermal generation would be needed for occasional backup. However, the analysis also showed that, under current available technology, pushing towards 100 per cent renewable generation was likely to raise electricity prices and could make it harder to achieve net-zero emissions for the country as a whole. Higher electricity prices could hinder switching from petrol to electric vehicles and the use of electricity for industrial processes. It would also exacerbate affordability problems.<sup>71</sup>

Some demand will be met by small scale generation such as rooftop solar panels. But larger scale grid connected generation will also be necessary to meet most of the increased demand. Developers already have projects with resource consents that could meet demand growth for at least a decade – providing a window to identify further projects for later development.

<sup>67</sup> Some smaller generators use the power they produce in their own facilities (such as dairy factories) and may also use the contract market at times.

<sup>68</sup> Transpower, *Te Mauri Hiko – Energy Futures*, 2017.

<sup>69</sup> Productivity Commission, *Low emissions economy*, draft report April 2018.

<sup>70</sup> More precisely, the analysis estimates the current proportion at between 80 per cent and 85 per cent, and predicts it will reach between 95 per cent and 97 per cent by 2050.

<sup>71</sup> The Interim Climate Change Committee has the task of providing reports with evidence and analysis required for the Climate Change Commission (once formed in 2019) to make recommendations on, among other matters, planning for the transition to 100 per cent renewable electricity, in a normal hydrological year, by 2035.

One qualification is that generators have told us many existing wind farm consents may need to be reassessed or potentially reconsented as a result of technology change (for example wind turbines are now much bigger) since the consent was initially granted. However, we don't know whether this poses a risk to timely development of new generation. There may be scope to address any problems through measures such as updating the national policy statement on renewable energy.

Another question raised is whether there are sufficient incentives to retain backup generation plant or other resources (such as users willing to temporarily reduce demand) to manage extreme and infrequent hydro shortfalls.<sup>72</sup> The Productivity Commission believes an effectively operating contract market may help address this question.<sup>73</sup> This reinforces our view that improving the depth and resilience of the contract market should get a high priority.

### **What are your views on whether current arrangements will ensure sufficient new generation to meet demand?**

## Retailing

Retailers buy electricity in bulk at wholesale prices and pay for it to be taken over networks to homes and businesses. They arrange billing, payment collection, fault handling, connections and disconnections and meter reading. They are the point of contact for most consumers, so this contact shapes consumers' views about the sector's performance.

### **Retailers' performance**

By many measures, competition among retailers has strengthened in recent years. There are 36 registered retailers.<sup>74</sup> Competition is generally strongest in the main centres, although every region offers consumers a choice of at least seven retailers. In assessing retailers' performance, we have looked at switching and prices, costs, consumer satisfaction and innovation.

### **Switching and prices**

The Electricity Authority has put considerable effort into making it easier to switch from one retailer to another – a prerequisite of consumers taking advantage of better offers from competitors. New Zealand has one of the fastest switching processes in the world. A recent Electricity Authority survey showed 87 per cent of consumers were aware they could change their retailer, and 70 per cent thought it was easy to switch retailer.<sup>75</sup> The Authority has also worked with community groups, such as budget advisory services and public libraries, to promote switching in an effort to reach lower-income and vulnerable consumers.<sup>76</sup>

The proportion of consumers switching from one retailer to another has been rising. Between 2007 and 2012, the proportion roughly doubled. Since 2013, the figure has averaged about 20 per cent a year, or 440,000 consumers. With a fifth of all households and businesses changing retailer each year, uncompetitive retailers would have exposed themselves to a serious loss of consumers. We know, however, that a sizeable core of consumers has never switched, meaning there is another core that is repeatedly switching. This point is examined shortly. Nor do we know what proportion of switching is simply people moving house.

<sup>72</sup> For example, see Stevenson, T., Batstone, S., Reeve, D., Poynton, M., & Comendant, C., Sapere Research Group, Transition to zero net emissions by 2050: Moving to a very low emissions electricity system in New Zealand. Wellington: New Zealand Productivity Commission, 2018

<sup>73</sup> Productivity Commission, Low emissions economy, draft report April 2018, p326.

<sup>74</sup> As at 30 June 2018. See Electricity Authority electricity market data at [www.emi.ea.govt.nz/r/eap00](http://www.emi.ea.govt.nz/r/eap00)

<sup>75</sup> See Electricity Authority, Advertising tracker, Telephone Omnibus Results, August 2017.

<sup>76</sup> Electricity Authority, New Zealand Market reforms to unlock innovation, 19 June 2017, slide 12.

We do not know how much consumers have saved by switching or what those savings amount to as a proportion of their total bills. We have a clue through the Electricity Authority's WhatsMyNumber website, which gives visitors to the site an estimate of how much they can save by switching to the cheapest retailer in their area.<sup>77</sup> The Authority set up the website in 2011 to 'add competitive pressure to the electricity market.' Between that date and July 2018, the website received more than 1.8 million inquiries involving potential savings of more than \$295 million.

This is only a broad indicator because some consumers who change retailer don't visit this website, and some visitors to the site do not make a switch. Furthermore, another website, Powerswitch, handles about three times as many consumer inquiries as WhatsMyNumber.<sup>78</sup>

We know a lot of potential savings are not being taken up. If all residential consumers, including those who have never switched, were to switch to the cheapest plan available to them (excluding spot price-based plans), they would save an average of about \$200 a year.<sup>79</sup> The Electricity Authority's Market Development Advisory Group says that "since 2002, 42 per cent of residential [consumers] have never switched."<sup>80</sup>

However, we understand this figure is likely to be overstated because it assumes switches recorded as a 'move-in' did not lead to any change in a consumer's retailer. There is little information on how many consumers shop around for a new retailer when they move house.<sup>81</sup> If every move-in switch had triggered a change in retailer, the proportion of residential consumers who have not switched since 2002 would be 23 per cent.<sup>82</sup> In reality, the true figure will lie between these percentages. This implies that between 400,000 to 750,000 residential consumers have never switched retailer since records began in 2002.

Such consumers may regard the saving as too small to justify the effort, or their existing retailer may offer benefits that offset the higher price. Consumers can threaten to switch unless their retailer matches a competitor's prices, so no switch takes place, but they still get the benefit of competition. Switches can also be terminated when a retailer, learning it is about to lose a consumer, offers to match the new company's price and the offer is accepted – known as a win-back discount.<sup>83</sup>

Undoubtedly, many consumers are benefiting in one form or another from competition among retailers – but not all. New Zealand is not alone in this experience. In Australia, 47 per cent of residential consumers have not switched retailer or plan in the past five years, despite potential annual savings of between \$A175 and \$A507 (depending on the state). Likewise, in 2017, 35 per cent of consumers surveyed in the United Kingdom had never switched retailer, and 60 per cent of all consumers remained on default plans that can be about £300 more expensive a year than the cheapest fixed-term deals.<sup>84</sup>

The United Kingdom's Competition & Markets Authority found poorer households were less active than higher-income households in switching retailers to get the best deals and therefore paid more for their electricity.<sup>85</sup> In Australia, there were similar findings.<sup>86</sup> Officials in both countries have expressed

<sup>77</sup> See [www.whatsmynumber.org.nz](http://www.whatsmynumber.org.nz).

<sup>78</sup> The WhatsMyNumber site uses Powerswitch to generate the savings estimates for each consumer inquiry. Powerswitch is funded by Consumer NZ, the Electricity Authority, the Gas Industry Company and 22 retailers. Powerswitch provides savings estimates for electricity and gas consumers.

<sup>79</sup> Electricity Authority Electricity Market Information portal. We do not have an equivalent estimate for small business consumers.

<sup>80</sup> Electricity Authority Market Development Advisory Group, Customer acquisition, saves and win-backs – issues paper, May 2018, p29. Note that strictly speaking, the ratio measures switching by consumer premises, rather than consumers.

<sup>81</sup> One exception is a 2011 UMR survey that found 11.1 per cent of consumers switched because they had moved house.

<sup>82</sup> Electricity Authority, email of 9 August 2018.

<sup>83</sup> Strictly speaking, a win-back occurs when a switch has been completed, and the losing retailer obtains a consumer's agreement to switch back to it. A losing retailer may also get a consumer's agreement to cancel a switch before it is completed. This is known as a 'save.' For simplicity, we refer to both practices as win-backs in this report.

<sup>84</sup> Ofgem, State of Market Report, 2017

<sup>85</sup> Ibid at 19, p33–34.

<sup>86</sup> Ibid at 18, p xi.

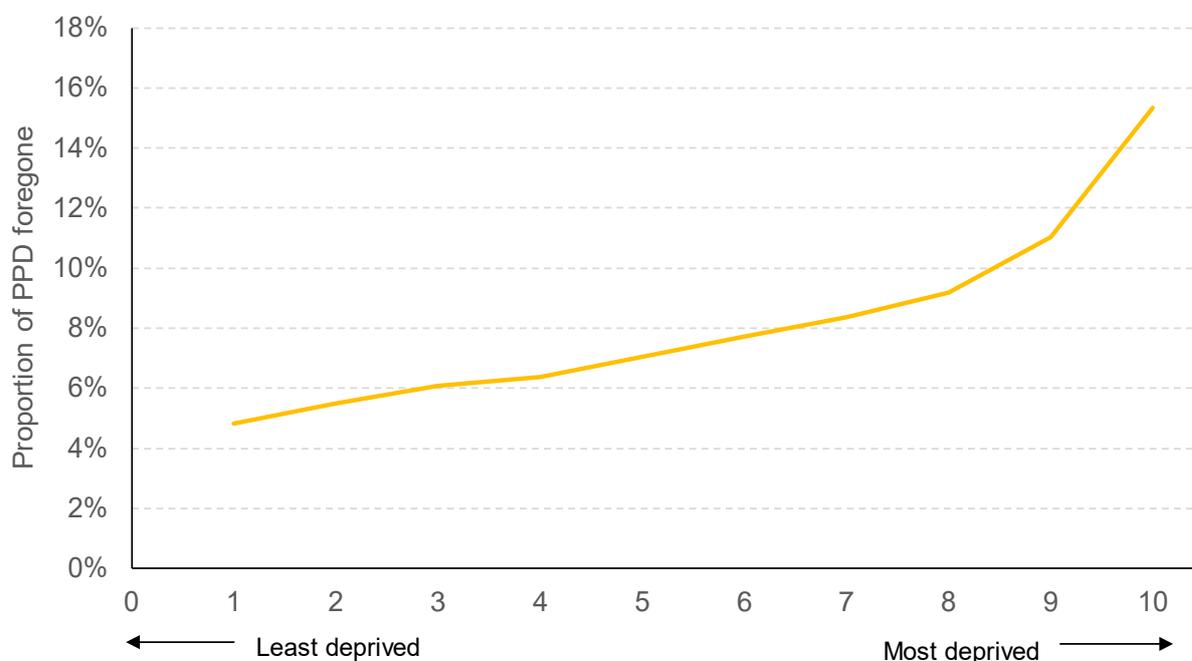
concern about the emergence of a two tier market; well-off, internet savvy households that are able to seek out the best deals; and poorer, vulnerable households that lack the motivation or means to make informed choices.

In those countries, it was found that barriers included difficulties in comparing prices; failure to disclose that ‘standard’ prices were often higher than a retailer’s other prices; greater difficulty accessing the internet by the poor and non-English speakers to check prices; an unwillingness (as yet unexplained) to find the cheapest plan; and high late payment fees (which struggling households were more likely to incur). The ACCC said recently: “Electricity retailers have also played a major role in poor outcomes for consumers. Retailers have made pricing structures confusing and have developed a practice of discounting which is opaque and not comparable across the market... leaving inactive customers paying far more than they need to for electricity. Pay on time discounts... are excessive and punitive for those customers who fail to pay bills on time.”<sup>87</sup>

On this last point, the Consumer NZ survey found more than a quarter of households with incomes of less than \$50,000 a year reported missing out on prompt payment discounts because they paid late. In New Zealand, such discounts are typically 10 to 20 per cent of the bill, but can be as much as 26 per cent – adding substantial penalties for those consumers unable to pay on time.<sup>88</sup>

Analysis of retailer billing data shows vulnerable households are disproportionately affected by prompt payment discounts. Figure 15 shows the proportion (by value) of prompt payment discounts not received by consumers in different socioeconomic groups. Decile one represents the least deprived 10 per cent of households, and decile 10 the most deprived 10 per cent of households.<sup>89</sup> In relative terms, the most deprived households miss out on roughly twice the proportion of prompt payment discounts compared to median households, and three times the proportion compared with the least deprived households.

**Figure 15: Proportion of prompt payment discount forgone by decile group**



Source: Analysis of retailer billing data.

<sup>87</sup> Ibid at 18, p v.

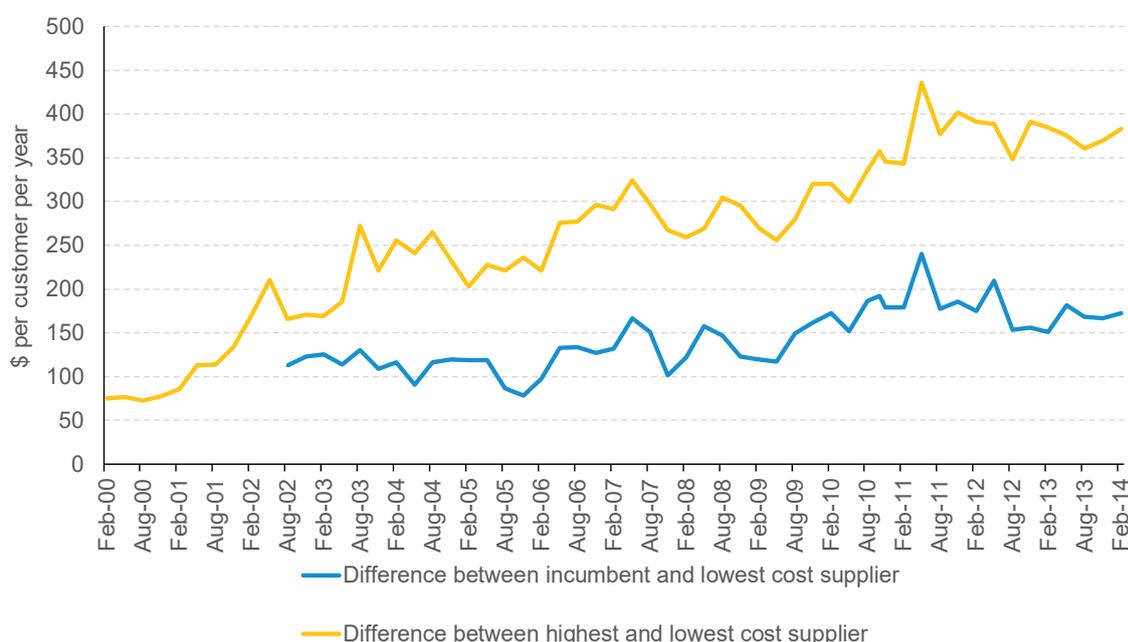
<sup>88</sup> Some retailers offer pricing options that have no prompt payment discount – but these options generally require the consumer to pay by direct debit.

<sup>89</sup> Based on Statistics New Zealand data.

There are signs competition may be producing uneven benefits. One indicator is the price difference between the cheapest retailer in each area and the retailer there when retail competition was introduced in the late 1990s (the ‘incumbent’ retailer).

Figure 16 shows this price difference has increased by about 50 per cent since 2002, after adjusting for inflation.<sup>90</sup> This difference is particularly significant for the households and small businesses that have never switched retailer and are likely to still be with the incumbent retailer. The sheer number of those not switching (between 400,000 and 750,000 households) suggests much of the turnover is a group of consumers jumping from retailer to retailer, and that a substantial portion simply doesn’t bother to switch. The chart also shows the gap between the lowest and highest prices in each area has been widening, suggesting those consumers who don’t or can’t easily shop around are paying more and more than they need to.

**Figure 16: Retailer price variations in individual areas**



Source: Ministry of Business, Innovation and Employment. Note: assumes residential consumers use 8,000 kWh a year and receive all prompt payment discounts. Figures are adjusted for inflation and expressed in 2018 dollars.

There are some indications vulnerable residential consumers may be over-represented among those who do not shop around and are therefore paying higher prices. A range of surveys indicates that lower-income households are less likely to shop around. The surveys also suggest people over 60, not in full-time work, not university educated or not internet savvy are less likely to shop around. For example, the Consumer NZ survey reported that only 18 per cent of households with annual incomes below \$50,000 thought it likely they would change supplier in the next 12 months.<sup>91</sup>

On the other hand, a 2017 survey for the Authority suggested that switching rates were similar across households with different incomes.<sup>92</sup> The Authority recently commissioned analysis of switching rates

<sup>90</sup> Data in comparable format is not available after 2014.

<sup>91</sup> For households with incomes between \$50,000 and \$80,000 the figure was 26 per cent, and for households with incomes above \$80,000 it was 34 per cent or more. A 2016 survey undertaken for the Electricity Authority reported, however, that 60 per cent of people with annual incomes less than \$40,000 thought it was worthwhile to shop around, compared with 71 per cent of people with incomes over \$40,000. Similarly, a 2015 survey for the Authority reported that “those on very low household incomes (\$20,000 or less) were more likely to say they would not shop around for the best power deal.” See Electricity Authority, International comparison of activity, behaviour and attitudes towards electricity industry, A quantitative study, 2014

<sup>92</sup> Ibid at 75

in different socioeconomic groups as part of a review of the WhatsMyNumber campaign. The draft results suggest average switching rates among the most deprived consumers are similar to, or higher than, other consumers – depending on whether move-in switches are counted as switches. We understand the Authority will publish the report once it is finalised.<sup>93</sup>

Overall, information on switching rates by different consumer groups is not clear cut. To obtain more detailed information about what consumers are paying and how this varies by consumer group, we sought billing data from retailers in a format that allowed it to be matched to Statistics New Zealand's deprivation index. Much of the retailer data was received just before we finalised this report, so it has not been possible to analyse it fully and include the results here. We will publish comprehensive findings in our second report, and are also likely to publish analysis of specific issues before then.

Several other price-related matters warrant mention: First, in the past, consumers buying electricity on a pre-pay basis (and often they are vulnerable consumers) paid more usually than those on standard plans, in part because of the need for special meters. However, the increasing use of smart meters has apparently lessened the gap between standard and pre-pay prices. We welcome views on this point.

Secondly, one distributor advised us that some retailers did not pass on an 8.8 per cent reduction in distribution charges that took effect from 1 April 2018, despite receiving more than three months' notice of the change. The Electricity Authority also investigated a complaint to this effect from a distributor.

The Authority found that two of the main retailers passed on the reduction. Another big retailer passed on only part of the reduction because it had held prices down the previous year to expand market share when the distributor had raised distribution charges. The other two retailers told the Authority the timing of the reduction did not align with their price review process. One advised it would review prices in August 2018, and the other has written to customers reducing its prices.<sup>94</sup> This raises a question about whether retailers should be required to promptly pass on reductions in distribution charges to consumers.

Thirdly, retail competition – particularly switching – has also exerted a competitive pressure in the generation sector. Because of high switching rates and the fact most companies in the sector generate and sell electricity, poor generation investments (or poorly timed generation investments) cannot be offset simply by raising prices to consumers – at least not without the risk of losing market share. This adds pressure to those making generation investments to get them right. Independent generators are also under pressure to make sound investment decisions because they often look to sign contracts with retailers – both independents and integrated companies – for their output, so retail competition filters through to them as well.

Overall, some stakeholders consider retail competition is stronger here than in Australia and the United Kingdom, based on measures such as switching rates and savings available from switching. However, some stakeholders consider that, like Australia and the United Kingdom, a two-tier retail market is developing, in which those who actively shop around enjoy the benefits of competition, and those who don't pay higher prices. We welcome comment on this matter.

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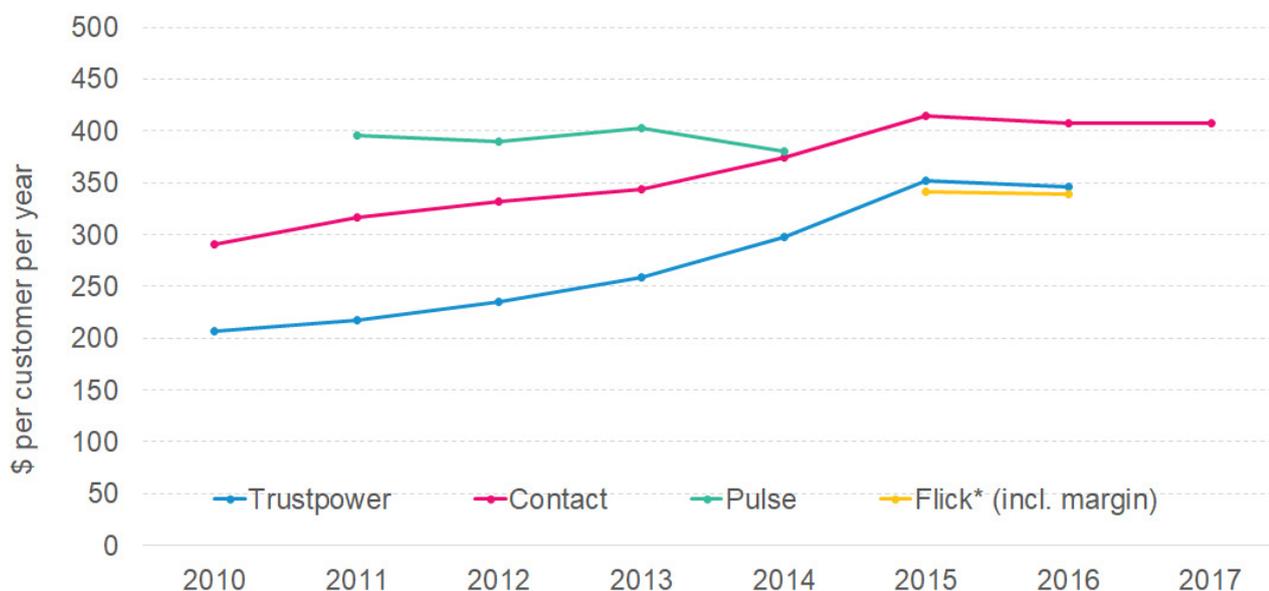
<sup>93</sup> Ibid at 82.

