

DISTRIBUTOR ASSET MANAGEMENT AND RISK

SECURITY AND RELIABILITY COUNCIL

This paper provides the SRC with information about distributors' approach to asset management and risk, as part of the SRC's role to ensure reliable and secure energy for consumers.

Note: This paper has been prepared for the purpose of the Security and Reliability Council (SRC). Content should not be interpreted as representing the views or policy of the Electricity Authority.

Distributor asset management and risk

- 1.1.1 As part of its theme of asset management and risk, the SRC has asked the secretariat to provide information on distributors' approach to asset management and risk.
- 1.1.2 To achieve this in previous years, the secretariat has arranged for distributors to attend SRC and present the information. This year, for efficiency and to avoid potential disclosure of sensitive information, the Authority, on the SRC's behalf, has engaged MartinJenkins to conduct a series of interviews with key distributor participants and present an anonymised report of their findings at this meeting.
- 1.1.3 As part of an agreed scope, the secretariat asked MartinJenkins to consider any recommendations for the Authority arising from this report. For convenience we have set these out below for members to consider.
- 1.1.4 Appendix A is the MartinJenkins report.

Key recommendations from the report

- 1.1.5 *Note that there is little cause for concern on the core asset management capabilities of EDBs; by and large all had strong engineering-led processes and a sound understanding of their own equipment and network*
- 1.1.6 *Note that the regime is set up to prioritise a conservative approach towards asset management, with the threat of penalties to EDBs forcing a focus primarily on network stability*
- 1.1.7 *There is the potential for the Authority to drive greater and faster standardisation amongst EDBs, and to support the creation of a centralised strategic spare store for New Zealand*
- 1.1.8 *There may be a need for a deliberate process across EDBs to coordinate phasing of demand, as a potential demand bubble looms from both simultaneous replacement and electrification*
- 1.1.9 *There is potential for the Authority to improve access to data and information through centralised datasets open to EDBs and other market participants to support their asset management processes*
- 1.1.10 *There could be a role for the Authority in supporting EDBs to gain greater access to data on their own LV networks from retailers, to support a greater understanding of the needs of LV consumers and subsequent investment into LV assets.*
- 1.1.11 *The Authority could explore ways to help improve the market for non-network or non-line solutions. This could include exploring a contestable market or replicating initiatives undertaken overseas.*
- 1.1.12 *There would be value in explicitly looking into the mismatch in perceptions around the regulatory regime, to ensure distributors fully understand the price path options available to them so they can make appropriate levels of investment.*

Questions for the SRC to consider

The SRC is asked to consider the following general questions.

- Q1. Does the SRC agree with the recommendations?**
- Q2. What further information, if any, does the SRC wish to have provided to it by the secretariat?**
- Q3. What advice, if any, does the SRC wish to provide to the Authority?**

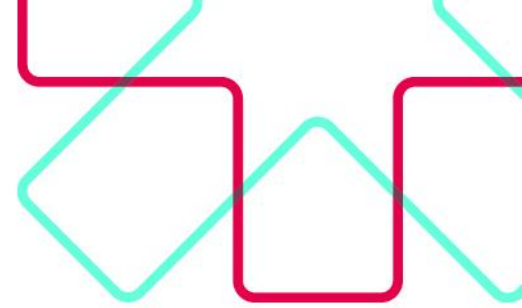
Appendix A: MartinJenkins Distributor Asset Management and Risk Assessment

DISTRIBUTOR ASSET MANAGEMENT

Final Report

19 May, 2022





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PREFACE

This report has been prepared for the Electricity Authority's Security and Reliability Council by Bex French and Daniel Miles from MartinJenkins (Martin, Jenkins & Associates Limited).

MartinJenkins advises clients in the public, private and not-for-profit sectors. Our work in the public sector spans a wide range of central and local government agencies. We provide advice and support to clients in the following areas:

- data analytics
- public policy
- evaluation and research
- strategy and investment
- performance improvement and monitoring
- business improvement
- organisational improvement
- employment relations
- economic development
- financial and economic analysis.

Our aim is to provide an integrated and comprehensive response to client needs – connecting our skill sets and applying fresh thinking to lift performance.

