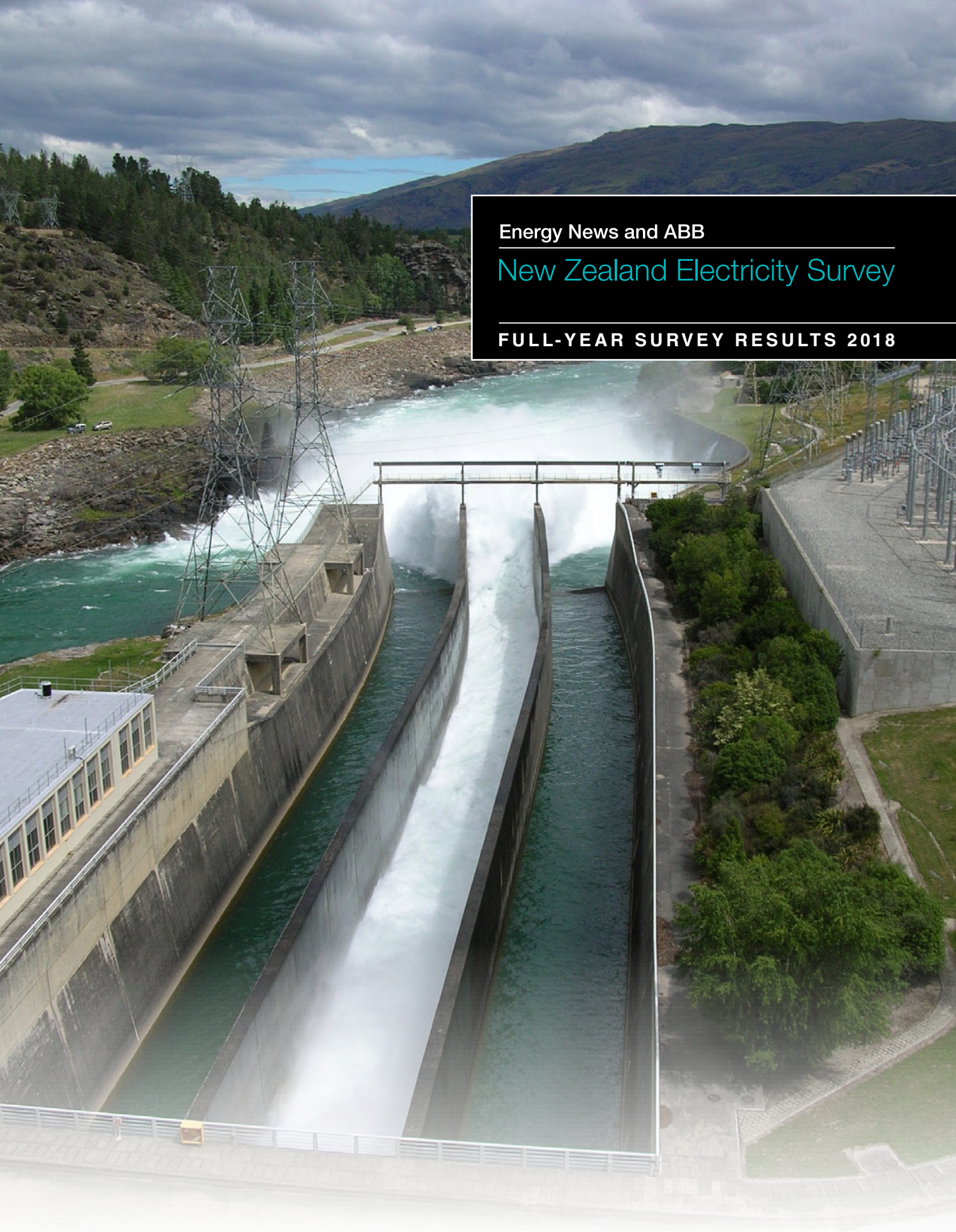


Energy News and ABB

New Zealand Electricity Survey

FULL-YEAR SURVEY RESULTS 2018

ENERGY NEWS
www.energynews.co.nz

ABB

Gentrack

Introduction

Energy News **and ABB are delighted to announce the full-year results of the New Zealand Electricity Survey 2018. This document contains results from three of our quarterly surveys that have already been released, and results from the fourth and final instalment – focusing on technology and data.**

The survey, now in its seventh year, had a face-lift in 2018. We moved from an annual instalment to four shorter quarterly surveys.

This allowed us to ask the electricity sector thought-provoking questions and gauge its response throughout the year as different announcements were made and new policy signalled.

Thank you to everyone who took the time to complete the surveys each quarter – we received almost 1,000 responses in total.

During the year we polled the sector on everything from generation plant to electric vehicles, new Government policy directions to the importance of cyber security.

We brought back a feature for the third year running where we asked the industry when they expected to see different milestones achieved. Notable changes from last year's answers include:

- The sector doesn't expect to see a single solar asset larger than 5 MW until 2024, three years later than responses showed last year
- Respondents also pushed out the next network amalgamation to 2022, after thinking it was just around the corner in 2017
- Everyone underestimated the rapid growth in electric vehicle ownership. Most respondents thought we wouldn't see 10,000 EVs in this country until 2020, but that milestone was reached in September

Responses to other questions throughout the year ranged from equal views on all options to heavily supporting a particular direction.

A majority of the respondents – 62% - felt that after a year of being in power, the Labour Government was generally heading in the right direction when it came to energy policy.

However, when asked specifically about the offshore oil and gas ban announced in April, 40% thought it was a lose-lose situation, while 48% supported it.

There were split views over which type of 50MW-plus generation asset should be prioritised to meet the changing needs of this country's electricity demand, although geothermal squeezed ahead of the other options for the second year running.

Results from our latest survey show most respondents think that off-grid or grid-edge distributed generation has already reached cost parity for network companies in some situations. They also picked data management and analytics as the highest technology-related priority for the sector in 2019. You can see the full report from our fourth quarter survey on page 4.

A breakdown of respondents by organisation type is available on page 27. This year respondents included consultants, distributors and gentailers. The survey 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 any feedback to kate.barker@freemanmedia.co.nz. We welcome any and all suggestions for questions, themes and responses for 2019.

Kate Barker – Research Analyst
Freeman (publisher of Energy News)

About ABB

ABB (ABBN: SIX Swiss Ex) is a pioneering technology leader in electrification products, robotics and motion, industrial automation and power grids, serving customers in utilities, industry and transport & infrastructure globally. Continuing a history of innovation spanning more than 130 years, ABB today is writing the future of industrial digitalisation with two clear value propositions: bringing electricity from any power plant to any plug and automating industries from natural resources to finished products. As title partner of Formula E, the fully electric international FIA motorsport class, ABB is pushing the boundaries of e-mobility to contribute to a sustainable future. ABB operates in more than 100 countries with about 135,000 employees. www.abb.com

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 5,000 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.

About Gentrack

Pairing deep market knowledge with essential software for essential services, Gentrack currently enables over 90 of the world's most progressive utilities to lower service costs, foster innovation and confidently navigate market reform.

Gentrack Velocity is a leading billing and customer engagement solution for utilities, providing a full range of proven capabilities along with hosted and managed services options for energy networks, new entrant energy retailers, and larger utilities in competitive markets, where flexibility, uniqueness and compliance are essential.
www.gentrack.com

Advisory panel

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.

Jenny Cameron (formerly) ERANZ

Jenny Cameron joined ERANZ as its inaugural Chief Executive in February 2016.

Ms Cameron joined ERANZ from the Brewers' Association of Australia and New Zealand where she held the role of Director of External Relations. Prior to this, Ms Cameron served as a diplomat with the NZ Ministry of Foreign Affairs and Trade including a posting in Tokyo, and an assignment in Manila.

Craig Evans – Electricity Authority

Craig is Manager Retail and Network Markets at the Electricity Authority of New Zealand. He leads the team developing electricity market arrangements that deliver long-term benefits to consumers from the greater choice and control over their electricity supply that technology is now making possible.

Louise Griffin – Contact Energy

Louise joined Contact in 2008 and has held roles in communications, regulatory affairs and as an advisor to the CEO. These roles, coupled with her time working on the Kupe Gas Project have provided her with an in depth understanding of New Zealand's gas and electricity sectors.

Tony McGlennon – Gentrack

Tony is Gentrack's New Zealand Country Manager and has been working across the energy sector for 10+ years, delivering essential software solutions for retailers and networks. He is actively engaged with energy utilities, spearheading all aspects of Gentrack's service delivery business in NZ and the Pacific.

Ewan Morris – ABB

Ewan Morris is the Managing Director of ABB New Zealand, a role he has held since March 2014. He has been with ABB since 1988, and has enjoyed a long and extensive career in the company across five countries including New Zealand, Australia, Sweden, Malaysia and Switzerland.

Andrew Renton - Transpower

Andrew presently works in Transpower's Grid Development Division. Andrew's role involves investigating and providing holistic, pragmatic and strategic advice, on suitable and cost effective transmission solutions as well as new developments and technologies.

Greg Skelton – Wellington Electricity

Greg has been the Chief Executive of Wellington Electricity since April 2009. Prior to his appointment as Chief Executive, Greg was the Chief Executive of Alpine Energy Limited and has held various senior management roles in the electricity industry.

Charles Teichert – Nova Energy

Mr Teichert has been with Nova Energy since 2000 and is currently responsible for strategy development, key commercial arrangements, commodity risk management and regulatory affairs. Mr Teichert began his career in the energy sector joining the ECNZ wholesale electricity trading team in 1996 followed by short stints at Genesis Energy and Contact Energy.

Neil Wembridge – Freeman

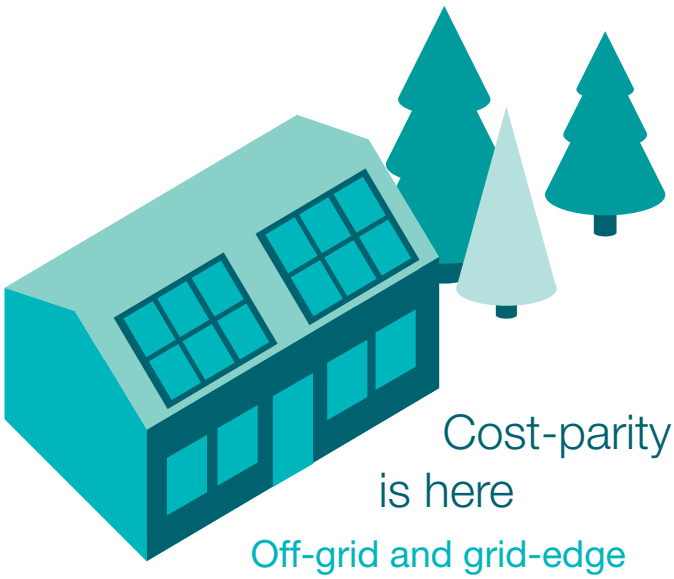
Neil Wembridge is the General Manager at Freeman, which sees him take responsibility for the commercial side of the energy sector products of Freeman, including all events, surveys, stakeholder management and business development.

Angus Watson – Meridian Energy

Angus is the Energy Modelling Analyst within Meridian's Strategy and Performance Team. This team is responsible for monitoring and advising the executive team on opportunities across the electricity sector, in addition to exploring different time horizons from both an operational and strategic focus.

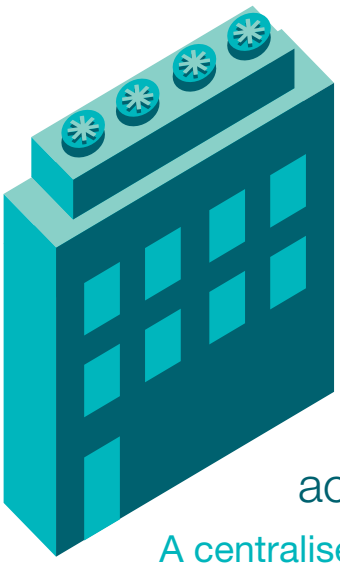
4th quarter – Technology and Data – all change please!

In response to our 4th quarter survey, the sector thought:



Cost-parity is here

Off-grid and grid-edge distributed generation has reached cost-parity as a solution for some network applications



We want access

A centralised repository that accredited third parties can access is the best way to open access for consumption data

Are we secure?