<sup>94</sup> Ibid at 82.

## Costs

Retailers' reported costs have risen steeply, particularly marketing and information technology related costs (see figure 17). Costs are now substantially higher than in Australia.<sup>95</sup>

**Figure 17: Retailers' operating costs**



*Source: Company annual reports and disclosures to NZX. Amounts are adjusted for inflation and expressed in 2018 dollars. The data for Flick Energy reflects the fee it charges to cover its operating costs and any retail margin.*

Some of the increase may be due to outlays that directly benefit consumers, such as loyalty programme costs, but it is unlikely to account for much of the increase. Retailers' operating costs now exceed the transmission charge component of residential bills (which is 10 per cent). These factors raise questions about what is behind rising retailers' costs, and how to reverse the trend.

## Consumer satisfaction

Surveys show consumer satisfaction ratings have remained high. Consumer satisfaction levels in 2016 were the same as for internet providers, though not as high as for banks or mobile phone providers (see figure 18). Satisfaction was higher than in Australia and the United Kingdom.

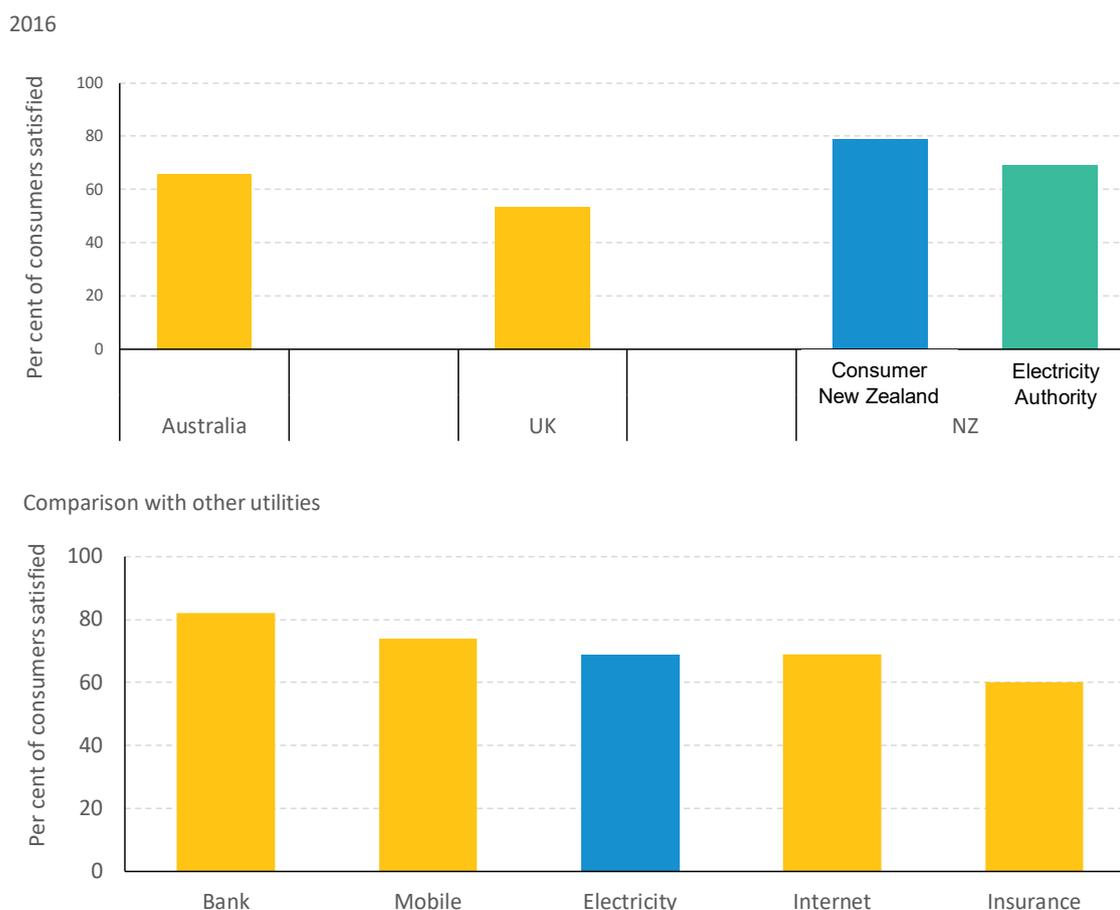
Another indicator of consumer satisfaction can be the level of consumer complaints and/or disputes. We note that Utilities Disputes handled 3,294 enquires and 2,233 complaints in 2017–2018.<sup>96</sup> This is despite consumers' apparent low level of awareness of its work to resolve utility related disputes with businesses.<sup>97</sup>

<sup>95</sup> Australian operating costs exclude metering related charges, but even after adjusting for this, New Zealand costs are higher.

<sup>96</sup> For context, the Banking Ombudsman handled 1,263 enquires and 2,709 complaints (including 140 disputes), and the Insurance and Financial Services Ombudsman handled 3,357 complaint enquires and 320 complaints, in the same period.

<sup>97</sup> Only 21 per cent of consumers surveyed were aware of Utilities Disputes (formerly the Office of the Electricity and Gas Complaints Commissioner), compared to 32 per cent for the Insurance and Financial Services Ombudsman, and 51 per cent for the Banking Ombudsman Scheme. Source: Consumer Protection, National Consumer Survey 2016, figure 17.

**Figure 18: Consumer satisfaction with electricity retailers**



Source: Concept Consulting analysis of data from Consumer NZ, Electricity Authority, Energy Consumers Australia and Ofgem.<sup>98</sup>

### Innovation

Retail competition has stimulated innovation. Consumers can access websites and apps, making it easier to monitor and manage usage. There are new pricing packages such as a free hour of power each day, prices targeted at electric vehicle owners, plans that bundle power with broadband, and retailers that target particular groups, such as homeowners with solar panels or non-English speakers.

One example is GLOBUG, a traffic light-type device that shows pre-pay consumers their balance. More innovations are on the way, including lower prices for smart devices that can power down at peak times and residential brokers who can search out the best offer for their consumers.

In summary, a significant number of retailers have entered the sector, and consumers have been offered new products, plans and services – and keener prices for those who shop around. But those who don't or can't easily shop around are paying more and more than they need to. Since 2002, between 400,000 and 750,000 residential consumers have never moved retailer, despite the likelihood of meaningful savings. Retailers' operating costs have risen substantially, adding considerably to power bills. And prompt payment discounts – which can be as high as 26 per cent of a bill – penalise vulnerable consumers struggling to pay on time.

<sup>98</sup> The surveys in Australia, United Kingdom and New Zealand all identify consumers who indicate they are somewhat or very satisfied. However, differences in the survey questions and approach mean the relative results should be considered as indicative only and may not be fully comparable.

## What are your views on this assessment of retail sector performance?

### Barriers to retail competition

Of today's 36 retailers, 28 are new since 2005.<sup>99</sup> At first glance, this would suggest there are few or no barriers to entry. Undeniably, barriers have previously stood in the way of new entrants. But the Electricity Authority has done a lot to lower them by removing unduly strict prudential requirements on retailers, improving contract market liquidity, actively providing information to new entrants, and interpreting more flexibly the technical requirements of entry.

Some stakeholders consider barriers remain. They say the big five still dominate – with 90 per cent of the market. Two smaller companies told us barriers to entry had been reduced, but they still found it difficult to expand.

This is similar to Australia where three big companies have 67 per cent of the market. About 30 independent retailers have another 5 per cent, and a handful of mid-sized retailers (mostly vertically integrated) have the rest. The market share of the big three has shrunk by 9 per cent since 2012 as a result of gains by mid-sized retailers in some states. Alinta, for example, was able to win more than 100,000 new consumers in Queensland in just six months.<sup>100</sup> However, the Australian regulator says the decline in market share of the big three is slow and doesn't appear to be gathering pace. It also says the inability of small retailers to make meaningful inroads suggests there are barriers to expansion.

New entrants in New Zealand cite the prevalence of win-back discounts as a big barrier to expansion. A recent Electricity Authority sponsored study found consumers cancelled about 25 per cent of switch requests because of these offers.<sup>101</sup> One big retailer managed to keep 40 per cent of consumers who initiated a switch.<sup>102</sup> We do not know what proportion of cancellations was due to win-back discounts. Some are likely to reflect other factors, such as consumers changing their mind because of fixed-term contracts and termination fees in the new offers. Furthermore, any retailer can make such an offer to keep a consumer, but the big five retailers naturally account for the great majority.

Some argue the practice is good because the consumers in question get cheaper power as a reward for shopping around. Others argue such selective offers come at the expense of lower prices for all consumers because giving special discounts to consumers who switch lessens the incentive for retailers to offer competitive prices to their other consumers – meaning they pay what is sometimes described as a 'loyalty premium.' They also say the discounts put new entrants at a disadvantage relative to incumbent retailers, thereby undermining the longer-term competitiveness of the retail market. An industry code prevents telecommunication companies from conducting any marketing activity after a consumer has requested to switch providers.<sup>103</sup> The Electricity Authority is investigating this question, so we do not propose to examine it in detail, although we would consider submissions on the effect of win-back discounts on competition.<sup>104</sup>

Another key factor affecting the ability of independent retailers to compete is their ability to access risk management contracts on competitive terms. The performance of the contracts market is discussed in *Vertical integration*.

<sup>99</sup> Electricity Authority, Electricity Market Information: Entry and exit report, 2018.

<sup>100</sup> Ibid at 18, p136.

<sup>101</sup> Electricity Authority Market Development Advisory Group paper.

<sup>102</sup> The Dominion Post, 9 June 2018: "Industry data shows Mercury wins back 40 per cent of its customers who try to change to a new provider... Meridian wins back 27 per cent."

<sup>103</sup> Providers in the fixed telecommunications market may not direct any form of marketing activity at a customer in response to a transfer request - the electricity market equivalent would be a ban on saves: see the Customer Transfer Code, clause 43.

<sup>104</sup> See Electricity Authority Website, Saves and Winbacks.

Finally, the Electricity Retailers' Association of New Zealand said a lack of standardisation in distributors' contract terms and price structures raised costs for retailers and hindered competition.<sup>105</sup> However, individual retailers did not highlight this as a major concern. We welcome views on the significance of this point from a competition perspective.

## What are your views on this assessment of barriers to competition in retailing?

### Outlook for retailing

We expect uptake of emerging technologies and business models will be the key new challenge for retailing activities. We discuss this in *Technology*.



### Vertical integration

We have been asked to consider whether vertical integration limits competition across the supply chain. Vertical integration simply means, in our context, companies that generate electricity and also retail it. The five big companies that dominate generation and retailing are vertically integrated. Some smaller retailers, such as Nova Energy, are also vertically integrated.

### Costs and benefits

Vertical integration has costs and benefits. On the plus side, it can reduce risk management costs because a market change that hurts the generation arm of a business is likely to benefit the retail arm (and vice versa). This natural stabilising tendency is especially important in New Zealand, where electricity wholesale prices can swing markedly depending on whether hydro lakes are high or low.

On the minus side, it can hinder competition because independent generators and retailers will find it hard to compete if vertically integrated companies refuse to deal with them or do so only on unfavourable terms. Some independent companies have said there are discriminatory pricing terms. The Electricity Authority, for example, investigated claims that vertically integrated companies were systematically discounting prices to commercial and industrial consumers below prices to retailer competitors in the contract market.<sup>106</sup> The Authority found prices to be lower in 12 per cent of the contracts for which it had data, but it concluded there was no evidence of systemic discounting. We do not have the Authority's data, but at face value 12 per cent seems sufficiently high to warrant concern. We welcome views on this.

Another drawback of vertical integration is that it can result in less use of contract markets – where companies buy and sell electricity ahead of time to lessen their exposure to wholesale price volatility. Vertically integrated companies have no inherent need for contract markets, whereas independent generators and retailers rely on them heavily. If large portions of the generation and retailing sectors have little use for contract markets, there will be low liquidity and muffled price signals, making it difficult and costly for independent companies to manage electricity price risks. An effective contract market, in contrast, supports ready access to contracts on reasonable terms, and sends clear price reference points for buyers and sellers.

Since 2010, the Electricity Authority has been working on ways to encourage more activity in the contract market. Its most significant success has been to get the four biggest vertically integrated companies to enter into voluntary agreements with the Australian Securities Exchange to quote buy and sell contract prices on the exchange with maximum price spreads of 5 per cent for defined

<sup>105</sup> Electricity Retailers' Association of New Zealand, letter of 14 August 2018.

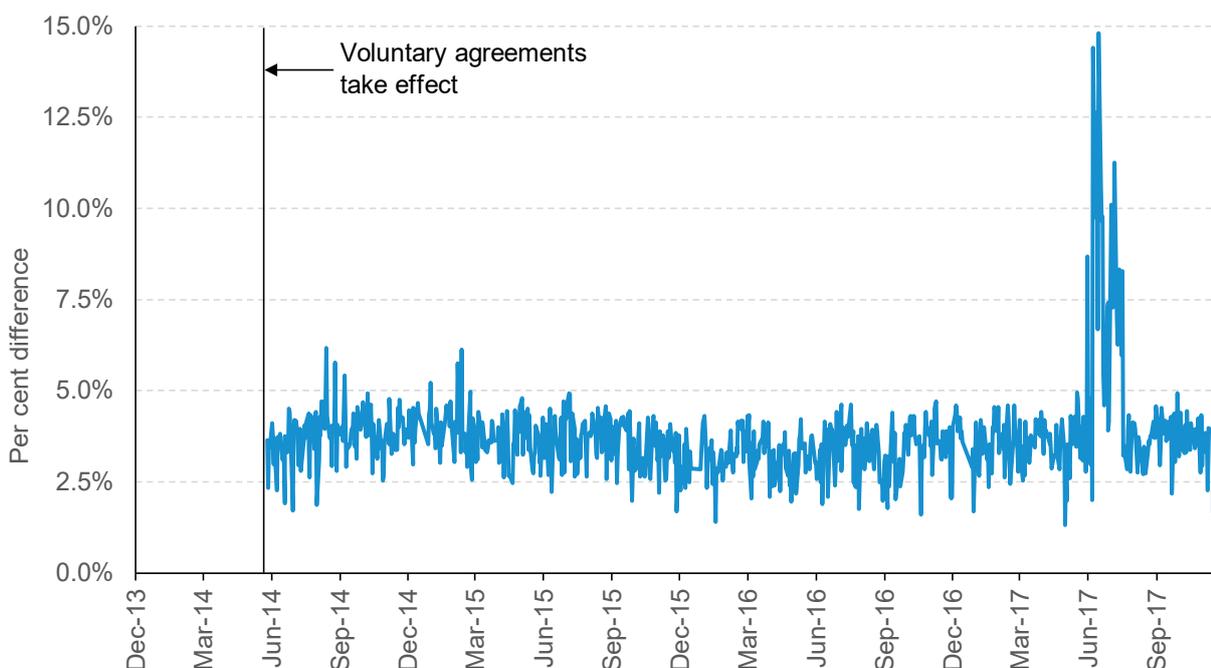
<sup>106</sup> Electricity Authority, Review of fixed price variable volume commercial offers, 2017.

minimum volumes. The volume of traded contracts has grown significantly as a result. Quoted prices have become an increasingly important benchmark for companies negotiating wholesale contracts directly with each other. A new retailer described progress in contract market development and liquidity as “the key enabler” in getting started and applauded the Electricity Authority for its work in this area.

New Zealand was a pioneer in its encouragement of vertically integrated companies to enter agreements to quote buy and sell prices. Other countries have since drawn on this approach to improve their own electricity contract markets. The United Kingdom and Singapore, for example, have introduced similar agreements – albeit through more heavy handed intervention. Australian policymakers have recently recommended that vertically integrated retailers in South Australia be obliged to form such agreements.

Some aspects of the contract market's performance have faltered recently. We were told of a “steady decline in market-maker performance,” as evidenced by buy-sell price spreads routinely wider than 5 per cent, and the absence at times of any quoted prices for some contracts during parts of the 2017 winter. As shown in figure 19, the buy-sell price spreads often exceeded the minimum of 5 per cent during the winter of 2017.

**Figure 19: Spread between contract buy and sell prices**



Source: ASX. Note: average spread at the end of each trading day for the nearest three-monthly futures contracts for Benmore on the ASX.

The Electricity Authority also registered concern about the widening of buy-sell price spreads in the winter of 2017.<sup>107</sup> It said: “The commitment to maintaining normal bid-ask spreads seemed fragile, especially when the dry winter was not severe when compared to 2008... there may be long-term adverse impacts associated with not being able to rely on... hedge prices when the physical market becomes tight.”<sup>108</sup>

<sup>107</sup> The Electricity Authority refers to the buy-sell price spread as the 'bid-ask spread.'

<sup>108</sup> Electricity Authority, winter review, 2017.

We agree. An effective contract market is critical to mitigating the potential adverse effects of vertical integration and short-term generator market power. Our view is reinforced by the recent review in the United Kingdom, which concluded vertical integration was not adversely affecting competition, in part because the contract market had sufficient liquidity “for independent firms to hedge their exposure to wholesale market risk in a similar way to vertically integrated firms.”<sup>109</sup>

The New Zealand contract market had been developing well and has been on a trajectory of steady improvement since 2010. However, events during the winter of 2017 highlight the fragility of current arrangements. For this reason, we consider improving the depth and resilience of the contract market should be given high priority.

On a related issue, the recent ACCC review recommended more information be published about the prices of wholesale contracts negotiated directly between parties. These contracts are not traded on exchanges and therefore the prices remain confidential. The ACCC recommended prices for such contracts be published in a neutral place to “facilitate the dissemination of important market information.”<sup>110</sup>

The Electricity Authority already requires disclosure of key terms for such contracts. Indeed, the ACCC considered the New Zealand regime might ‘provide a good model’, although some New Zealand stakeholders believe the disclosure regime should be strengthened. We welcome views on the effectiveness of the regime.

### **What are your views on this assessment of vertical integration and the contract market?**

#### **Financial performance and profits of generators and retailers**

We have been asked to look at generators and retailers’ financial performance and whether they have been making excessive profits. The absence of sufficiently detailed data has prevented us from separately analysing the performance of generators and retailers, and we have instead considered their combined performance. We collated information on net operating cash flows, excluding interest and tax. We selected this measure because it gives a more reliable indicator of earnings than non-cash measures, such as net profit after tax.<sup>111</sup> In looking at cash flows over a 20-year period, we adjusted them for inflation and changes in total grid demand. We have had to use estimates in places. (No results, for example, were available between 1999 and 2002).<sup>112</sup> As a result, the following should be treated as a broad guide to – rather than comprehensive assessment of – generators and retailers’ financial performance.

Figure 20 summarises the analysis. Between 1996 and 1998, cash flows averaged about \$1.7 billion a year. In 2003, the next year for which reliable data is available, cash flows were also about \$1.7 billion. Cash flows increased during the next two years to about \$2.2 billion and have averaged around that figure ever since.

According to our analysis, wholesale price movements have been the main cause of cash flow changes. As shown earlier in figure 14, wholesale prices increased markedly in the early 2000s, but have broadly moved in line with the cost of building new stations since then. Generators using existing plants, as opposed to the new, more expensive plants, also benefited from the higher wholesale prices from the early 2000s, and so their net cash flows increased.

<sup>109</sup> Ibid at 19, p18.

<sup>110</sup> Ibid at 18, p122.

<sup>111</sup> As noted in the technical paper, generation accounts for most of the combined earnings.

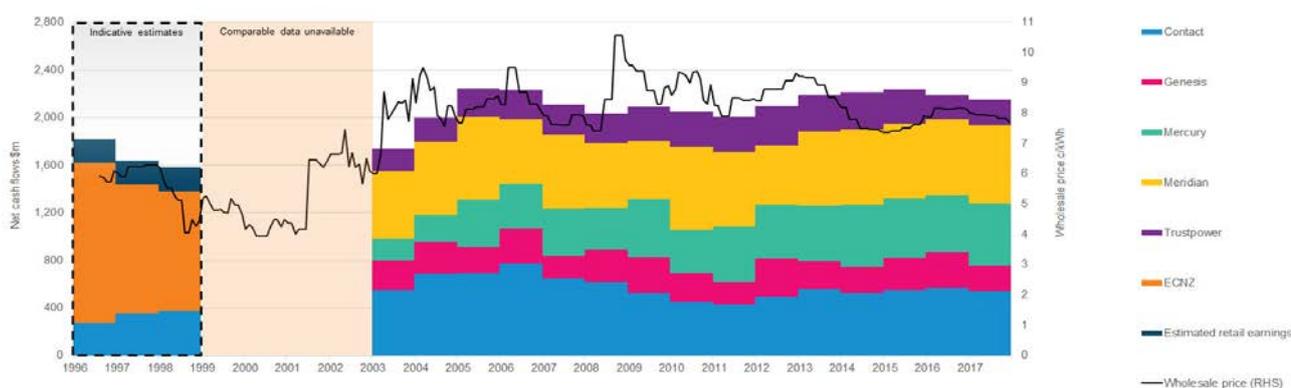
<sup>112</sup> A full description of the data and caveats is set out in the technical paper.

