



Energy News and GE Digital

Electricity Survey

2020 – SURVEY RESULTS

Introduction

Energy News and GE Digital are delighted to announce the results of the New Zealand Electricity Survey 2020.

In 2018 and 2019 we used multiple surveys throughout the year to drill down on specific issues. However, given the challenges and distractions experienced in 2020, we decided to return to a single survey format for the ninth edition.

Thank you to everyone who took the time to complete the survey. We polled the sector on future predictions across a range of topics, how it is aspiring to be better and how it is inspiring customers and, finally, how sector participants rate sector services themselves.

We first asked for predictions on when specific milestones might be achieved in 2016. We have revisited this question several times to check how views have changed, notable changes since the previous survey include:

- Electric vehicle uptake is on the rise, but has been difficult to forecast. In 2019 only 31% of respondents correctly predicted we would reach 20,000 vehicles in 2020. This time 46% think the 2016 goal of 64,000 electric vehicles will happen by 2024
- Respondents now expect the announcement of a new 50 MW generation asset to occur sooner, in 2021, not 2024 as predicted in 2019
- A net increase in the number of active retailers, now appears to be a possibility by 2024, versus unlikely in 2019
- A new network distribution company amalgamation keeps getting pushed out, from 2024 in 2019 to 2030 now

Responses to other questions produced strong support for some specific scenarios, but in other cases views were spread evenly.

- Most people thought the forward price curve for wholesale and retail prices would rise modestly year on year
- The next big (ie >50 MW) generation asset is likely to be wind or grid-scale solar plus batteries
- A pumped hydro scheme at Lake Onslow saw respondents divided on the emissions benefits versus the ability to provide dry-year security. On the whole, however, respondents disagreed with the idea that the scheme would deliver cheaper energy outcomes for customers

A breakdown of respondents by organisation type is available on page 21. The survey's questions and range of responses were guided by an advisory panel chaired by John Hancock. The panel members are listed on page 3 and we would like to thank them for their input.

Please email irwin.munro@freemanmedia.co.nz with any suggestions for questions or themes for 2021.

Irwin Munro – General Manager
Freeman (publisher of *Energy News*)

ENERGY NEWS
www.energynews.co.nz

GE Digital – Putting industrial data to work

As part of GE, we have a unique opportunity to change the way industry works. Our customers are on the front line of the world's toughest industrial challenges – from enabling more renewable energy on the grid, to reducing emissions, increasing plant productivity, adapting to demand and keeping their teams safe. Our years of hard-won insights in power generation, transmission & distribution and industrial manufacturing mean we're uniquely positioned to help our customers better operate, optimise and analyse their assets.

GE Digital's software manages 40% of global electricity, and the company has been operating in New Zealand for well over 25 years where its technology manages numerous industrial assets including the national electricity grid, wholesale market dispatch, several distribution networks and local telecommunications infrastructure. In addition, its aviation technologies are assisting air traffic controllers and national airline carriers to optimise flight traffic and aircraft operations. In particular, GE Digital has deep domain capabilities in the following areas of the power sector:

- Transmission – Optimise energy dispatch, grid stability and security. Up to 25% increase in grid utilisation
- Advanced Distribution Management Solutions (ADMS) – Achieve a reliable and resilient distribution grid via next-generation control and optimisation capabilities. Up to 30% reduction in SAIFI and SAIDI
- Grid Analytics – Leveraging the power of artificial intelligence and machine learning to maximise Risk Spend Efficiency for today's biggest utility challenges. 'Out of the box' analytics such as grid inertia, vegetation management and visual intelligence deliver significant operational savings
- Power Generation – Using Asset Performance Management (APM) and Operations Performance Management (OPM) transform data into actionable intelligence to achieve a 10-40% reduction in reactive maintenance

About Energy News

Energy News is New Zealand's online news and information service for the energy sector. The website (www.energynews.co.nz) was launched in 2008 and now boasts more than 5000 readers every month from 300 subscribing organisations. Its readership consists of New Zealand energy sector organisations and service companies spanning the electricity, oil and gas, petroleum and alternative energy value chain. The subscription-based site provides daily news, executive interviews, opinion and commentary. It also hosts a suite of sector information including two large databases of sector participants and energy resources. Other information tools include 30-minute electricity prices, supply and demand monitoring, petroleum permit deadline summaries and an oil price monitor.



Building a world that works

Advisory panel



Kevin Hart – GE New Zealand

Kevin Hart, an industry veteran with more than thirty years' experience in the energy sector, was previously GE's CEO for New Zealand and Papua New Guinea before taking on his current role of Asia Pacific Regional Leader for GE's Digital Energy business.



John Hancock (Chair)

John Hancock is an independent consultant to utility companies and their suppliers. He is the independent chair of the Electricity Authority's Wholesale Advisory Group, secretariat to the NZ Smart Grid Forum and has chaired the advisory panel for this survey since its inception in 2012.



Neil Cowie – Solar City

Neil Cowie is the chief executive officer of solarcity New Zealand, a role he has held since October 2019. Prior to this he was CEO of Mitre10 New Zealand, and has also held executive positions in the retail sector both in New Zealand and internationally for the past 30 years.



Briony Bennett – MBIE

Briony started her career as an electricity trading systems analyst. She went on to work as a renewable energy policy analyst at Bloomberg New Energy Finance in London, UK, before returning to New Zealand and undertaking a role as an energy & carbon analyst for Genesis Energy. She currently works for the energy markets policy team, as a senior policy advisor, at the Ministry of Business, Innovation and Employment.



Nick Russ – Commerce Commission

Nick Russ manages the Commission's regulatory functions across a number of sectors, including electricity lines, gas pipelines, major airports, telecommunications, and dairy. Before joining the Commission he spent a number of years working for energy regulators in the UK and Australia.



James Tipping – Electricity Authority

James works across the Authority to bring leadership and excellence to its work programme and to the evidence that underpins the Authority's decision-making. He has more than 17 years' experience working in strategy, analytics, policy and regulatory roles in the energy sector in New Zealand and in Europe.



Josie Boyd – Northpower

As General Manager Network, Josie is responsible for leading the engineering, asset investment, customer, operational, commercial, and regulatory aspects of Northpower's electricity network business. Prior to Northpower Josie worked in New Zealand and the UK in a range of private practice and in-house corporate roles in the utilities, construction and professional services industries.



