KRAKEN FLEX

Electricity Survey

2022 - Survey Results

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ENERGY NEWS

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Introduction

Energy News and Octopus Energy are delighted to announce the 2022 KrakenFlex Electricity Survey results.

The survey polls the sector on its views across a range of dimensions, including New Zealand's future electricity mix, how we can decarbonise faster, and where challenges may arise.

Since 2016 we have been asking for predictions on when specific sector milestones might be reached. It's fascinating to see opinions evolve over time.

- More than a quarter of respondents believe the NZ Battery Project will instead result in a portfolio approach to securing New Zealand's electricity supply, possibly with a smaller scheme in another location
- With a pipeline of grid-scale solar projects developing, respondents also point to renewable baseload options such as geothermal
- There is support for removing regulatory barriers to increase the viability of new renewable generation projects and better market structures to support retail competition were seen as the best actions Government could take to support the energy transition
- Nearly all respondents said their businesses were facing cost increases, with a few saying these were up 20 per cent or more, year-on-year
- Nearly half report a shortage of skilled and experienced labour across all positions, there is competition from other countries which are able to pay more and concern about businesses being able to access the new capabilities businesses need

A breakdown of respondents by organisation type is available on page 18. This year respondents included consultants, distributors and gentailers.

The panel members are listed on page 3, and the survey questions and range of responses were guided by an advisory panel chaired by industry consultant and expert John Hancock. We thank them for their input.

Please email any feedback to irwin.munro@freemanmedia.co.nz. We welcome suggestions for questions, themes and responses for 2023.

Irwin Munro – *General Manager*

Freeman (publisher of *Energy News)*.

About Octopus Energy

Octopus Energy Group is the global energy tech pioneer, launched in 2016 to use technology to unlock a customer focused and affordable green energy revolution. It currently looks after 3.5 million customers across nine countries with award-winning customer service, and serves 25 million energy accounts via its proprietary platform Kraken, which has been licensed to the likes of E.ON, EDF and Origin Energy.

Kraken Flex is a cloud-based platform that controls distributed energy assets with machine learning and artificial intelligence to match supply and demand – helping the electricity grid deal with the natural volatility of renewable generation. The new energy system requires decentralisation and flexibility. Asset owners, energy traders and retailers will control and optimise large portfolios of diverse, distributed energy resources. Kraken Flex meets this need – connecting a multitude of devices from commercial, industrial or domestic sites, including battery storage systems, electric vehicle charge points, UPS and heating and cooling systems. Kraken Flex (previously Upside) joined the Octopus Energy Group in November 2020.

Octopus Energy is live in New Zealand. Octopus makes it easy for you to access affordable power as we all transition to a clean energy future, through market-leading innovation and technology.

Learn more at https://octopusenergy.nz/

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 information resources 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.

Advisory panel

Margaret Cooney – Octopus Energy

Margaret is Chief Customer Officer for Octopus Energy and has previously led electricity retailer Powershop. She has worked across a range of functions including operations, regulatory affairs, strategy, restructuring and capital raising in the energy and technology sectors. She holds an LLB and BCom (Economics).

John Hancock (Chair)

John Hancock is a well-known energy utilities consultant and commentator. He chairs the Electricity Authority's Innovation & Participation Advisory Group and is a member of Expert Advisory Group for the Government's Electricity Price Review. Much of his experience draws on his unusual combination of deep experience in both technology and deregulation – key dimensions of the strategic environment in the sector.

Neil Wembridge – Evoegy

With over 25-years of international experience in strategic energy consulting, I have extensive experience in regulatory design and investigations, market studies, due diligence support, financial modelling, asset valuations, asset management, project management, feasibility studies and asset expenditure reviews.

Andy Sibley – Simply Energy

Andy came to Simply when it joined forces with Contact in 2020. During his nine years at Contact, his focus on people before process delivered significant business improvements and shifts in culture within the teams he led as Engineering Manager, Head of Operations Support and more recently General Manager Innovations and Ventures.

Karen Frew – Powerco

Karen Frew leads Powerco's Electricity Service Delivery and Operational Teams. She joined Powerco in 2002.Karen holds an electrical engineering degree and diploma in management. She is a chartered engineer with 25 years' experience in distribution, generation and large industrial sectors in New Zealand and UK.

Josie Boyd – Northpower

Josie joined Northpower in 2011, was its General Counsel for a number of years and prior to that 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. Josie has responsibility for managing Northpower's electricity network, including engineering, asset investment, customer, operational, commercial, and regulatory functions.

Fiona Wiseman – Manawa Energy

With over 12 years' experience in the energy sector, Fiona has worked in regulatory roles both within the market regulator and privately owned participants. Prior to moving back to New Zealand in 2017, Fiona held the role of Senior Advisor in the Market Development team of the Independent Market Operator in West Australia and later was the Wholesale Regulation Manager for Alinta Energy.

Sam Elder – Orion

Sam leads Orion Group's Energy Futures team, collaborating to develop new, innovative energy solutions for a cleaner, brighter future for our community. Sam started out as a spacecraft thermal systems engineer in the UK, before moving to NZ in 2006. Since then she has held a range of leadership roles including Retail Insight Manager at Meridian Energy, South Island Director at the Ākina Foundation, and Senior Strategy Manager at Environment Canterbury.

Sharon Corbett – MBIE

Sharon joined MBIE's Energy and Resource Markets Branch in November 2021 as a Policy Director, working across all aspects of energy and resources policy. Sharon has been in MBIE since 2013 working in competition policy and, more recently, as Manager of MBIE's Financial Markets Policy team. Prior to that Sharon worked for Ireland's electricity transmission system operator.

Steve Rotherham – Energy News

Steve grew up in Christchurch but spent most of his career in Australia. He is a former editor of Perth-based online publication PetroleumNews.net (now known as Energy News Bulletin). He has also held corporate communications roles with the Australian Petroleum Production & Exploration Association and the Australian Automobile Association.

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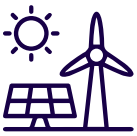
Highlights

Market-led choices

Geothermal and off-shore wind are potential options for New Zealand to prioritise over the next 10 to 20 years, but most respondents favour a market-led approach.



Portfolio approach

There is support for a portfolio approach to meeting the country's renewable electricity targets over a single big investment, such as the NZ Battery Project. This may include smaller pumped-hydro options.

Renewable expectations

Energy technologies, including off-shore wind and hydrogen solutions, are expected to play a meaningful role in the nation's energy supply by 2035.

Managing demand

Many respondents favour distribution businesses for managing demand-side response, as they understand the network and know how to manage load. This may lead to the development of a 'Distribution System Operator' - similar to the transmission system operator - by 2030.