MartinJenkins is a privately owned New Zealand limited liability company. We have offices in Wellington and Auckland. The company was established in 1993 and is governed by a Board made up of executive directors Kevin Jenkins, Michael Mills, Nick Davis, Allana Coulon, Richard Tait and Sarah Baddeley, plus independent director Sophia Gunn and chair David Prentice.



EXECUTIVE SUMMARY

New Zealand's energy distributors have a robust and longstanding practice of effective asset management. Incentivised through reputational risk and, in many cases, quality standards set by the Commerce Commission as regulator, distributors keep a close eye on the state of their equipment and ensure a rolling programme of capital investment to maintain their network.

Appropriate multi-disciplinary engagement across their firms is employed in making decisions as to what is and is not prioritised within the asset management plan. However, there are wildly variable degrees of sophistication as to how these choices are made – ranging from data-driven risk-weighted analysis at the most sophisticated end, through to a more or less pure qualitative discussion process at the least sophisticated end.

In general, scale of the distributor was the primary determinant as to the sophistication of asset management prioritisation, with smaller players generally not capable of investing in the up front time and money costs associated with large data-driven risk and prioritisation systems.

As well as improving the quality and transparency of decision making, codified and quantitative systems also supported boards to focus on governance and avoid extending too far into management, with their involvement in setting up the systems in the first place serving to have pre-emptively built confidence, at a governance level, in how decisions are made.

Supply chains for equipment have been tested in recent years, through a combination of both COVID-19's impacts on global supply chains, plus increased demand stemming from more regular severe weather events. This has caused distributors to hold larger stockpiles – either directly or through their contracted suppliers – generating not insignificant holding costs. There is scope for enhanced collaboration and the potential to centralise a national

supply of strategic spares; though this is limited by the degree to which distributors have standardised.

While the core of asset management – maintaining the network to meet quality standards and be resilient to external events – was solid across distributors, we found significant variability in how distributors considered the risk of being ill-equipped to service future demand in their asset management planning.

Consideration of future demand – both in terms of level of demand and changing profile of demand across low and high voltage elements of the network – was extensively considered by some distributors, with substantial investment in analytics to forecast that demand. However, other distributors elected to actively avoid predicting forward demand, instead responding to demand as it eventuated.

We do have concerns about the future implications of “wait-and-see” approaches to demand. There are economic costs associated with the early-life replacement of assets where an asset was replaced but proves unsuitable for the demand which ultimately presents. Equally, there are economic costs associated with upgrading too early and holding significant excess capacity. Given the unprecedented pace of change in consumer needs, we believe there is significant scope for improvement among many distributors in how they consider future demand.

Distributors employed three different models for how asset management services were contracted, directly employing staff, employing through a subsidiary, or contracting on the open market (an option generally open only to distributors in large urban areas). We saw valid reasons amongst all distributors for the model they had adopted; and there seems little reason for a distributor to change from the model which works for them.



Regardless of model, all distributors expressed concerns around future availability of skills, with local supply being limited and an expectation that a number of skilled staff will leave overseas once borders fully reopen.

Finally, conversations in many cases tended to come back to the impact of regulation on asset management, given the natural monopoly status of distribution and the corresponding role of the Commerce Commission in setting price paths for regulated distributors. While revenue and investment regulation itself was outside of our scope, and we do not pass any comment on the regime itself, it is unavoidable to comment somewhat on its impact on distributor asset management.

We saw distributors as being deeply cautious around costs associated with engaging with the Commission where they believed that further investment was needed beyond what had been historically allowed for under their default price path. The perception tended to be that applying for a customised price path was a necessary evil if greater investment was needed, but would cost multi-millions to achieve.

The Commission, alternatively, saw a level of flexibility within the cheaper to apply default price path regime to allow for greater investment. While it is not in our purview to engage deeply with this mismatch, it is worth noting its presence and a possible need to delve further into why this mismatched perception might exist.