Some argue generators using existing plants should not benefit from increases in the wholesale price if their own costs don't change. In support of this argument, they cite the use of historic costs to calculate the regulated prices for network companies subject to price-quality regulation. If generation were charged on the basis of historic costs, this would be expected to lower electricity prices – potentially by a significant amount depending on how historic costs were calculated.

Moving to pay generators based on historic costs would require extensive changes to current market arrangements. Another way to achieve a similar outcome would be to charge generators for the use of water and geothermal resources, passing on some or all of the money as rebates to consumers to lower their power bills. Similarly, transmission charges paid by generators could be increased to lower the portion of charges ultimately paid by consumers. (See *Transmission*).

Others say generation is similar to other sectors such as housing where prices are set by supply and demand, not historic costs. Asset owners enjoy gains or suffer losses depending on whether prices go up or down. Proponents of this view note consumers can enter into contracts for set periods if they want to protect themselves against possible price rises. Generators also face the risk of falls in wholesale prices from oversupply or technological changes. This contrasts with regulated networks, where consumers bear these risks via the regulated price mechanism.

**Figure 20: Cash flows for generators and retailers**



Source: Concept Consulting analysis of company reports and other data. Wholesale contract price and net cash flows are adjusted for inflation and expressed in 2018 dollars. Net cash flows are volume-weighted.

Finally, those who say a market based approach should be used to set generation prices note that this has been the approach used for more than two decades. Switching to historic costs would be a major change. It would create significant uncertainty and potentially undermine the confidence of those considering building more generating capacity.

In summary, we have not identified any evidence to indicate generator-retailer profits are excessive compared to underlying costs. However, we note the lack of sufficiently detailed data means this is not a definitive assessment.

**What are your views on this assessment of generators and retailers' profits?**

## Transmission

The high-voltage transmission grid is the link between generators and the country's 29 distributors (as well as certain large industrial users). It transmits 93 per cent of all electricity. The remaining 7 per cent goes directly from generators to distributors or industrial sites. Transpower and the distributors are monopolies since it would be uneconomic to duplicate the national grid or local networks.

### Transpower's profits

Transpower is subject to price-quality regulation by the Commerce Commission – as are 17 of the 29 distributors. Price-quality regulation has two aspects (and applies in broadly the same way to the 17 distributors):

The first aspect, price, is about limiting Transpower's ability to make excessive profits. The Commission sets a maximum allowable price Transpower can charge.<sup>113</sup> It is set at a level that should allow Transpower to invest and maintain its network and earn enough profit to cover its capital costs if it operates efficiently. These capital costs are determined with reference to the weighted average cost of capital, or WACC. If its profitability is broadly in line with the WACC over the long term, it is not considered to be earning excessive profits.

The second aspect, quality, is about ensuring Transpower can satisfy consumers' demands for a good, reliable service. Minimum service levels are defined so Transpower doesn't make cost savings by reducing maintenance or investment on its network, which would threaten network reliability.

The price-quality regulation typically covers five years. At the end of each five years, the Commission assesses Transpower's performance during that period and resets price-quality targets for the next period. Transpower is midway through its current regulatory period, which runs from 2016 to 2020.

Overall, the regulation aims to create pressures like those faced by any company in a competitive market, with incentives to invest, innovate and improve efficiency. Transpower, and the distributors, have incentives to make efficiencies because they can retain part of any profits over their WACC, that is, over what the Commission has determined they need to earn as efficiently run businesses. Conversely, they partially bear any losses if they are inefficiently run.

When the Commission resets price-quality limits, it takes into account efficiency savings and profits made in the preceding five years. At that point, any profits above the WACC are progressively shared between Transpower and consumers. Consumers receive their share in the form of lower prices. The sharing of efficiency gains is a common feature of monopoly regulation internationally and we consider it necessary here.

We have been asked to look at whether Transpower is making excessive profits. An acceptable test is to compare Transpower's rate of return on investment (or profit) with its WACC. Figure 21 shows Transpower's profits and WACC between 2012 and 2017.<sup>114</sup> Transpower's profits exceeded the WACC in every year, but only marginally so in the first four years. In the next two, which were the start of a new regulatory cycle, profits relative to the WACC increased only because the WACC dropped. In reality, Transpower's profits dipped slightly during those two years.

Most of the profits above the WACC that are due to efficiency savings will eventually be returned to consumers via a regulatory mechanism known as the Incremental Rolling Incentive Scheme.

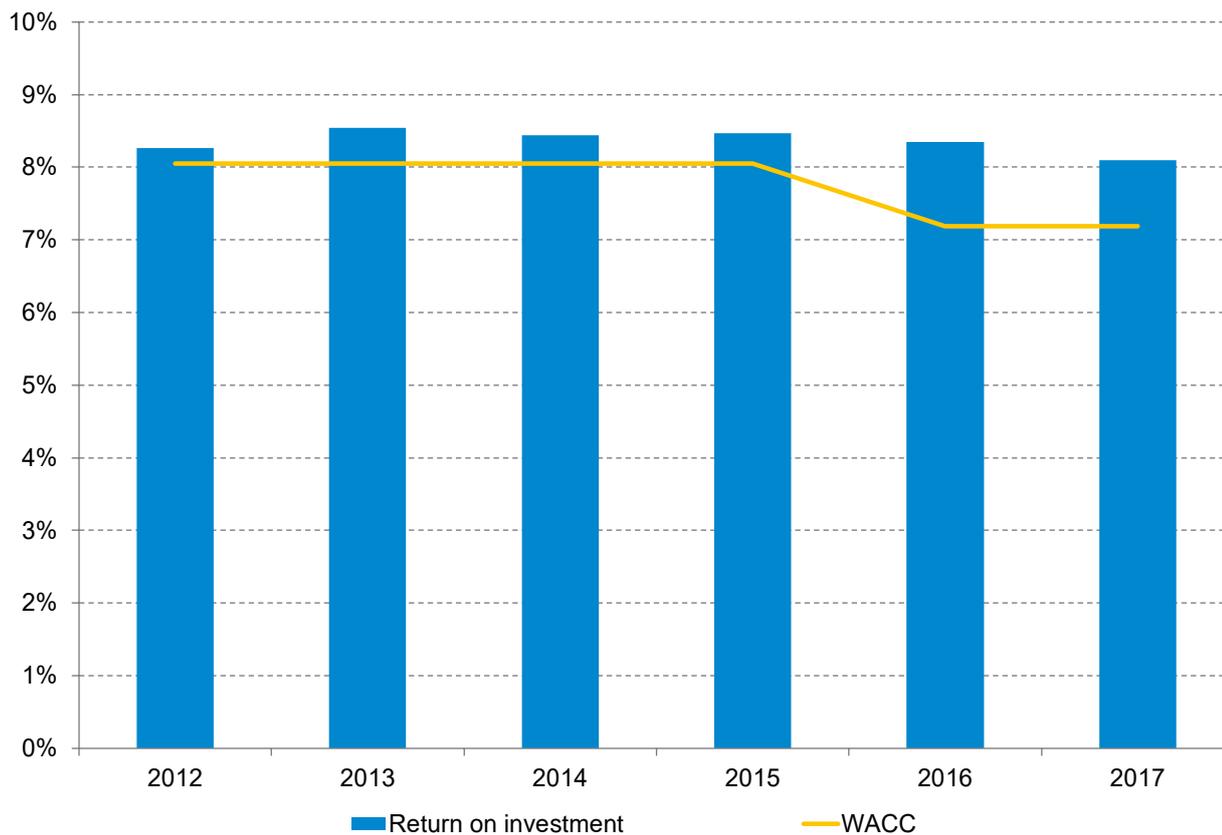
<sup>113</sup> It is expressed as a cap on revenues rather than prices for Transpower, but the effect is to cap Transpower's prices. For distributors, it is directly expressed as a price cap.

<sup>114</sup> The WACC was 8.05 per cent between 2012 and 2015, based on the 75<sup>th</sup> percentile, and 7.19 per cent in 2016 and 2017, based on the 67<sup>th</sup> percentile. Between the two regulatory periods, the Commerce Commission changed how it determined the WACC.

This allows Transpower to retain a third of excess profits over time, but pass two-thirds back in the form of lower transmission charges.

The Commerce Commission errs on the high side when calculating the WACC, rather than using a mid-point estimate. Some stakeholders consider this allows Transpower (and distributors) to make excessive profits. The Commission's response is that underestimating the WACC carries greater risks: it can increase the possibility of underinvestment, which can harm service quality and even result in major outages. The Commission also says its review of international practice shows erring on the high side is not unusual.

**Figure 21: Transpower's profits compared with WACC (2012–17)**



Source: Transpower information disclosure statistics.

Overall, we do not think the profits Transpower is making above its WACC are significant and do not warrant concern. The potential to increase returns acts as an incentive to achieve efficiencies, the results of which come back, in part, to consumers in subsequent regulatory periods, and this is a desirable outcome.

Finally, some stakeholders have previously questioned the methodology for determining asset values, a critical input in price-quality regulation. The Commerce Commission sets the methodology, and the current approach has been subject to extensive consultation, expert analysis and review by the High Court. We see no merit in reopening the methodology used for setting asset values.

### Reliability and upgrading the grid

Between 2007 and 2014 Transpower spent more than \$2.1 billion upgrading the transmission grid into Auckland, upgrading transmission in the central North Island for new geothermal generation, and

improving the inter-island cable.<sup>115</sup> Since then, it has made no further significant investments because of relatively low growth in electricity demand. If this trend continues, the grid is expected to be able to comfortably handle projected needs.

However, there is a growing view that New Zealand's economy will adopt electrification to reduce carbon emissions, and that this will significantly increase demand. The Productivity Commission<sup>116</sup> and Transpower have explored these implications in recent reports.<sup>117</sup> Both reports include forecasts of significant growth in electricity consumption as a result of sales of electric vehicles and the conversion of heat from industrial processes to electricity. Increased renewable generation is expected to meet this growth in demand, much of which will be connected to the transmission grid. If this happens, the grid will need significant investment to allow for plant connections and to provide for reliable transmission of wind and solar power generated electricity, which is by nature intermittent and which is expected to become more so.

This brings into focus the need for a durable, robust transmission investment and pricing methodology to support this investment, send clear price signals and support the potential de-carbonisation and electrification process.

### Transmission pricing

The transmission pricing methodology, or TPM, has importance beyond the basic question of who pays what share of Transpower's costs. It should also guide cost recovery in ways that:

- encourage efficient use of the existing grid, including investment decisions about where to install equipment that uses and generates electricity
- give industry participants incentives to provide accurate information for grid investment planning purposes.

The Electricity Authority began consulting on changes to the TPM in January 2012.<sup>118</sup> This process has proven contentious and costly and is not yet complete. In June 2018, the Authority reconfirmed its intention to continue the TPM review.<sup>119</sup>

Its focus has been consistent with its interpretation of its statutory objective of efficiency. In June 2018, the Authority said it had not made any final decisions, but expected to propose TPM guidelines that would:

- charge those who benefit from new grid investments for the associated costs, and
- charge them also for the costs of some recent major investments, including significant upper North Island projects.

It added that it was "considering pragmatic options for [this] latter category of investments."<sup>120</sup>

Some stakeholders support this approach. Others argue the first of these goals (allocation of new investment costs) is of low priority because the wholesale market already sets prices that vary by location, and the Authority's preferred method for charging those who benefit from such investment is unduly complex and unsound.

<sup>115</sup> This includes the North Island Grid Upgrade (\$894m), Wairakei Ring Upgrade (\$141m), North Auckland and Northland Project (\$426m) and inter-island cable upgrade (\$602m).

<sup>116</sup> Ibid at 69.

<sup>117</sup> Ibid at 68.

<sup>118</sup> Work originally began under the Electricity Commission and industry working groups.

<sup>119</sup> Electricity Authority, Next Steps for the Electricity Authority's TPM Review, June 2018.

<sup>120</sup> Ibid at 119.

Many of those same stakeholders – as well as others – also say reallocating the costs of past investments will be a wealth transfer without any worthwhile efficiency benefits. For example, the TPM Group representing 11 organisations said it opposed the proposed approach because it would “[attach] penalties to sunk investments and [create] new fairness and equity issues.”<sup>121</sup>

We are unaware of any other country undertaking retrospective reallocation of past grid investments. Indeed, some say retrospective reallocation is the principal obstacle to progress on a new TPM. They say agreement could be reached more readily if a new TPM were confined to future investments – a feature of overseas transmission pricing.

It is not our role to arbitrate on this intense and potentially litigious debate. It is the Authority’s job to develop TPM guidelines. Our task is rather to stand back and ask whether, from a policy and not operational perspective, the TPM debate can tell us anything useful about how reforms are introduced in order to determine a TPM that delivers efficient, durable, and fair outcomes. Several issues emerge.

## Process

The Authority’s process for developing TPM guidelines has been under way for six years and has been subject to considerable consultation, submissions and expert reports. The Authority has announced its next steps, although there is no firm timetable.<sup>122</sup>

Even when the Authority develops guidelines, there are more steps: Transpower must follow the guidelines to develop a pricing methodology; it must then go back to the Authority to seek approval for its methodology; and the Authority then gives or withholds its approval. If approval is withheld, Transpower has the opportunity to revise the methodology. However, if the Authority still withholds approval, it must develop the methodology itself. Once the methodology is finalised, Transpower implements it from 1 April of the following year.

It is apparent implementation of a new TPM may be years away. Experience to date indicates timelines are challenging because of the complexity of the issues and divergent stakeholder interests. Legal challenges seem likely, given the amount of money at stake. We estimate such legal challenges alone could delay implementation by several years or more. And Transpower has said the complexity of the Authority’s December 2016 proposal means it would take two to three years to implement.<sup>123</sup>

Stakeholders have also referred to the ‘opportunity cost’ of giving so much attention to the next iteration of the TPM. Some, for example, consider improving distribution price structures to be more urgent and believe the TPM focus may divert the attention of the Authority and industry from this question. This is especially important if, as some say, distribution pricing reform is necessary to facilitate decarbonisation and get the full benefits of emerging technology.

Despite holding divergent views on the preferred TPM, all stakeholders agree the process has been slow and costly. One participant said: “The mere fact that the TPM issue has gone on so long is itself an issue.” Another said: “The only winners in this process have been the lawyers and experts.” Many, too, impressed upon us the need for certainty and for the TPM process to “be brought to a conclusion one way or the other speedily.”

A government policy statement on the electricity industry is something to which the Authority – or indeed, any regulator – must have regard.<sup>124</sup> Whether more use should be made of such statements to guide significant reform is a pertinent question. Such guidance may well be useful, even at this stage, to clarify the next stage of the TPM review. Or there may be other ways to achieve this result.

<sup>121</sup> TPM Group, letter to Electricity Price Review Panel, 17 July 2018.

<sup>122</sup> Ibid at 119.

<sup>123</sup> Transpower submission to the Electricity Authority, TPM 2nd issues paper, supplementary consultation, February 2017, p5.

<sup>124</sup> Section 17 of the Electricity Industry Act 2010 contains the ability to provide a government policy statement.

## Timing

Others, however, have questioned the need for urgent change to the TPM and cited the following reasons to put reform on hold:

- A well established and effective grid investment test already exists to assess any major grid investments, should they emerge in the near term.
- An aggressive de-carbonisation strategy is a real prospect. It would involve a radical expansion of renewable electricity generation. Adjustments to the TPM might be desirable to facilitate this strategy, in which case it could be better to defer any TPM changes in the meantime.
- The cost and effort of TPM reform is disproportionate to the expected impact. Transmission makes up only 10 per cent (before GST) of the total electricity sector's cost,<sup>125</sup> and the Electricity Authority estimated its December 2016 proposal would result in a typical residential consumers' annual bill going up or down by about \$50.<sup>126</sup> (See *appendix B* for more details).

In the meantime, investment decisions about new generation and power using facilities are guided by a combination of the wholesale electricity market prices, which are location specific, and the existing TPM. This includes some beneficiary based charges, and spreads other transmission costs across numerous parties through the interconnection charge.

The Electricity Authority, unsurprisingly, has a different view. It believes it is critical a new TPM is in place as soon as possible, especially given the prospect of increased electrification. It considers the existing TPM is an obstacle to New Zealand getting on the most efficient path to a low emissions economy, and that its proposed changes will help ensure the right investments are made, in the right place and at the right time, which is vital to reaching a low emissions future at the least cost.

## Fairness

Fairness related concepts were not carried over into the Electricity Authority's statutory objectives as part of the reforms in 2009. A challenge for any TPM, particularly from a fairness perspective, is that a significant share of transmission costs are common in nature, and have typically ended up being spread across all consumers. The Authority's work seeks to reduce the scale of this by attributing more costs to particular grid users, but some sharing of costs will still be needed even in the best-case scenario. How to achieve this raises difficult practical questions.

Much of the debate has been about fairness. Two quotes from submissions on the Authority's 2016 consultation document illustrate some of the contrasting positions on this matter:

*"I believe in user pays and it's unfair ...to be subsidising transmission charges... if you live further from the power generation sites you pay accordingly."*

*"It is not fair... for consumers in some regions to pay more in transmission charges to benefit large generators and corporations. Transmission should be funded equally by all users of the grid."<sup>127</sup>*

These quotes highlight some stakeholders' concerns about the regional aspects of transmission pricing. Such concerns are understandable, but other factors can have an equal or greater impact on consumers. For example, the regional variation in distribution charges (which includes transmission charges) is currently more than \$1,000 a year for households with usage of 8,000kWh, depending on where they are.<sup>128</sup>

<sup>125</sup> Electricity Authority, *Electricity in New Zealand 2016*, p7.

<sup>126</sup> Submissions on the Electricity Authority's, *Transmission Pricing Methodology*, second issues paper. Appendix F: TPM supplementary complementary consultation modelling results.

<sup>127</sup> Ibid at 126.

<sup>128</sup> See appendix B for more information.

These quotes demonstrate, too, that changes to the TPM may alter the share of transmission charges paid by different grid users – such as between residential and business consumers, and by generators. The Authority’s December 2016 proposal would have reduced the share of charges paid by generators and increased the proportion ultimately paid by residential and business consumers including those in poorer regions like Northland, King Country and Asburton. (See *appendix B*).

Some say efficiency is not a practical test to apply in determining how to allocate the costs of existing grid assets, and that fairness is a more relevant criteria. This begs the question whether the Authority’s statutory objective needs to be broader than just an efficiency test. Would it be beneficial to reinstate fairness in the Authority’s statutory objectives? This question of fairness is discussed further in *Regulation*, since it goes beyond the TPM debate.

We asked the Authority – putting aside that fairness is not a statutory objective – whether a fairness objective would have led it to promote a different TPM. It responded that it would have developed the same guidelines. A key reason was that an unfair TPM would not enjoy widespread support and would not last. The Authority considers a new TPM would be more durable, and by implication fairer, if based on a user-pays principle.<sup>129</sup>

## Regulation of TPM

The Commerce Commission determines Transpower’s total revenue (‘the size of the pie’), and the Electricity Authority determines how charges are allocated among Transpower’s customers (‘slicing that pie’).

Some stakeholders consider one regulator should undertake both tasks. For example, the TPM Group said responsibility should be transferred to the Commerce Commission. Reallocating responsibilities could create different boundary issues if there were still two regulators because transmission pricing structures can affect wholesale market arrangements and vice versa.<sup>130</sup> New Zealand is not alone in splitting responsibility for transmission revenue setting and pricing between different bodies, as discussed in *Regulation*.

In summary, we do not intend entering in the debate about the merits of any TPM guidelines proposal. Instead, our focus is on the high-level question of how the process of transmission pricing reform could be improved to achieve a timely, cost-effective and ideally simple resolution that has broad support. We are seeking suggestions on the procedural and structural issues arising from these matters. Please do not submit detailed analysis of the current or any new TPM: as noted above, we are not arbiters of this debate.

**What are your views on the process, timing and fairness aspects of the TPM?**

<sup>129</sup> Electricity Authority, note to the Electricity Price Review Panel, 6 July 2018.

<sup>130</sup> For example, the structure of transmission charges can affect the behaviour of users and generators in the electricity spot market. Likewise, the design of the spot market can affect the behaviour of users and generators, and the need to build transmission.

## Distribution

New Zealand's 29 distributors convey electricity from Transpower's high voltage grid to consumers throughout their networks. They range in size from 5,000 to 500,000 connections and are owned by trusts, local bodies, cooperatives and companies. Distribution costs make up about 25 per cent of the total cost of electricity delivered to consumers. Most are infrastructure related and fixed.

### Distributors' profits

The Commerce Commission subjects 17 of the 29 distributors to 'default price-quality regulation,' which in very broad terms sets maximum prices and minimum quality levels. The remaining 12 distributors are exempt from this regulation because they are relatively small and owned by local community trusts and are deemed to be working in their consumers' interests. They are free to set their own prices and quality levels, although they must publish detailed information each year about their financial and operational performance. Distributors covered by default price-quality regulation can apply to the Commission for a customised price-quality regulation that takes account of its alternative needs, such as increased investment in its network. Orion had such a need after the Canterbury earthquakes.