EV uptake supported

More than a quarter of respondents say flexibility services that reward EV adopters are needed in the electricity market. Increased network infrastructure investment is needed to remove potential network constraints, allowing for better public and private charging.

System security

As decarbonisation increases electricity demand, there is a need to ensure it will be delivered reliably and securely. Overall, respondents are thinking about future constraints as more companies and consumers switch from fossil fuels to low-carbon electricity for industry and transport.

Market design

Re-designing the electricity market may be necessary to promote more retail competition, encourage decarbonisation and reduce consumer costs.

Government role

Removing regulatory barriers to increase the viability of new renewable generation projects is the most popular potential action the Government could take to support the energy transition.

Talent challenge

The industry needs to attract skilled and experienced labour to replace an ageing workforce and add new capabilities to support the 100 per cent renewable transition. Challenges include competition from countries which are able to pay more.

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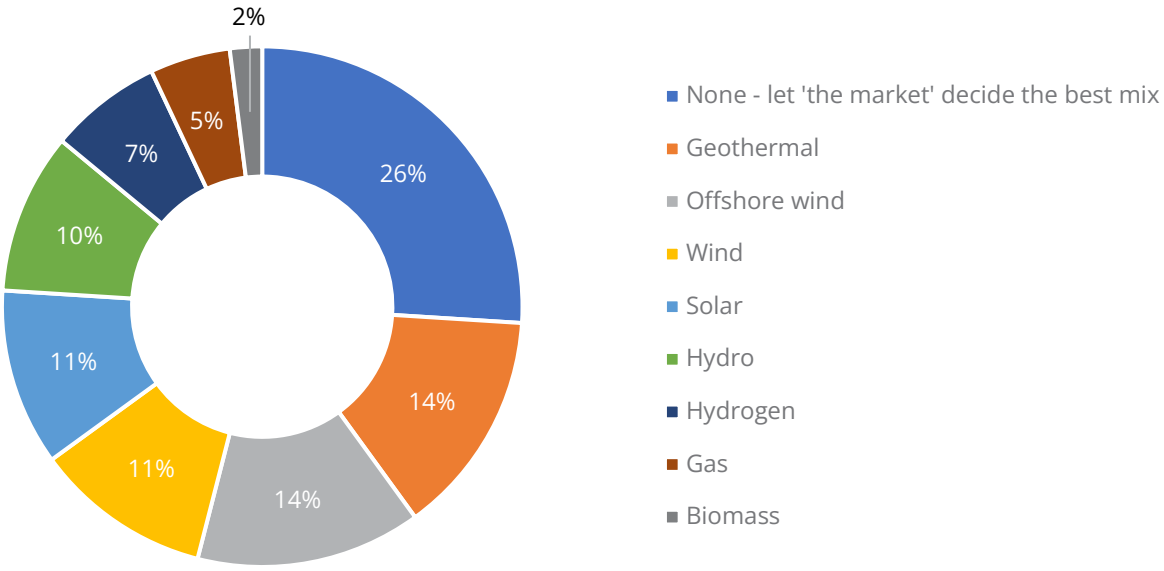
Long-running survey questions

To test some key predictions for the electricity sector we have a few questions that we like ask each year in one way or another which illustrates how opinions are changing over time.

Question 1

Here are the electricity generation asset types you thought should be prioritised for development over the next 10 to 20 years to best complement the existing generation mix and evolving energy environment.



	2020	2021	2022
None - let 'the market' decide the best mix	3%	▼ 1%	▲ 26%
Geothermal	21%	▲ 24%	▼ 14%
Offshore wind			14%
Wind	29%	▼ 17%	▼ 11%
Solar	32%	32%	▲ 11%
Hydro	8%	▲ 16%	▼ 10%
Hydrogen			7%
Gas	7%	▲ 10%	5%
Biomass			2%

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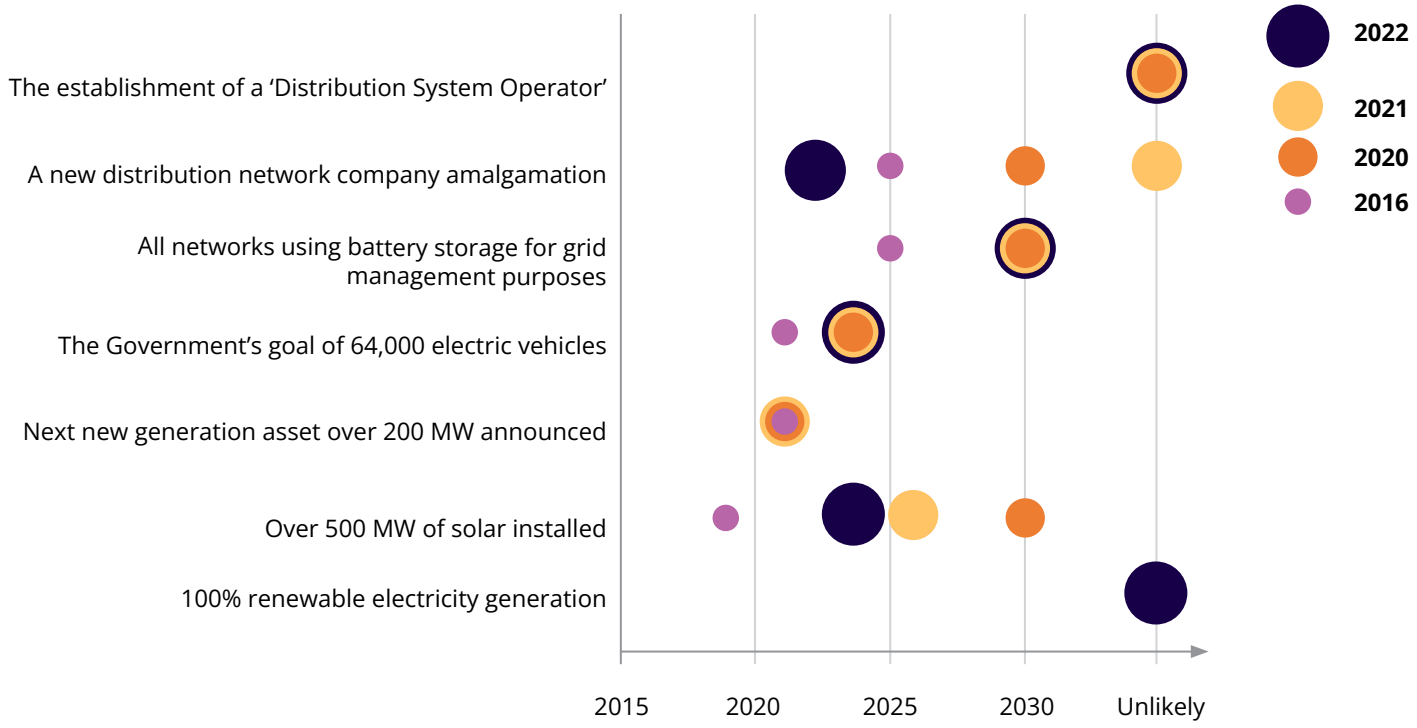
Long-running survey questions

Question 2

We have been asking for your predictions on the following since 2016. It is interesting to see how projections have changed, or not, over time.