Recommendations

Table 1: List of recommendations

- Note that there is little cause for concern on the core asset management capabilities of EDBs; by and large all had strong engineering-led processes and a sound understanding of their own equipment and network
- Note that the regime is set up to prioritise a conservative approach towards asset management, with the threat of penalties to EDBs forcing a focus primarily on network stability
- There is the potential for the Authority to drive greater and faster standardisation amongst EDBs, and to support the creation of a centralised strategic spare store for New Zealand
- There may be a need for a deliberate process across EDBs to coordinate phasing of demand, as a potential demand bubble looms from both simultaneous replacement and electrification
- There is potential for the Authority to improve access to data and information through centralised datasets open to EDBs and other market participants to support their asset management processes
- There could be a role for the Authority in supporting EDBs to gain greater access to data on their own LV networks from retailers, to support a greater understanding of the needs of LV consumers and subsequent investment into LV assets.
- The Authority could explore ways to help improve the market for non-network or non-line solutions. This could include exploring a contestable market or replicating initiatives undertaken overseas.
- There would be value in explicitly looking into the mismatch in perceptions around the regulatory regime, to ensure distributors fully understand the price path options available to them so they can make appropriate levels of investment.



INTRODUCTION

Background

The Electricity Authority's Security and Reliability Council (SRC) is seeking to assess the asset management practices and policies of electricity distributors from a security of supply perspective. The Authority has commissioned MartinJenkins to conduct interviews with distributors (EDBs) to provide an overview of the current asset management process and procedure, and make any appropriate recommendations as to steps the Authority could take to improve the standard of asset management.

While we have taken a broad view of "emergency preparedness" in discussions with generators, including health and safety, our focus has been on those elements of risk and emergency preparedness with a potential impact on security of supply.

This report gathers insights on the views of industry participants on their own practices, though we have not independently reviewed their processes to verify statements made within the interviews. Desktop reviews of the asset management plans of the EDBs we spoke with were conducted – though primarily for context gathering rather than any detailed review of the asset management choices made therein.

Scope

Our interviews focussed on:

- Roles & Responsibilities – which roles in the firm were involved in making the core choices involved in asset management planning.
- Prioritisation – how choices were made as to which projects made it into the plan.

- Risk Management – which categories of risk were considered in making asset management choices, and how these were balanced.
- Demand forecasting – how likely future demand on assets was extrapolated.
- Future trends – decarbonisation including consumer photovoltaic generation, electric vehicles, and open-access networks, as well as the consequences of COVID-19.
- Parts, Logistics, and Workforce – security of supply for critical spares and ease of access to vital skills.

Out of scope

- We did not review the actual decisions made in asset management plans, only the processes which led to them.
- We did not consider the impact of Commerce Commission regulation directly, though it was unavoidable in some areas. We have not provided any recommendations which speak to the economic regulatory regime operated by the Commission as outside of our scope, though we did conduct an additional in-confidence interview with the Commission in order to ensure EDB's views on regulation were not presented absent the views of the regulator itself.

Approach

We conducted interviews with stakeholders from a number of EDBs to draw our industry insights. Attempts were made to ensure we had a balance across large and small, urban and rural, private and trust-owned distributors. These companies are listed below:



- Network Waitaki
- Orion
- Powerco
- The Lines Company
- Top Energy
- Unison
- Vector
- Wellington Electricity

We also conducted an additional interview with the Commerce Commission to seek further context on aspects of interviews with EDBs where issues had been raised relating to regulated price paths and limitations on investment into networks.



Analysis

Asset Management Decision Making

At its core, asset management is about ensuring a balance between costs and risk mitigation. A range of risks require consideration – specifically:

- Ongoing reliability – EDBs must consider when the age of plant & equipment reaches the point where risk of imminent failure is unacceptable
- Specific events – EDBs must ensure the network can handle events both on a large scale, such as extreme weather events and their impact on the network, or small scale such as foliage intrusion
- Capacity limits – EDBs must ensure the network has capacity to cater to forward demand from industrial/commercial, residential growth, and the changing profile of demand (particularly in terms of decarbonisation and consumer electrification)

The fact that asset management is risk management does not, however, mean that it requires a risk based approach. In reality, EDBs have different approaches, tools and methodologies which contribute to their asset management plans (AMP).

At the most simplistic end, some EDBs continue to use deterministic approaches, with defined end-of-life and replacement cycles. These EDBs focus primarily on the first two categories of risk, and avoid any significant

speculation as to future demand – instead waiting for that demand to eventuate before attempting to respond to it.