Dr Julie MacArthur – The University of Auckland

Dr Julie MacArthur hails from Vancouver, Canada. She is currently working on two research projects: the first investigates the nature and politics of community renewable energy in New Zealand, Denmark and the UK. The second explores the role of women in New Zealand's electricity sector.



Josh Riddiford – Editor Capital Letter

With a background in journalism and public policy analysis, Josh started reporting for Energy News in 2017 before moving into the editor's role with legal publication Capital Letter in 2020.



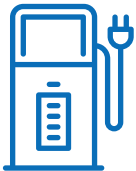
Irwin Munro – Freeman

Irwin is the general manager at Freeman, which sees him take responsibility for the commercial side of its energy sector products, including all events, surveys, stakeholder management and business development.



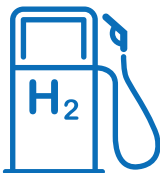
Modest price rises

Predictions are for a 2% per annum increase in wholesale and retail electricity prices



EV adoption hard to forecast

Delayed exponential growth means 64,000 EVs now expected to be reached by 2024



Hydrogen in the mix

Green Hydrogen seen displacing transportation fossil fuels not for power generation



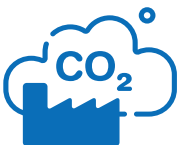
Onslow divides opinion

Many do not believe a pumped hydro scheme build at Lake Onslow will deliver cheaper energy outcomes. But support is split on emissions and dry year benefits



Talent required

The industry consensus is that the most significant people issue is the need for a collective effort to find and attract talent



Emissions reduction progress concerning

Alarmingly nearly half of the survey respondents claimed their organisation had not set or stated emissions reduction targets

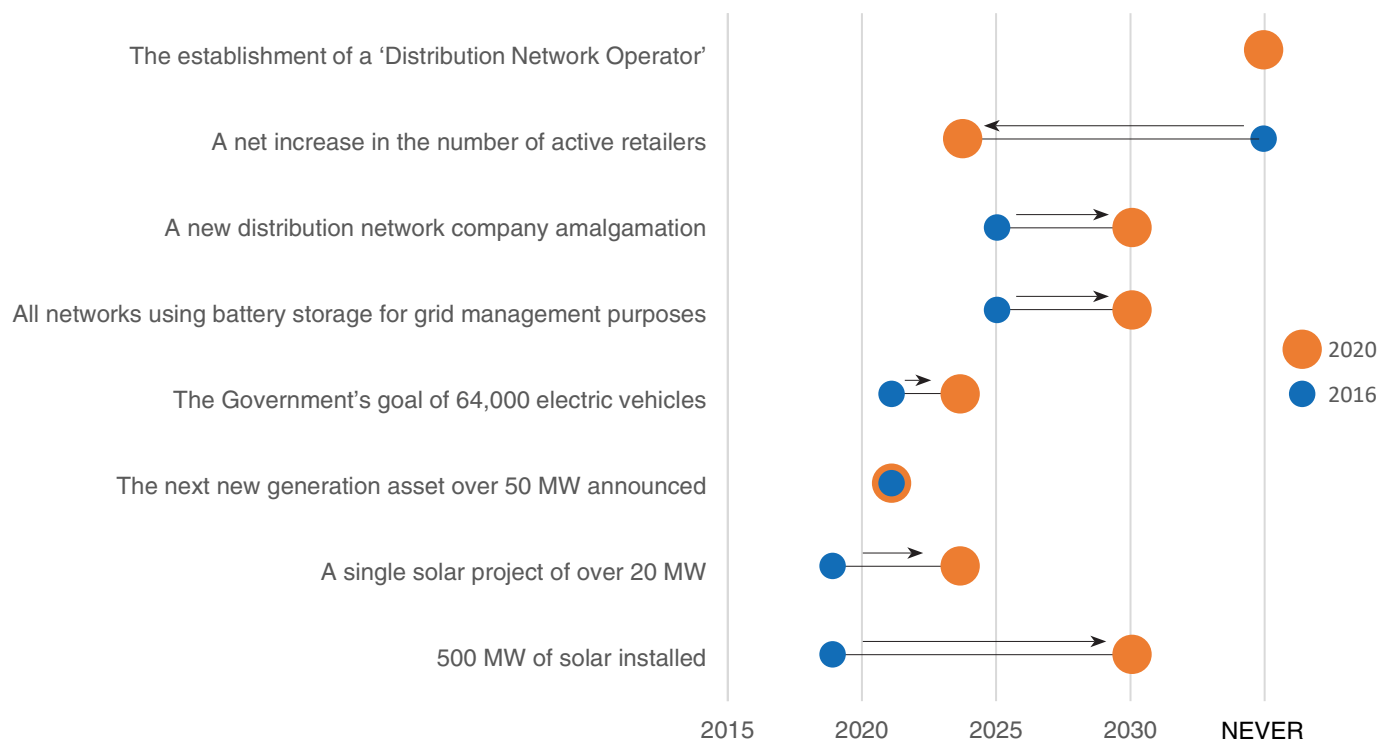


Value – cost versus reality

Respondents think that the cost of electricity drives customers feelings of poor value for money; they themselves generally rate the value from their suppliers favourably

Question 1

We introduced this question in 2016 – asking when all these sector milestones might actually be achieved. How much has industry opinion changed in 12 months? Let's find out what year your think we will see the following:



	2021	2022	2024	2030	NEVER
500 MW of solar installed*	0.66%	8.61%	36.09%	47.02%	7.62%
A single solar project of over 20 MW**	8.61%	27.15%	39.74%	21.19%	3.31%
The next new generation asset over 50 MW announced	30.46%	27.48%	24.50%	14.57%	2.99%
The Government's goal of 64,000 electric vehicles (we reached 23,046 EVs in New Zealand at Oct 2020)***	2.98%	24.83%	46.69%	24.17%	1.33%
All networks using battery storage for grid management purposes	0.33%	1.99%	15.23%	55.30%	27.15%
A new distribution network company amalgamation	3.64%	13.58%	28.81%	31.13%	22.84%
A net increase in the number of active retailers	14.24%	22.85%	25.83%	14.57%	22.51%
The establishment of a centralised (national or regional) 'Distribution Network Operator', similar to transmission system operator	0.66%	6.29%	15.23%	32.45%	45.37%

* This year we reached 100 MW of installed solar (with 25 MW installed since last year's survey)