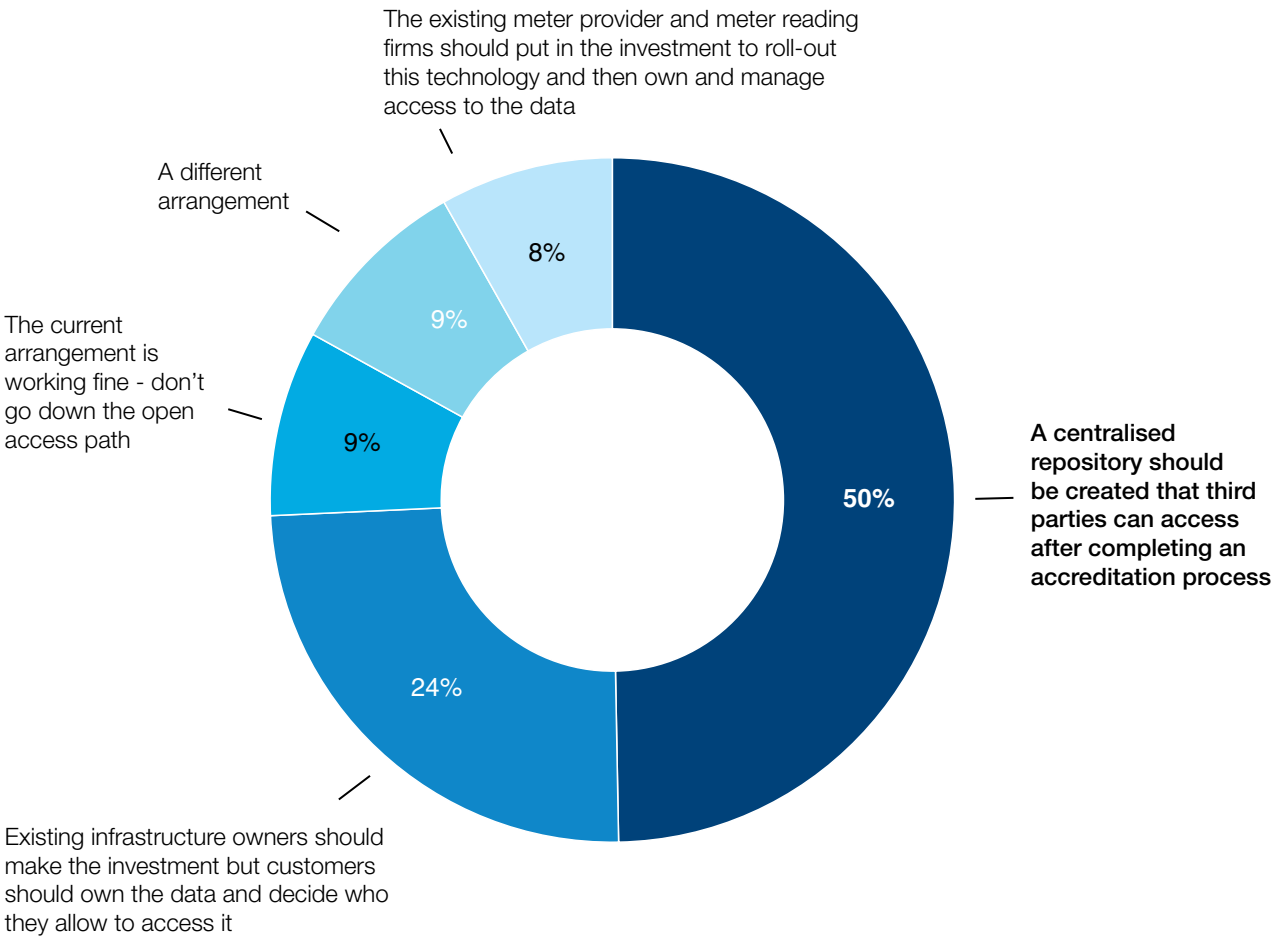
Cyber security breaches are happening within the sector, but they are not overly common

Data is king

Data management and analytics will be the highest priority for most of the sector in 2019

Question 1

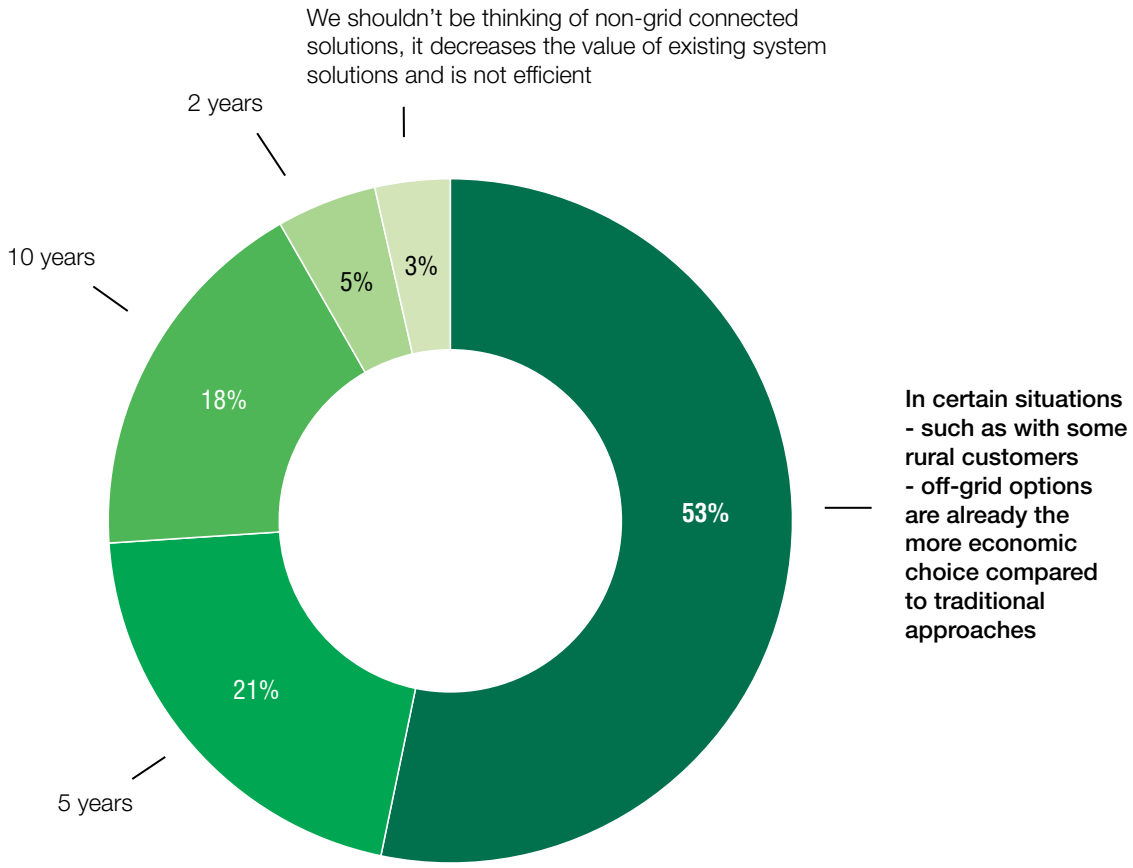
Demand is growing for open access to consumption data. What is the best way to make this happen? Choose one option:



- **A centralised repository should be created that third parties can access after completing an accreditation process – 50%**
- Existing infrastructure owners should make the investment but customers should own the data and decide who they allow to access it – 24%
- The current arrangement is working fine - don't go down the open access path – 9%
- A different arrangement – 9%
- The existing meter provider and meter reading firms should put in the investment to roll-out this technology and then own and manage access to the data – 8%

Question 2

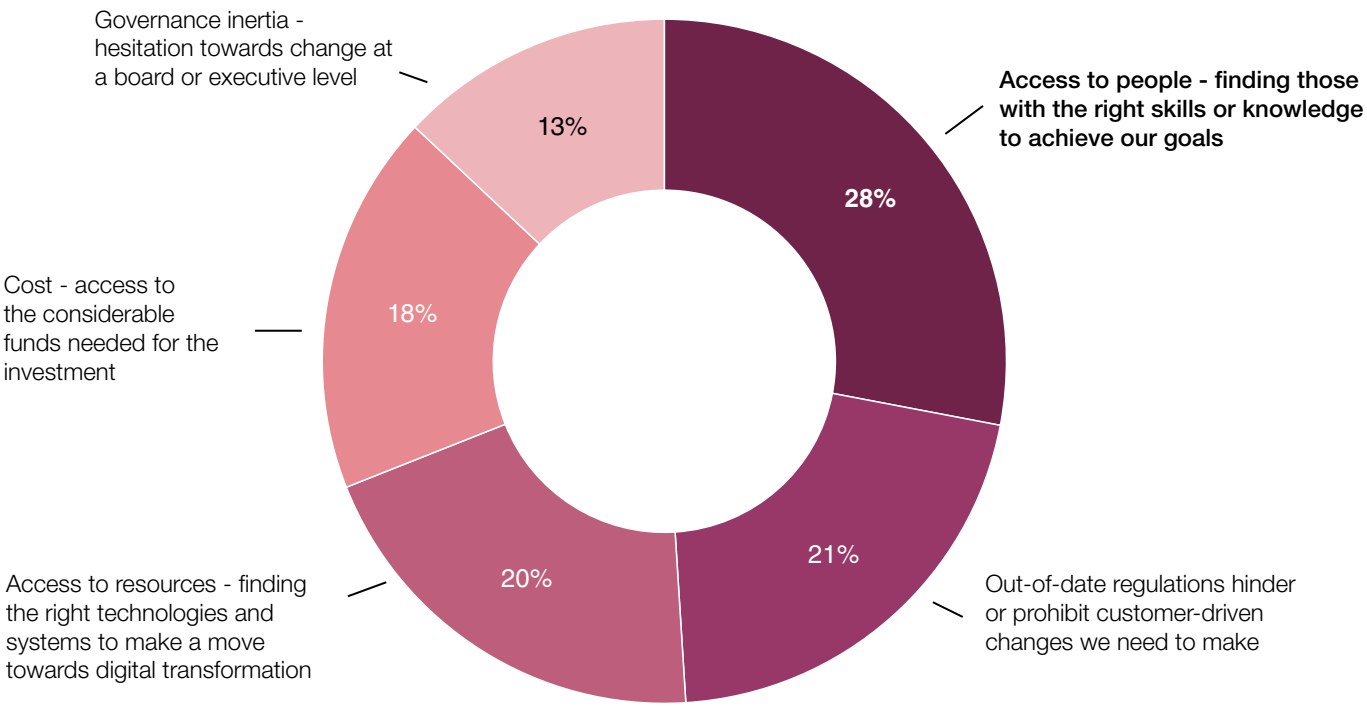
How far away do you think off-grid or grid-edge distributed generation is from cost parity compared to a grid-supplied solution (such as upgrading existing network assets)? Choose one option you most agree with:



- **In certain situations - such as with some rural customers - off-grid options are already the more economic choice compared to traditional approaches – 53%**
- 5 years – 21%
- 10 years – 18%
- 2 years – 5%
- We shouldn't be thinking of non-grid connected solutions, it decreases the value of existing system solutions and is not efficient – 3%