We have been asked to look at whether distributors are making excessive profits.<sup>131</sup> An accepted way to do this is by comparing distributors' rates of return on investment, or profit, with the weighted average cost of capital, or WACC. To do this, we examined the five years from 2013 to 2017. For the first three years, the Commission set the WACC at 8.77 per cent a year, and for the next two (when a new regulatory cycle began) at 7.19 per cent a year, a fall of 18 per cent.<sup>132</sup> Figure 22 shows that comparison for the first three years, and figure 23 shows it for the next two.

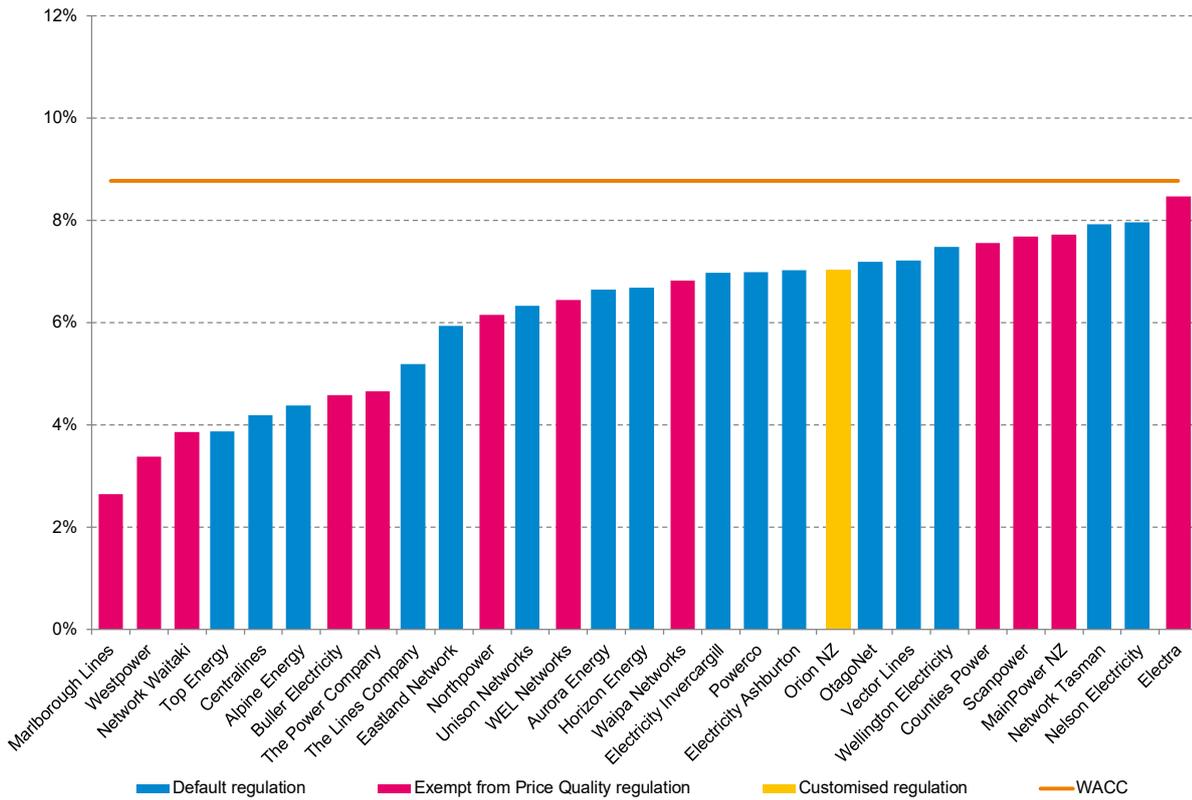
Figure 22 shows that between 2013 and 2015 no distributor made a profit greater than the WACC.<sup>133</sup> Figure 23 shows that in the next two years 11 distributors made a profit greater than the WACC, although for some it was only marginally more. Between those two periods, distributors' profits rose from an average of 6.2 per cent to 6.6 per cent.

<sup>131</sup> This analysis includes only distributors' natural monopoly operations, and excludes any other business activities they may own and operate.

<sup>132</sup> Certain changes to the regulatory regime in 2013 made it difficult to include the two previous years of the five-year cycle in the comparison.

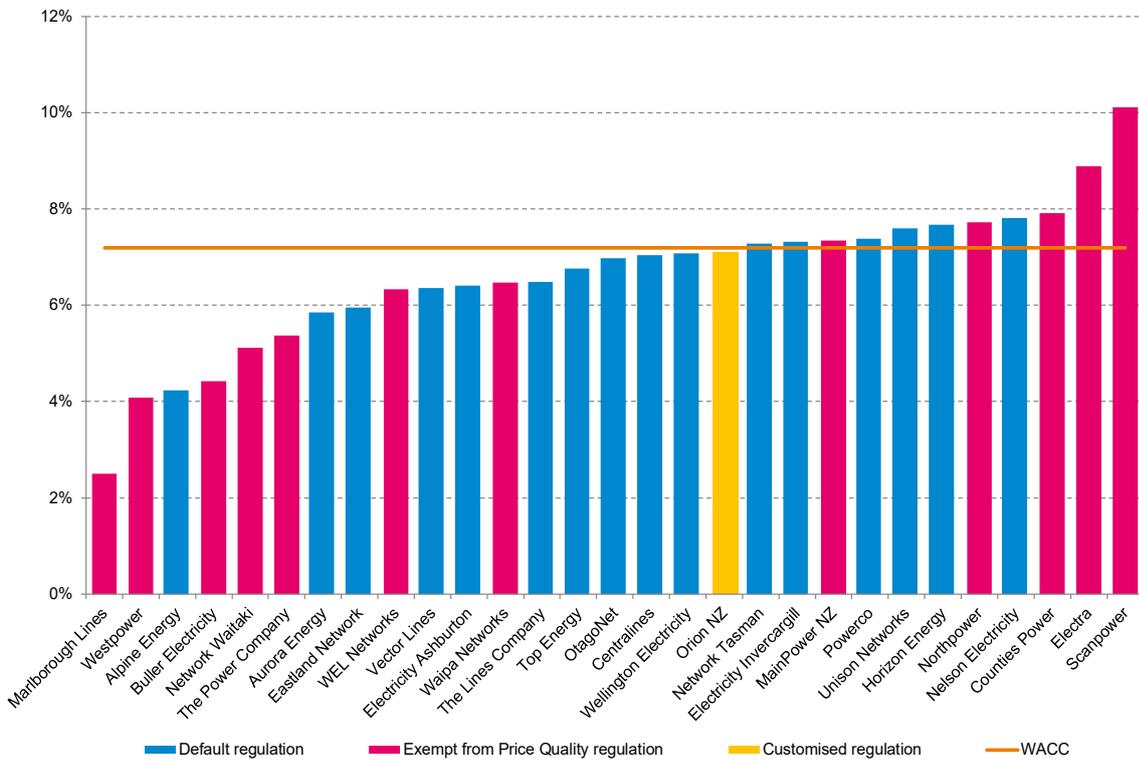
<sup>133</sup> Profits exclude financial incentives and wash-ups

**Figure 22: Distributors' profits compared with 8.77 per cent WACC (2013–15)v**



Source: Ministry of Business, Innovation and Employment analysis of Commerce Commission data.

**Figure 23: Distributors' profits compared with 7.19 per cent WACC (2016–17)**



Source: Ministry of Business, Innovation and Employment analysis of Commerce Commission data.

Distributors' profits vary widely, as do their costs, which can be affected by factors including the size and topography of their area and whether consumers are concentrated or spread thinly. Different ownership structures can also affect profitability and pricing.

Stakeholders say there is potential for distributors to cross-subsidize any competitive businesses they own from their monopoly network business. Such activity could disguise the monopoly's true profitability and give an unfair advantage to its competitive business interests. They cite some distributors' recent investments in new technology such as electric vehicle chargers and batteries (which the Commerce Commission is looking at), but we are unaware of any proven cross-subsidization. Nevertheless, we welcome comments on this point.

In summary, some distributors are making profits above the WACC, but for most it is a marginal amount. See also the discussion on asset values in *Transmission*.

## What are your views on this assessment of distributors' profits?

### Barriers to greater efficiency

We have been asked to examine whether there are any barriers to greater efficiency in the distribution of electricity. We have identified seven areas where there is potential for improved efficiency.

### Price structures

Peak demand is all-important for distributors. Their networks can have ample spare capacity in off-peak periods, but it counts for little if they struggle to cope on winter evenings, for example, when everyone comes home to turn on lights, warm the house, have a shower and – as we eventually expect – recharge the family car.<sup>134</sup> As peak demand grows, so does the need to build more network and generation capacity. Eventually the consumer has to pay for this outlay. One distributor, for example, has said it estimates the need to accommodate peak demand contributes to nearly half of its costs.

Most residential and small business consumers pay a flat amount per kWh for distribution, regardless of what time of the day or night or season they use it. However, peak demand strains networks and brings forward the need for investment. The current flat pricing structure fails to take account of these facts.

There is a chance that measures to make the economy carbon free will lead to many more electric vehicles and the widespread recharging of electric vehicles at homes. Under the existing flat distribution price structure, this is likely to magnify demand in evening peak hours and add a huge burden to networks, possibly requiring an expansion of network capacity, adding greatly to distribution charges. One study puts the cost as high as \$2.1 billion over the next 30 years if existing price structures are kept.<sup>135</sup> Any increased network cost would fall on all consumers, not just electric vehicle owners. Non-owners would, in effect, help to pay for investment from which they received no benefit.

Changing distribution charges so they more accurately reflect costs would send a clear signal about the infrastructure costs of meeting peak demand and would delay – or possibly avoid altogether – the need for costly upgrades. This point applies to all electricity usage, but would be especially relevant to electric vehicles owners, many of whom would not care whether recharging of their vehicle began at 6.30pm or 11pm, as long as it was ready for use the next morning.

<sup>134</sup> A handful of distributors offer electric vehicle recharging plans, but there have not been many takers. Some distributors are using the opportunity to trial how recharging affects the load on their grids.

<sup>135</sup> Concept Consulting, *Driving Change – issues and options to maximize the opportunities from large scale electric vehicle uptake in New Zealand*, March 2018.

The current structure of distribution charges is also distorting decisions about installing solar panels, according to a study by the New Zealand Institute of Economic Research.<sup>136</sup> It says installing solar panels will seldom reduce peak demand (and hence costs) on distribution networks because solar panels cannot generate energy on cold winter evenings. However, a high proportion of distribution costs do not vary with demand and are recovered via variable usage charges rather than fixed charges. As a result, households able to afford solar panels will reduce their contribution to distribution costs, leaving the shortfall to those without solar panels. This shifting of solar panel related costs has also been identified as a significant issue in Australia and Europe, where the burden has been found to fall hardest on the very poor.

Restructuring distribution prices could be justified on the grounds of fairness, efficiency and better reflection of costs, but it would come with challenges:

- There would inevitably be winners and losers, as demonstrated by consumers' experience of The Lines Company, which changed from consumption based prices to peak demand based prices. (*See Affordability*).
- Some consumers don't like change or are unconvinced it would bring benefits.
- Some consumers who have invested in technology on the basis of existing price structures would resist change.
- Trade-offs would be needed between simpler, more practical solutions and more targeted and technical solutions. A straightforward peak/off-peak division would be an example of the former; dynamic prices (which change constantly, including in response to other consumers' consumption) and price variations by location would be examples of the latter.
- Retailers use various means to bundle distribution charges with electricity usage charges, making it difficult to unpick the two.
- Current regulations may hinder the ability to change pricing structures. As discussed in *Regulation*, low fixed charge tariff regulations are exacerbating inefficient price signals to consumers, and causing some unintended shifting of costs, including on to some of those in greatest energy hardship.

We think distribution pricing should more accurately reflect the costs of distribution networks. We also think prices need restructuring in time to catch a wave of investment starting to build.

The industry is working on initiatives to make distribution pricing more accurately reflect costs, including time-of-use pricing and demand and capacity charges. Such changes can result in sharp price rises for some consumers. The industry is installing smart meters and collecting metering data in preparation for any changes. Many distributors expect pricing changes to begin in 2020 to coincide with the next cycle of the Commerce Commission's default price-quality regulation, which should give them more flexibility to change prices.

### Efficiency pressures

The 12 community owned distributors are exempt from price-quality regulation because, as noted, they are assumed to be working in their consumers' best interests. However, it is unclear how much pressure this creates to improve efficiency and reduce costs. These 12 distributors serve about 400,000 consumers, or a fifth of the total, so it is vital they have strong incentives to lift their efficiency.

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<sup>136</sup> NZIER, Effects of distribution charges on household investment in solar, September 2015. This study found high consumption charges relative to fixed charges will encourage investment in solar panels of between \$2.7 billion and \$5 billion, much of it in the next 10 years, and this investment is premature and will shift the burden of distribution charges to those without solar panels (chiefly lower-income consumers), as well as raise those same consumers' power bills by 10 per cent.

There may be scope to strengthen the pressures to lift efficiency among distributors subject to price-quality regulation. The Commerce Commission is currently prohibited from using performance benchmarking to set default price-quality regulation. It says benchmarking is “used widely overseas” and “can be a useful tool” (albeit with some limitations).<sup>137</sup> Others have questioned whether the complexity of parts of the price-quality regime deadens incentives to cut costs.

In addition, some have pointed to the apparent duplication of networks’ core systems as a sign of potential inefficiency. We understand most, if not all, distributors own their supervisory control and data acquisition systems, despite the significant costs of developing and operating bespoke systems.

## Business size

New Zealand has a lot of distributors relative to its size: 29 serve a population of five million compared with Australia’s 15 for a population of 25 million, and the United Kingdom’s 15 for a population of 66 million. The small size of some distributors has been cited as a possible barrier to efficiency.<sup>138</sup>

The International Energy Agency review found opportunities for economies of scale, more cost-effective investment and better performance by merging some distributors, sharing management and other services, and forming joint ventures to look after distributors’ assets.<sup>139</sup> It also said having fewer and bigger distributors might result in price-quality regulation being extended to some community-owned distributors – which are exempt if they have fewer than 150,000 consumers – and considered this would make for more consistent, more effective regulation of distributors.<sup>140</sup> However, one stakeholder said smaller distributors might be discouraged from amalgamation by the costs of price-quality regulation.

However, Energy Trusts of New Zealand, most of whose 22 members own shares in distributors, engaged a British regulatory expert to review the International Energy Agency’s findings. Professor George Yarrow found “no convincing [international] evidence of significant economies of scale in electricity distribution, other than at very small scale.”<sup>141</sup> He said New Zealand’s distribution sector was less fragmented than countries such as Denmark, Finland, Norway, and Sweden, and considered amalgamations “no panacea for corporate governance problems” and might even reduce experimentation.<sup>142</sup>

Given these opposing views, we looked at other research and found a handful of studies, including Canadian research that found utilities’ minimum efficient size to be about 20,000 consumers.<sup>143</sup> An earlier study by two New Zealand authors found 30,000 consumers to be the minimum efficient number.<sup>144</sup> Half of New Zealand’s distributors are below this figure.

We also examined distributors’ published data on operating costs in 2017, which is set out in figure 24.<sup>145</sup> It shows most small distributors have higher operating costs per consumer than big distributors, although the pattern is far from uniform. Whether consumers are close together or widely dispersed will account for some of this difference, as will the terrain of distributors’ regions. Although not conclusive, the evidence suggests a link between distributors’ size and operating costs, especially among the smallest distributors.

<sup>137</sup> Commerce Commission memorandum to Electricity Price Review Panel, 8 June 2018.

<sup>138</sup> Bigger distributors may also be in a better position to take advantage of new technologies because of the necessary investment in sophisticated asset management software

<sup>139</sup> Ibid at 23, p161.

<sup>140</sup> Ibid at 23, p161.

<sup>141</sup> G. Yarrow, The International Energy Agency’s 2017 Review of New Zealand, 2018.

<sup>142</sup> Ibid at 141 p19.

<sup>143</sup> A Yatchew, Scale Economics in Electricity Distribution: a semiparametric analysis, Journal of Applied Econometrics, 15, 2000, p202.

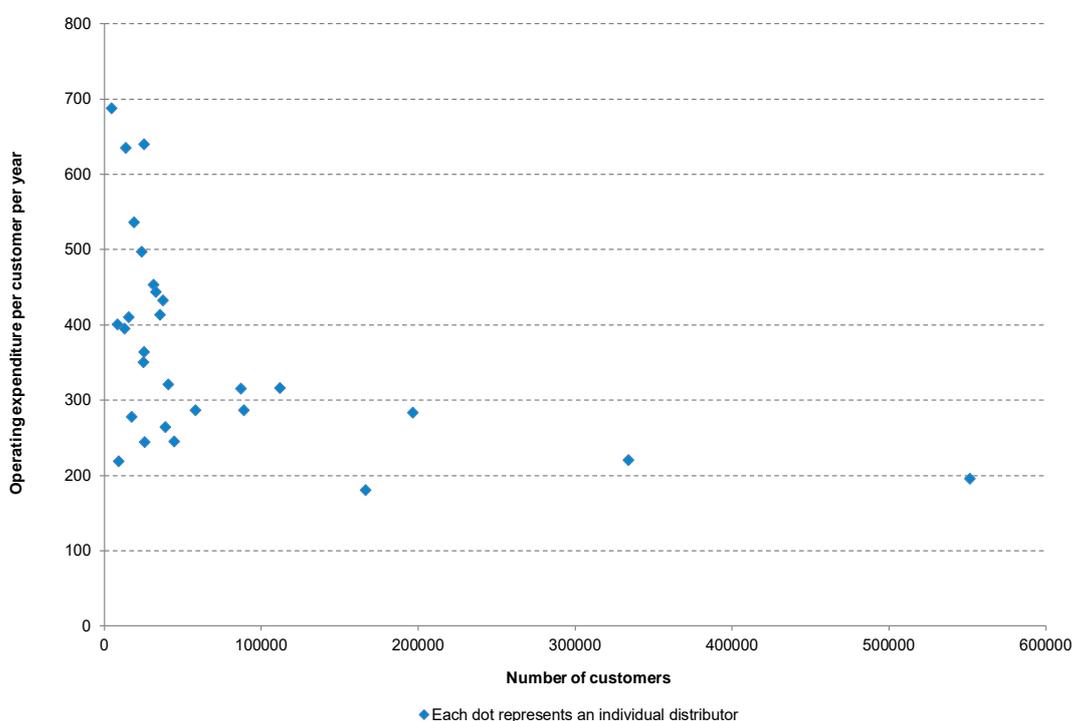
<sup>144</sup> Ibid at 143, p202.

<sup>145</sup> Operating costs are defined as spending on routine and corrective maintenance of networks and general asset renewal and replacement. It also includes administration of the network. It does not include capital expenditure, depreciation or financing costs.

Efficiencies of scale are possible by means other than amalgamation, such as contracting between distributors and joint ventures. Some distributors have already headed down this path. Network management company PowerNet looks after the networks of The Power Company, Electricity Invercargill and OtagoNet, which together service almost 70,000 consumers. Centralines contracts out the vast majority of its functions to its neighbour, Unison. Both PowerNet and Unison have reported improvements in efficiency, operational reliability and governance from these arrangements.

Collaboration is another way for distributors to achieve efficiencies. The Electricity Network Association says collaboration among its members is increasing and has resulted in efficiencies. It cites coordinated emergency responses, the sharing of services and meetings of South Island chief executives. However, we feel greater collaboration is possible. We are interested in ideas that might encourage alternative business models and more collaboration between distributors.

**Figure 24: Distributors’ operating expenses per consumer**



Source: Commerce Commission.

### Metering data

Businesses have already invested a great deal in smart metering that can provide detailed data about consumers’ consumption. Some say this investment is unwarranted, while others say it is a good basis for technological innovation. Either way, this investment has already happened and is a sunk cost.

Some distributors are dissatisfied with the commercial terms offered by meter owners for access to consumers’ voltage and consumption data. They say this data will help them detect and fix outages, and will be vital to making the right investment and management decisions as new technologies start to radically change the pattern of power flows on distributors’ networks.

Approval is often needed from retailers before distributors can access the data. Some retailers have objected to distributors accessing some types of data, in particular kWh consumption, which they consider commercially sensitive and potentially a breach of consumers’ privacy.

We think metering data should be readily available on reasonable commercial terms so distributors can properly manage their networks, including making decisions about maintenance and upgrades and managing power outages more promptly. Outages to Vector and Counties Power's networks after storms in April 2018 illustrate the current difficulties. Vector did not have timely access to metering data for its network area, delaying the restoration of power. In contrast, Counties Power owns many of the meters in its network and was able to restore power more promptly. We note that some meter owners are developing tools to provide voltage and outage data as a commercial service.<sup>146</sup>

We see some merit in one stakeholder's suggestion of an open-access regime for meter data with standardised terms and conditions for all parties. This could take the form of a virtual central repository for metering data, giving distributors better information to maintain their networks and avoid costly upgrades. Access to usage data is likely to assume increasing importance as more consumers generate and use more electricity. However, access to certain types of data may become contentious if distributors become more involved in competitive parts of the electricity supply chain.