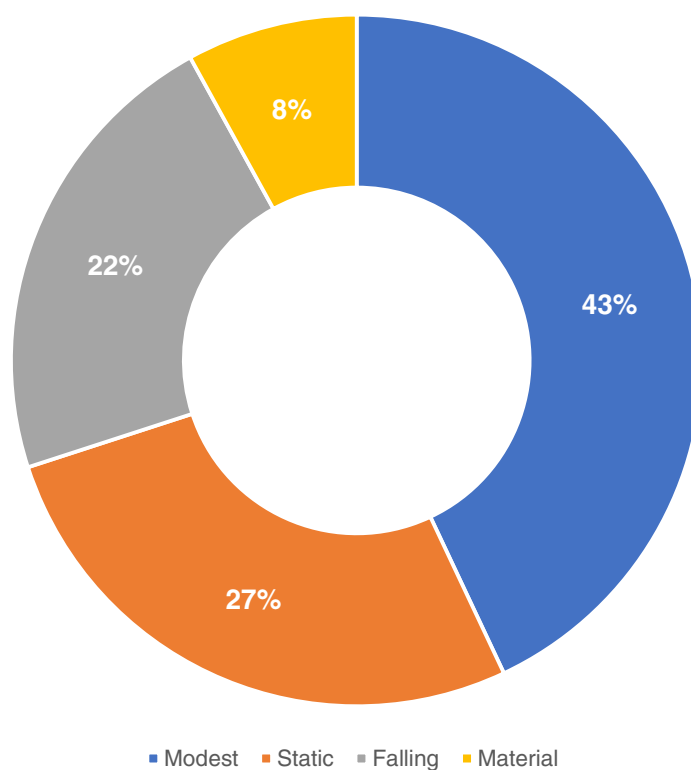
** This milestone has increased from 5 MW to 20 MW since the construction of a 10 MW array has already been announced for Hawke's Bay Airport

*** The Government's goal to reach 64,000 electric vehicles by the end of 2021 was set in 2016

Future predictions

Question 2

New in 2020, here is your prediction for future consumer electricity prices given the current market settings, including increased renewable energy penetration (ie to achieve the target of 100% renewable energy by 2035), hydrogen, decarbonisation, technology developments, fuel costs, competition and demand trends.

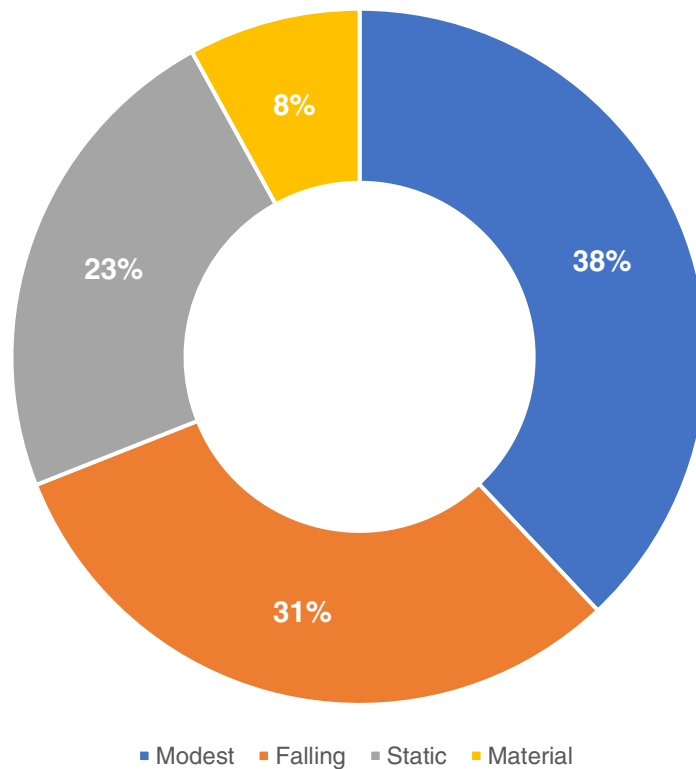


	'real' cents per kWh			
	2021	2022	2030	
Falling	28.8	28.5	26.3	22%
Static	29.1	29.1	29.1	27%
Modest	29.7	30.3	35.5	43%
Material	31.3	33.6	60.0	8%

Future predictions

Question 3

Following on from Question 2, more relevant to the industrial and commercial markets is a prediction around wholesale prices.

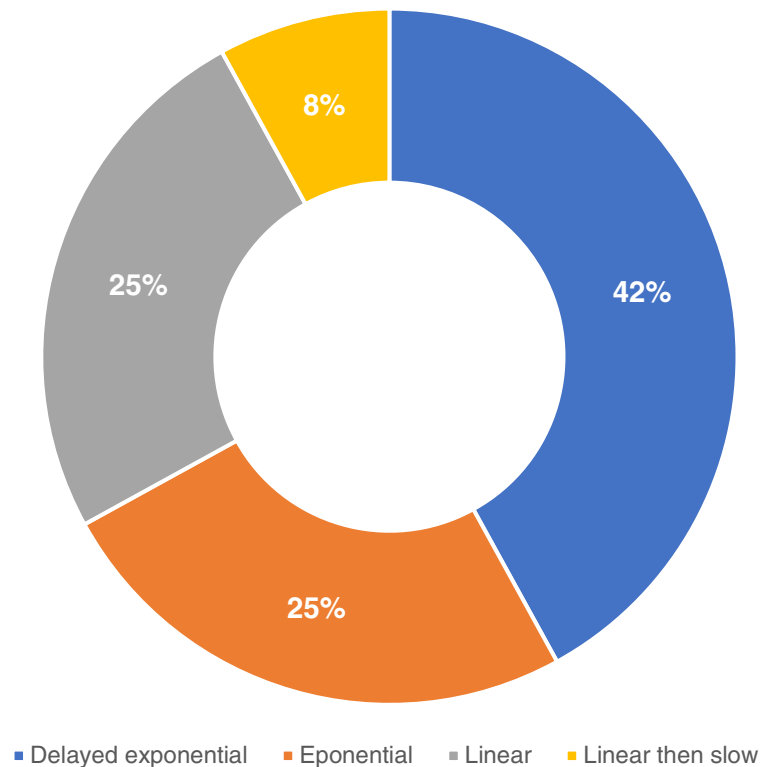


	Dollars per MWh			
	2021	2022	2030	
Falling	100.4	99.4	91.7	31%
Static	101.4	101.4	101.4	23%
Modest	103.4	105.5	123.6	38%
Material	109.0	117.2	209.0	8%

Future predictions

Question 4

The government of the day set an aspirational target in 2016 to have 64,000 electric vehicles on the road by the end of 2021. Currently New Zealand appears to be on a straight line track and will fall short of the 2016 target. Here is what you thought of the uptake scenarios for electric vehicle registration growth.