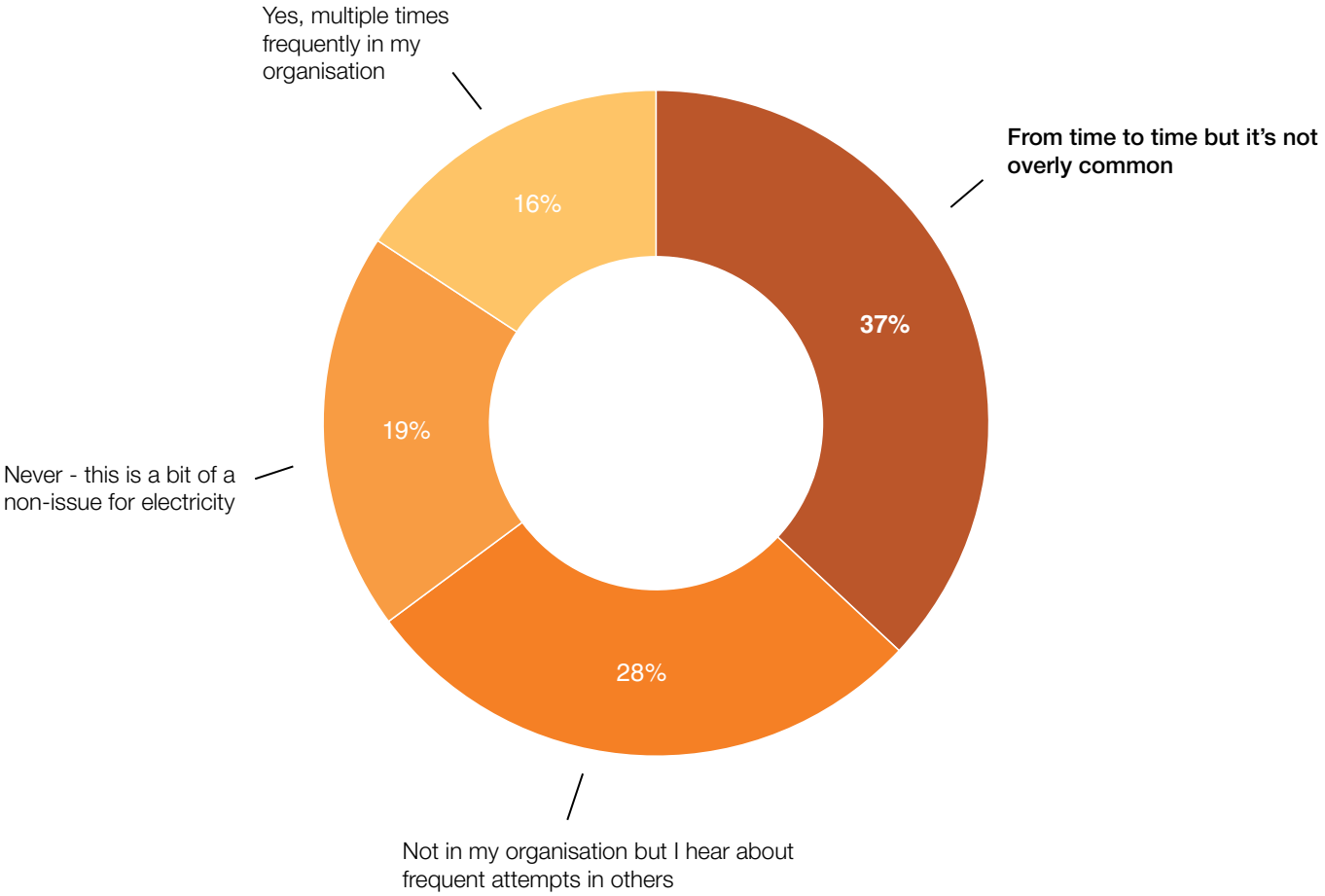
Question 3

This question is brought to you in partnership with Gentrack: Digital transformation of a business can deliver huge benefits such as better customer experience, agility and innovation. What is the biggest digital transformation challenge your organisation faces? Choose one option:



Question 4

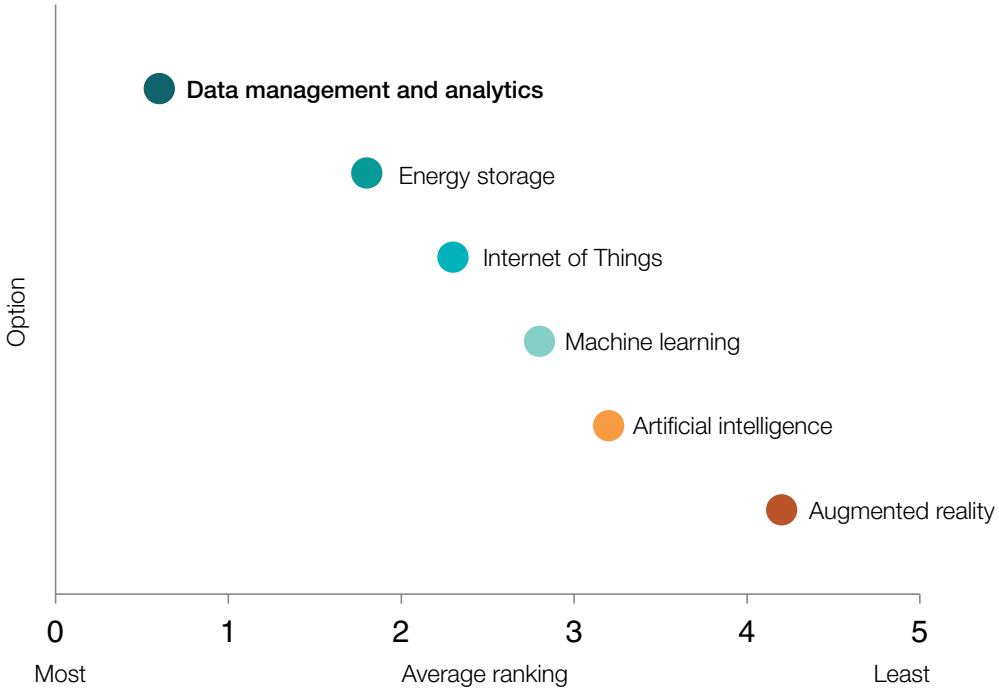
Have you seen evidence of cyber security breaches or attempts in the New Zealand electricity sector - other than instances picked up by the media? Choose one option:



- **From time to time but it's not overly common – 37%**
- Not in my organisation but I hear about frequent attempts in others – 28%
- Never - this is a bit of a non-issue for electricity – 19%
- Yes, multiple times frequently in my organisation – 16%

Question 5

Thinking ahead to 2019, which aspect of technology and data in the electricity space do you think will be of highest priority to your organisation? Please rank the following options in order of most important to least important (rank 1 being the most important):



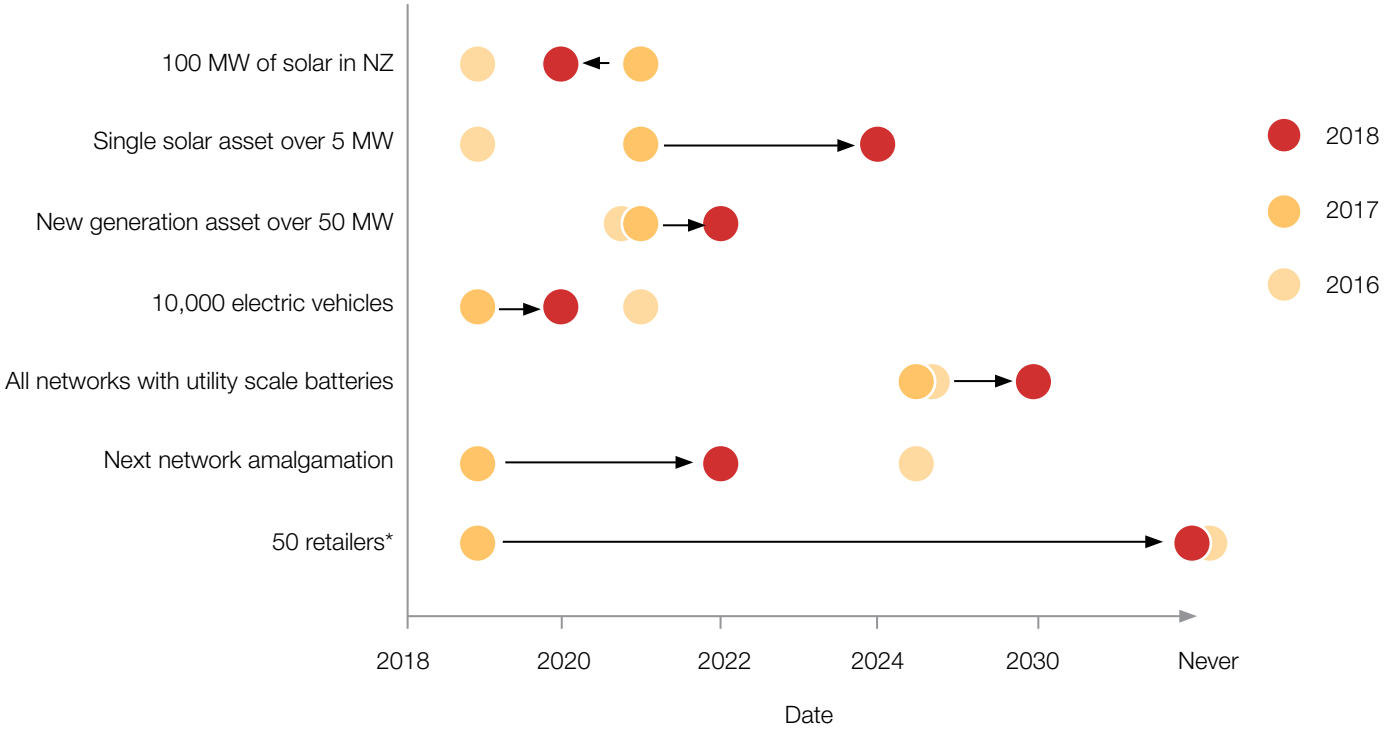
- **Data management and analytics – 0.6**
- Energy storage – 1.8
- Internet of Things – 2.3
- Machine learning – 2.8
- Artificial intelligence – 3.2
- Augmented reality – 4.2

The **first quarter** survey for 2018 went live in March and quizzed the sector on whether it was in agreement or divided on the key challenges and opportunities ahead. We had more than 350 respondents to the survey and the results were as follows:

Timeline for change

Question 1

We've been tracking this since 2016, asking when all these sector milestones might actually be achieved. How much has industry opinion changed over two years?



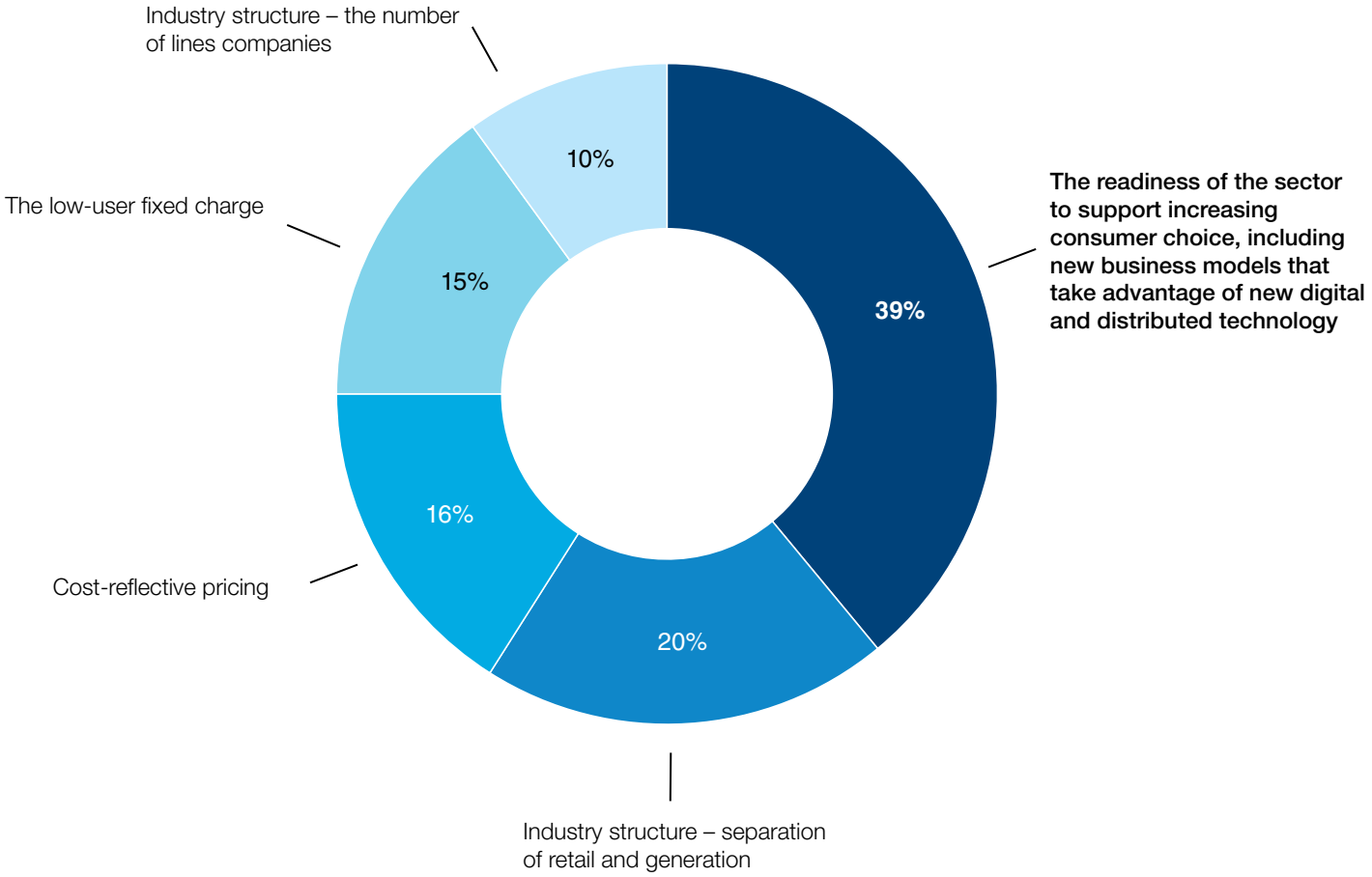
Milestone	2020	2022	2024	2030	NEVER
100 MW of solar installed? (68 MW as of 31 Jan 2018)	**47%**	36%	11%	4%	1%
A single solar project over 5 MW? (Yealands is the largest at 0.5 MW)	12%	28%	**31%**	21%	8%
A new generation asset over 50 MW?	16%	**30%**	25%	21%	9%
10,000 electric vehicles? (6,603 as of 31 Jan 2018)	**76%**	17%	6%	1%	0%
Every lines network with utility-scale batteries? (Three in 2017)	3%	16%	29%	**36%**	15%
The next distribution network company amalgamation?	28%	**35%**	21%	7%	8%
50 retail brands to choose from? (36 as of 31 Oct 2017)	13%	23%	16%	13%	**35%**

** We increased the number of retailers to 50, from 40 in 2016 and 2017. We are at 47 retail brands as at April 2018!*

Ready for a review?