At the most sophisticated end, some EDBs use project prioritisation tools or value frameworks which allow for quantification of risk, and comparison across categories of risk. Tools and systems such as these require significant up-front investment; not just financially¹, but primarily in terms of governance investment into their use.

Balancing across categories of risk in a quantitative manner requires clarity on the relative significance of each category of risk; eg, is an EDB more concerned about small outages or inability to meet future demand? These discussions are difficult to have, and require a sophisticated understanding of risk appetites – avoiding the temptation to see risk as solely something to be avoided.

Most EDBs had taken some steps to take risk-based asset management approaches, though there was only one EDB we spoke with which exhibited a truly sophisticated risk-based approach with an explicit quantitative framework for balancing across risk categories.

Governing asset management

All EDBs had clear processes in place for making decisions around their asset management prioritisation, with clear and defined roles and responsibilities which included representation from across diverse perspectives – such as engineering and consumer-facing.

¹ though one EDB we spoke with had invested in deploying Copperleaf - <https://www.copperleaf.com> - at a significant financial cost



All also had the plans ultimately approved at board level, though we note the tenor of the conversation at board level varied significantly based on the sophistication of the EDBs processes. Those EDBs with more sophisticated processes, where the board had previously been involved in explicit setting of risk appetites, noted the board had a lesser level of engagement with the plan – more from a perspective of confirming the results aligned to the risk appetites they had set previously. Those who had not invested in these conversations with the board tended to see more detailed board engagement in decision making.

Ownership & Investment

The ownership structures of EDB's appears to have an impact on the approach to asset management. Those with local ownership structures tended to acknowledge higher levels of engagement with their communities and a greater openness to investing in things that may not result in higher levels of profit or have direct commercial benefit to the EDB but might be desirable to the community, such as increased aesthetic undergrounding.

This also holds a direct relationship to the level of investment which can be made in the network. Private distributors are subject to price path regulation, limiting the revenue they can bring in and accordingly the level of investment which can be put into the network. Community-owned distributors are not subject to these limitations, which may contribute to their willingness to invest in their assets for reasons such as aesthetics – as this does not need to come at the cost of risk management investment, and can be additional.

Managing Ongoing Reliability

All EDBs did a credible job at the core role of their asset management plan – ensuring a regular programme of capital investment which maintains supply to the existing set of customers connected to the network. Each had strong engineering skills and a sufficient understanding of the condition of their

assets to ensure confidence in their equipment maintenance and replacement procedures.

That said, taking a deterministic approach to equipment maintenance and replacement (as compared to a risk-based approach) tends to result in over investment in maintaining equipment – meaning either that funding for other categories of risk is squeezed out, or consumers risk paying too much for the level of distribution service received.

Due to the non-market, monopoly nature of distribution, price signals cannot send signals as to appropriate levels of investment and force a distributor to adopt an explicitly risk-based approach to capital maintenance.

Further, the regulatory environment requires a focus on service quality measures which must be reported to the Commerce Commission, and where the Commission can and does take enforcement action where measures are not met. These measures force EDBs to prioritise service stability – and primarily the first category of risk.

Given this, we think it absolutely consistent with incentives that distributors apply an often deterministic, and at best low-risk approach to the replacement and maintenance of their plant.

This low-risk approach to equipment failure does come at a real economic cost, with consumers ultimately funding that low risk approach through more conservative asset management plans used to support price path determinations by the regulator – and importantly, through the preponderance of attention paid to this type of risk crowding out attention on other types of risk – particularly that of potentially not meeting future consumer requirements or demand levels.

Supply chain Management

COVID-19 brought into sharp relief for EDBs the importance of supply chain management and the level of strategic spares kept in supply with the EDB (or their contracted provider). It was clear that while supply chains were



managed as well as could have been hoped through COVID, there is little sign of things getting easier with issues further exacerbated by the ongoing war in Ukraine. It appears that most EDBs are facing the same supply chain challenges due to disruptions in manufacturing and shipping, and New Zealand continuing to be deprioritised compared to other regions in the global marketplace for electrical network supplies.

EDBs had experienced unprecedented increases in price over the past two years of around 30%. Shipping costs have also increased by a similar amount.