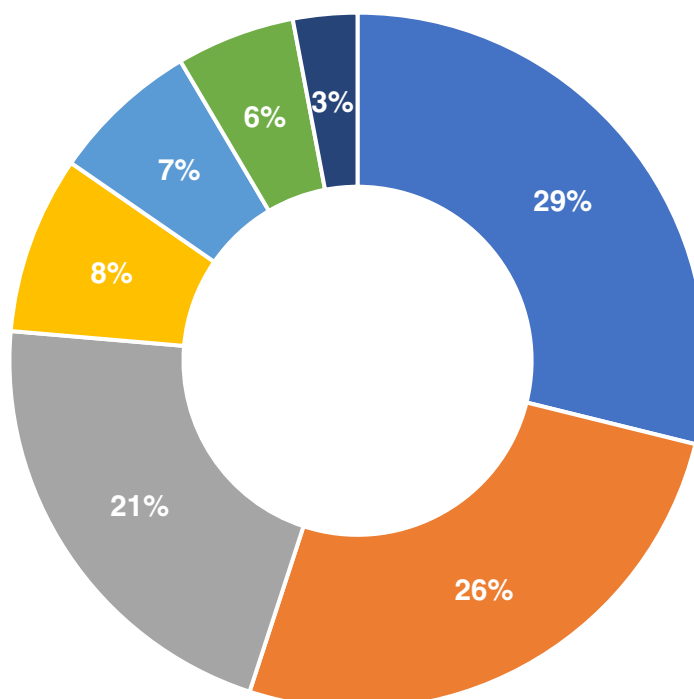


Delayed exponential – Until there are sufficient second-hand EV options out there, the trend will continue and then grow exponentially but we are 10 years away from this happening	42%
Exponential – There will be exponential growth as EV costs fall to parity with ICEs and the public charging network expands	25%
Linear – The trend line will continue in a linear fashion for the foreseeable future given current government settings, industry developments and purchaser sentiments	25%
Linear then slow – EV registrations will continue, but won't accelerate as they will be overtaken by the growth of transport-as-a-service offerings or other alternative fuels	8%

Future predictions

Question 5

What type of big (ie >50 MW) generation asset should be prioritised for development over the next 10 to 20 years to best complement the existing market?



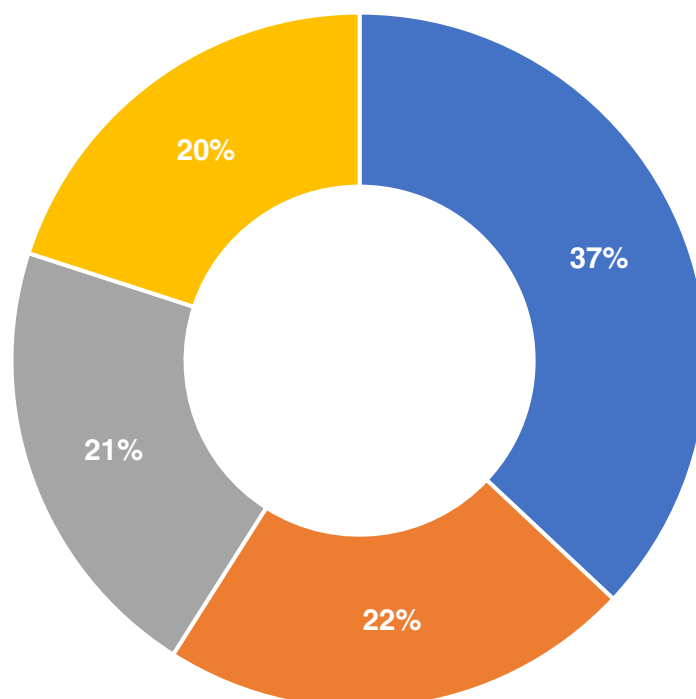
■ Wind ■ Grid-scale solar plus batteries ■ Geothermal ■ New hydro ■ Gas ■ Grid-scale Solar ■ None

Wind – Provides the best form of low-cost renewable energy to complement our existing energy mix	29%
Grid-scale solar plus batteries – Delivers the best system-wide benefits, with global technology costs set to fall materially over the next 10 years	26%
Geothermal – The best form of reliable baseload power we have accessible	21%
New hydro – Delivers the most power at the least cost in the long run	8%
Gas – We have plenty of it and it can provide a reliable, flexible backup to our unpredictable renewable generation portfolio	7%
Grid-scale solar – The larger the asset, the cheaper the cost of generation	6%
None – With energy efficiency and the advent of low cost distributed energy solutions, we don't need to be building new big assets	3%

Future predictions

Question 6

New Zealand has an opportunity to transition to a smart grid that uses renewable electricity to meet all our energy needs. This can be achieved by ensuring we extract the full value from the Distributed Energy Resources (DER) we use to generate electricity. Transpower's recent report* on exploring the potential of DER posed the following question: "Where does the industry leadership come from for DER integration into the current system and arrangements, where the problem is economically and technically complex?"