## Governance

Some stakeholders are concerned about the governance of the distribution sector. A report in 2016 by the Office of the Auditor-General referred to the inherent risk of distributors investing in areas outside their normal field of expertise.<sup>147</sup> Investments outside an organisation's core business are inherently riskier because the board and management may lack the relevant experience to make such investments.

Given the immense challenges worldwide facing electricity sectors, including the introduction of de-carbonisation policies and the rapid pace of technology changes in generation and storage, there is little room for poor governance. The International Energy Agency's review noted concerns about "the governance and decision making capability of some distributors and their capacity of manage this potentially complex transition in an efficient and timely manner that will help to realise the potential consumer benefits."<sup>148</sup> Some stakeholders have suggested that alternative business models, joint ventures and collaborations could lead to improvements in corporate governance.

## Asset management and planning

The Commerce Commission requires distributors to publish 10-year asset management plans. Ten years is a relatively short time for such infrastructure planning – a point the Office of the Auditor-General also made, adding that effective management planning required a lifecycle approach.<sup>149</sup>

We agree and think a 10-year horizon doesn't encourage distributors to consider the longer-term impact of emerging technology or the transition to a low emissions economy. Forecasting demand over long time periods is not easy, especially for some smaller distributors, but we nonetheless consider it would improve asset planning. We note the Commerce Commission is already working on initiatives to improve asset management.<sup>150</sup>

## Ageing assets

We have been told many distributors' assets are coming to the end of their useful life and need replacing, and that some distributors will struggle with the task. However, official information disclosures suggest otherwise. Capital expenditure is forecast to increase by about 15 per cent over the next 10 years. This scale appears manageable. The Commerce Commission has carried out

<sup>146</sup> N. Wilson, letter from the ERANZ data working group to the Commerce Commissions, August 2018.

<sup>147</sup> Controller and Auditor-General, Energy Sector: Results of the 2014/15 audits, 2016, p23.

<sup>148</sup> Ibid at 23 p160.

<sup>149</sup> Controller and Auditor-General, Managing the assets that distribute electricity, 2017, p24.

<sup>150</sup> Commerce Commission, Review of asset management plans.

analysis that supports this view. For now, we do not consider there are grounds for concern over the replacement of assets.

## What are your views on this assessment of barriers to greater efficiency for distributors?



### Allocation of distribution costs

#### Business versus residential

As we noted in *Prices*, commercial and industrial consumers once paid a bigger share of distribution costs than residential consumers, and this was reversed over the years due to various reforms. Since 1990 and now, distribution costs for householders have risen 548 per cent, while those for commercial and some industrial businesses have fallen 58 per cent.

The scale of this reallocation raises the question of whether the process has gone too far. To get a clearer idea of the current allocation, we compared the share of total distribution charges paid during 2017 by residential consumers on each network with their share of energy used on that network. We compared those payments with what are called incremental and standalone cost allocations.<sup>151</sup> The analysis was repeated for business consumers. This analysis, despite some qualifications, gives a good overview of how costs are being allocated between residential and commercial consumers.

Compared with usage, businesses on affected networks are paying on average less than a proportionate share of distribution costs, and residential consumers are paying more. We estimate householders' average yearly bill could fall by \$90 (including GST), or about 4.5 per cent, if business and residential allocations were brought into line with usage on all networks. Businesses' average yearly bills would increase by about 5.5 per cent.<sup>152</sup>

Making such an adjustment would need to be considered against two criteria: economic efficiency and fairness. As to the first, some businesses might in theory disconnect from the network if their distribution costs rose, which would clearly be an inefficient outcome. However, we think the risk of this is slight and could be managed efficiently by distributors offering discounts in any specific cases where disconnection was likely. We also note that many of the largest industrial consumers for whom electricity is a major cost (such as pulp mills and smelters) are not connected to a distribution network, and would therefore not be affected.

As to fairness, current outcomes may be considered fair on the basis that common costs are allocated in a similar way to peak related costs. Conversely, it could be argued it is unfair for some householders to struggle to heat their homes or pay power bills while also paying a larger share of common costs.

Fairness may dictate a need for some distributors to readjust shared network costs between residential and other consumers. By exactly how much is a matter on which we seek your views.

#### Urban-rural costs

Providing services to rural consumers generally costs more than to urban consumers, although many distributors' prices don't differentiate between rural and urban consumers. Some in the industry argue this amounts to urban consumers subsidising rural consumers. But this does not stand up to scrutiny

<sup>151</sup> Incremental costs are those arising from residential consumers' assessed contribution to network peak demand, plus the costs of any 'connection assets' (such as poles and fuses) needed solely for supplying residential consumers. Standalone cost is defined as the lowest cost alternative for serving each consumer or consumer group. In this analysis for residential consumers it is estimated as the total network costs minus the incremental costs calculated for business consumers. A cross-subsidy exists if any user or group of users pays less than its incremental cost or more than its standalone cost.

<sup>152</sup> See the technical paper.

when revenues and costs are assessed and compared using the incremental-to-standalone measure – except in the case of extremely remote rural consumers.

Others say forcing the use of urban and rural categories would add needless complexity and cost to network pricing. Furthermore, they say such a step could spur some rural consumers to disconnect from the grid in favour of solar panels and/or diesel generators, leaving others to pay the network costs – which would be an inefficient outcome. From a fairness perspective, forcing the use of urban-rural pricing would make it even harder for rural low-income consumers to pay their electricity bills.

In some remote locations, distributors are already encouraging on-site generation and batteries because it is more cost-effective than maintaining overhead wires. However, legislation prevents existing consumers from being disconnected without their consent. Powerco is seeking consent from some consumers to use alternative means of supply where economically viable.<sup>153</sup> It says the biggest hurdle is getting consent from all affected consumers. Powerco suggested we consider the fine tuning of relevant legislation to make this step easier. Although we note the problem may resolve itself when alternative technologies become more reliable and cheaper.

### **What are your views on this assessment of the allocation of distribution costs?**

#### **Outlook for electricity distribution**

Emerging technologies may well have the greatest bearing on the future of the distribution sector. The International Energy Agency says distributors' governance and decision making capabilities need examination in view of the complexities of integrating emerging technology.<sup>154</sup> The Productivity Commission made similar observations about the increasing sophistication needed to operate new distribution service models.<sup>155</sup>

Other stakeholders questioned whether the supply of qualified and experienced electrical technicians is adequate to meet the potential surge in demand created by emerging technologies. The Electricity Engineers' Association says a skills shortage is possible if the training of such people does not keep pace.

The International Energy Agency says distributors will need to buy business systems to handle the integration of new technologies into their networks. It foresees two possible business models:<sup>156</sup>

- the value adding services model in which distributors are actively involved in new markets to exploit emerging technologies and increase profits
- the platform provider model in which distributors act as neutral facilitators and provide information, system operations and network infrastructure for others.

Whichever model is adopted, it seems likely there will be more small-scale generation such as solar power plus a significant growth in demand from electric vehicle recharging. That will mean a corresponding need for more active management of distribution networks. One possible solution is establishing distribution system operators that coordinate the buying and selling of electricity over a distributor's network.<sup>157</sup> Distributors may not necessarily own these operators.

### **What are your views on this assessment of challenges facing electricity distribution?**

<sup>153</sup> The Electricity Industry Act 2010 requires distributors to maintain services, whether by lines or alternatives to lines, to places that were supplied in 1993.

<sup>154</sup> Ibid at 23, p160.

<sup>155</sup> Ibid at 73, p344.

<sup>156</sup> Ibid at 23, p141.

<sup>157</sup> Ibid at 73, p344.

## Part Five: Technology and regulation

Technological advances have the potential to profoundly alter the way the electricity sector works. This part examines the potential effects on consumers, the industry and the country. It also looks at whether the regulatory framework is able to respond to change of this scale.



### Technology

The electricity sector stands on the threshold of change that – depending on each participant’s role – will be disruptive, unpredictable, promising or hardly noticeable. To date, change has consisted mostly of making the current one-way system bigger. Generators supply a waiting base of consumers. But consumers with solar panels and batteries are starting to turn this into a two-way system.

Electric vehicles are another transformative technology. Their numbers are tiny but they will eventually be commonplace. They, along with solar panels and batteries, will disrupt the electricity market and its business models and have the potential to cut people’s overall energy costs by substituting electricity for fossil fuel use in transport. This is already happening elsewhere. In Norway in 2016, 40 per cent of new car sales are electric. In Germany, some power companies will top up householders’ electric vehicles for free overnight – provided consumers allow their car’s batteries to be drawn from in an emergency.

In California, solar panels will be compulsory in all new homes by 2020.<sup>158</sup>

Overseas, strong sales of electric vehicles and solar panels have generally been the result of government subsidies, rebates or tax deductions. The proliferation of solar panels has nearly overwhelmed the capacity of some countries’ networks and threatened their reliability. Several countries, including Australia and Germany, have scaled back or cancelled solar panel subsidies to let a more balanced and integrated system emerge.

New Zealand has avoided these problems because sales have been modest without subsidies. It has yet to experience the full benefits or problems of these technologies. Looking to the future, distributors, retailers and new companies are likely to offer products allowing people to manage their consumption better. Systems will develop to allow those who generate their own power to sell it to others (‘peer-to-peer trading’). Alternative payment systems will also be possible, such as Blockchain.<sup>159</sup>

These new technologies will affect consumers, the industry and the country in different ways, especially as New Zealand moves to a low carbon future. The technical paper provides examples of emerging technologies that have the potential to significantly disrupt aspects of the electricity market.

### Implications for residential consumers

Residential consumers have much to gain from emerging technologies, but the sector will need to coordinate with consumers to get the most benefit from them. Retailer–consumer relationships will change and new price structures are almost certain. At present, only a few solar panel owners with batteries can store electricity produced during the day and use it during the evening peak, selling any unwanted power to their retailer. In future, however, peer-to-peer trading platforms should give them the ability to sell that extra power directly to others.

Householders will also be able to plug their electric vehicles into their home supply and draw on

<sup>158</sup> California Energy Commission, Rooftop Solar PV System Report, May 2018.

<sup>159</sup> Blockchain, originally developed for the cryptocurrency Bitcoin, could provide alternative payment methods for consumers, such as peer-to-peer trading. It could in time supplement or replace the electricity sector’s trading and payment processes. It is too early to say how big its impact could be, or when it might be felt. However, regulatory frameworks will need to be flexible enough to take account of Blockchain and its derivatives should this technology make any significant inroads into the electricity sector.

the power stored in their vehicles. This will lessen their reliance on the network. Owners will need big enough batteries in the home and car and will need to leave enough charge to drive away next morning. Home recharging will take place mainly overnight because it is the practical time to do it and future price structures are likely to encourage discharging power into the house during the evening peak and recharging once the peak is over.

The biggest barrier to electric vehicle sales is cost, but this is changing. Some predict electric vehicles will cost the same as petrol vehicles by 2030.<sup>160</sup> It will happen here sooner or later depending on petrol prices, whether there are subsidies for electric vehicles, and whether manufacturers can offer a wider range of models. Emissions restrictions could also speed up the switchover. Some countries have banned sales of new petrol and diesel vehicles after certain dates.<sup>161</sup> Another barrier is drivers' anxiety about recharging times and driving ranges, but this, too, will change, as battery technology improves.

Another option will be electric powered self-driving vehicles. Their widespread introduction may have implications for the network, especially if privately owned vehicles are charged at different times and for different periods of time compared with company owned (or community owned) self-driving vehicles. They could also dramatically reduce the number of cars in the country.<sup>162</sup>

Overseas, other technologies are in the pipeline. Some involve making biofuels from wood or waste. Others involve hydrogen technologies.<sup>163</sup> One example is Toshiba's 'Enefarm,' a household device that converts natural gas into heat and hydrogen for a fuel cell. These devices meet about half of the electricity needs of 150,000 homes in Tokyo. Being produced at its source, such electricity has significantly lower emissions than power generated from big fossil fuel power stations a long way from consumers. New Zealand's mainly renewable electricity supply means it would not gain the same emissions benefit from such a device. However, its New Zealand equivalent is a Callaghan Innovations project called Hylink, which involves small-scale hydrogen production and may be of value to isolated communities or for disaster relief.<sup>164</sup>

Consumers will also benefit from new business practices. We have already mentioned Blockchain. Innovative plans and tools are available now in New Zealand from many retailers so consumers can more easily make smart energy choices.

### Implications for commercial and industrial consumers

In the future, hydrogen or biofuel technologies may be commercially viable in competition against large-scale batteries. Solar panels are already an option in some cases. Many businesses have enough land or rooftop space to install panels to make themselves self-sufficient – or at least during sunny, daytime hours when they need power most. At other times, they can draw from batteries. Although expensive, they will give businesses more choices about how to manage their consumption. Many businesses have big vehicle fleets, which could be recharged on site and integrated with solar panel and battery technology.

Coal and gas are the main fuels for generating heat for industrial processes, which make up a third of the country's energy use and around 10 per cent of gross emissions. Increasingly, technologies using electricity will generate that heat. Using mostly electricity to make process heat – whether from the grid or from locally produced solar, wind or hydrogen power – is one of the biggest opportunities for commercial and industrial consumers to improve energy efficiency and lower emissions.

<sup>160</sup> D. Carrington, Electric cars 'will be cheaper than conventional vehicles by 2022', article for the Guardian, 25 February 2016.

<sup>161</sup> A. Petroff, These countries want to ban gas and diesel cars, article for CNN.

<sup>162</sup> M. Cameron, Realising the potential of Driverless Vehicles, 2018.

<sup>163</sup> Hydrogen technologies work by either re-forming natural gas or splitting water into hydrogen and oxygen using electricity, known as electrolysis.

<sup>164</sup> See Hylink website at <http://www.hylink.nz/>.

## Implications for the electricity industry

Every business in the sector will face opportunities, risks and threats to existing practices. Today's electricity system has been built around 19th century technology and the needs of generators, distributors and retailers. Its defining features are its inability to store the electricity it produces, and the passive role played by consumers whose chief motivation is price.<sup>165</sup> Market reforms have not fundamentally changed these facts, but emerging technologies will do exactly that. Some commentators predict today's centralised, coordinated, one-way model will eventually be replaced by a decentralised, diffused, two-way model run on Blockchain (or something similar). In essence, today's 'top down' market will need to fit into a 'bottom-up' market, whose key features will be:<sup>166</sup>

- Consumers and/or networks will be able to store electricity, and consumers will actively determine what metered electricity they take rather than be passive consumers.
- Solar panels and batteries may dominate many distributors' networks, potentially reversing normal electricity flow patterns at some times of the day.
- Widespread use of electric vehicles and their connection to household generation will create shifting, unpredictable patterns of demand.
- Distributors will need new technology, and may need to invest in more infrastructure, to handle demand fluctuations.
- New companies may emerge to compete with distributors in managing the two-way power flows.
- New software systems will be needed so consumers can track and sell power to other consumers.

Much of this change will depend on access to consumer and consumption data. The Electricity Authority is working on a default distributor-retailer agreement that promotes competition, efficiency and innovation in retail and related markets. It is also looking at any barriers to consumers simultaneously using more than one company's electricity or electricity related services at the same address.<sup>167</sup> Removal of such barriers should make it easy to adopt peer-to-peer trading.

Distributors say new technology will help them manage their networks better and contain (and even potentially lower) their costs. And they say there are also benefits for consumers, including the ability of networks to communicate with consumer devices.

Large, grid connected solar farms are a growing phenomenon overseas, although their potential is likely to be more limited in New Zealand. The world's biggest is the Kamuthi Solar Power Project in India. Its 10 square kilometres of solar panels generate 648 MW.<sup>168</sup> However, solar farms of this size have a huge footprint relative to the energy generated. This is not a problem for countries with sizeable areas of desert or only minimally productive land. But in New Zealand solar farms on this scale are likely to compete with other productive land uses. They may also encounter environmental objections like those raised in Japan<sup>169</sup>, and like those raised in New Zealand against big hydro reservoir and wind farm projects.

**What are your views on this assessment of the impact of technology on consumers and the electricity industry?**

<sup>165</sup> D. Helm, Cost of Energy Review, 2017.

<sup>166</sup> See, for example, the work of the GridWise Architecture Council and Energy Web Foundation's Decentralized Autonomous Area Agent Market Model.

<sup>167</sup> See default distribution agreement project and multiple trading relationships project in Enabling mass participation: Response and next steps, Electricity Authority, 4 October 2017.

<sup>168</sup> World's largest solar power plant unveiled in Tamil Nadu, article for The Indian Express.

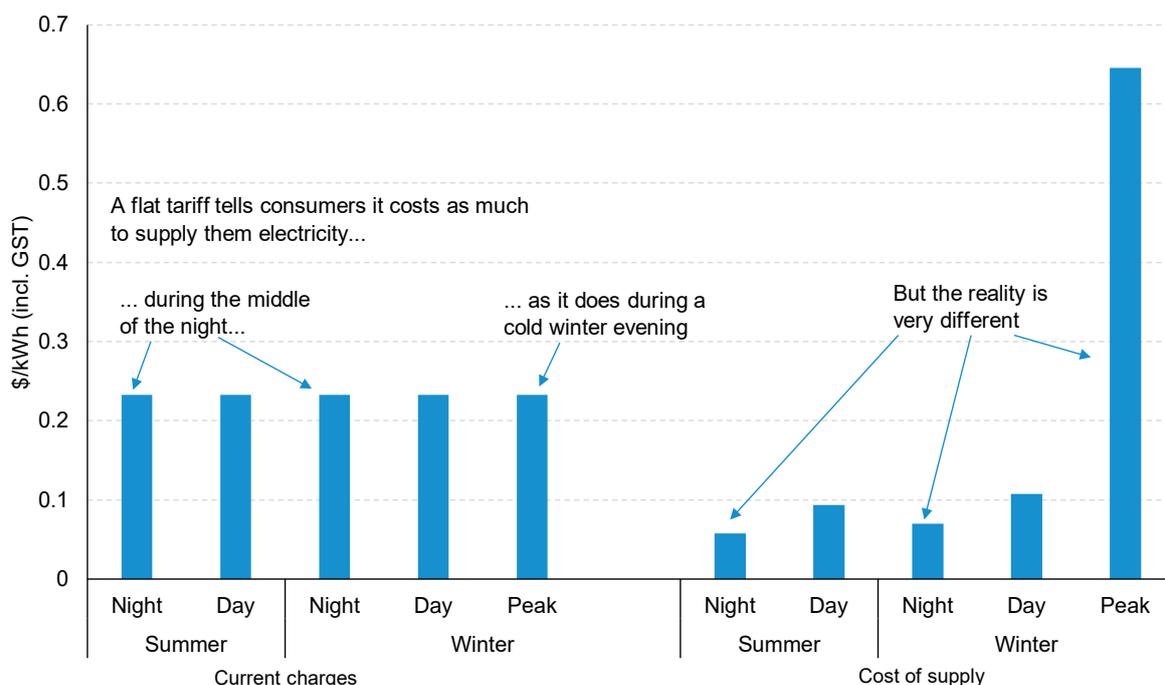
<sup>169</sup> J. McCurry, Japan's renewable energy puzzle: solar push threatens environment, article for The Guardian, April 2018.

## Pricing mechanisms and fairness of prices

Most residential price structures contain a feature that may be greatly exacerbated by the widespread use of solar panels and electric vehicles. At present, most residential consumers pay, in addition to fixed charges, a price per kWh that remains the same day or night, summer or winter, even though it costs more to generate and transport electricity at peak times than off-peak times.<sup>170</sup> The difference between cost and price can be as much as 300 per cent (see figure 25). Charging most residential consumers a flat amount per kWh, regardless of when they use it, sends a misleading signal and encourages inefficient consumption.

Were prices to be structured around peak and off-peak times, households could benefit if they adjust their use. They could, for example, use washing machines and dishwashers at off-peak times to minimise costs. They could charge their electric vehicles during the late evening when peak demand was over, but most have no incentive to do so. If enough owners recharged during peak times, more network capacity would be needed – which would push up distribution charges. Currently, this would be passed to all consumers, including those without electric vehicles. Altering distribution charges to encourage off-peak recharging when the network had spare capacity would significantly defer (or even avoid) the need for costly network upgrades while still allowing full recharging.

**Figure 25: Consumption charges and costs**



Source: Concept Consulting analysis of 2017 MBIE data.

Householders with solar panels save money on their power bills because they are using less metered electricity, which means lower sales and potentially declining revenues for generators and retailers. If solar powered households really grow in number, distributors could either shift more of their network overhead costs to other consumers or change their prices in a way that forces consumers with solar panels to contribute more to distribution overhead costs. If they choose to do the former, lower-income households that can't afford solar panels may bear the brunt of this cost transfer.