Question 2

The new Government has proposed a "full-scale" review of the electricity market. What's the biggest issue that should be focused on?

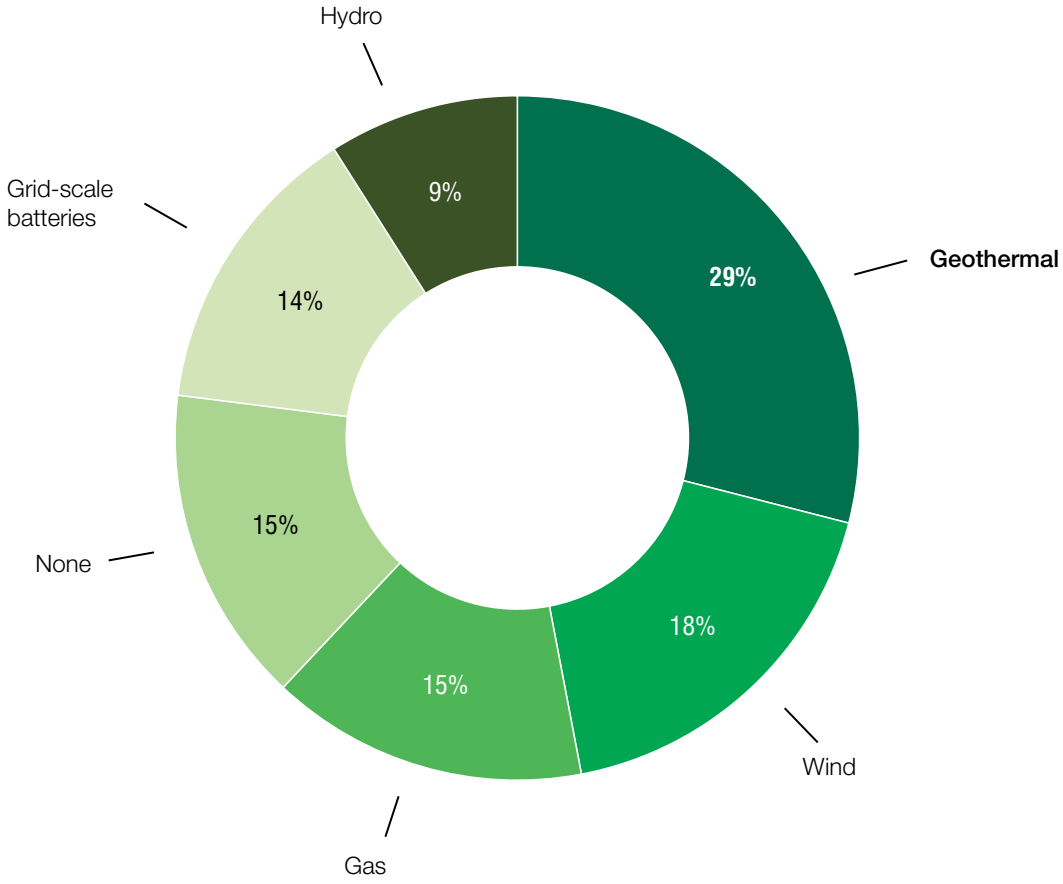


- **The readiness of the sector to support increasing consumer choice, including new business models that take advantage of new digital and distributed technology – 39%**
- Industry structure – the number of lines companies – 20%
- Cost-reflective pricing – 16%
- The low-user fixed charge – 15%
- Industry structure – separation of retail and generation – 10%

What to build next?

Question 3

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

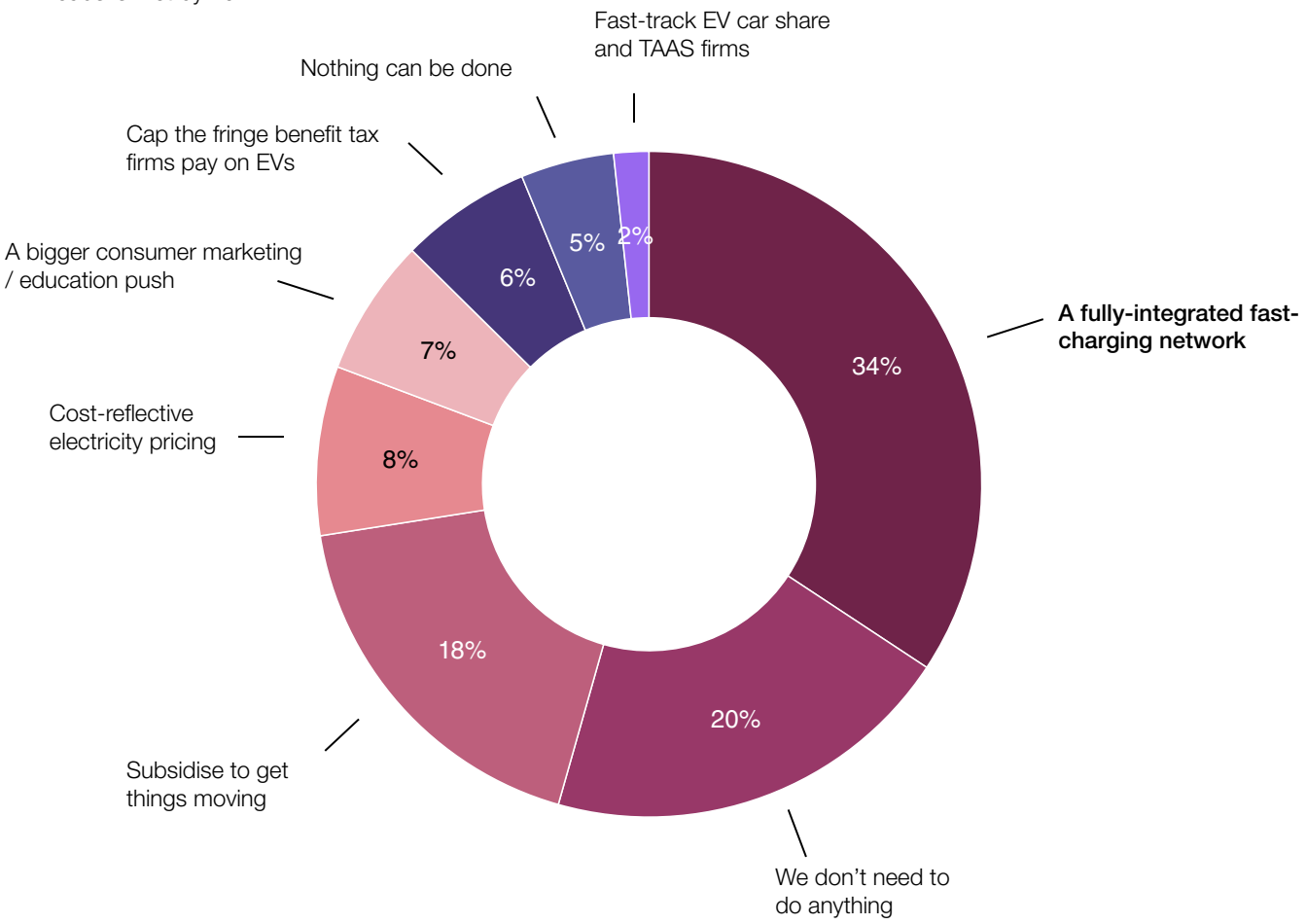


- **Geothermal, it is the best form of reliable baseload power we have – 29%**
- Wind, it is the best form of renewable energy to complement the abundant power provided by hydro and geothermal – 18%
- Gas, we have plenty of it and it can provide a flexible backup to our unpredictable renewable generation portfolio – 15%
- None… with energy efficiency measures, and the advent of distributed energy solutions, we shouldn't be building any new big assets going forwards – 15%
- Grid-scale batteries – 14%
- New hydro, delivers the most power at the least cost in the long run – 9%

EV support needed

Question 4

In 2017, uptake of electric vehicles exceeded targets set by the previous Government. What option will best help ensure the target of 64,000 EVs on NZ roads is met by 2021?

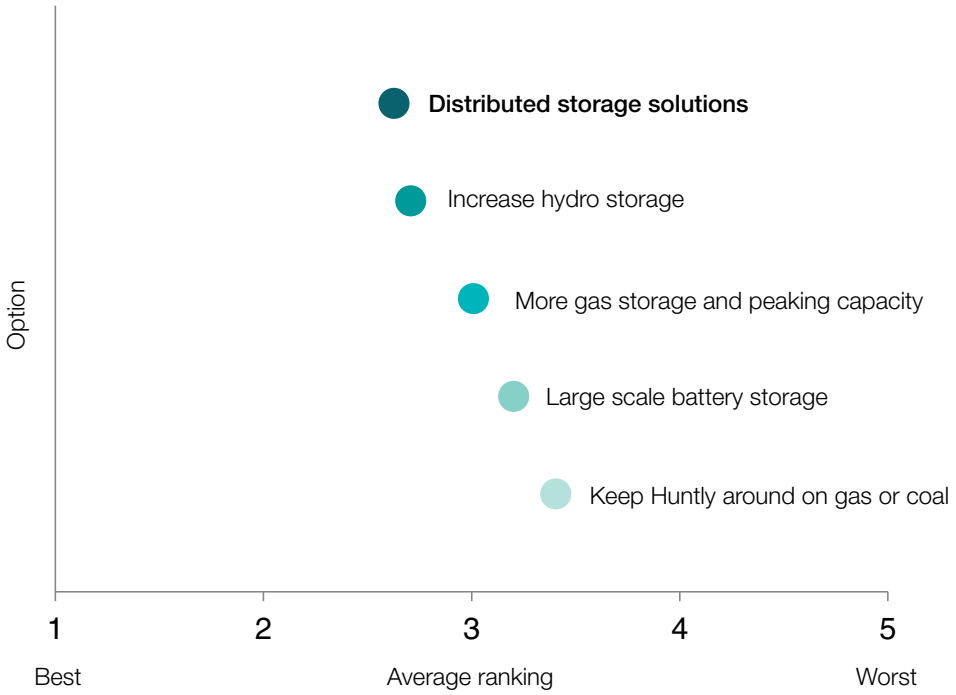


- **A fully-integrated fast-charging network – 34%**
- We don't need to do anything, take-up is already tracking beyond annual targets – 20%
- Subsidise to get things moving (excuse the pun) – 18%
- Cost-reflective electricity pricing – 8%
- A bigger consumer marketing / education push by the electricity sector – 7%
- Cap the fringe benefit tax firms pay on EVs at the rate paid on fossil-fuelled cars that EVs replace – 6%
- Nothing can be done, we won't meet it. There aren't the range of new and used vehicles available at the right price levels to satisfy customer requirements – 5%
- Fast-track EV car share and TAAS firms, such as Mevo or Yoogo, to establish themselves around the country – 2%

Is there a best form of energy storage for New Zealand?