	2022	2024	2026	2030	2035	2035 -2050	Unlikely ever
The establishment of a 'Distribution System Operator' (DSO),carrying out a similar role to the transmission system operator	3%	11%	16%	25%	8%	10%	**27%**
A new distribution network company amalgamation	**20%**	19%	15%	18%	5%	5%	18%
All distribution networks using battery storage for local grid management purposes	2%	14%	17%	**28%**	18%	12%	9%
The Government's goal of 64,000 electric vehicles*	20%	**37%**	22%	13%	3%	3%	2%
The next new generation asset over 200 MW** announced	**48%**	28%	15%	5%	1%	1%	2%
Over 500 MW of solar installed***	8%	**33%**	32%	16%	6%	3%	2%
100% renewable electricity generation	0%	1%	2%	9%	17%	35%	**36%**

*The Government's goal to reach 64,000 electric vehicles by the end of 2021 was set in 2016
**The threshold was only 70 MW in 2021
***As at the end of December 2021, New Zealand has 186.7 MW of grid-connected photovoltaic (PV) solar power installed

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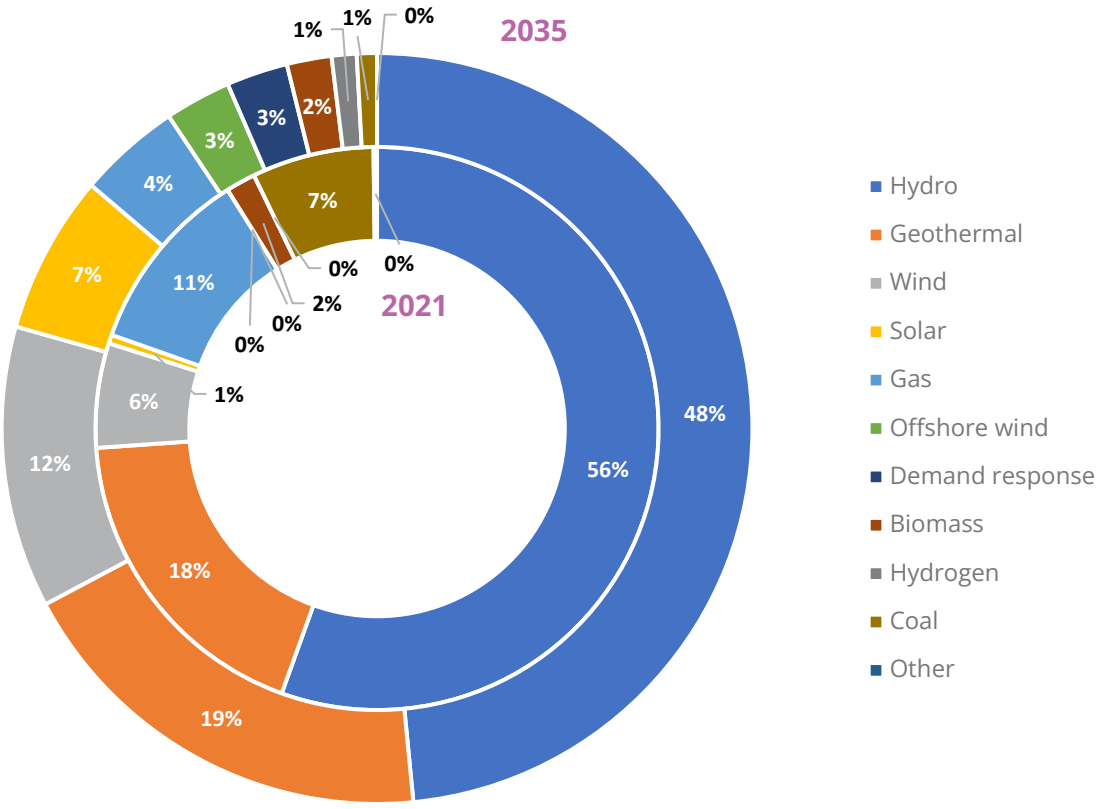
Long-running survey questions

Question 3

We asked you to predict the net-generation mix in 2035. Here is what you thought compared to the 2021* mix.



	2021*	2035
Hydro	**55.5%**	**48.5%**
Geothermal	18.4%	18.8%
Wind	6.0%	12.1%
Solar	0.5%	6.8%
Gas	10.7%	4.4%
Offshore wind	0.0%	2.8%
Demand response	0.0%	2.6%
Biomass	1.7%	1.9%
Hydrogen	0.0%	1.1%
Coal	7.0%	0.9%
Other	0.2%	0.0%

*https://www.mbie.govt.nz/building-and-energy/energy-and-natural-resources/energy-statistics-and-modelling/energy-statistics/electricity-statistics/

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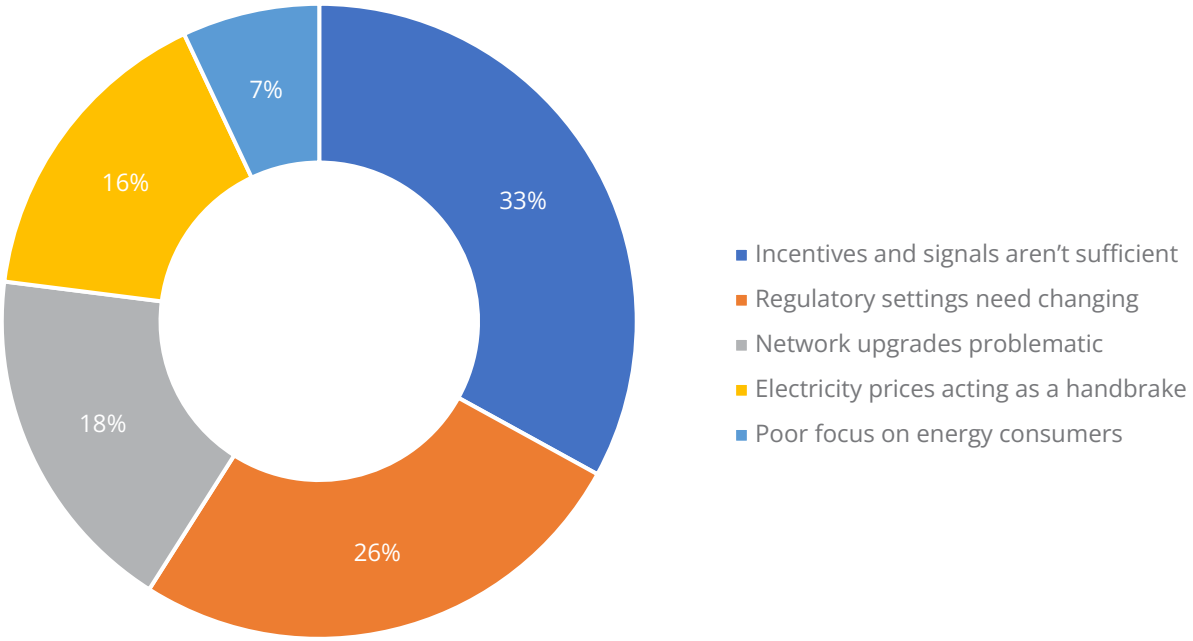
Securing the energy transition