■ Our market regulator ■ Laissez-faire ■ A new independent agency ■ From the top

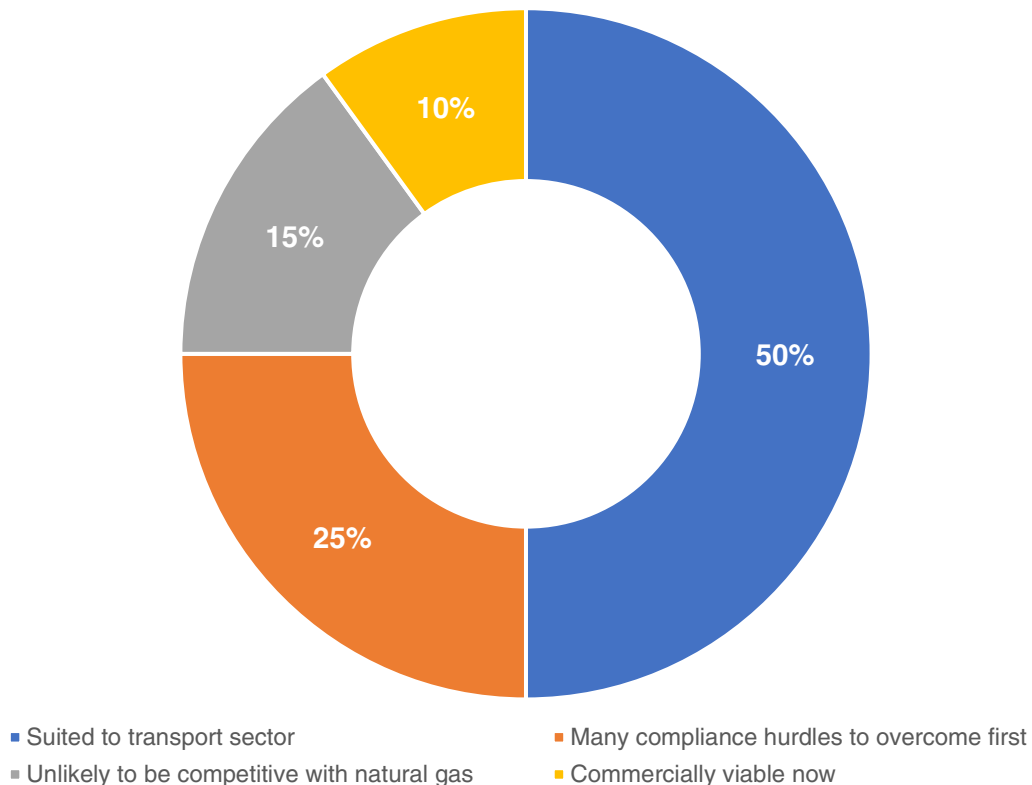
Our market regulator – The Electricity Authority sets the arrangements for many aspects of the industry such as settlement and market participation, there is no reason with the right governance why they can't take the lead on this	37%
Laissez-faire – Why does anyone need to lead? The 'market' and the individual entities are more than capable of evolving the market to deliver the most value to consumers	22%
A new independent agency – This is so critical to New Zealand's future that a new entity should be established with the sole purpose of delivering the best outcomes that DER can offer	21%
From the top – To ensure independence and that system wide benefits are maximised, the Government needs to lead	20%

*<https://www.transpower.co.nz/resources/distributed-energy-resources-der-report>

Future predictions

Question 7

The Government's aspiration to reach its 100% renewable energy and carbon reduction targets is supported by various initiatives, including 'green' hydrogen as a new fuel source. Here's what you thought about Hydrogen.

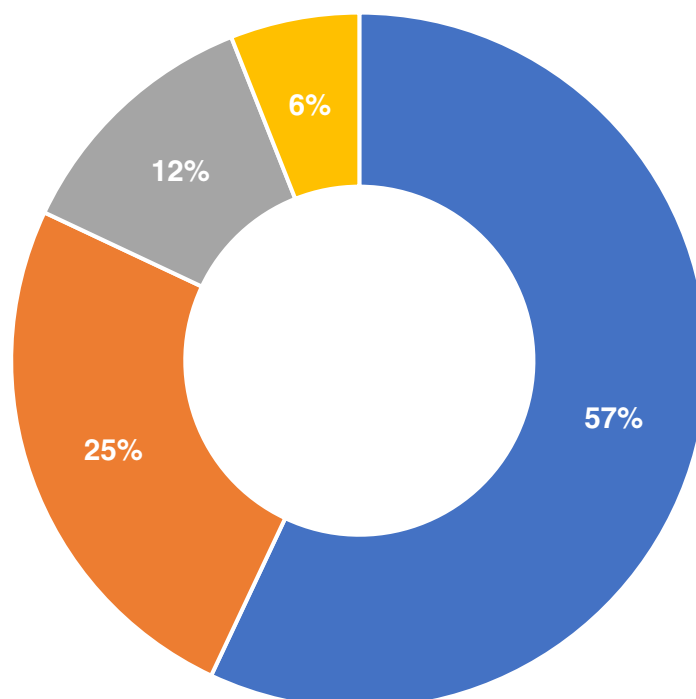


Hydrogen has its place in the future, but is more suited to the transportation sector to displace traditional fossil fuels rather than as a power generation fuel source	50%
Hydrogen has its place in the future, but there are many compliance hurdles yet to overcome before it is commercially or technically accepted	25%
Hydrogen is unlikely to compete for the foreseeable future against natural gas as an alternative electricity generation fuel	15%
Hydrogen fuel is here and now and will be commercially viable across multiple industrial sectors within 5 years	10%

Future predictions

Question 8

Gas and electricity – How do you see the future role of gas (natural gas and LPG) impacting the electricity sector over the next 10 years?



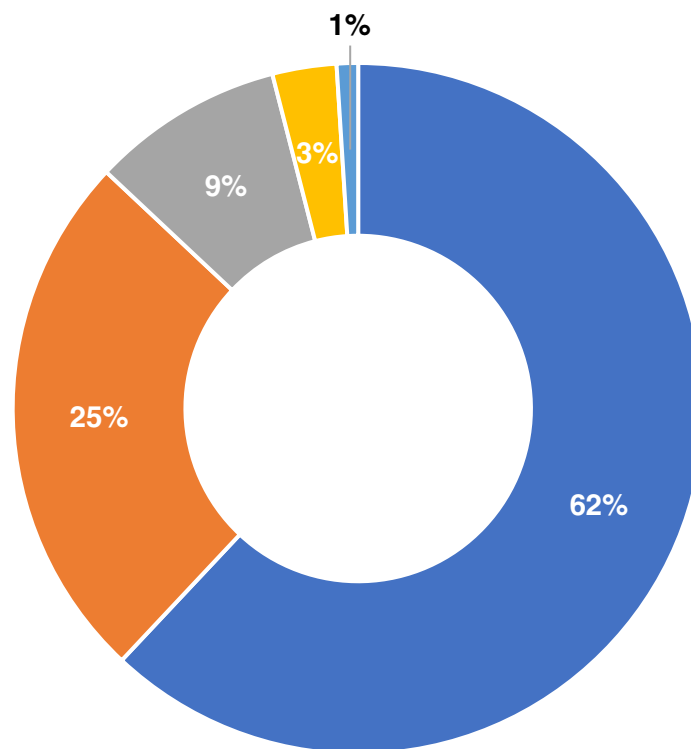
■ Gradual substitution ■ Stable gas use ■ Sharp decline ■ Gas increasing its share