Question 5

Given weather dependent renewable electricity generation (such as wind and solar) will be making up more of our energy supply mix, what is the best form of energy storage to support the system? Rank these from best to worst, with one being the best:

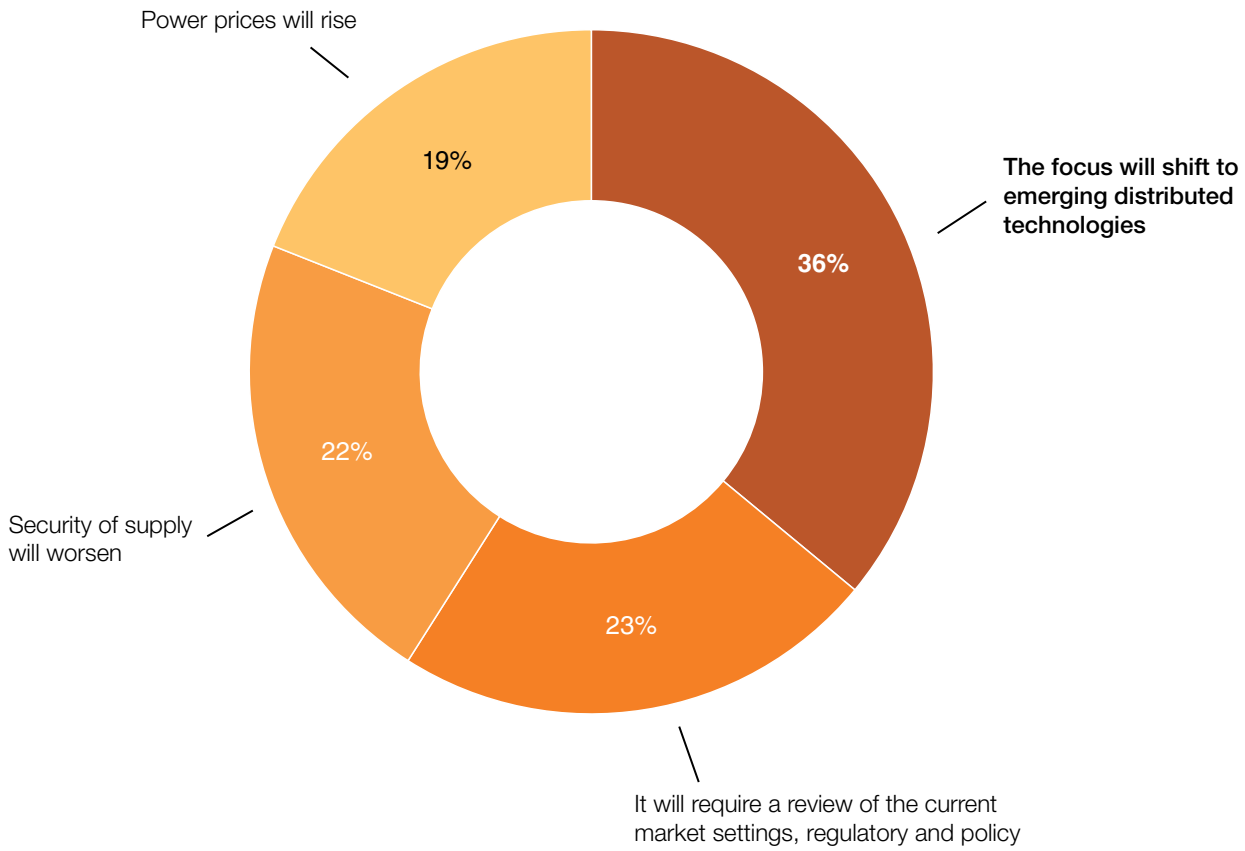


- **Distributed storage solutions such as solar plus battery and increased demand response participation – 2.6**
- Increase hydro storage (e.g. increased lake operating levels or pumped storage) – 2.7
- More gas storage and peaking capacity such as Ahuroa and McKee – 3.0
- Large scale battery storage such as the Tesla plant in South Australia – 3.2
- Keep Huntly around on gas or coal as it performs many valuable roles – 3.4

Decarbonisation and the electricity sector

Question 6

A Climate Commission is due to be established under the new Government. How will the electricity sector and its customers be affected by an increased focus on decarbonisation?



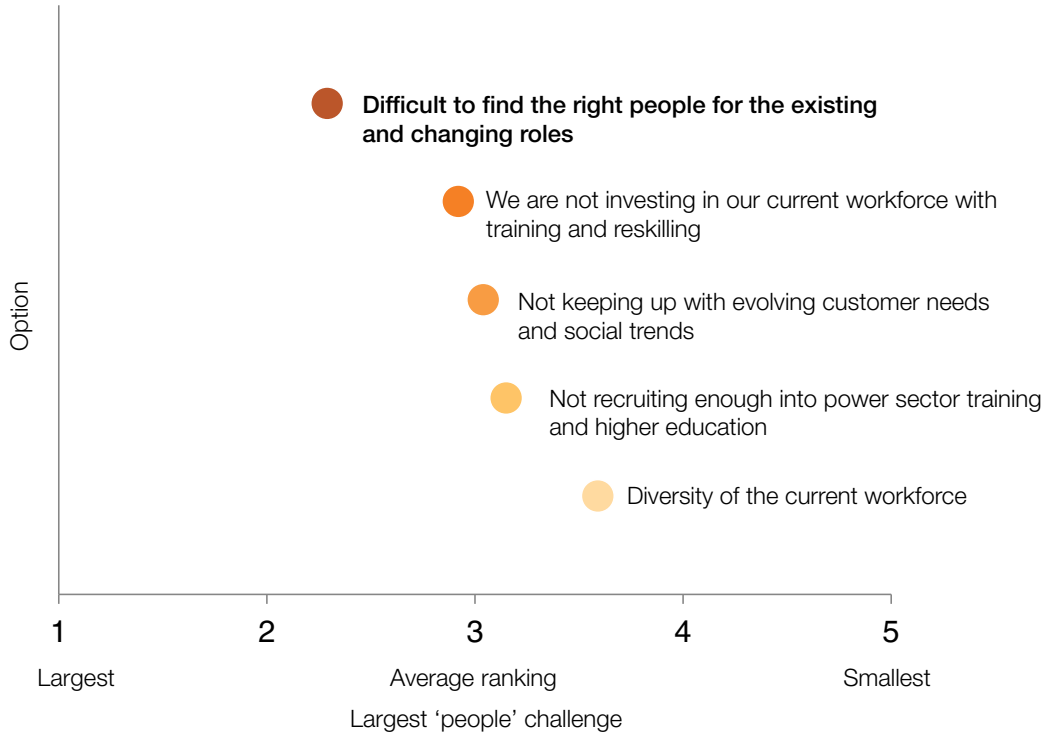
- **The focus will shift to emerging distributed technologies such as batteries to help manage the transition – 36%**
- It will require a review of the current market settings, regulatory and policy, otherwise the status quo will prevail without government intervention – 23%
- Security of supply will worsen. Without new expensive storage options and the thermal backup we will be more exposed to running out of water in the hydro lakes – 22%
- Power prices will rise. The sector will need to figure out how to keep power prices steady as it decarbonises – 19%

In June the **second quarter** survey focused on whether the electricity sector is 'all about the people', or something else. More than 300 people completed the survey to provide us with the following results:

It is the people

Question 1

What is the largest 'people' challenge facing the sector right now? Rank the options in order of largest to smallest, with one being the largest problem:

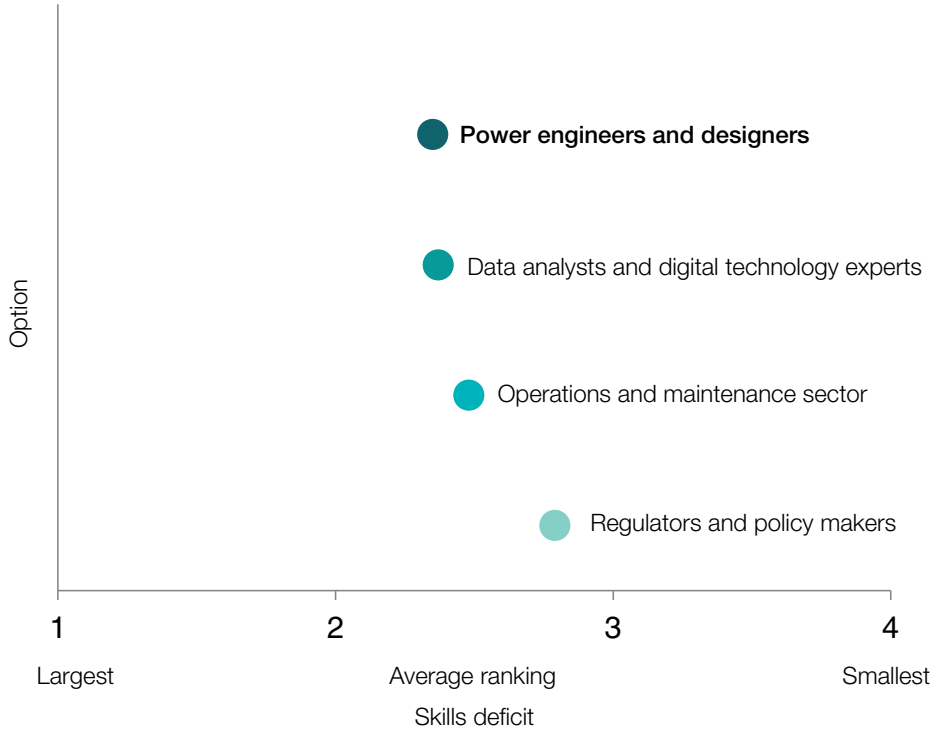


- **Difficult to find the right people for the existing and changing roles – 2.3**
- We are not investing in our current workforce with training and reskilling – 2.9
- Not keeping up with evolving customer needs and social trends – 3.0
- Not recruiting enough into power sector training and higher education – 3.2
- Diversity of the current workforce – 3.6

Do we have the right people?

Question 2

Which part of the sector is most lacking the skills and people needed to deliver the new and improved future electricity system. Rank these in order of the largest skills deficit to the smallest, with one being the largest:

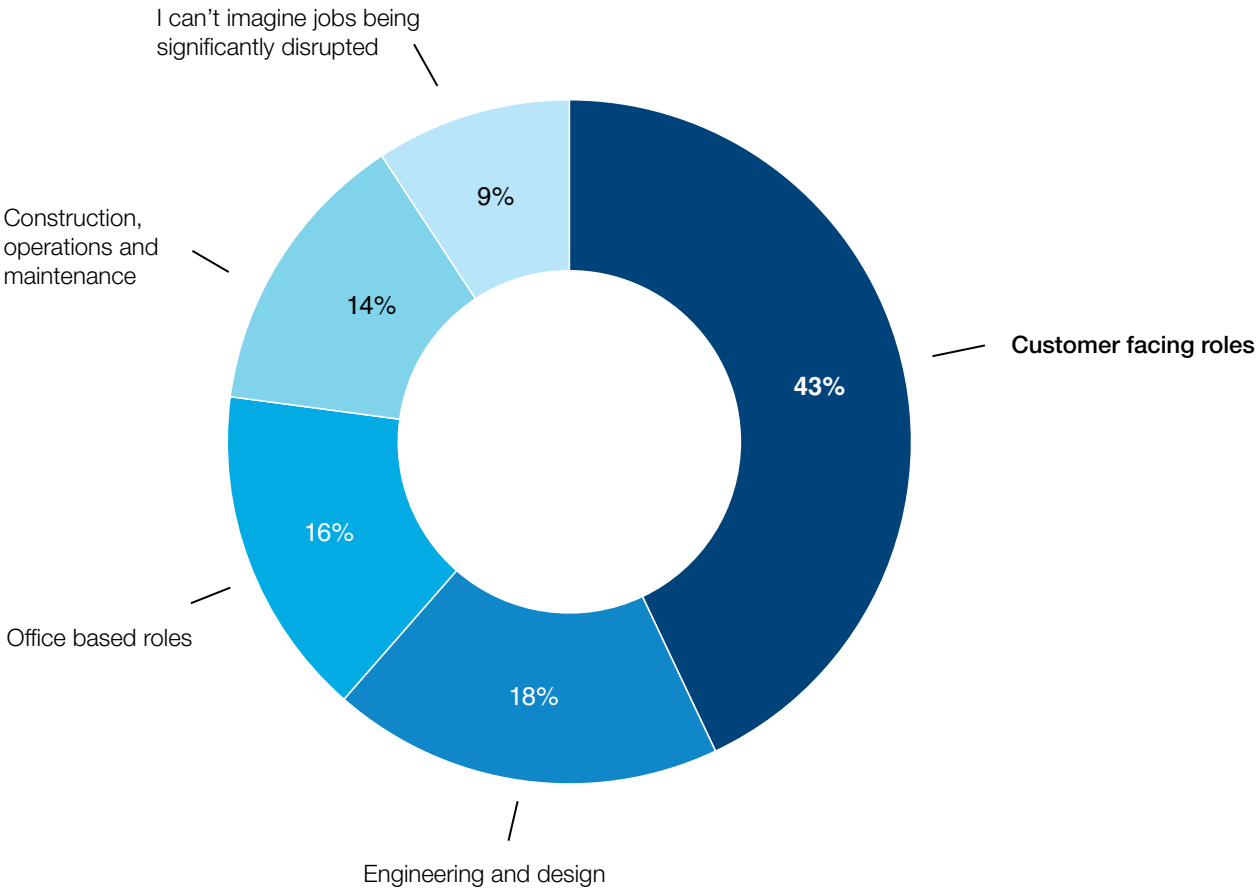


- **Power engineers and designers – 2.3**
- Data analysts and digital technology experts – 2.4
- Operations and maintenance sector – 2.5
- Regulators and policy makers – 2.8