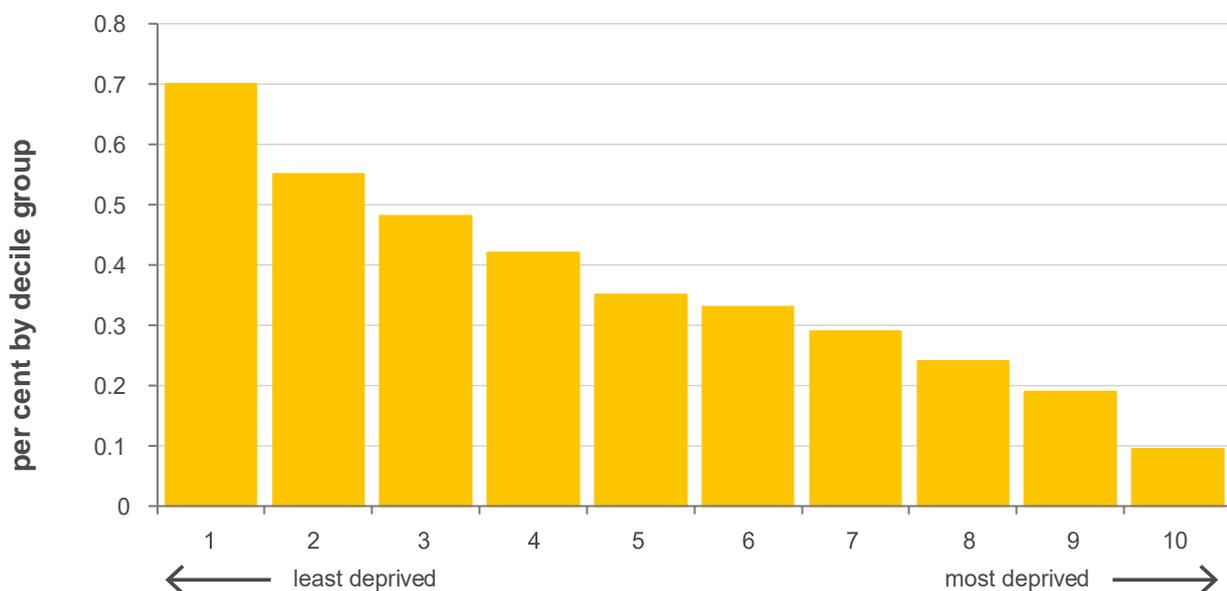
<sup>170</sup> Commercial consumers' prices commonly vary according to the time of use. A few retailers offer residential consumers the option of time-of-use prices (providing there is a digital meter at the property), and some even have a price for charging electric vehicles. More retailers are expected to offer such choices in future.

A study by Concept Consulting confirms this point.<sup>171</sup> Based on analysis of more than 100,000 consumers' consumption data, it found the power bills of households that installed solar panels would typically fall. Some of this reduction would reflect genuine cost savings, but a portion reflected the fact distribution costs would simply be shifted to other consumers. It concluded that, in the absence of any change to pricing structures, more than 80 per cent of the poorest consumers were likely to face higher power bills over the next 15 years. The Australian regulator reached a similar conclusion.<sup>172</sup> It found vulnerable customers are less likely to have solar panels, and households with solar panels were paying on average \$A534 a year less than other households, raising concerns about affordability for those consumers without, or unable to afford, solar panels.

Some in the industry say regulations requiring retailers to offer prospective consumers the option of a low fixed charge tariff plan is causing a bias in favour of those who install solar panels. The tariff is intended to help those using less than 8,000 kWh a year. Average residential consumption is about 7,100 kWh, so even high consumption residential uses with a typical 2 kW to 5 kW solar panel installation, especially if coupled with a battery, are likely to produce enough of their own electricity to be qualify as a low user.<sup>173</sup> Industry participants argue this creates an incentive to install solar panels to benefit from low fixed charge plans, exacerbating the transfer of costs discussed above.

The Electricity Authority found a strong link between household income and installation of solar panels, which can cost up to \$10,000.<sup>174</sup> As household income drops away, so does installation of solar panels (see figure 26). Solar panel costs continue to fall, and leasing rather than buying is now an option, so it is possible a much wider cross-section of the population will eventually use them.

**Figure 26: Installation of solar panels and household income**



Source: Electricity Authority.

**What are your views on this assessment of the impact of technology on pricing mechanisms and the fairness of prices?**

<sup>171</sup> Electric cars, solar panels, and batteries in New Zealand Vol 3: The social impact, Concept Consulting, 2017.

<sup>172</sup> Ibid at 18, summary px, and p26.

<sup>173</sup> The same issue arise where the household uses gas for cooking or heating.

<sup>174</sup> Electricity Authority, Implications of evolving technologies for pricing of distribution services, 2015.

## Reliability and resilience

Renewable electricity accounts for about 80 per cent of New Zealand's generation – the fourth highest in the world. The Government aims to reach 100 per cent, in a normal hydrological year, by 2035 and also to have a zero carbon economy by 2050 – a goal that new technologies will play an important role in helping to achieve, although this technology will need to be introduced carefully to avoid any risk to the electricity system's reliability and resilience.

Emerging technologies (for example, solar panels) can give the sector an extra level of protection against growing demand, but they can also potentially increase demand (for example, recharging electric vehicles), which puts stress on the overall system. Batteries that can efficiently store solar generated electricity for when it's needed most will help householders cut their metered consumption. This will particularly benefit such householders if time-of-use plans, rather than the current predominantly flat plans, become common.

Large-scale, or aggregated, batteries are helping to reduce peak loads in countries that have wide variations in output from wind and solar power. The Hornsdale Power Reserve in South Australia, the world's biggest lithium ion battery, has already proved its worth during several potential system disruptions.<sup>175</sup>

New Zealand meets much of its peak demand through fast starting hydro-generation, backed up by gas fired stations, so grid-scale batteries may be less useful here – at least until wind and solar power output increases significantly above current levels. Indeed, Transpower found grid connected batteries are best located for now close to consumers who draw from them.<sup>176</sup>

There is no question emerging technologies will have a big impact. What is uncertain is when and where and how much they will affect the sector. Two studies by the Productivity Commission and Transpower sketch various scenarios.<sup>177</sup> They predict widely varying demand. Transpower's scenarios, for example, range from 73 TWh to 125 TWh by 2050.<sup>178</sup> Even the most conservative of these estimates will require a considerable increase in generation by 2050. Figure 27 shows the predicted retreat of most non-electricity sources of energy in all areas of the economy.

Grid connected wind, hydro and geothermal power plants could meet some of this growth in demand. Smaller power stations connected to local distributors' lines could also make a contribution, but consumer-generated electricity (in the form of solar panels) is likely to account for a significant portion. How significant is difficult to predict, but based on likely price trends and efficiency gains in emerging technology, it is not unreasonable to suggest household solar panels could account for at least 10 TWh of predicted growth by 2050. To put that in perspective, 10 TWh represents a quarter of today's supply.

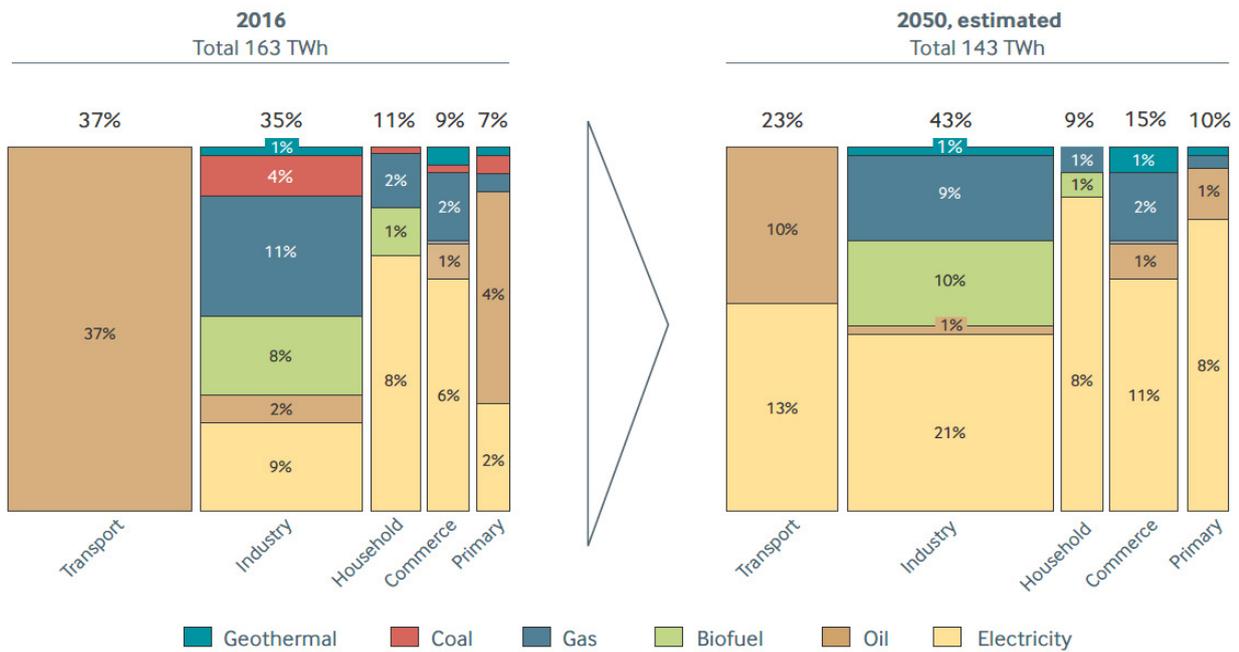
<sup>175</sup> B. Fung, Tesla's enormous battery in Australia, just weeks old, is already responding to outages in 'record' time, article for The Washington Post, December 2017.

<sup>176</sup> Transpower, Battery storage in New Zealand, discussion document, 2017.

<sup>177</sup> Ibid at 69 and ibid at 68.

<sup>178</sup> Leaving aside the more pessimistic scenario of 40 TWh by 2050.

**Figure 27: The economy’s demand for energy by type and sector**

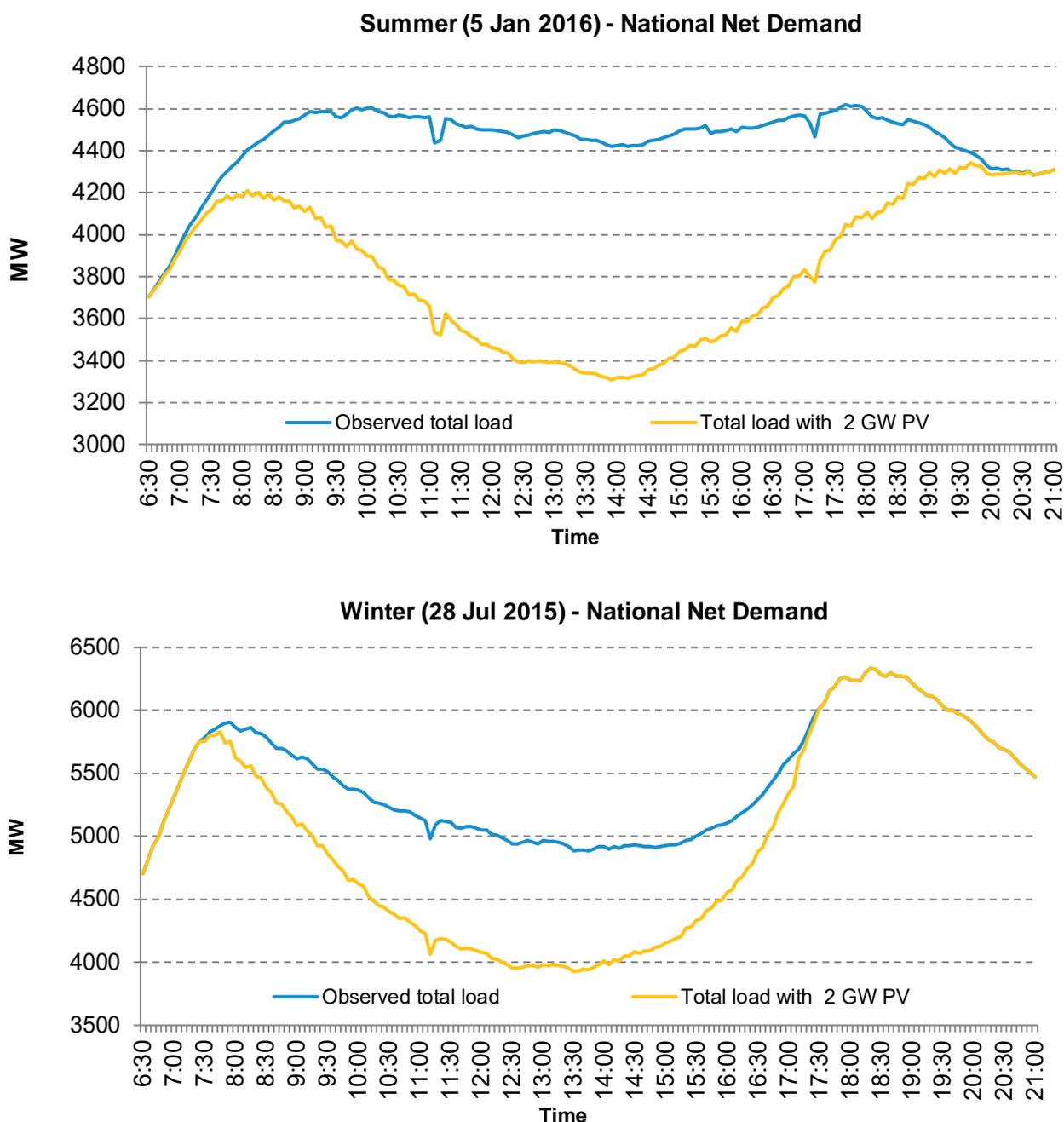


Source: Transpower.

Transpower has looked at whether the national grid can handle such high levels of solar generated power and found it could cope with as much as 2 GW of solar power without putting system security or resilience at risk.<sup>179</sup> Transpower concluded no more studies were needed on the effects of solar power on the grid until such generation approached 1 GW – 16 times current output. Hydro-generation was the crucial factor in this outcome because of its ability to respond quickly and flexibly to demand. One limitation on solar power’s contribution to New Zealand’s electricity supply is that low hydro inflows, which are generally greatest in June and July, correspond to the lowest solar output months (see figure 28). In addition, Transpower found that solar power without the use of batteries, even if widely adopted by residential consumers, could not offer any significant help during winter peak periods.

<sup>179</sup> Transpower, Solar PV in New Zealand – Discussion Document December 2017.

**Figure 28: Summer-winter variations in demand**



Source: Transpower.

Whether individual distribution networks can handle a big rise in solar power is less clear. Unlike the national grid, they aren't configured for two-way flow and may need considerable new infrastructure to do so. Nor do we know which networks will bear heavier or lighter loads. This will depend on factors such as the cost of solar panels, their relative affordability to consumers in each network and number of sunshine hours. Networks with high sunshine hours can probably expect the biggest uptake and will need to upgrade systems sooner.

The Commerce Commission is looking at distributors' investments in emerging technologies and their potential impact,<sup>180</sup> while the Electricity Authority has produced a report on the challenges,

<sup>180</sup> Commerce Commission, Impact of emerging technologies in monopoly parts of electricity sector, 2018.

including new technologies and business models.<sup>181</sup> The report looks at how to reduce barriers, boost consumer participation, provide efficient price signals and promote flexibility and resilience. Three of the Electricity Authority's six top priorities relate to new technology and consumer expectations.<sup>182</sup>

In summary, new technology promises to change, improve, disrupt and challenge. Consumers will have more choices and services. The shifting of costs risks higher-income households benefiting more at the expense of lower-income households. Industry participants can expect significant disruption as well as opportunities. In the case of distributors, big investments and a reinvention of business practices may be necessary. And the country as a whole should benefit because these technologies will ease the transition to a zero emissions economy. Careful management of change should ensure no risk to the electricity system's resilience and ability to perform reliably.

## What are your views on how emerging technology will affect security of supply, resilience and prices?

### Regulatory framework

As we have seen, the electricity sector is facing technology-driven changes unlike any it has ever experienced. At the same time, a determined focus on reducing carbon emissions will have implications for the sector, as will a new focus on fairness for the consumer. Obvious questions are: how well placed is the sector's regulatory framework to deal with these developments? And, how well is it regulating the sector now? These are the questions we consider here.

#### Current framework

The electricity regulatory framework is the result of reforms by successive governments over the past 30 years. Underpinning them has been promoting competition, on the assumption competition stimulates innovation, gives consumers more choice, improves service and keeps costs and prices in check. Reliability has also been a high priority.

The framework has three tiers: Acts of Parliament, regulations and what we loosely call rules. The two Acts most relevant are the Electricity Industry Act 2010 and the Commerce Act 1986, particularly Part 4. Governments can make certain 'second tier' regulations under the Electricity Industry Act 2010 to, among other things, protect rural consumers and promote the fair treatment of domestic and small business consumers. Regulations made under the Electricity Act 1992 promote electrical safety and power quality, including by incorporating standards to support new technologies. The Government can also issue statements of policy that influence but cannot direct the independent regulators.<sup>183</sup>

The Electricity Authority and Commerce Commission develop and enforce rules, which are intended to adapt to changing circumstances more quickly than first and second-tier legislation.<sup>184</sup> Given the accelerating pace of change in the sector, we think more use could be made of the second and third tiers, and less of the first – but this is a question for stage two of our review. Supplementing the rules are non-mandatory guidelines and market facilitation measures to guide businesses and consumers.<sup>185</sup>

As already noted, transmission and distribution are natural monopolies, making regulation necessary to limit their ability to earn excessive profits, operate inefficiently, or deliver lower-quality services

<sup>181</sup> Electricity Authority, Strategic directions for market development.

<sup>182</sup> Electricity Authority, 2018/19 Work Programme.

<sup>183</sup> An example is the government policy statement issued to the Commerce Commission in 2017 on Wellington's electricity resilience.

<sup>184</sup> These are the Electricity Industry Participation Code, administered by the Electricity Authority, and determinations on price-quality regulation and information disclosure made by the Commerce Commission.

<sup>185</sup> Examples include guidelines for retailers on helping medically dependent consumers, and WhatsMyNumber advertising.

to consumers than a competitive provider would. This is called economic regulation. There is also access regulation – ensuring generators and retailers have access to transmission and distribution networks so they can produce and sell electricity on an equal footing.<sup>186</sup>

The Commerce Commission administers economic regulation under Part 4 of the Commerce Act 1986.<sup>187</sup> The Electricity Authority looks after access regulation through the Electricity Industry Participation Code, which it administers under its Act. Access regulation can also be found in Part 3 of the 2010 Act.<sup>188</sup> This sets out how much distributors can be involved in generation and retail markets where competitors require access to their lines (on the basis that a distributor competing to generate or sell electricity may harm competition by giving preferential access to itself). Splitting regulation between two statutes and two regulators is a choice. In principle, electricity regulation could be brought together under a single statute and a single regulator if the benefits were thought to exceed the costs.

The Electricity Industry Act 2010 requires the Electricity Authority to promote competition, reliability and the efficient operation of the electricity industry for the long-term benefit of consumers. It does this by developing and monitoring the tier three rules mentioned above and through market facilitation measures.

Part 4 of the Commerce Act 1986 requires the Commerce Commission to promote the long-term benefit of consumers by ensuring regulated businesses have incentives to innovate, invest, improve efficiency, provide services at the quality consumers' demand, and share the benefits of efficiency gains with consumers. It must also ensure regulated business have a limited ability to make excessive profits.

For the division of the regulatory roles, see figure 29.

In summary, today's framework has evolved in response to government priorities and goals of promoting competition, reliability and efficiency. It has sufficient flexibility to adapt to a changing environment because regulators can develop rules without changing primary legislation. But it is also predictable and helps maintain a low-risk investment environment for a capital intensive industry.<sup>189</sup>

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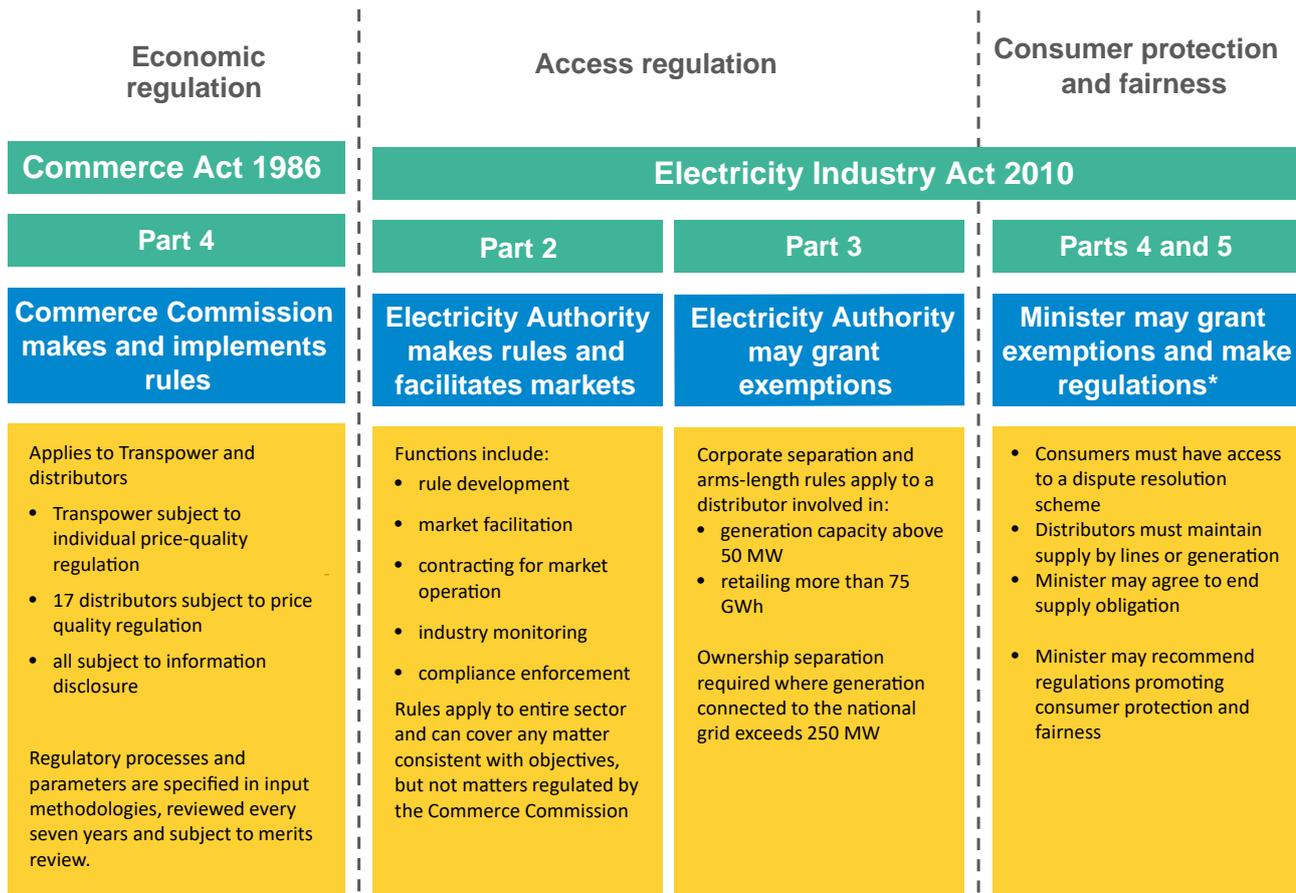
186 In New Zealand, electricity companies had voluntary access arrangements until 2003 when regulated access rules came into force.