The pathway towards net-zero Aotearoa by 2050 and the aspirational target of 100 percent renewable electricity by 2030 has a few hurdles. The next section considers decarbonisation challenges and future energy security.

Question 4

Here is what you thought was the biggest concern for the ability of the sector to support decarbonisation.



The incentives and signals aren't sufficient to motivate the key organisations into action, or into the right kind of action (eg demand side optimisation)	**33%**
The regulatory settings and incentives aren't there to unlock the required scale of green alternatives	26%
Upgrades to networks to support increased renewable generation and low carbon distributed energy solutions are going to be too expensive	18%
Current electricity prices will act as a handbrake and potentially prolong the use of fossil fuels as an energy source for major industrial energy users and gas consumers	16%
Inadequate focus on, and understanding of, energy consumers	7%

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Securing the energy transition

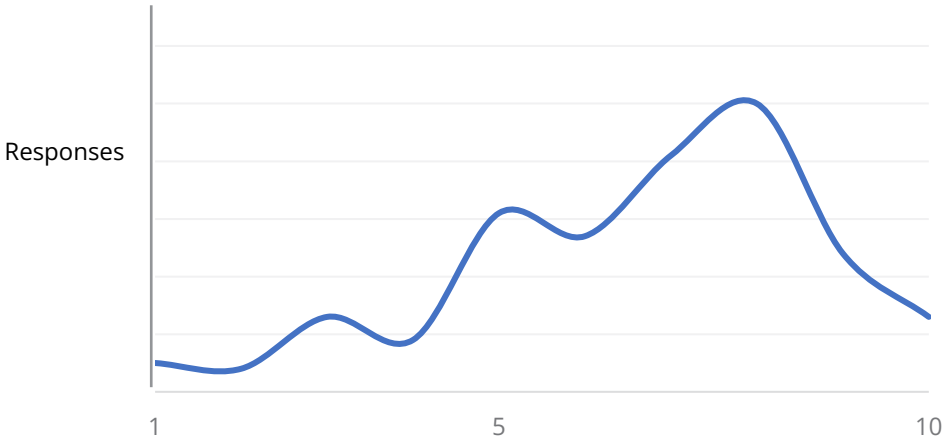
Question 5

Given the widespread outage on 9 August last year and the increased use of Grid Emergency Notices, here is your distribution of opinions on how close we are to the electricity system's security limit.

1 = We are more secure than we have been for a long time thanks to recent improvements in managing security, reliability and system stability

5 = No change, recent sector changes have kept the level of security as it has been for the last 20 years

10 = We are more heavily exposed than we have been in recent times. It won't take much to go wrong before frequent electricity system outages and curtailments are experienced



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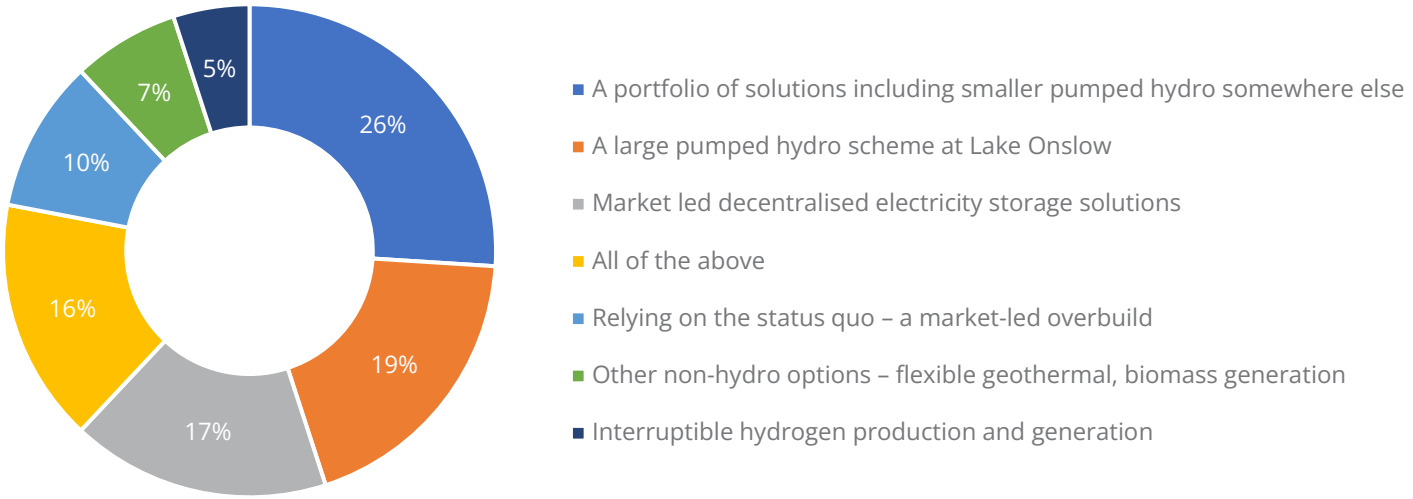
Securing the energy transition

Question 6

Here is what you think will result from the governments NZ Battery Project.