Rise of the machines

Question 3

In terms of impact on jobs and people, which part of the electricity sector workforce will be most enhanced and/or disrupted by technology such as machine learning, robots, bots, blockchain and Artificial Intelligence? Choose one option:

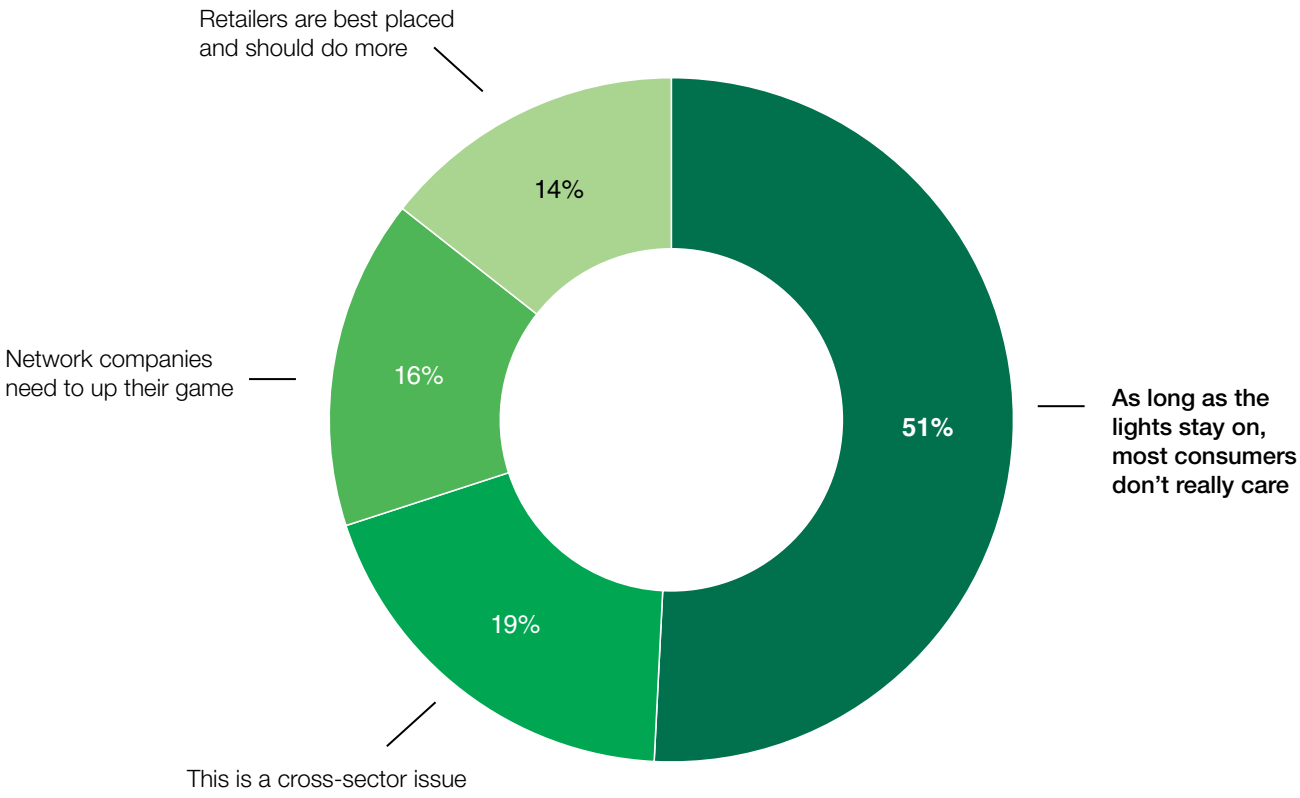


- **Customer facing roles such as customer service and sales – 43%**
- Engineering and design – 18%
- Office based roles such as finance, regulatory and legal – 16%
- Construction, operations and maintenance – 14%
- I can't imagine jobs being significantly disrupted by those technologies, it is just hype – 9%

Trust and confidence: winning the hearts and minds of customers

Question 4

How much faith and trust do customers have in the New Zealand electricity sector? Do developments like the Ministerial power price review have an impact? How much effort should be placed on building trust and who should do it? Pick the option you most agree with:

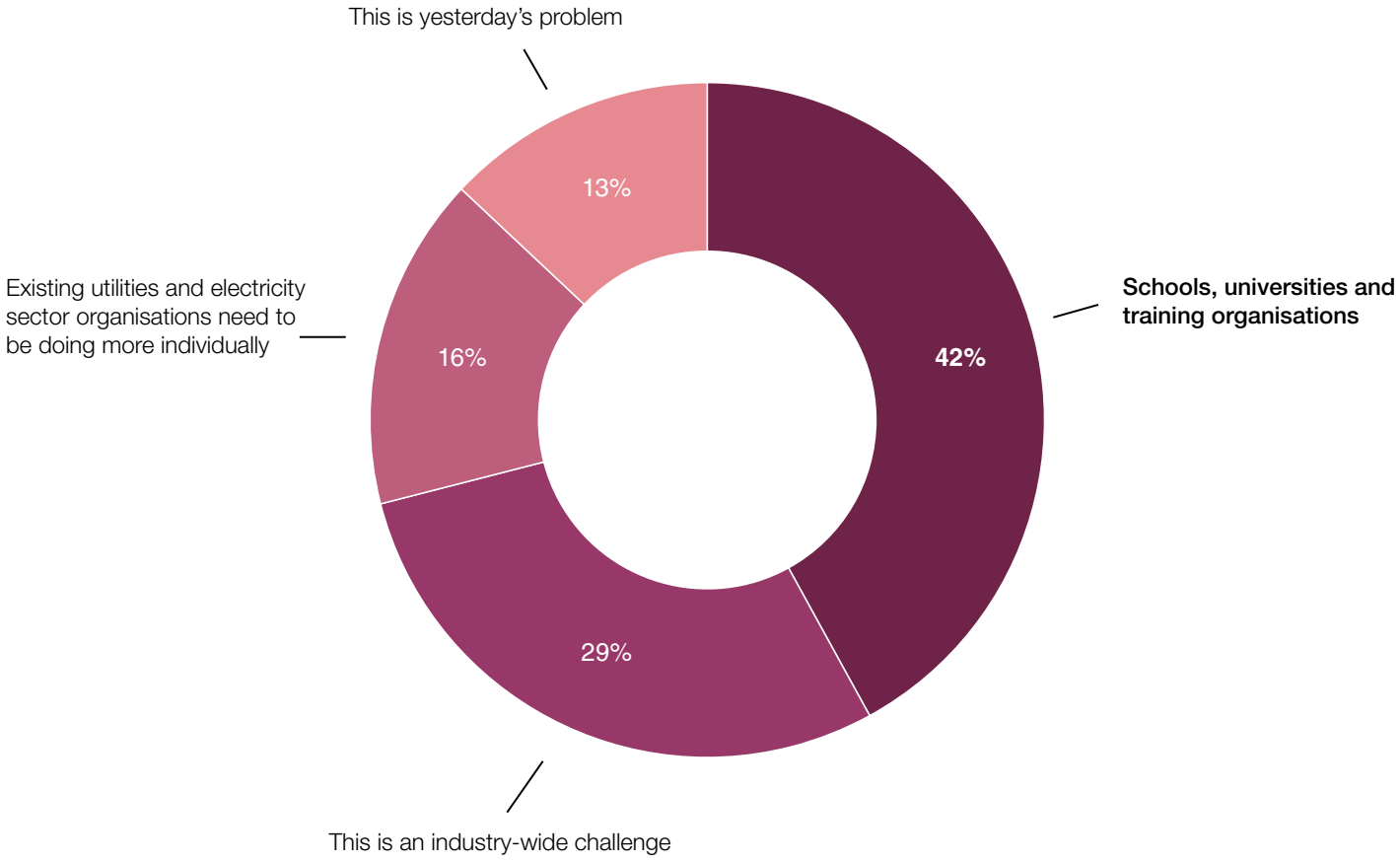


- **To be honest as long as the lights stay on, most consumers don't really care how it works and how much it costs as long as they aren't being charged too much (excessive profits). The sector will struggle to tackle this because no-one will listen. – 51%**
- This is a cross-sector issue that the likes of ERANZ and the ENA should be working together on so that information is out there for those with questions and concerns about the sector. – 19%
- Network companies need to up their game. Most consumers are fine with their retailers, it is the network piece that is most misunderstood and creates the most distrust. Networks need to do more to explain the relationship between service level and price. – 16%
- Retailers are best placed and should do more. Retailers should provide much more balanced information about what they do, why prices are what they are and how the sector works. This will build trust and confidence in the sector. – 14%

Diversity in the workforce

Question 5

Where do you think more positive effort should be made to address the workforce diversity challenge (gender, age, ethnicity, etc.) faced by the electricity sector? Choose the option you most align with:

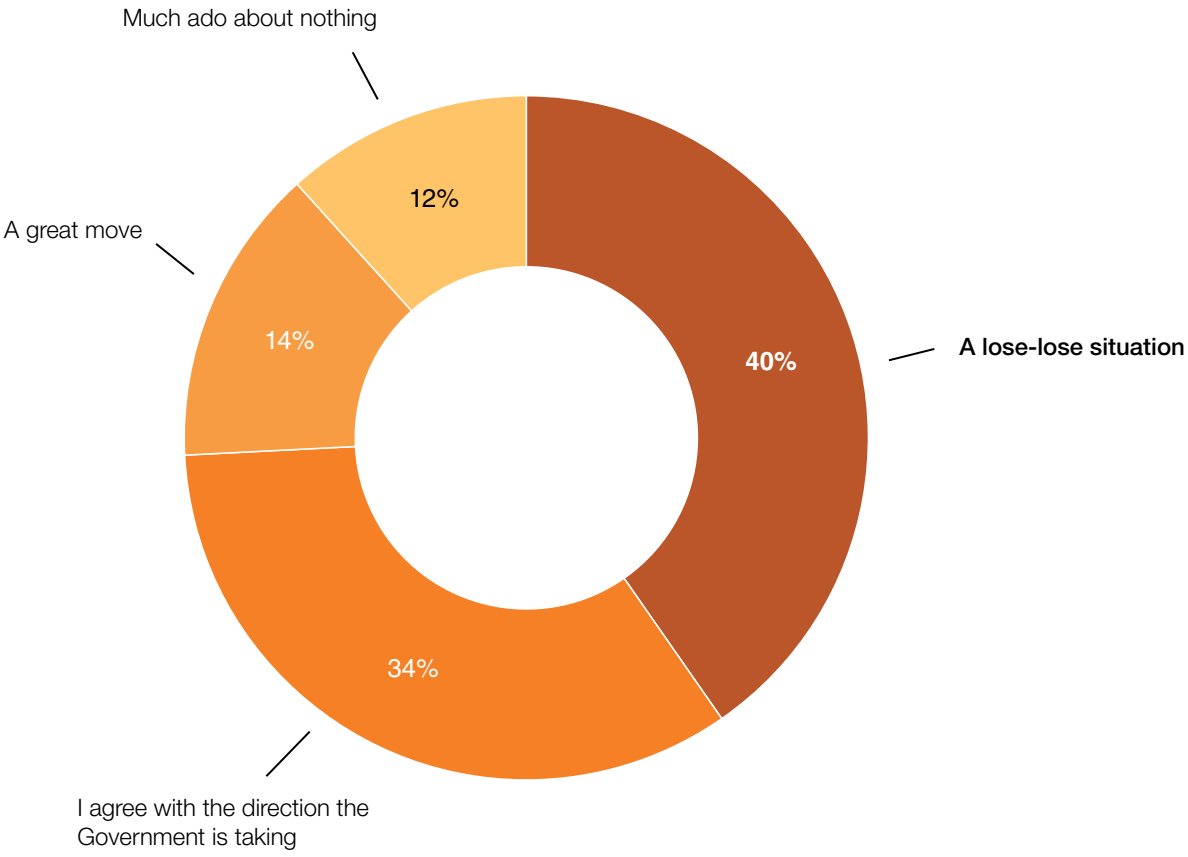


- **Schools, universities and training organisations. This is a generational issue. Start at the beginning with education and encouragement for all people to consider a future in the electricity sector. – 42%**
- This is an industry-wide challenge and hence the industry should come together through their respective industry associations to adopt common industry wide goals. Only by tackling this together will anything change. – 29%
- Existing utilities and electricity sector organisations need to be doing more individually with their HR policies around hiring new talent, and looking internally to address the problems. – 16%
- This is yesterday's problem. Actually, the sector has already recognised the problem and is already tackling the issue with some great progress so I wouldn't say any additional effort is needed. – 13%

Bonus question – just because this is very topical and it will be interesting to see where you all sit on this one!