187 Natural gas pipelines and some airport services are also subject to economic regulation.

188 Some elements of economic regulation, e.g. accounting separation for regulated activities, also support access regulation.

189 Global rating agency Standard & Poor's said in April 2018: "We now consider the framework to be more mature and predictable, as well as being stable, supportive, and transparent. The regulatory regime is in line with the strong regulatory landscape in Australia and the UK."

**Figure 29: Division of regulatory roles**



\*Regulations are made by Executive Council on the Minister's recommendation

## Objectives

### Environmental sustainability

Earlier, we asked whether the framework should regulate the electricity sector to achieve environmental objectives. Obvious objectives would be reducing carbon emissions and other environmental effects from electricity infrastructure. These are not in the electricity framework, but can be found in the Resource Management Act 1991, Climate Change Response Act 2002 and Energy Efficiency and Conservation Act 2000.

Through these Acts the government is able to promote environmental objectives, some of which are directly relevant to the electricity sector.<sup>190</sup> For example, the National Policy Statement on Renewable Electricity Generation guides consenting and planning decisions under the Resource Management Act 1991. Fuels used for electricity generation are subject to a carbon price through the New Zealand Emissions Trading Scheme. And finally, measures such as promoting electric vehicles and encouraging switching away from fossil fuels are given effect through energy efficiency and renewable energy programmes run by the Energy Efficiency and Conservation Authority.

<sup>190</sup> For example, consenting and planning decisions under the Resource Management Act 1991 are guided by the National Policy Statement on Renewable Electricity Generation; fuels used for electricity generation are subject to a carbon price through the New Zealand Emissions Trading Scheme; and the promotion of energy efficiency and renewable energy is carried out by the Energy Efficiency and Conservation Authority through programmes such as those supporting electric vehicles and fuel switching.

The Productivity Commission looked at whether the Electricity Authority should have an objective of reducing carbon emissions, but rejected such a sector specific approach in favour of an economy-wide approach.<sup>191</sup> It said giving the Authority such an objective might result in electricity sector emissions falling, but at a cost that was higher than in other sectors of the economy. This, it said, “would raise the cost of electricity unnecessarily, and also make it more costly to use electricity to lower emissions in other parts of the economy, such as in transport and process heat.” We also see such a potential risk.

More generally, there are already specialist mechanisms to consider the inevitable trade-offs needed to lower emissions, and we question whether electricity specific regulators would have that breadth of view. For example, the Electricity Authority is not the right agency to consider whether the benefits of a proposed wind farm outweigh its adverse environmental effects, just as the Commerce Commission is not in a position to consider how Transpower should mitigate or avoid the environmental effects of a proposed transmission line. The Environment Court or another decision maker on Resource Management Act matters is the place for such questions.

This does not mean the Electricity Authority and Commerce Commission cannot have regard to environmental or other objectives. Government policy statements could, if warranted, require them to have regard to such matters in their decision making.

It is worth noting that environmental sustainability, fairness and energy efficiency were explicit objectives of the electricity regulatory framework between 2003 and 2010. A ministerial review in 2009 found these wide ranging objectives resulted in duplication and poor focus, and the Electricity Authority was given scaled back objectives when it was established in 2010.<sup>192</sup>

## Fairness

Fairness is another objective whose inclusion in the electricity regulatory environment we have considered. Part 4 of the Commerce Act 1986 makes no explicit mention of fairness, but we consider an aspect of fairness to be implicit in its objectives of limiting distributors’ and Transpower’s ability to make excessive profits, and sharing efficiency gains with consumers through lower prices.

The Electricity Authority has no explicit fairness objective, although we note the Authority does consider how stakeholders’ perceptions of fairness can affect the durability, and therefore efficiency, of proposed rule changes. In addition, the Authority supports the fair treatment of consumers through non-regulatory measures, including voluntary principles and minimum terms and conditions for contracts between retailers and consumers, and guidelines for retailers on how to manage vulnerable and medically dependent consumers.

Also, as we have noted, regulations can be made under the Electricity Industry Act 2010 to protect rural consumers and promote the fair treatment of domestic and small business consumers.<sup>193</sup> The sole instance of this is the low fixed charge tariff regulations. The Act also requires distributors to maintain services to places supplied in 1993 because it could be unfair and might cause undue hardship if electricity supply to remote places were unilaterally withdrawn. It also requires retailers, distributors and Transpower to be members of a free and independent dispute resolution scheme.

Fairness includes being fair to consumers in energy hardship. The electricity regulatory framework contains no specific objectives about households in energy hardship. One reason is households in

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<sup>191</sup> Ibid at 69.

<sup>192</sup> For example, the Electricity Commission was required to promote energy efficiency, duplicating the role of the Energy Efficiency and Conservation Authority. The Commission also determined how much Transpower could spend on transmission upgrades (a function better suited to the Commerce Commission’s role as economic regulator).

<sup>193</sup> A memorandum of understanding between the Electricity Authority and the Ministry of Business, Innovation and Employment notes that the Ministry advises the Government on matters of fairness relating to the regulation-making powers in the Electricity Industry Act 2010.

hardship can't readily be identified without private information about their income and energy needs (including housing insulation, efficiency of heating appliances and so on) – information that is not available to electricity retailers.

Measures outside the electricity framework, such as the Warmer Kiwi Homes programme, partly tackle the problem by promoting warm, dry homes.<sup>194</sup> The winter energy payment introduced in July 2018 will improve affordability for those eligible. Other welfare measures also partly address the problem, but as a general rule do not take into account recipients' energy needs.<sup>195</sup>

New Zealand is unusual among comparable countries in having few targeted measures that reduce an eligible household's energy bills or provide rebates to help pay power bills.<sup>196</sup> The ACCC review recommended means tested concession schemes for those facing energy hardship.<sup>197</sup> Such concession schemes are similar in concept to New Zealand's Community Services Card, which is used to reduce prescription fees and other health service costs.

While adding fairness and environmental sustainability to the Electricity Authority's statutory purpose may not be necessary, this does not mean the regulatory framework has no part to play in coordinated efforts to achieve these important objectives. As many stakeholders emphasised, and we agree, there is a "real need for a joined-up approach between regulatory bodies and other government agencies" – particularly given the challenges ahead to achieve climate change objectives. Such an approach should go some way to addressing energy hardship. Boosting competition and extending its benefits to vulnerable consumers will also help. To the extent any problems remain, other targeted measures – like grants for insulating houses – will be needed. There may be other initiatives, too, the industry can take as part of its social responsibility to consumers.

### **What are your views on this assessment of the place of environmental sustainability and fairness in the regulatory system?**

#### **Low fixed charge tariff regulations**

We have been asked to look at any aspects of the electricity regulatory framework causing unintended harm. One area suggested in our terms of reference was regulations establishing low fixed charge tariffs. Since we could find no other aspect causing unintended harm, we have concentrated on these regulations.

Known as the Electricity (Low Fixed Charge Tariff Option for Domestic Consumers) Regulations 2004, they were introduced after big rises in fixed charges following reforms to electricity retailing.<sup>198</sup> Distributors and retailers began increasing daily fixed charges because they considered this a better way to recover network capacity, billing and metering costs, which are altered very little by the amount of electricity households' use.

The result of this shift was that fixed charges – which households can do nothing about – grew as a proportion of their bills, while the variable charge for each kWh used – which they can do something about by lowering their consumption – shrank. The impact of this change was greatest on low-use households: their careful use of power now made less difference to the size of the bills they received.

<sup>194</sup> Warmer Kiwi Homes provides grants for insulation and efficient heating appliances in eligible homes. Rental properties are required to meet minimum standards for insulation.

<sup>195</sup> These measures include social housing (which meets minimum insulation and efficient heating standards), tax credits and income support for people with insufficient income from paid employment. Health and disability allowances may include assistance for recipients' energy needs.

<sup>196</sup> Examples include the Low Income Home Energy Assistance Programme in the United States, and the New South Wales Low Income Household Rebate.

<sup>197</sup> Ibid at 18, px.

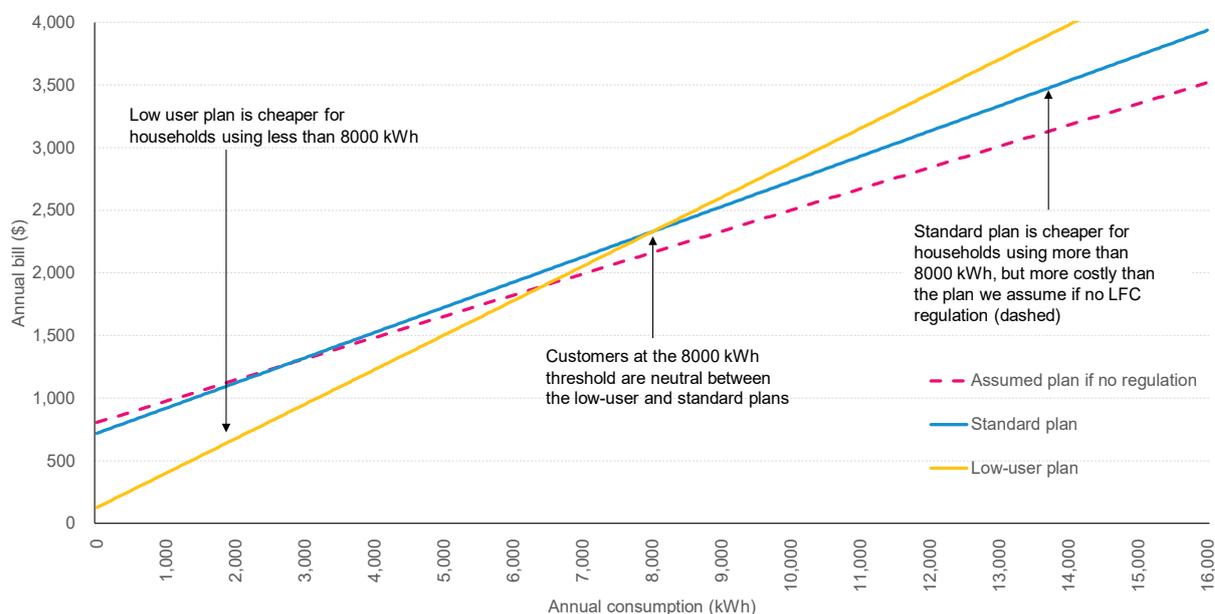
<sup>198</sup> Retail competition began in 1993 for big consumers with half-hourly metering capability. In 1999, retail competition was extended to households and small businesses.

Faced with criticism of the impact of this change, particularly on older people on fixed incomes who are frugal power consumers, the Government responded by introducing the low fixed charge tariff regulations. They are intended to help low-user households, which are defined as those consuming less than 8,000 kWh a year.<sup>199</sup> Although not stated in the regulations, they were particularly intended to help low-income households.<sup>200</sup> An estimated two thirds of households use less than this amount, although only about half choose a low fixed charge plan, meaning a significant portion pay more than they need to.<sup>201</sup>

The regulations require retailers to offer every household the option of a low fixed charge plan, normally called a low-user plan. (Retailers also typically offer consumers a high-user plan, referred to normally as their standard plan). The fixed charge under a low-user plan must not exceed 30 cents a day (and the distribution component must not exceed 15 cents). Choosing a low-user plan must not result in the household paying more each year than under any alternative plan. The important qualification is – up to 8,000 kWh. Households consuming more than 8,000 kWh a year actually pay more on a low-user plan than if on a standard plan, as figure 30 shows. Similarly, those on high-user plans who use less than 8,000 kWh will pay more than they need to. This is why households must take care to choose a plan that matches their consumption. It is also why the regulations require retailers to advise consumers of their annual consumption and the option best matched to that consumption.

The fact such a large number of consumers are not on the right plan raises the questions: to what extent are retailers first explaining the low-user option, and to what extent are they drawing to the attention of those on a low-user plan that they would be better moving to another plan when their usage exceeds 8,000 kWh?

**Figure 30: Indicative annual spending under low-user and high-user plans**



Source: Concept Consulting.

It is widely accepted the regulations lower the bills for many consumers on low-user plans and increase them for many on high-user plans. This is illustrated in figure 30. The pink dashed line is a plan closer to costs that we assume retailers would offer without regulation. Households on

199 In the lower South Island, the figure is 9,000 kWh.

200 The Government’s intent was set out in its Power Package policy statement, released in August 2000 after an inquiry into the electricity industry. A secondary goal was to encourage conservation.

201 Average household consumption is about 7,100 kWh a year, and median consumption about 6,300 kWh. Note that low fixed charge tariffs are not available at properties that are not a primary place of residence.

a low-user plan (yellow line) consuming less than about 6,500 kWh pay less than they would on the unregulated plan (pink dashed line), and all households using more than 6,500 kWh (both yellow and blue) pay more than they would on the unregulated plan.

The regulations are intended to help low users, but not all low users are in need of help, or indeed the only ones who need help. Low users could be well-off people who can afford to live overseas during the winter or install insulation and solar panels, and have gas heating.

Furthermore, some high users can be in greater need of help. A 2017 study estimated between 40 per cent and 45 per cent of low-income consumers had greater than average usage, particularly large poor families in badly insulated homes.<sup>202</sup> A United Kingdom study of energy hardship reinforces the view that low usage does not necessarily imply high need for help.<sup>203</sup> Indeed, the study found those in greatest need had a combination of low income and high usage. We therefore think the regulations are poorly targeted at only one type of household in need of help, and to that extent they have unintended consequences.

Some distributors say the regulations also discourage more efficient distribution pricing because they make price structure design unduly complex and prohibit certain price structures (such as stepped or tiered prices).<sup>204</sup> Some say they are reluctant to offer certain options because of the risk they may be found to be non-compliant.<sup>205</sup> However, the Electricity Authority says the regulations do not unduly limit development of more efficient pricing plans, and has published guidance for distributors and retailers on how to develop more efficient pricing plans that comply with the regulations.

It may be questionable how much the regulations limit development of more efficient plans, but we are concerned they do have that unintended consequence. We also think there are likely to be better ways than mandatory low fixed charge plans to help those in energy hardship (such as the income supplement and energy concession schemes discussed previously).

### What are your views on this assessment of low fixed charge tariff regulations?



## Regulatory gaps and overlaps

As we noted earlier, the Commerce Commission is responsible for economic regulation of transmission and distribution, while the Electricity Authority is responsible for regulating access to networks. This allocation of responsibilities is designed to avoid gaps, but there are overlaps. Both regulators, for example, need information from distributors about the reliability of their networks. Being mindful of the risk of duplication, they routinely exchange information and collaborate where it makes sense to do so.<sup>206</sup>

Some stakeholders question whether there ought to be a single regulator to avoid overlapping responsibilities, although we have found little duplication. Nonetheless, some countries concentrate economic regulation, access regulation and other types of regulation in a single industry specific agency. In the United Kingdom, for example, there is one agency to regulate both gas and electricity.

<sup>202</sup> S. Coates, Concept Consulting, The low-fixed charge (LFC) regulations: History, impact, alternatives, Presentation to the Productivity Commission, May 2017.

<sup>203</sup> Centre for Analysis of Social Exclusion, Getting the measure of fuel poverty, final report of the Fuel Poverty Review, John Hills, March 2012.

<sup>204</sup> The benefits of more efficient distribution pricing are discussed in *Distribution*.

<sup>205</sup> A distributor or retailer can seek the Electricity Authority's approval when proposing to depart from the conventional price structure but such approval can't protect them from a legal challenge. Any price structure found by a court to be non-compliant would need to be withdrawn and replaced, at some cost, and with significant disruption to consumers.

<sup>206</sup> Where regulatory overlaps are not managed through statutory obligations, a memorandum of understanding provides a framework for the two regulators to identify potential boundary issues and agree on how to manage them. The Council of Energy Regulators, which includes the Ministry of Business, Innovation and Employment, is a multi-agency forum for discussion of such matters.

(See *Transmission*). There may be merit in considering a single regulator for energy if New Zealand's changing energy mix warrants it.

### Access to distribution networks

There is, however, one area where we think the two agencies' respective roles are ambiguous – the regulation of access to distributors' networks. This ambiguity arises, in our view, from interaction of the Electricity Industry Act 2010 with the Commerce Act 1986 and it will not necessarily be resolved by good efforts on the part of the Electricity Authority and Commerce Commission.

The Electricity Authority has a clear mandate to promote competition and has generally broad regulatory powers. However, we are unsure whether, or in what ways, those powers may be limited by Part 3 of the Electricity Industry Act 2010. In particular, we are unsure of the extent to which the Authority could limit distributors' participation in distributed energy related markets, if warranted, given Part 3 contains similar provisions, and the Act takes precedence over the Electricity Authority's rules.

There is some regulation governing the relationship between distributors and retailers, which is supported by non-mandatory principles and guidelines for the contractual terms and conditions between distributors and retailers. These arrangements have generally served their purpose well. However, impending technology developments have strengthened the case for further regulation of access to distributors' networks. The emergence of services to handle two-way electricity flows from solar powered households will be a matter of importance in the future.

The Electricity Authority has been working on mandatory or default terms and conditions for agreements between distributors and retailers, but aspects of this work face legal challenge arising from the fact the Electricity Industry Act 2010 prohibits the Electricity Authority from regulating anything the Commerce Commission is authorised to regulate.<sup>207</sup> This provision may limit the Authority's ability to regulate aspects of distribution services because the Commission is authorised to determine quality standards for the 17 distributors subject to price-quality regulation. Further challenges over this question of statutory interpretation are possible. In the meantime, the industry is waiting for the courts to clarify the Authority's jurisdiction – a situation we find unsatisfactory

Clarity of regulatory boundaries is not the only issue here. Competition is another. The concern is that distributors will exploit information advantages (such as household energy consumption data or other information not generally available to competitors) and use monopoly services to subsidise competitive services (such as offering discounted battery services to a household knowing any losses can be recovered through monopoly lines charges).

Some countries, including Australia, have limited the involvement of distributors in distributed energy related services. New Zealand's regulatory framework must also find a balance between, on the one hand, ensuring access to distributors' networks to promote competition for distributed energy related services, and on the other hand, ensuring distributors have appropriate incentives and opportunities to exploit those services.<sup>208</sup> We think this balancing of objectives is a job for third-tier rules because of the need to be able to respond to changing market conditions.

Part 3 of the Electricity Industry Act 2010 governs how distributors can participate in generation and retailing markets, but it doesn't explicitly deal with some distributed energy related services – particularly the control of batteries and consumer appliances (such as water heaters and electric

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<sup>207</sup> Vector and Entrust recently appealed against a High Court decision about access to distribution networks after the Electricity Authority proposed regulating certain terms and conditions of distributors' agreements with retailers. The outcome is not yet known.  
<sup>208</sup> We note some stakeholders have also raised concerns about another type of vertical integration – that between generation and retail activities, which can reduce liquidity in wholesale contract markets, making it harder for non-integrated generators and retailers to compete. There is some regulation currently addressing this issue, and we think the Electricity Authority has adequate jurisdiction to consider further regulation if warranted.

vehicle chargers). It doesn't, for example, limit a distributor's ability to sell batteries. A distributor could sell batteries at a discounted price to households in return for the ability to control them to reduce its network management costs, but a competitor could not match that discounted price unless the distributor also paid the competitor for the equivalent battery control capability.

Assuming Part 3 does not effectively limit opportunities for distributors to lessen competition in distributed energy related markets, the question is whether the Commerce Commission or Electricity Authority can nonetheless develop third-tier rules to address this matter adequately. (Both are actively considering it).

The Commerce Commission recently reviewed aspects of its accounting separation rules and has signalled it will consider further rules in the future, if necessary.<sup>209</sup> However, some provisions in Part 4 of the Commerce Act 1986 suggest the Commission may not have a strong mandate to promote competition in distributed energy related markets.<sup>210</sup>

In summary, the electricity regulators' functions could be shared in other ways, but for now we have not identified gaps or overlaps that would justify such change. The regulation of access to distribution networks, especially distributed energy services, is one area, however, in need of attention.<sup>211</sup>

### **What are your views on this assessment of gaps or overlaps between the regulators?**

#### **Emerging technologies and business models**

The electricity regulatory framework was largely designed for yesterday's technologies and businesses models. Legislation defines generation, transmission, distribution, retailing and consumption in terms of those technologies and models. This necessarily limits the activities that fall within them. If such limitations result in consumers missing out on benefits, they can be considered a regulatory barrier.