A portfolio of solutions including smaller pumped hydro somewhere else	**26%**
A large pumped hydro scheme at Lake Onslow	19%
Market led decentralised electricity storage solutions	17%
All of the above	16%
Relying on the status quo – a market-led overbuild	10%
Other non-hydro options – flexible geothermal, biomass generation	7%
Interruptible hydrogen production and generation	5%

*The NZ Battery Project will provide advice on options to address the 'dry year problem' as we transition away from fossil fuels. https://www.mbie.govt.nz/building-and-energy/energy-and-natural-resources/low-emissions-economy/nz-battery/

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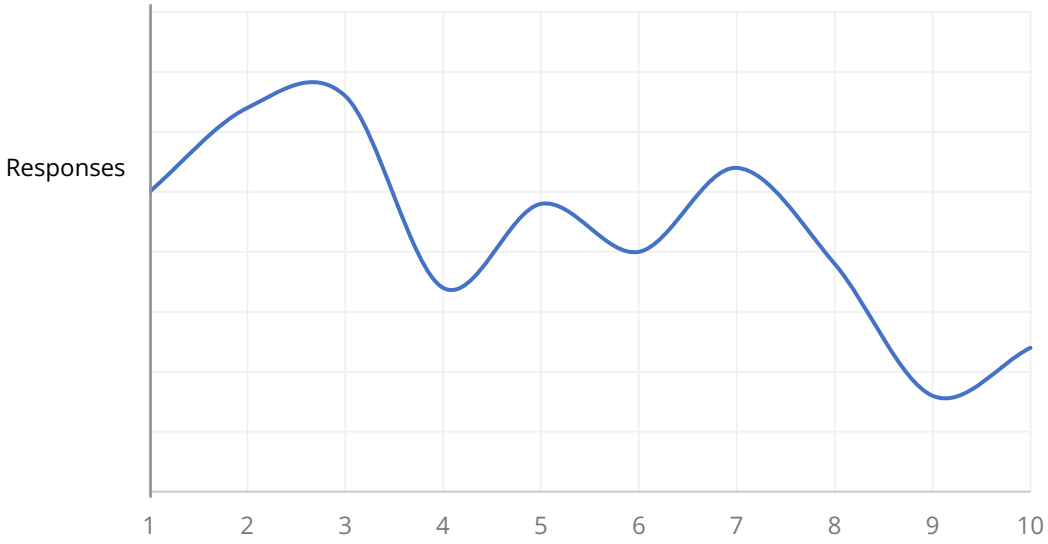
Securing the energy transition

Question 7

In the context of the international energy situation, here is the range of concerns about New Zealand's energy independence.

1 = Not at all, we have enough energy resources to supply all our own future needs and can even consider energy export through options such as hydrogen

10 = Very, I have very real concerns about our exposure to international energy markets going forwards, the Government should be very worried



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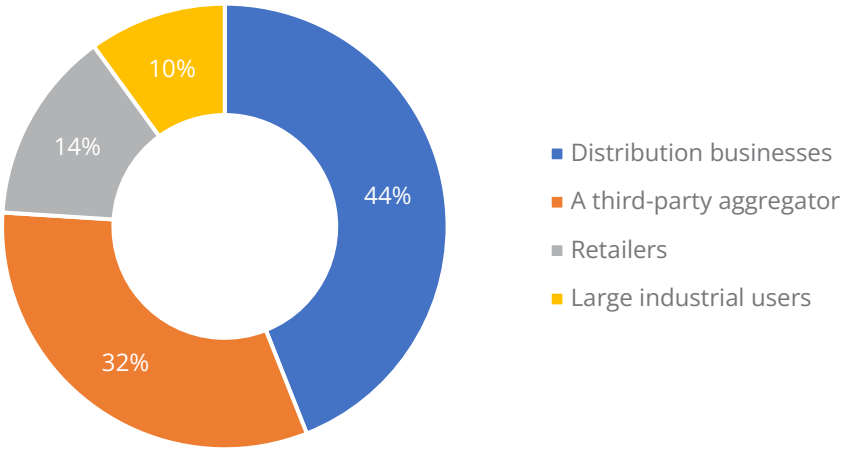
Securing the energy transition

Question 8

The likely impacts of moving towards more renewable energy generation are*:

- The generation portfolio will diversify in location and grid connectivity
- Supply and demand from distributed sources will become significant
- Intermittency will increase
- Flexible demand-side response will become more valuable

This is who you ranked as best placed to manage the demand-side response to renewable intermittency.



Distribution businesses – understand the network and how to manage load and with a history of using successful systems like ripple control can do the job	**44%**
A third-party aggregator – who can offer non-biased choices	32%
Retailers – are most connected to energy consumers and are best placed to offer opt-in demand response control	14%
Large industrial users – have the capacity to make a material difference, if load shedding is required quickly	10%
Interruptible hydrogen production and generation	5%

*Referenced from section 1.5 of the MDAG Price discovery under 100% renewable electricity supply issues discussion paper https://www.ea.govt.nz/assets/dms-assets/29/01-100-Renewable-Electricity-Supply-MDAG-Issues-Discussion-Paper-1341719-v2.4.pdf

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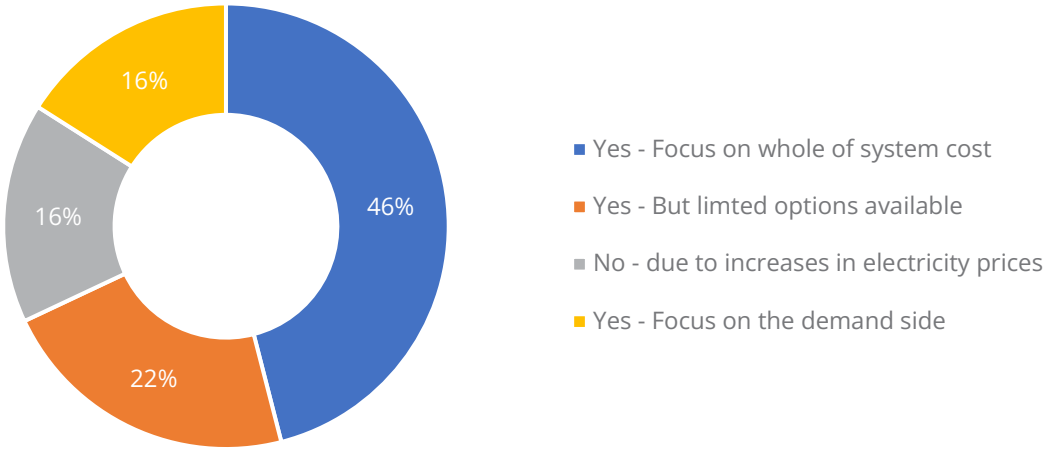
An affordable energy transition

The influence of commodity prices and costs on the practicalities of an affordable energy transition are considered next.

Question 9

Here is your view on how much the electricity sector has the ability to reduce the impact of the increasing cost of living in New Zealand.