Question 6

The Government has announced an end to new offshore exploration permits for oil and gas. A positive move? Choose the option you most align with.

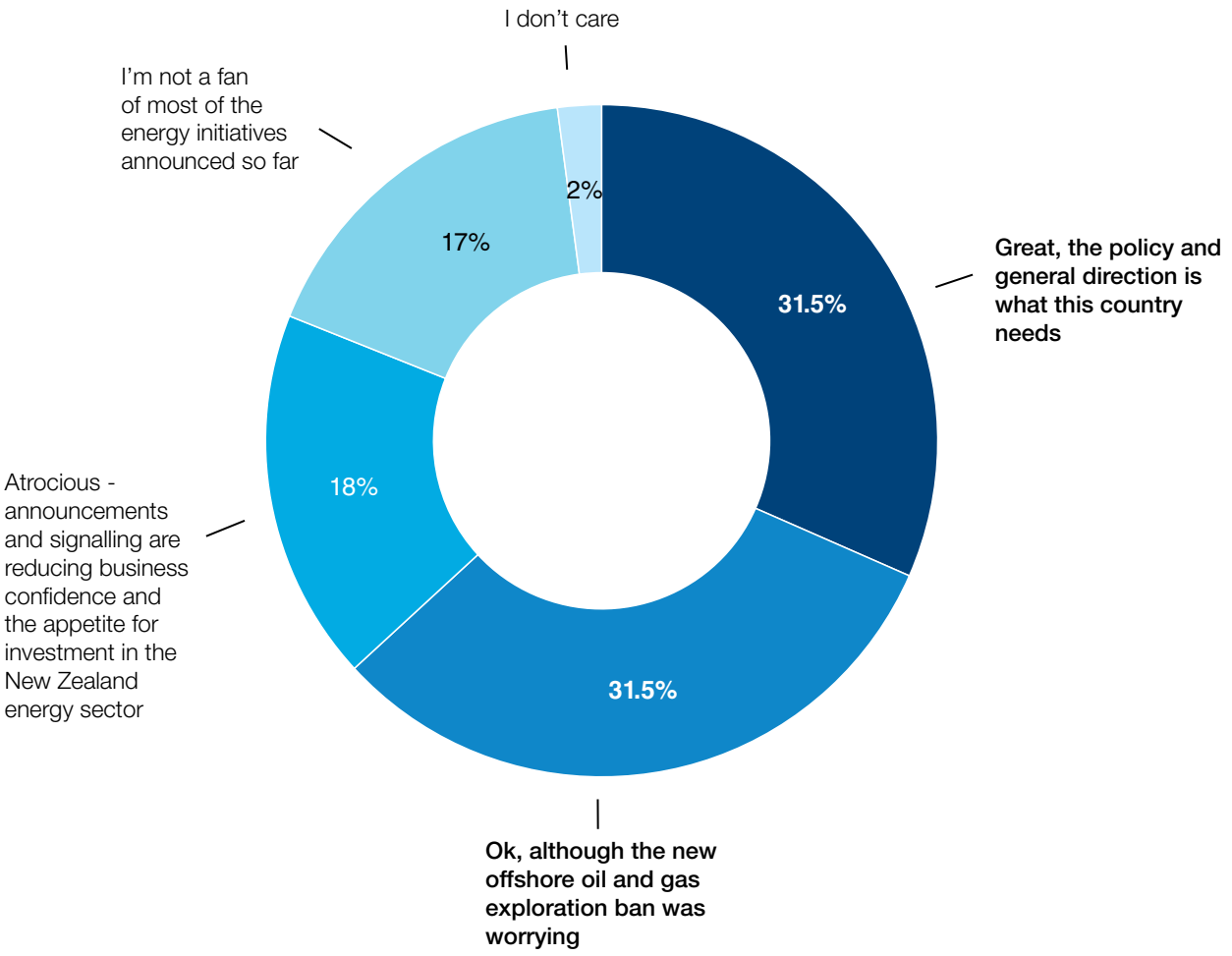


- **A lose-lose situation. This does nothing to reduce emissions, it worsens our energy security position, creates sovereign risk for investors, foregoes necessary revenue to the Crown and reduces the possibility of us finding gas which we could export and offset coal consumption elsewhere in the world. – 40%**
- I agree with the direction the Government is taking but their strategy should be improved. It needs to be more measured, planned and consulted on before decisions are made with potentially big unintended consequences. – 34%
- A great move, New Zealand needs to lead the way and send a signal. In my opinion this didn't go far enough. We should do more such as immediately stopping all exploration and hasten the transition to renewable energy solutions across all sectors of the economy. – 14%
- Much ado about nothing. It was mostly a political move that doesn't really affect things either way. No new exploration was likely and it won't affect our emissions profile one iota. Now back to something interesting. – 12%

Our **third quarter** survey asked questions about new policy directions indicated by the Labour Government, one year into its first term in office. More than 200 respondents provided us their thoughts on the direction of electricity policy and regulation:

Question 1

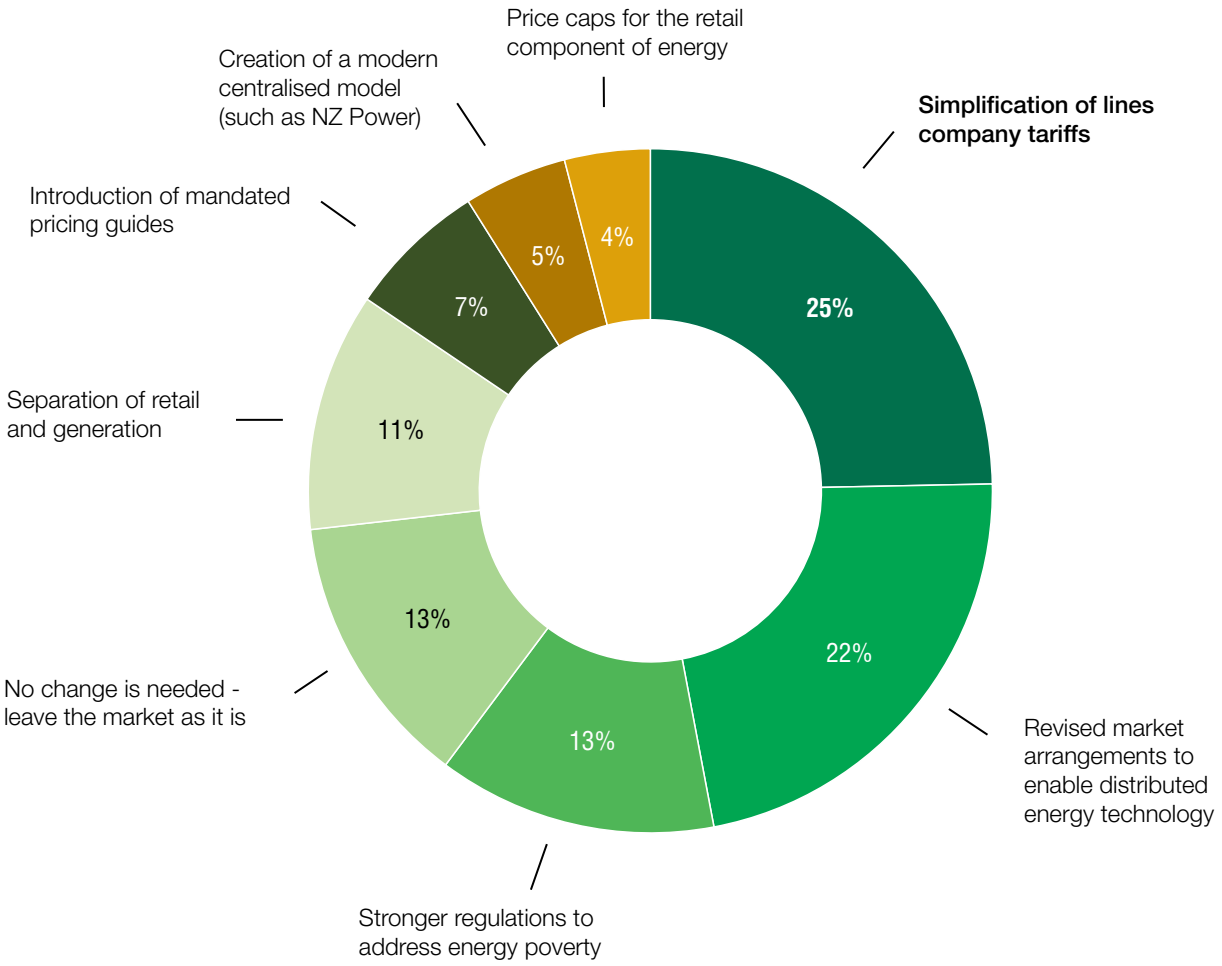
We are coming up to 12 months since we had a change of Government for the first time in nine years. With special consideration of the energy sector, how do you think the coalition is performing so far? Choose one:



- **Great, the policy and general direction is what this country needs – 31.5%**
- **Ok, although the new offshore oil and gas exploration ban was worrying – 31.5%**
- Atrocious - announcements and signalling are reducing business confidence and the appetite for investment in the New Zealand energy sector – 18%
- I'm not a fan of most of the energy initiatives announced so far – 17%
- I don't care – 2%

Question 2

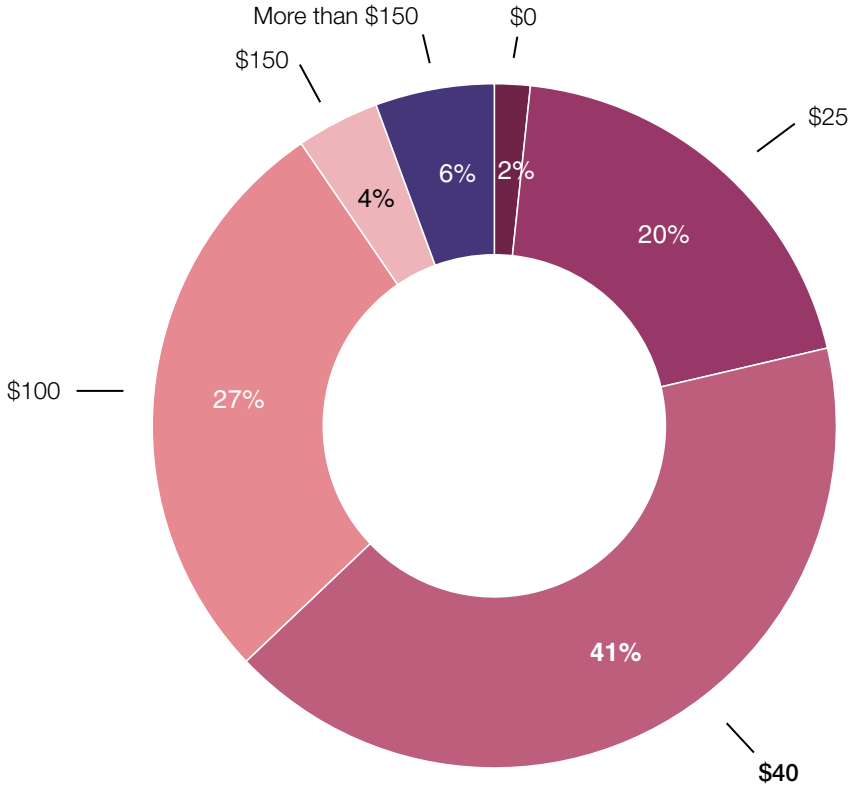
The Electricity Price Review expert advisory panel is due to release its first report for discussion in coming weeks. There are plenty of opinions on what outcomes will ensure fair pricing going forward. Here is your chance to join in. Of the following options, what are the top three outcomes you want to see from this review?