EDBs are increasingly building more meaningful relationships with suppliers to help manage logistics issues, some have pursued GPS location tracking technology that allows them and their suppliers to fully understand the delays as they occur. These delays are having a knock-on effect for some EDBs work programmes, where things must be reorganised or reprioritised to manage the delays in supplies. EDBs with greater levels of standardisation are able to move supplies around as need demands but delays are still impacting delivery timelines and the ability to schedule contractors to complete the works.

These increasing costs make investment difficult and EDBs have to reprioritise work programme items to ensure they remain within their regulatory investment limits. Should cost inflation continue to grow worldwide this issue will become increasingly difficult to manage in a heavily regulated environment.

Most EDBs identified supply chain risk early into the pandemic and immediately began working with suppliers to increase stock levels and lead times to manage the risk. Most commonly, this has led to EDBs, or suppliers on their behalf, holding more stocks - one EDB reported holding three times the number of poles that they would normally hold. EDBs are taking a longer-term approach to stock levels, holding stocks for three to six months of work (even longer in some cases) instead of one month. However, the

increase in stock levels requires increased storage space and costs for EDBs that is significantly greater than originally anticipated.

EDBs do not compete with each other (or anyone), and accordingly there is significant potential value in any activity which can reduce costs through cooperation. As it stands, EDBs already cooperate informally in sharing spares where necessary. As it is unlikely that multiple EDBs will encounter unexpected failures all at once, we see a real opportunity when it comes to the holding of strategic spares, where a third party or nominated EDB could hold a centralised pool of spares for the most standardised items – ensuring all EDBs have access to emergency supplies while not requiring all to pay to hold and store those supplies.

The other issue raised around supply chain management is that most EDBs experienced significant network growth at around the same time in the 1960s, and accordingly have aging assets that are set to be replaced in similar timeframes, which has the potential to send a demand bubble through the supply chain if not managed in a coordinated way.

Recommendations

- Note that there is little cause for concern on the core asset management capabilities of EDBs; by and large all had strong engineering-led processes and a sound understanding of their own equipment and network
- Note that the regime is set up to prioritise a conservative approach towards asset management, with the threat of penalties to EDBs forcing a focus primarily on network stability
- There is the potential for the Authority to drive greater and faster standardisation amongst EDBs, and to support the creation of a centralised strategic spare store for New Zealand
- There may be a need for a deliberate process across EDBs to coordinate phasing of demand, as a potential demand bubble looms from both simultaneous replacement and electrification



Managing Specific Events

Another growing concern for EDBs is the risk of increasing extreme weather events as a result of climate change. Some EDBs described it as 1 in 50-year storms occurring every year, while drought and fire risk is increasing, wind strengths are increasing, and tree growth is greater in wet periods.

In response, EDBs are putting greater emphasis on reducing single points of failure and working with customers to proactively manage vegetation risks. Interestingly, we noted many EDBs undertaking their own climate research to inform their modelling, with some working with NIWA to build a better understanding of future storm events, and others with the Climate Change Commission or in informal collaborations with other EDBs.

Risks of extreme weather events do depend on geography. Rural EDBs with long dispersed lines which serve only a handful of people are forced to consider this type of risk quite differently, with significant costs associated with building resilience needed despite them serving limited customers. Coastal areas are already experiencing the impacts of extreme weather events on EDB infrastructure with expensive alternative solutions (ie. undergrounding) becoming the only option.

Increasing rates of extreme weather events also serves to magnify the vegetation intrusion risks already carried by EDBs. As this risk continues to grow some EDBs are forced to look at new ways to manage the risk, particularly through working with customers and community groups to better educate on vegetation risk, and attempt to move some of the burden for regular inspection towards the consumer. The deepened relationships this drives will likely be an advantage when managing climate related risks that will continue to grow in frequency.

Health and Safety

Health and safety is a continuous risk to EDBs due to the nature of their work and is viewed as a top priority. Strong health and safety processes are embedded as business-as-usual risk for EDBs and we see little risk of widespread growing issues.