Gradual substitution – We are watching a slow-motion train wreck for the gas industry with a slow death spiral fuelled by increasing gas production costs, increasing emissions costs and the obvious political and environmental headwinds	57%
Stable – Gas will continue to support the current industrial and commercial markets, with a static residential demand. The majority of new energy demand will be met by renewable electricity generation	25%
Sharp decline – Once we are past Covid-19, the focus on climate change will accelerate the moves away from carbon intensive energy forms, and see a huge reduction in gas consumption in 10 years' time, leaving only niche users where no electricity option exists	12%
Gas increasing its share of the energy mix – Even with political headwinds, the global and domestic demand for energy will continue to rise and gas will be the fuel of choice for many consumers, plus an increasing need for peakers to support the renewables push	6%

Future predictions

Question 9

Grid parity – Given what you know about the cost of residential solar plus home battery installations, when do you think cost parity with grid supplied electricity will be reached?



■ Within five years ■ Never ■ Within two years ■ Now – we are already there ■ Within one year

Now – we are already there	3%
Within one year	1%
Within two years	9%
Within five years	62%
Never	25%

Future predictions

Question 10

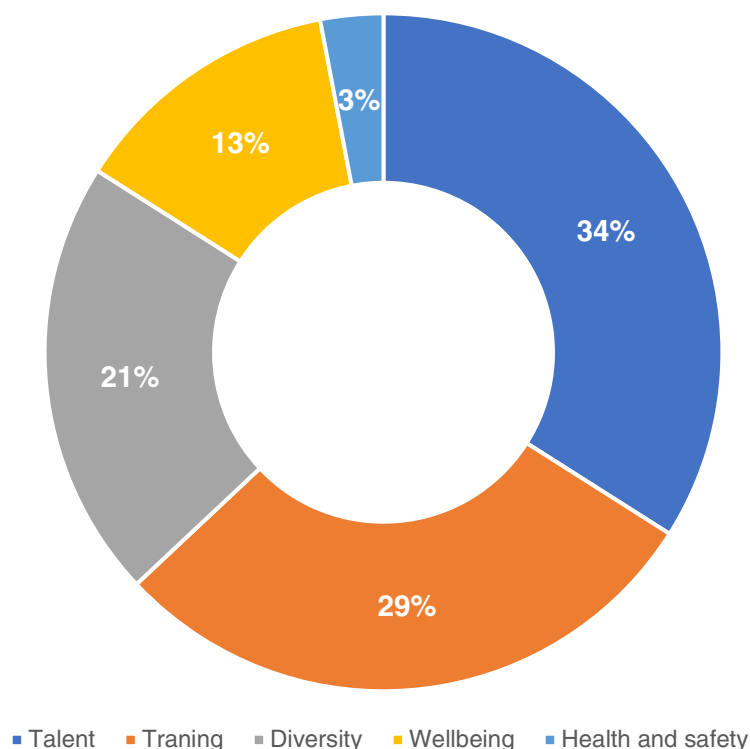
The Onslow pumped hydro scheme aka 'NZ Battery'. The industry appears to be split on whether the Onslow pumped storage hydro proposal is a good idea or not. We tested some of the key assertions to determine whether you all agree (or not).

	Strongly agree	Agree somewhat	Neither agree nor disagree	Disagree somewhat	Strongly disagree
The project will deliver cheaper energy outcomes for consumers, it is the cheapest method to support intermittency issues associated with renewable generation including hydro, wind and solar	4%	21%	17%	28%	30%
The project provides the best emissions outcome by removing the need for new thermal generation and supporting increased renewable generation	10%	30%	20%	21%	19%
The project provides the best long-term energy security outcome especially in dry-year scenarios	10%	27%	19%	20%	24%
The project will provide the best support for electrification of the transport fleet and moving industrial heating demand to electricity	5%	18%	22%	27%	28%

Aspiring and inspiring

Question 11

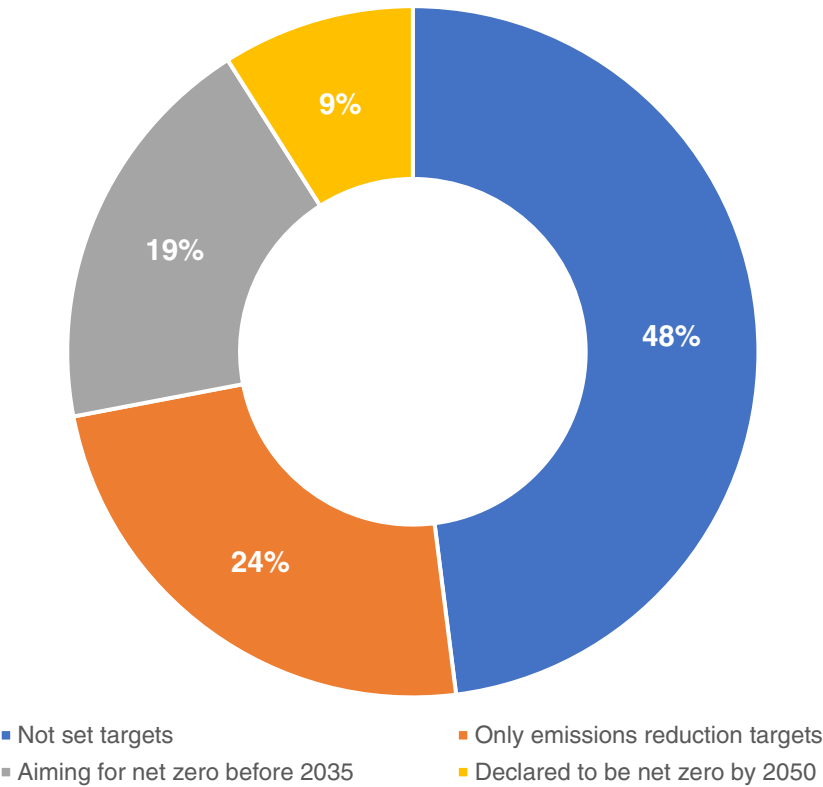
Looking after our people – In your view what is the one human-centred issue from the following list that needs the most attention from the electricity industry?