Yes, by focusing on the whole of system cost of electricity supply and changing the way electricity is priced and delivered – that has the greatest potential to minimise costs to consumers	**46%**
The sector only has limited options available which can dampen the effects of a rising cost of living, but the main causes lie elsewhere with issues such as a high oil price	22%
No, inevitable increases in electricity prices will only worsen the situation. With the way the sector is organised and regulated there is nothing that can be done	16%
Yes, by focusing on the demand side of the equation and helping consumers manage their demand and become more energy efficient we can assist significantly	16%

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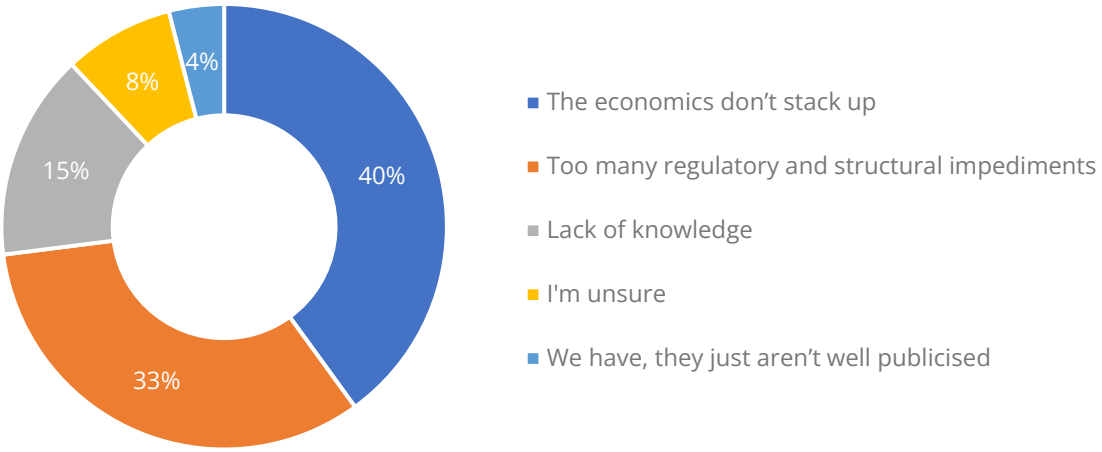
An affordable energy transition

Questions 10

This is what you thought about the low rollout of new community energy projects across Aotearoa, New Zealand.



The economics don't stack up. By the time groups do their sums, they realise grid connected solutions are the better option on most fronts	**40%**
Too many regulatory and structural impediments. The current industry arrangements including network charging regimes make it difficult for the value of community energy projects to be realised	33%
Lack of knowledge. Communities lack the information and support to understand the options and determine solutions that will benefit them in the long term	15%
I'm unsure	8%
We have, they just aren't well publicised, and there are many in the pipeline as communities realise the options now available to them are viable	4%

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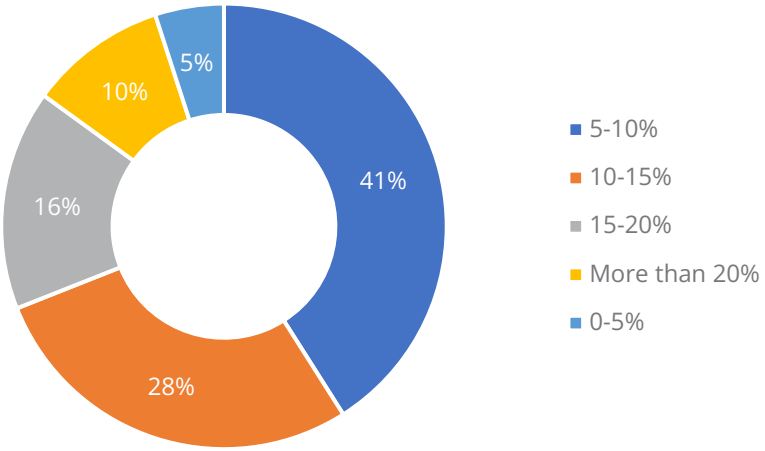
An affordable energy transition

Question 11

Input prices – With inflation and commodity prices high and supply chains heavily disrupted, this is what you thought the most significant inputs to your business have increased over the last year (these could include labour, raw materials, transport costs, etc).



0-5%	5%
5-10%	**41%**
10-15%	28%
15-20%	16%
More than 20%	10%

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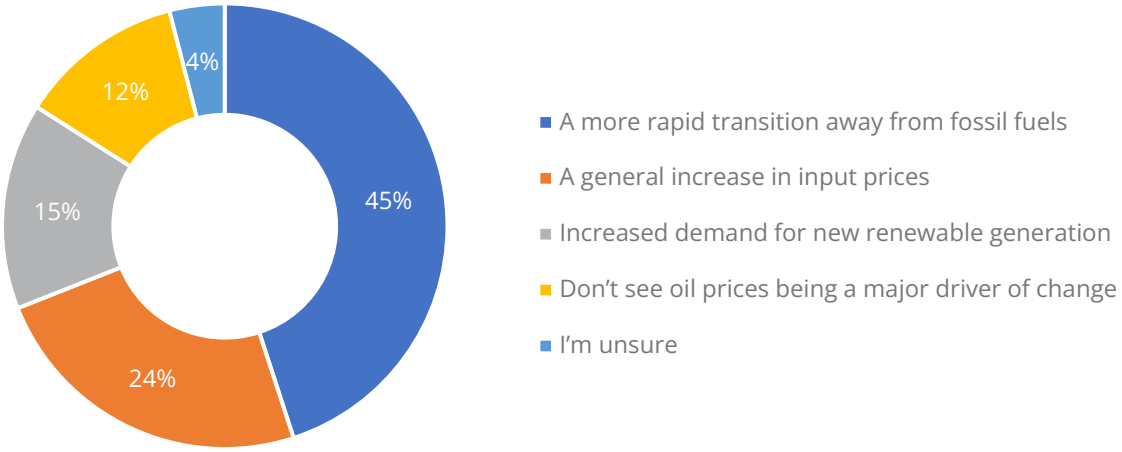
An affordable energy transition

Question 12

Here is what you thought will have the biggest effect on the electricity sector if we see prolonged oil prices of over US$100 a barrel.