One EDB noted concern they may have inadvertently fostered a non-reporting culture, through each year rewarding a zero substantial issue count. This is an interesting risk, with the potential that near misses and less substantial issues are not reported to be learned from. We were encouraged by the EDB's openness around that risk, however, and have confidence it is being managed. It would be valuable though for other EDBs to consider the degree to which the same culture may be present in their operations.

Managing Future Demand

Managing capacity limitations and the risk of not being set up appropriately to serve growing or different demand is a very different problem to manage than the first two categories of risk. Estimating probabilities of equipment failure is relatively simple – requiring consideration predominantly of the age and condition of the equipment, and the load it is placed under. Likewise estimating the probability of extreme weather events – albeit more difficult than it used to be – remains a relatively well understood discipline.

Predicting future demand used to be a relatively simple exercise, requiring consideration of population and industrial growth, and the likely locations thereof. Today though, electrification and decarbonisation have significantly complicated the ability of an EDB to estimate forward demand.

EDBs are now considering:

- The impact of Electric Vehicle (EV) charging on load;
- Bidirectional flow from increasing solar connections;
- Decarbonisation of industrial process heat;



- Rising housing intensification;
- Phasing out gas which will lead to an increase in electricity demand;

Many EDBs are concerned that these issues require significant investment in their infrastructure, and while they are conscious of the need to enable communities 20-30 years into the future, their ability to model that need is highly variable.

This is further complicated through the economics of mitigating the risk of being unable to meet future demand. If an EDB invests too soon, they hold significant unused capacity and costs for this are passed on to the consumer, compared to the much lower net present value (NPV) of deferring that investment to the future. At the same time, if an EDB underestimates future demand, they run the risk of installing lower capacity equipment and needing to replace it much earlier in its lifespan when demand actually eventuates – again, at a significant cost to consumers (or, in some cases, only to the particular consumer seeking the new connection).

The economic costs associated with under or over estimating demand underscores the importance of getting this right. However – in the case of EDBs on a regulated price path – estimating demand is not the whole picture. If an EDB estimates significant forward demand, they need to also convince the regulator of the need for investment prior to that demand eventuating – a task widely seen as difficult and expensive.

There is significant regional variation in what specific issues EDBs are concerned about in the electrification and decarbonisation space. Rural areas are seeing a much slower rise in EV and solar connections within their LV networks, however these regions tend to have higher rates of industrial connections and industrial process heat challenges to manage in their HV networks. Some rural regions are seeing higher rates of solar connections where sunshine hours make this particularly economic, but even then, EV requirements tended to remain very low.

As a result of the complexity of demand forecasting and of making the case to the regulator where demand is expected to be higher, some EDBs have adopted a wait-and-see approach; not bothering to put any significant effort into demand forecasting and waiting for that demand to eventuate, and placing the cost of those upgrades onto the consumer which triggered the demand. Another EDB noted that they had considered the costs associated with increasing capacity every time equipment was replaced and saw it as negligible, and was therefore choosing to build pre-emptive capacity regardless of estimated demand due to their view it was not much more expensive to do so.

Using Data

The most sophisticated of EDBs have modelling tools used to estimate demand (as well as risks within the first two categories – equipment failure and specific events), which utilise data points from local councils (considering local plans, construction forecasts, consent notifications, building typologies and footprints, council investments- electric buses, among other things), international research, major clients, individual ICP data, customer liaison data, Transpower modelling and modelling/forecasting around future events (ie. decarbonisation and climate related extreme weather events). These data points are often combined with in house experience, usually in the form of engineering teams. Universities have been used to study the potential impact of emerging issues and technology ie. Electric Vehicles impact on network loads.

Other EDBs are exploring the use of machine learning to provide options based on available data points for executives to consider.

This type of sophistication does not come cheap, and is one of the areas where we did see a clear benefit of economies of scale amongst EDBs, with only the largest EDBs able to justify the significant investment associated with an in-house data team.



We are not implying though that smaller EDBs did not invest in the use of data, including for demand projection. Rather, we observed that smaller EDBs were forced to prioritise more aggressively, and rather than holding a full data team, they might instead jointly commission work with other EDBs on a particular topic of value to them such as likely photovoltaic demand.