Talent – If you ask any asset owner or key service provider in the electricity industry, finding and attracting talent is a major hurdle for their organisation. This is an industry-wide issue that needs a bigger collective effort	34%
Training – The industry is missing a trick to upskill existing talent to leverage institutional knowledge and apply it to the new and emerging challenges	29%
Diversity – The industry is still suffering from the lack of a diverse workforce, holding it back from delivering much better outcomes as a sector	21%
Wellbeing – This is poorly understood and often poorly addressed. Increased focus in this area would deliver phenomenal outcomes for the sector	13%
Health and safety – Compared to other sectors we perform well but our performance in this area still needs to improve, we have become complacent	3%

Question 12

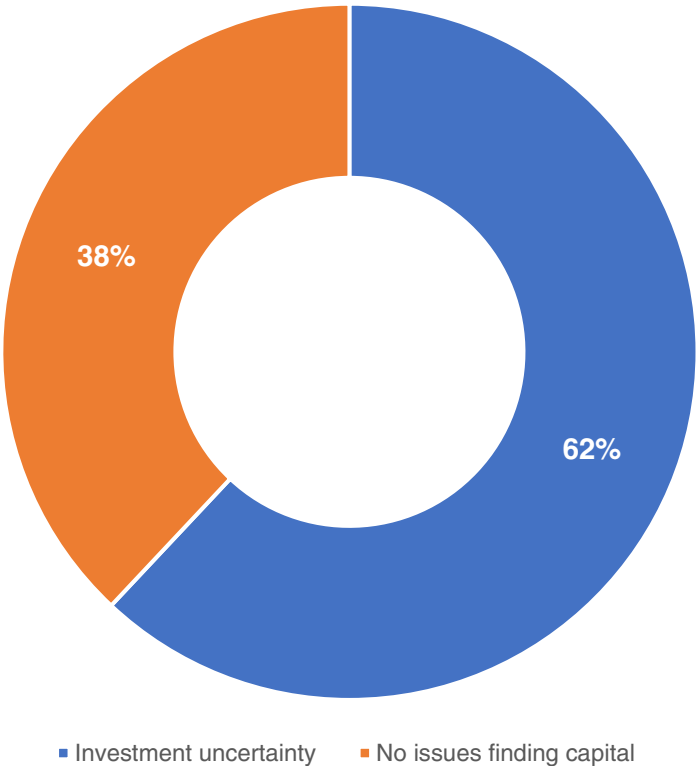
Zero carbon progress – In line with the Government’s target of net zero by 2050, has your organisation declared its target for becoming a net zero emitter?



No, we have not currently set and publicly stated any targets	48%
We have set targets for our emissions but not for net zero yet	24%
Yes, we have set a target of net zero by earlier than 2035	19%
Yes, we also have a target of net zero by 2050 and have publicly declared it	9%

Question 13

Infrastructure investment – Many of our electricity industry assets including generation plant and grids have their best years behind them, leaving a large investment need in the not too distant future. Here is what you thought about the challenge of reinvesting in infrastructure.



With so much investment uncertainty around new technology, regulatory settings and government interference, re-investing in assets will be increasingly harder to justify and may result in poorer outcomes for consumers from ageing plant	62%
This is a non-issue; sufficient investment certainty exists around electricity assets for owners to not have any issues finding the capital needed to replace or maintain existing plant	38%

Aspiring and inspiring

Question 14

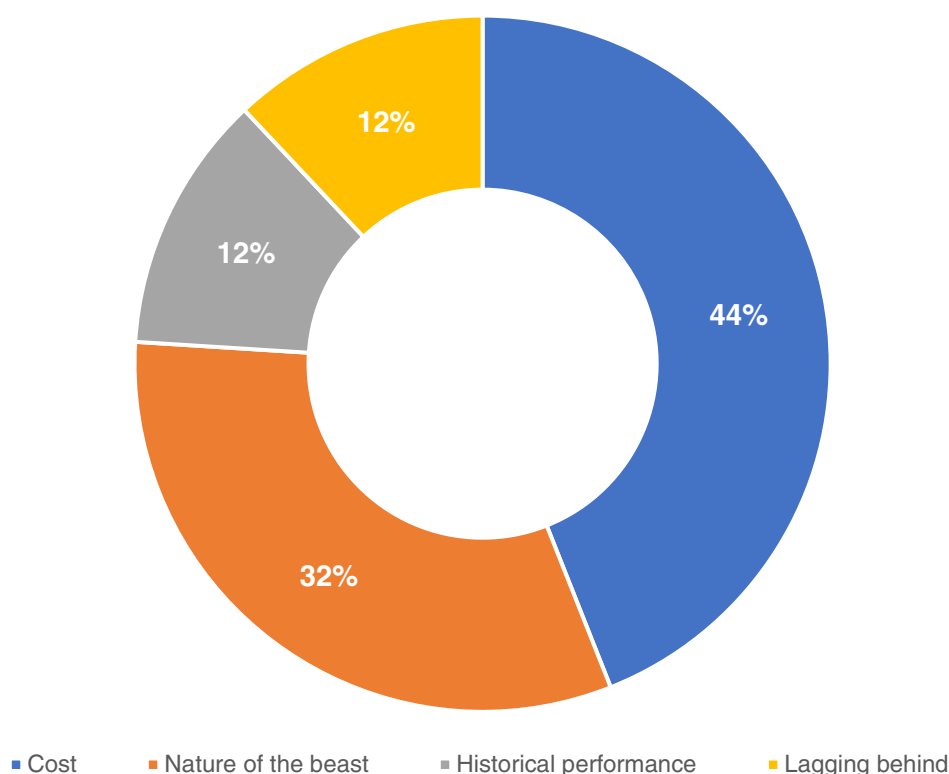
Accessibility to new electricity sources – We wanted to test the potential for key residential technology developments to positively impact consumers who currently face energy hardship. For each of the technologies below you rated the overall impact on these consumers.

	Very positive	Somewhat positive	Neutral	Somewhat negative	Very negative
Electric vehicles	18%	30%	23%	20%	9%
Residential solar	16%	38%	25%	15%	6%
Residential battery storage	18%	32%	24%	17%	9%
Residential demand response, smart metering	25%	46%	21%	5%	3%

Aspiring and inspiring

Question 15

Social licence – What do you think is the biggest reason for the alleged bad reputation the electricity sector has when it comes to delivering value for money? You chose the option you most aligned with.