A more rapid transition away from fossil fuels as a source of energy, increasing the speed of switching to low carbon electricity through increased EV uptake and industrial demand	**45%**
A general increase in input prices for all sector participants, resulting in above average increases in the cost of delivered electricity to consumers	24%
Increased demand for new renewable generation projects to keep up with increasing demand and to keep a lid on electricity market prices	15%
I don't see oil prices being a major driver of change as prices will even out and we will return to the status quo	12%
I'm unsure	4%

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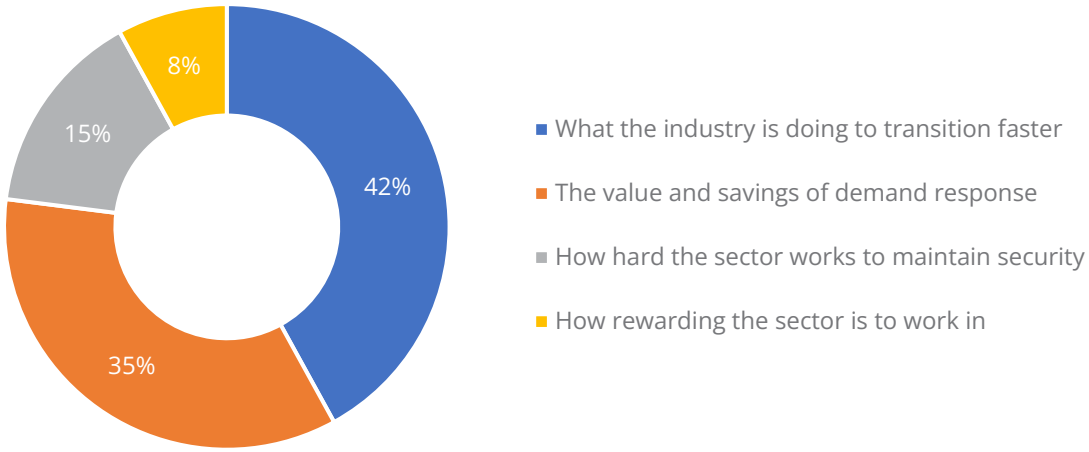
Promotion of the energy transition

Some questions around how the sector is going in its efforts to promote decarbonisation and lead the way.

Question 13

Earlier this year Brent Layton urged the sector to better inform the public of the issues facing the industry. Here is your ranking of messages we should focus on telling better.



The impact of the energy transition and what the electricity industry is doing to get us there faster	**42%**
he potential value available to customers through demand response and better managing their electricity demand	35%
How hard the sector works to keep the lights on and provide the very high level of security and reliability enjoyed by New Zealanders	15%
What a rewarding and exciting place the electricity industry is to work in and all the available career pathways within it	8%
I'm unsure	4%

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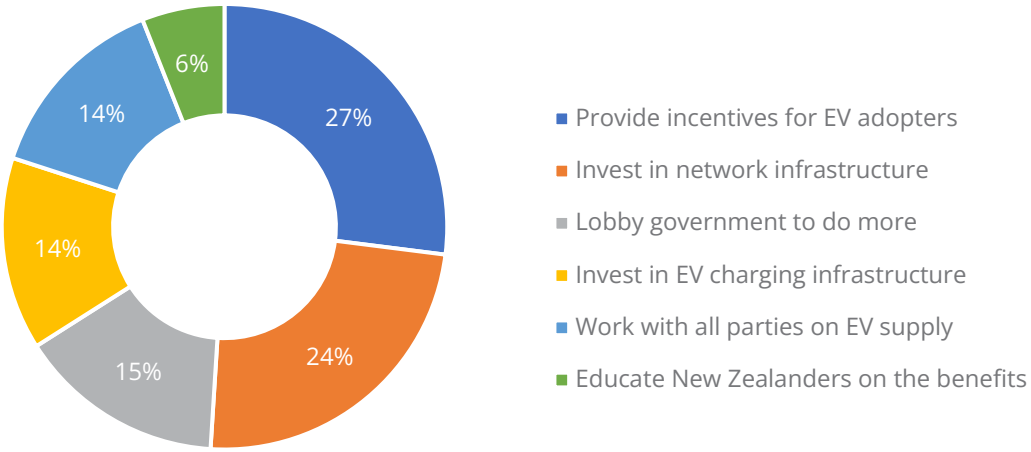
Promotion of the energy transition

Question 14

Here is an interesting ranking of the best things the sector can do to speed up the adoption of electric vehicles.



Ensure the electricity market incentivises and supports EV adopters through flexibility services that reward their contribution	**27%**
Invest in network infrastructure and remove potential network constraints to allow for better public and private charging in homes and businesses	24%
Lobby government to do more, such as tax relief on company electric vehicles or increased subsidies for purchasers of EVs	15%
Invest in EV charging infrastructure	14%
Work with all parties to ensure EV supply is not constrained	14%
Develop marketing and information campaigns to educate New Zealanders about the advantages of EVs (cheaper to run, lower carbon footprint, etc)	6%

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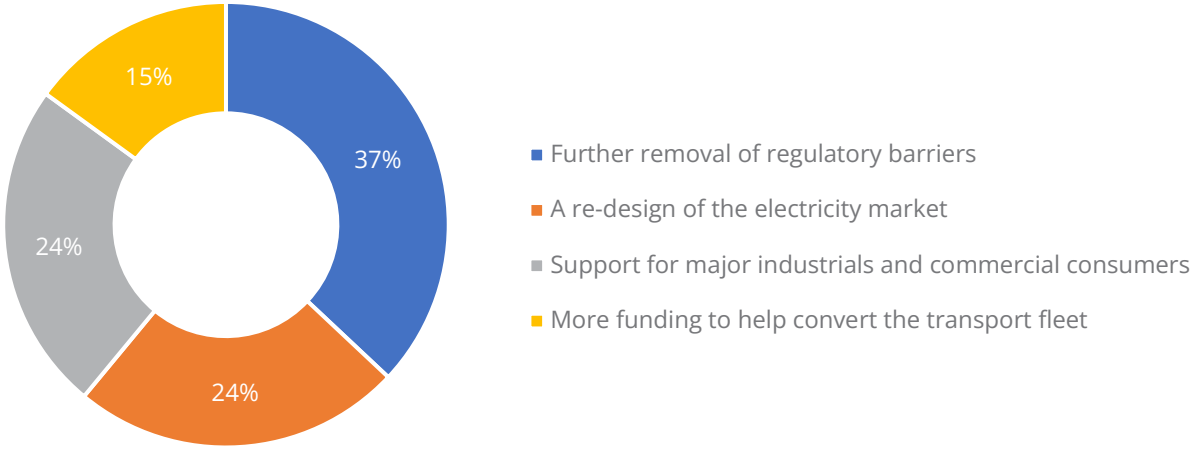
Resourcing the energy transition

The final series of questions looked at where we need to focus our efforts and some of the inputs required to support the energy transition

Question 15

Looking at Government action to support the energy transition, here is a ranking of policy responses that might work best.



Further removal of regulatory barriers to increase the viability of new renewable generation projects	**37%**
A re-design of the electricity market to promote more retail competition and reduce cost of supply	24%
Funding and support for major industrials and commercial consumers to switch away from thermal fuels to electricity as their main energy source	24%
More funding of projects to convert the nation's transport fleet to electric vehicles	15%

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Resourcing the energy transition

Question 16

You helped rank the following principles underpinning a New Zealand energy strategy from most important (1), to least important (6).