- **Simplification of lines company tariffs – 25%**
- Revised market arrangements to enable distributed energy technology – 22%
- Stronger regulations to address energy poverty – 13%
- No change is needed - leave the market as it is – 13%
- Separation of retail and generation – 11%
- Introduction of mandated pricing guides – 7%
- Creation of a modern centralised model (such as NZ Power) – 5%
- Price caps for the retail component of energy – 4%

Question 3

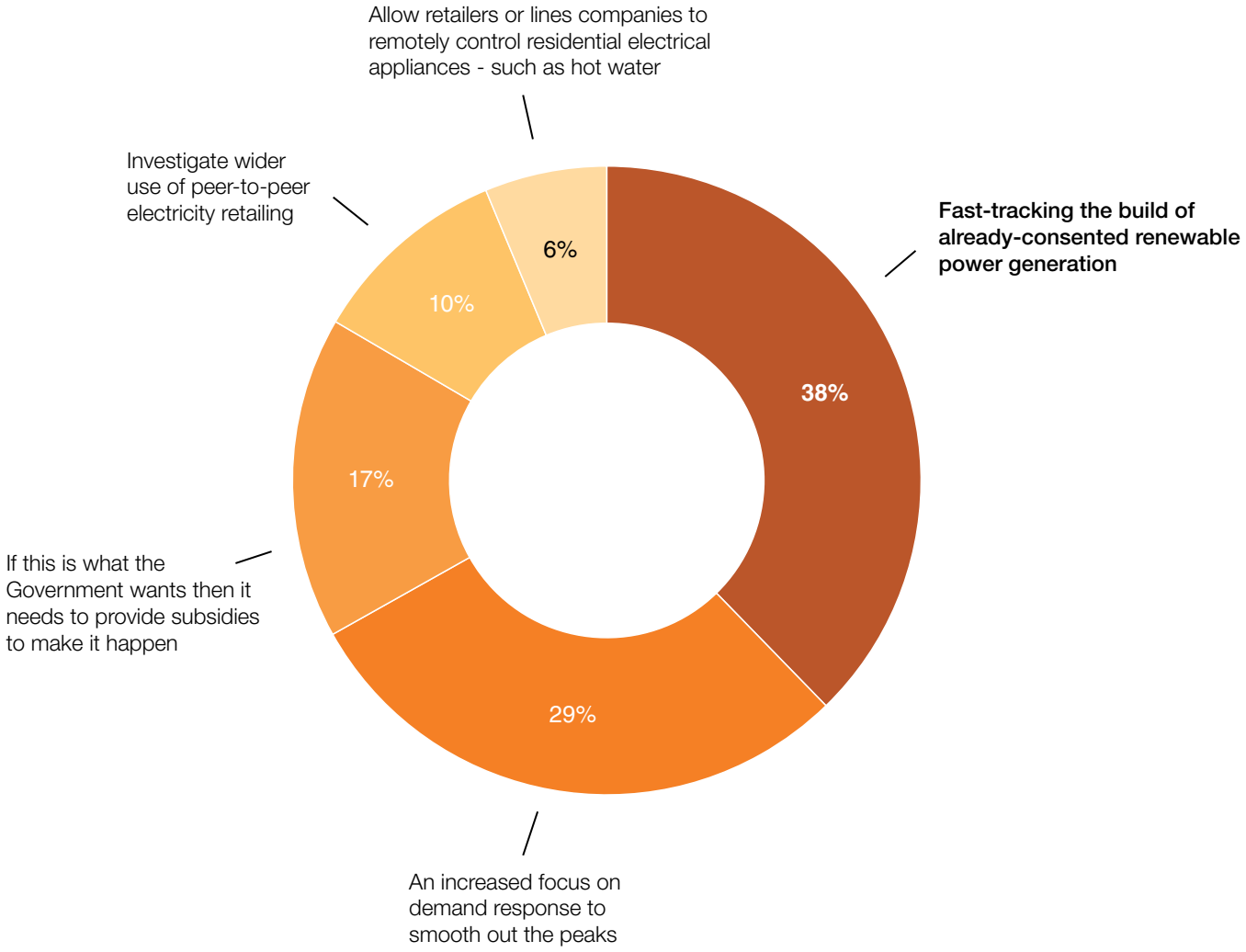
The Ministry for the Environment is consulting on changes to the Emissions Trading Scheme. It states the current $25 per tonne price cap on carbon may be lifted. The carbon price is currently nearing $25. Given this potential change, what price should companies be assuming for investment decisions? Pick one:



- $0 – 2%
- $25 – 20%
- **$40 – 41%**
- $100 – 27%
- $150 – 4%
- More than $150 – 6%

Question 4

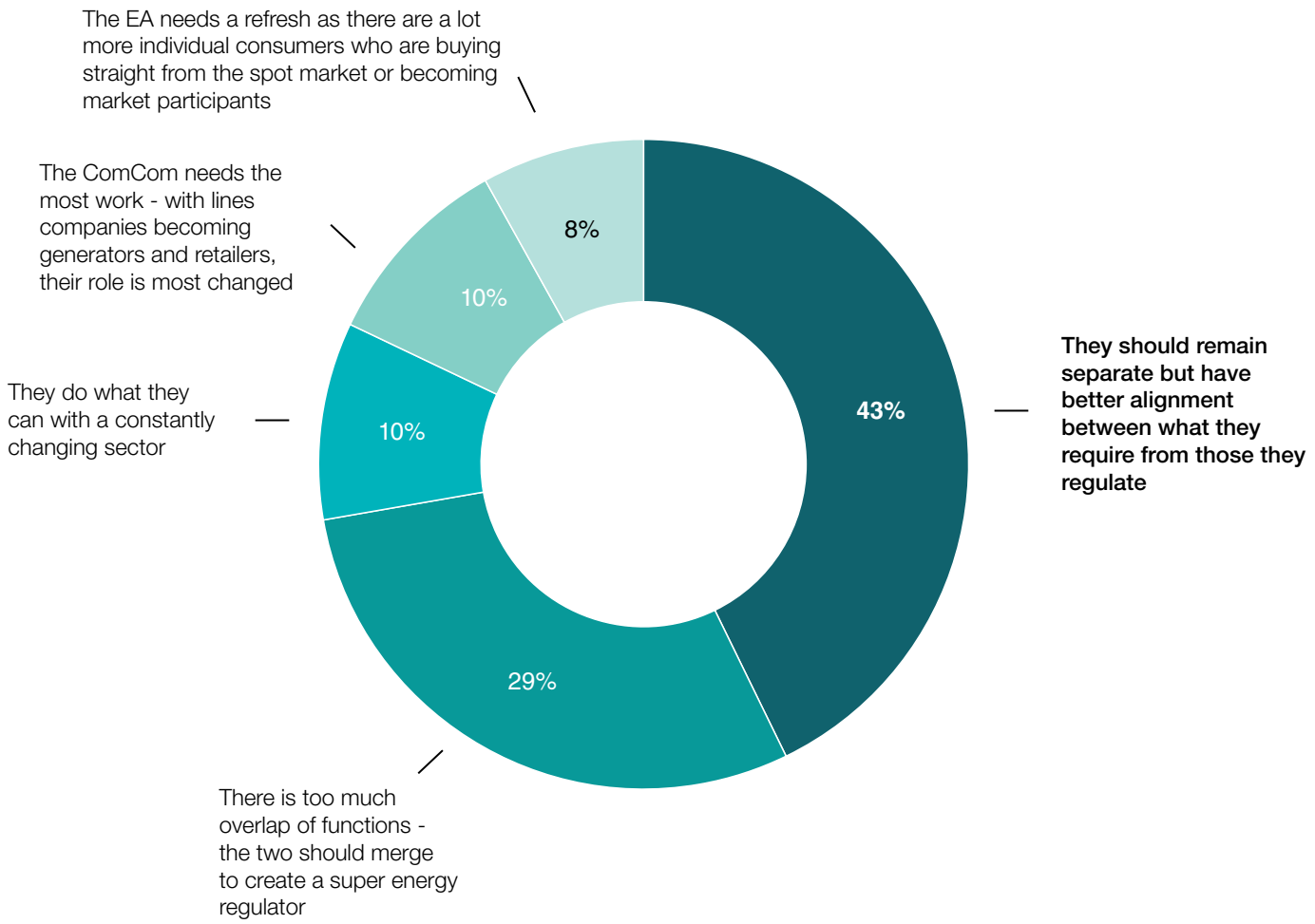
The Government has also set a target for 100% renewable power generation in a year of average hydrology by 2035. What is the best way for the sector to work towards this? Choose one:



- **Fast-tracking the build of already-consented renewable power generation – 38%**
- An increased focus on demand response to smooth out the peaks – 29%
- If this is what the Government wants then it needs to provide subsidies to make it happen – 17%
- Investigate wider use of peer-to-peer electricity retailing – 10%
- Allow retailers or lines companies to remotely control residential electrical appliances - such as hot water – 6%

Question 5

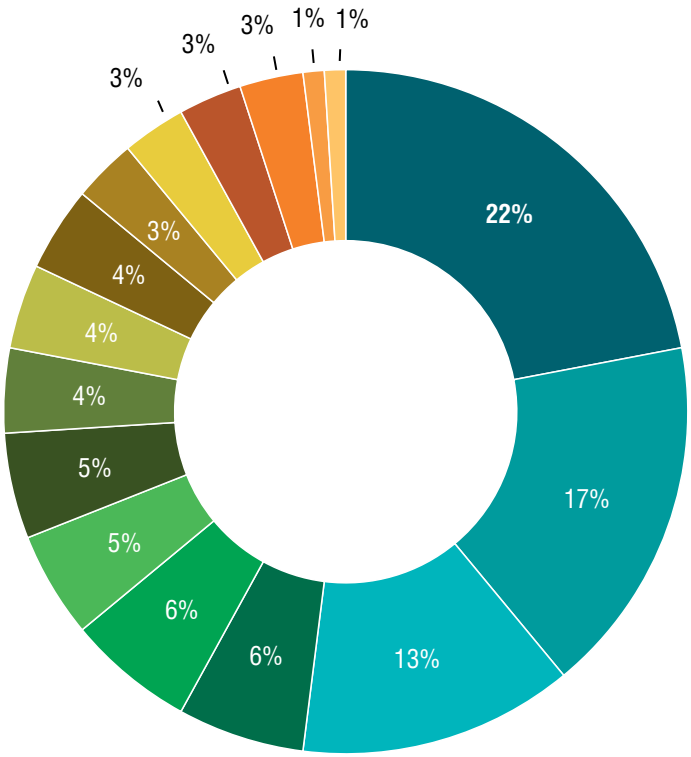
With the roles of energy companies evolving quickly it is becoming harder for the Electricity Authority and Commerce Commission to remain fit for purpose. How do you think the responsibilities of the two watchdogs align with the changing sector? Choose one:



- **They should remain separate but have better alignment between what they require from those they regulate – 43%**
- There is too much overlap of functions - the two should merge to create a super energy regulator – 29%
- They do what they can with a constantly changing sector – 10%
- The ComCom needs the most work - with lines companies becoming generators and retailers, their role is most changed – 10%
- The EA needs a refresh as there are a lot more individual consumers who are buying straight from the spot market or becoming market participants – 8%

Participants by organisation type

993 RESPONSES



KEY

- Distribution 22%
- Gentailer 17%
- Consultant 13%
- Other 6%
- Transmission 6%
- Consumer 5%
- Professional services company 5%
- Generator 4%
- Regulator 4%
- Equipment supplier 4%
- Government department/agency 3%
- Small retailer 3%
- Consumer – large 3%
- Upstream oil and gas 3%
- Lobby/association 1%
- Academic 1%

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