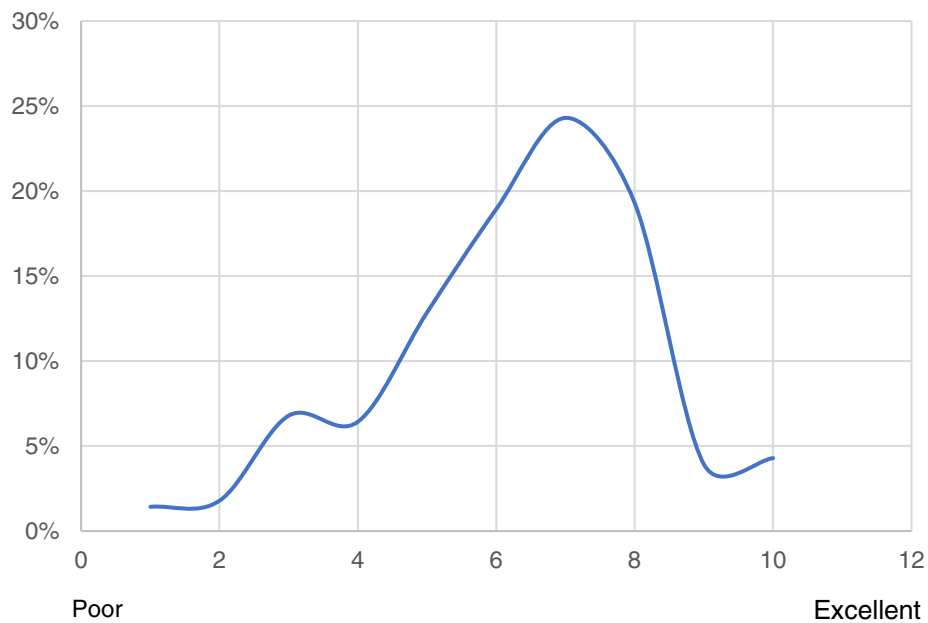


Cost – It's simple, there is a perception that costs increase materially every year for no reason and that the industry is overcharging	44%
Nature of the beast – As a necessity, rather than an optional purchase, the tangible benefits from having access to a reliable, low-cost electricity supply are often considered and are difficult to quantify. Not much can be done here to improve the 'begrudging' nature of the purchase	32%
Historical performance – Customer focus was almost non-existent 10 years ago but a lot has changed over that time which I believe results in much better customer outcomes and perceptions	12%
Lagging behind – Customer satisfaction has never been high on the priority list, resulting in other sectors jumping well ahead of the electricity industry relatively speaking. We are catching up, albeit slowly	12%

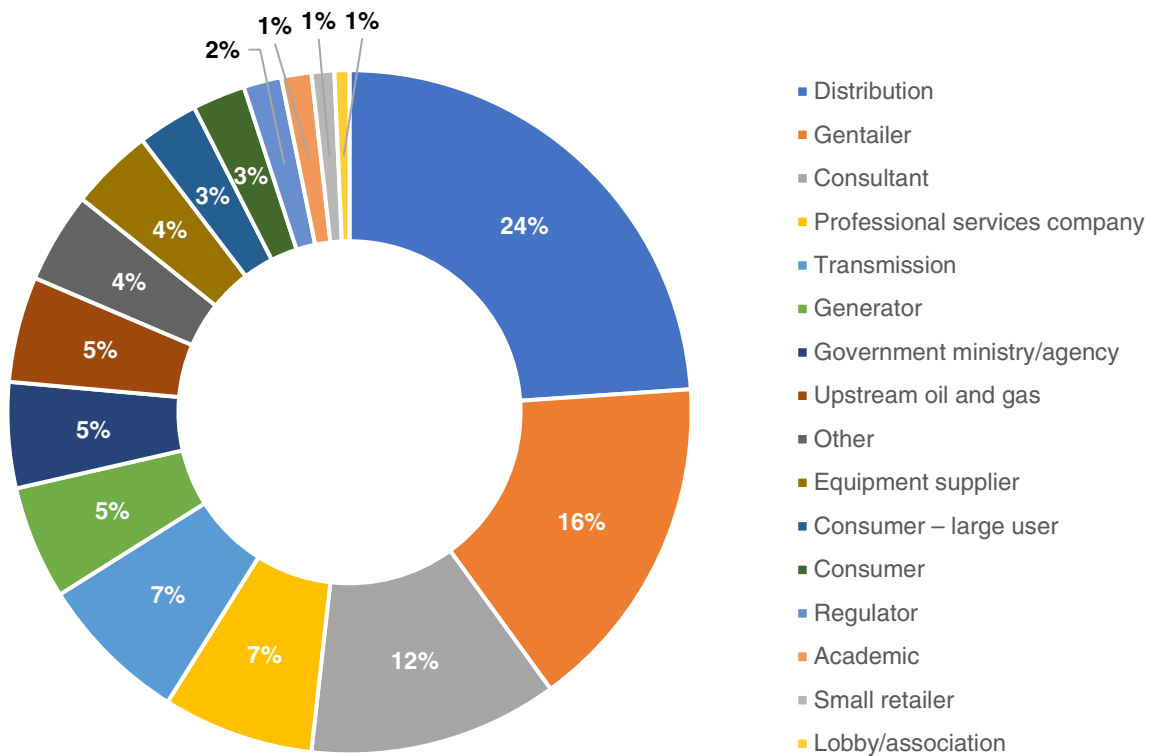
Your experience as a consumer

Question 16

As a consumer yourself, how do you rate the value-for-money you receive from your supply of electricity.



Participants by organisation type





Digital Energy Accelerates Your Time to Value

Specifically designed for the New Zealand (NZ) market, GE's DER-aware Advanced Distribution Management Solutions (ADMS) move beyond the traditional bounds of SCADA, DMS and OMS and provide software for the safe and secure management and orchestration of electricity networks and grids.

The NZ Operating Model (NZOM), developed specifically for the NZ electricity market, ensures distributors receive:

- NZ switching methodology, terminology and symbology
- Support based in NZ, backed by GE's International Support Centres of Excellence
- Access to GE's growing New Zealand ADMS User Group community

Talk to GE today about our affordable, fully featured New Zealand ADMS software, priced specifically for small distribution companies, and accelerate your time to value.

Call us today at +61 449 953 538.