	Most important to least
Science-led and evidence backed	**1**
Affordability	2
Consumer focused	3
Urgent	4
Zero emissions targeted	5
Balanced (sharing the benefits equally on all sector participants)	6

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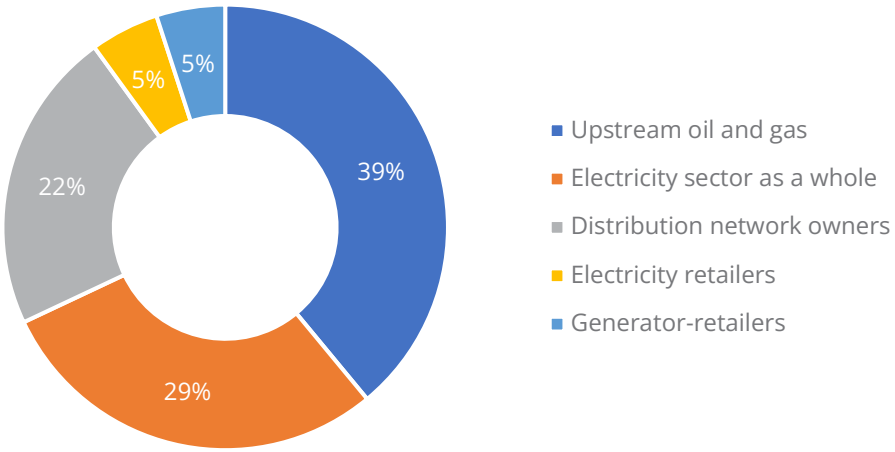
Resourcing the energy transition

Question 17

You ranked the following sector or sub-sector as facing the biggest disruption over the next five to 10 years as a result of the energy transition and push for decarbonisation.



New Zealand's upstream oil and gas sector, as demand for fossil fuels reduces	**39%**
The electricity sector as a whole as distributed energy technologies such as solar, batteries and EVs are brought into mass market adoption	29%
The distribution network owners since the majority of change will occur behind the meter and load flows around their networks will change dramatically	22%
The energy retail sector, as electricity retailers face more competition and having to broaden their product offerings to include services such as demand response packages	5%
Generator-retailers as their market dominance reduces through independent generators and customer-owned generation becomes more viable	5%

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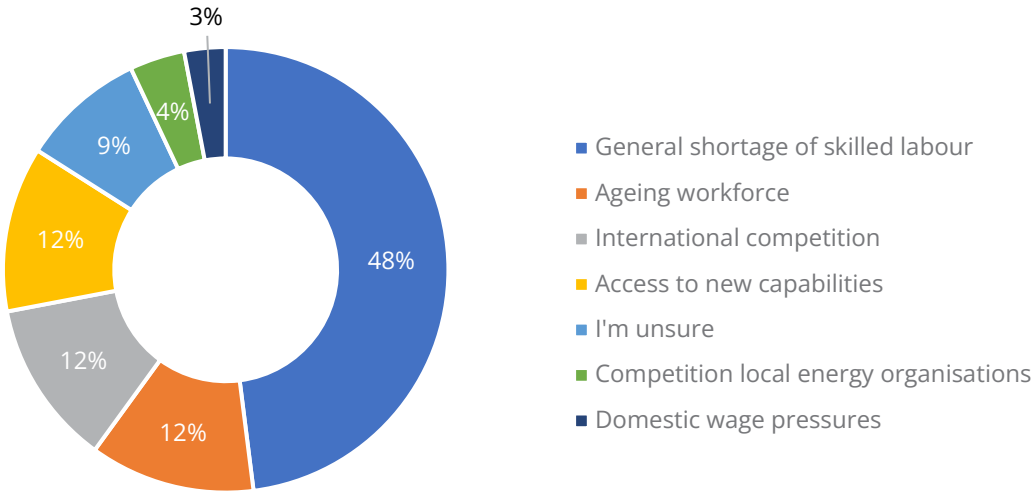
Resourcing the energy transition

Question 18

Here are the priorities for the biggest labour market issues organisations face through the energy transition as ranked by you.



General shortage of skilled and experienced labour across all positions	**48%**
Ageing workforce and retiring skilled employees	12%
International competition from other countries paying more for skilled staff	12%
Access to new capabilities required to support our evolving role in the transition	12%
I'm unsure	9%
Competition from other local energy organisations poaching your people	4%
Domestic wage pressures in a low margin, competitive environment	3%

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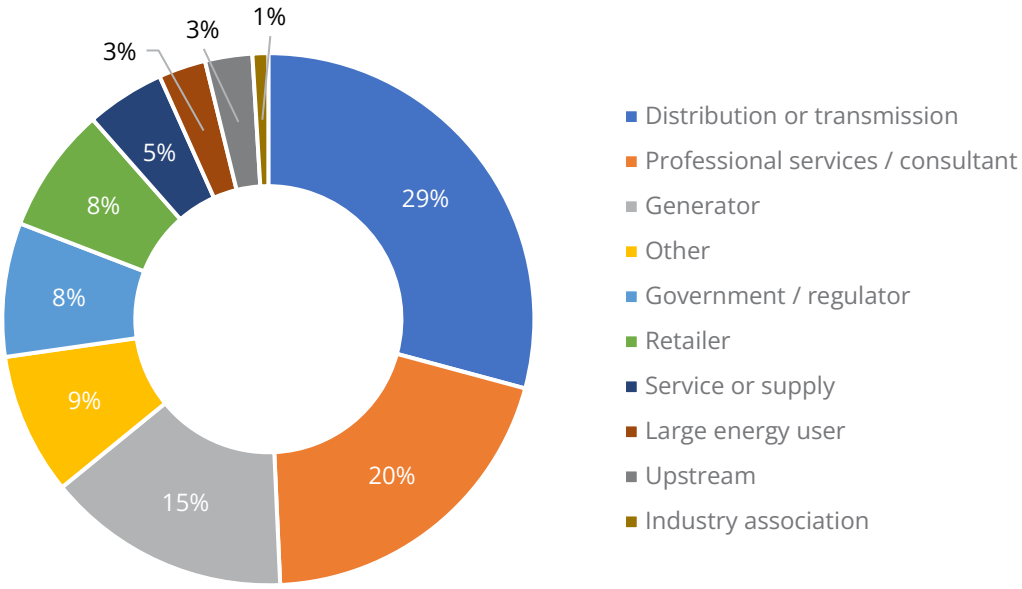
Survey respondents

Participants by organisation type



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