For example, peer-to-peer trading is an arrangement, in principle, that allows consumers with solar panels to sell surplus electricity to other consumers. However, this is possible in practice only if the consumers in question have the same retailer or their respective retailers are parties to an arrangement that enables such trading. The regulatory framework requires all electricity generated and consumed to be accounted for, and it requires payment for the common network services needed to buy and sell electricity. The contracts between the various parties in the supply chain – Transpower, generators, distributors, retailers and consumers – satisfy these requirements.

Rules may need to be amended to achieve the same outcomes for peer-to-peer trading and other business models, if there is benefit to consumers in doing so.

### **What are your views on this assessment of whether the framework and regulators' workplans enable new technologies and business models to emerge?**

There are potential regulatory barriers to emerging technologies and business models, although we have not identified any warranting urgent attention. Assessing the relative costs and benefits of lowering or eliminating any identified barriers should nonetheless be done as soon as possible.

<sup>209</sup> Commerce Commission, Input methodologies review decisions, Topic paper 3: The future impact of emerging technologies in the energy sector, December 2016.

<sup>210</sup> For example, the Commerce Commission must not unduly deter distributors from investing in unregulated goods or services, and it must promote incentives, and avoid disincentives, for distributors to invest in energy efficiency and demand-side management.

<sup>211</sup> We note that Ofgem has recently released a report on the regulation of access to distribution networks – see Ofgem, Getting more out of our electricity networks by reforming access and forward-looking charging arrangements, July 2018.

## Other matters

Stakeholders raised a range of other regulatory related points, which are included here for comment:

*Consumer voice:* Some consumers and advocacy groups say they are vastly outmatched by the resources of industry participants and big business consumers during review and submission processes – including judicial or merit reviews of regulatory decisions. The result, they say, is consumers have little voice in shaping the regulatory framework. The counterargument is regulators themselves are consumer advocates, and that they are obliged to inform themselves about consumer perspectives, including in the Electricity Authority's case, by ensuring consumer representation on advisory groups.

*Pace of change:* Some stakeholders say problems take far too long to fix, whether because regulators have other priorities or lack resources or for other reasons unknown to them. They cite the long running review of transmission pricing methodology guidelines, and also the long running claim that inadequate liquidity in wholesale contract markets is limiting the entry or growth of retailers not linked to a big generator. They say the Electricity Authority could make better use of stakeholder working groups to make progress on problem areas, freeing up its time and resources for governance and oversight rather than detailed diagnosis of problems and rule design.

*Authority's functions:* The Electricity Authority's twin roles of developer and enforcer of rules is not desirable, according to some stakeholders. They point to Australia where authorities have created a separation of such regulatory functions.<sup>212</sup> It is good practice to have separation between the functions of rule maker and rule enforcer, but how that is given effect is a matter of regulatory design and cost.

*Authority's decisions:* No Electricity Authority decision is open to legal challenge on its merits. Some stakeholders say this is unfair and unbalanced. They note some Commerce Commission decisions are open to challenge in the courts. Certainly, regulatory errors are possible, no matter how good the information gathered and analysis conducted. And certainly, a regulatory framework needs suitable checks and balances to ensure sound decision making processes and to correct regulatory mistakes.<sup>213</sup> Equally, it can be said, the ability to challenge regulatory decisions, especially through the courts, can prolong uncertainty, consume valuable resources and unduly bias outcomes in favour of those who are best resourced. It can also be costly for small or new participants.

*Price-quality regulation:* The price-quality regime was intended as a low-cost form of economic regulation. Partly for that reason, the 12 community owned distributors were exempted from this regulation because they do not have incentives to make excessive profits. The question is whether the time has come to consider including them in the regime to address the other objectives of economic regulation (efficiency and service quality). Some community owned distributors have told us they are put off by the compliance costs, and have avoided mergers or acquisitions that would result in a loss of their exemption. This means their consumers miss out on the potential benefits of such commercial moves. On a related point, some distributors have indicated a reluctance to apply for customised price-quality regulation, which comes with higher compliance costs. However, that disincentive may be too strong, meaning some consumers could be missing out on potential benefits of a customised price-quality regulation.

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212 The Australian Energy Markets Commission is responsible for rule development, and the Australian Energy Regulator is responsible for enforcing rules and implementing rules about the economic regulation of lines businesses.

213 For example, the Commerce Commission's input methodologies can be appealed against in the High Court (albeit with a high hurdle – applicants must prove an alternative decision would be 'materially better'). Also, judicial review by the court offers some safeguard against poor regulatory process, but there are limited grounds for action and courts are generally reluctant to overturn the decisions of specialist regulators.

*Regulatory costs:* Compliance with regulation comes at a cost, as does developing and enforcing regulation. In 2017–18, for example, the Electricity Authority and Commerce Commission spent \$25.6 million on regulatory functions, or about \$5 a household a year.<sup>214</sup>

*One final point:* we are satisfied that input methodologies, which have survived legal challenge and scrutiny, are generally fit for purpose. At this stage we see no reason to re-examine questions such as how best to determine transmission and distribution asset values and the cost of capital, which are important inputs in price-quality regulation.

**What are your views on this assessment of these other matters for the regulatory framework?**

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<sup>214</sup> The Electricity Authority spent \$20.3 million and the Commerce Commission \$5.3 million.

# Appendix A: One dollar of electricity

Figure 31 illustrates what a typical consumer could buy with one dollar of electricity.

**Figure 31: One dollar of electricity**



Source: ERANZ infographic. For more information see ERANZ, \$1 of electricity gets me, ERANZ website, August 2018.

## Appendix B: Transmission charges

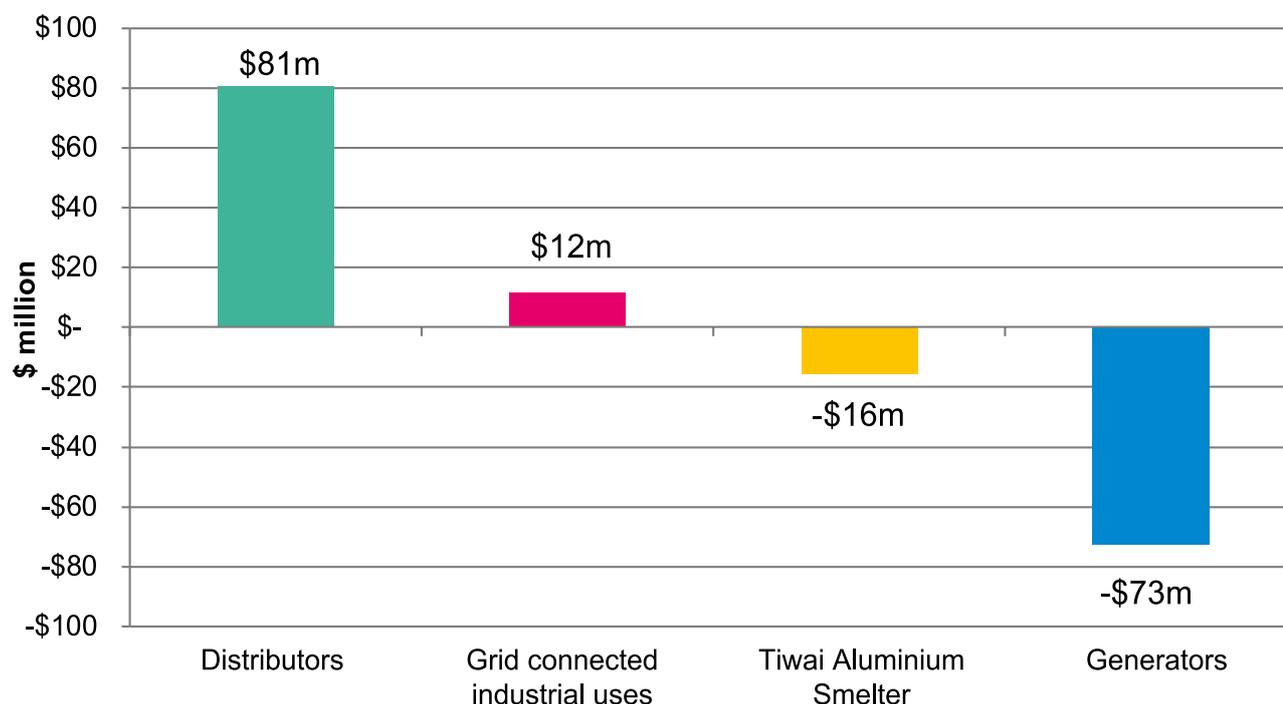
In December 2016, the Electricity Authority proposed new guidelines for the transmission pricing methodology (TPM). It also analysed the proposal's likely effect on different types of consumers and on consumers in different parts of the country. The results were published in an issues paper and are summarised here.<sup>215</sup> For comparison purposes, we have also included data on the existing TPM. Note the Authority decided against proceeding with the 2016 proposal and is preparing a revised proposal for consultation in 2019.

### Impact on transmission customers

As shown in Figure 32, analysis of the proposal's likely effect on direct users of the national grid found transmission charges would:<sup>216</sup>

- rise by \$81 million overall for distributors (although charges would go up or down for individual distributors)
- fall by \$73 million for generators (Meridian and Contact Energy benefiting the most)
- fall by \$16 million for the Tiwai aluminium smelter
- rise by \$12 million overall for grid connected industrial users (although charges would go up or down for individual companies).

Figure 32: Impact on transmission customers



Source: Electricity Authority.

<sup>215</sup> See Transmission Pricing Methodology: Second issues paper: supplementary consultation.

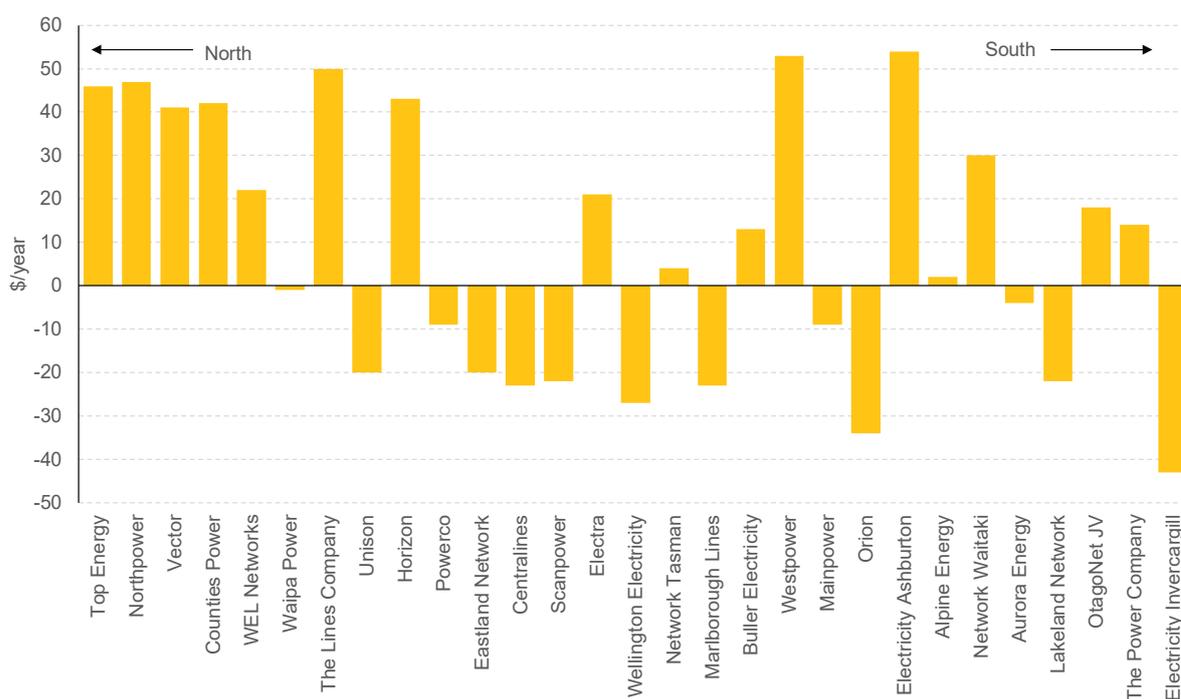
<sup>216</sup> The Electricity Authority published two scenarios, one based on the current WACC and another based on a forecast reduction in the WACC. The analysis uses the existing WACC to isolate the effect of the proposed TPM from any change to the WACC.

## Impact on residential consumers

The Authority also analysed the proposal's impact on typical residential power bills. The assumptions behind the analysis are set out in Appendix F: TPM supplementary consultation modelling results.<sup>217</sup> Figure 33 shows the results by distribution network, from the top of the North Island to the bottom of the South Island. The key findings were that:

- Consumers in the upper North Island would get higher bills, and those everywhere else would get lower bills – although this general pattern had many exceptions.
- The change would range from a \$43 yearly drop in Invercargill to a \$54 yearly rise in Ashburton.

**Figure 33: Impact on average residential bills**



Source: Electricity Authority.

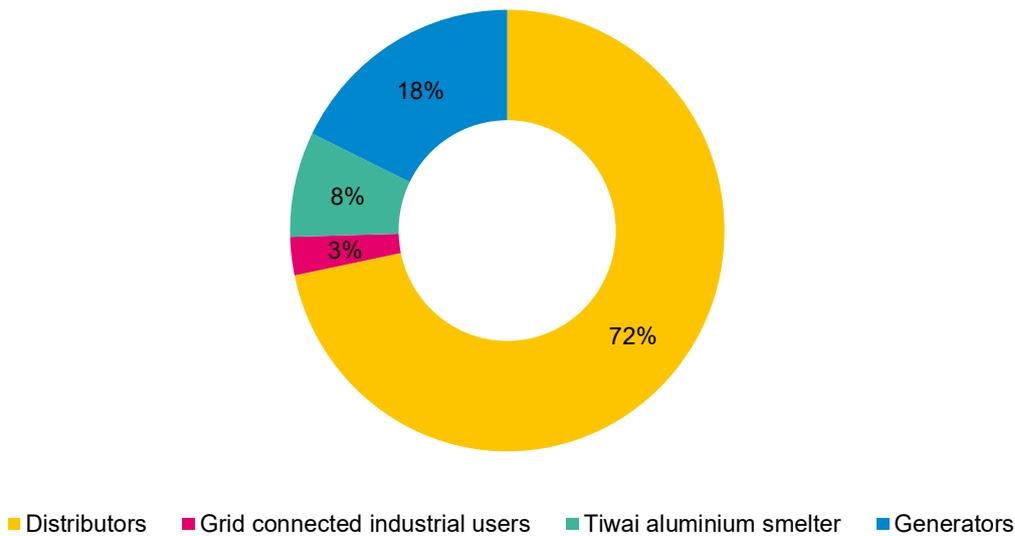
## Current transmission charges

For comparison purposes, figure 34 shows current transmission charge allocations. The key points of note are:

- Distributors bear nearly three-quarters of all transmission charges (72 per cent), which are passed on to consumers, along with their own costs.
- Generators pay 18 per cent of transmission charges. (South Island generators alone contribute to the inter-island cable (HVDC link).
- Industrial users connected directly to the grid, including the Tiwai smelter, pay 10 per cent of transmission charges.

<sup>217</sup> Ibid at 126.

**Figure 34: Current transmission charges**

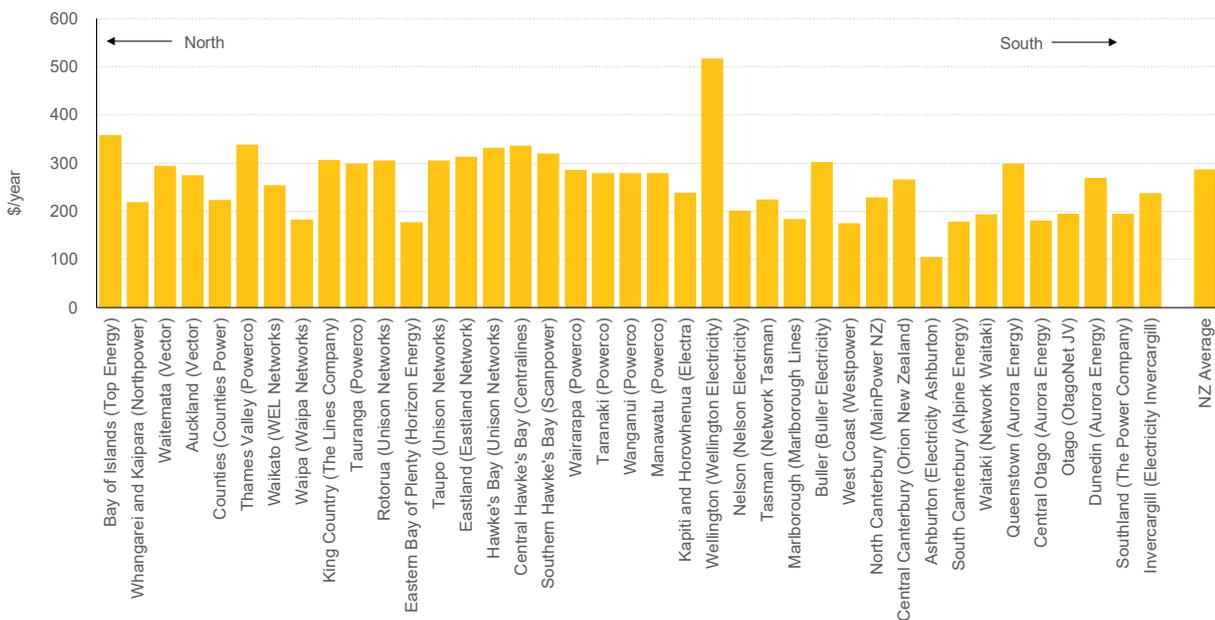


Source: Electricity Authority.

**Regional variations in transmission charges to households**

Currently, residential consumers pay widely different transmission charges (see figure 35). They can differ by up to \$410 a year, although there is no pattern to this variation. Note distributors pay transmission charges and then decide how to allocate them among residential, commercial and industrial consumers. Retailers typically pass on that allocation. Figure 35 is based on information from distributors about how they allocate transmission charges to residential consumers. The results are ordered geographically from north to south.

**Figure 35: Transmission charges for residential consumers**

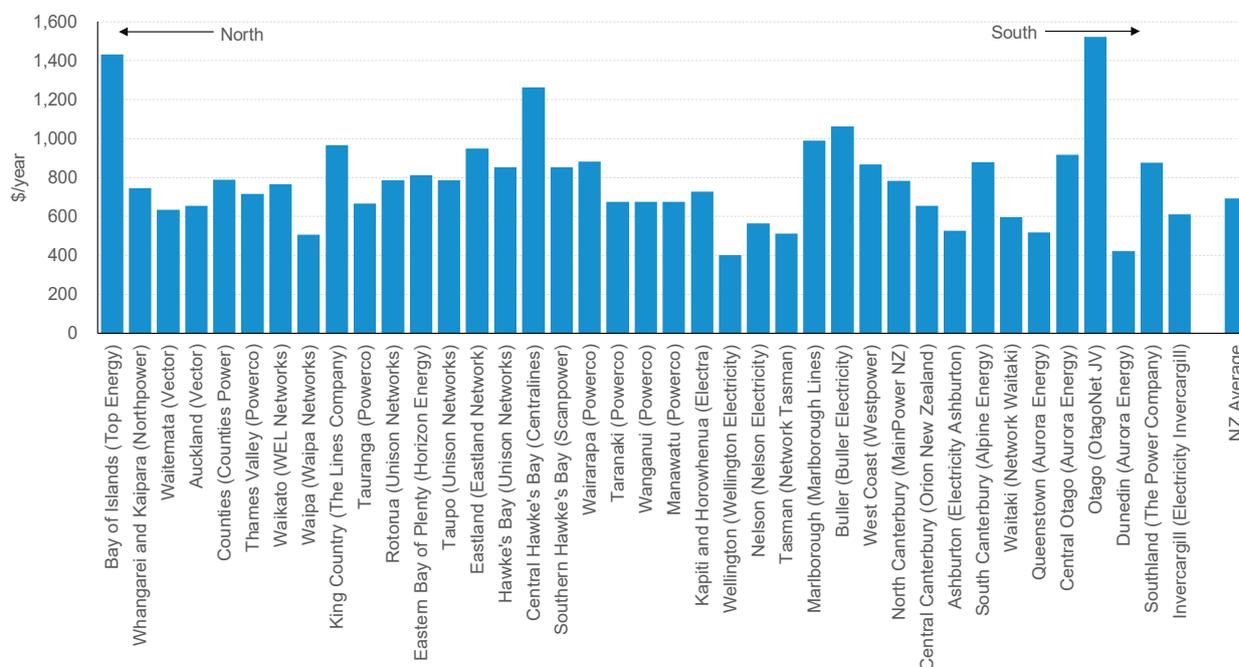


Source: Ministry of Business, Innovation and Employment, May 2018 data. Usage of 8,000 kWh a year.

## Distribution charges

For another perspective on regional variations in transmission charges, we have included the distribution component of network charges by region (see figure 36). Again, there is considerable regional variation – as much as \$1,000 a year or more – but there is no pattern to the variation.

**Figure 36: Distribution charges for residential consumers**



Source: Ministry of Business, Innovation and Employment, Household sales-based electricity cost data, May 2018 data.