Improvement in technology and access to it helps improve the ability to improve data points available to EDBs on their own assets. The ability to use drone technology has improved the ability to review the state of poles and lines as an example. This evolving technology continues to improve EDBs accuracy but also requires them to review their approach to asset management more regularly than they have in the past.

EDBs tended to have a level of scepticism as to the value of Transpower modelling – particularly due to the limitations of that macro-level modelling when it came to considering the more micro-level of local asset investment. Nonetheless, some smaller EDBs still rely predominantly on Transpower modelling, where it offers a more useful data point than what they might be able to achieve internally with their resource profile.

There was a desire from smaller rural EDBs to correct assumptions they saw made about the capability of their businesses, arguing that a number of small EDBs were pursuing innovation and performing just as well but did not have the marketing or communications to advertise their success. Broadly, we accept this view and certainly acknowledge pockets of strong expertise – though there is also an aspect of not necessarily knowing the value of what they do not have, particularly when it comes to sophisticated demand projection techniques.

Shaping Demand

Some EDBs noted their asset management processes were beginning to more deliberately explore demand management alongside increasing capacity. Particular examples included exploration of incentives for off-peak usage, and increased use of active demand management. This way of

thinking will likely become more important to manage peaks with rising electrification.

Shifting focus towards LV networks

One of the big issues that many EDBs are currently grappling with is scenario planning and forecasting of demand on their low voltage (LV) networks. Increasingly network reliability is becoming much more important for customers on LV networks – particularly post-COVID with a dramatically higher number of customers working from home. EDBs acknowledged that historically, the LV networks have largely taken care of themselves with focus predominantly on high voltage (HV); but this approach is becoming decreasingly viable as dependency on LV increases for economic activity. Other comparable jurisdictions (eg Australia, California) have experienced significant issues with under investment in LV networks.

We observed a clear shift in mentality where NZ based EDBs are actively trying to grow their understanding of their LV networks, future demand and their customers' expectations, with a clear focus almost universally across the EDBs we spoke to of refocussing towards LV in their asset management going forward.

However, as noted earlier, increased use of data and information is becoming more central to asset management amongst all EDBs, and data and information on the LV network remains difficult to access for EDBs. There remains significant barriers between EDBs and access to meter data to support them in understanding the detail of how those networks are used – though we note that EDBs tended to imply the data was unattainable, while our understanding from other discussions is it is likely attainable, but energy retailers expect payment in return or a burdensome access process to be conducted.



Recommendations

- There is potential for the Authority to improve access to data and information through centralised datasets open to EDBs and other market participants to support their asset management processes.
- There could be a role for the Authority in supporting EDBs to gain greater access to data on their own LV networks from retailers, to support a greater understanding of the needs of LV consumers and subsequent investment into LV assets.

Labour and skills shortages

Labour and skills shortages have been an issue for the sector for a long time, but COVID-19 and the subsequent border closures have made this issue far greater than previously experienced. The border closures (these interviews occurred before border opening announcements) are having a profound impact on the access to skills, with heavy reliance across the sector on skilled migrant workers and they currently cannot access. An EDB estimated that the border closures have driven a 10% reduction in their workforce, and another reported twenty to thirty open vacancies at the time of the interview. Some EDBs expect the full effects of COVID-19 on the labour market to take up to five years to emerge, with further issues stemming from reopening and the potential flight of skills to higher paying roles in Australia.

EDBs have recently started to undertake significant training and recruitment programmes aimed at upskilling New Zealand based workers, many have significantly increased their graduate programmes for engineers and one EDB stated that 10% of their workforce is in training of some form. However, this is a longer-term solution as it takes time to build the required skills as there are big gaps in education within New Zealand and many existing skills are retiring or about to retire.

Contracting Models

There was a wide array of contracting models EDBs employed to ensure they had access to necessary skills. In general, those best able to overcome these issues tend to have large workforces or contracting businesses within their umbrella. These EDBs are able to successfully access and move resources based on need and have less competition for resources. It was suggested having a model where there is a contracting business under the company umbrella was a good model for smaller regions as these resources can also be shifted to other sectors/areas when there is limited work. In general though, each EDB had a contracting model they viewed as right for them, and there was little obvious reason for any to shift.

Non line/network solutions

While the interest in non-network or line-based solutions is high and EDBs acknowledge that this is an area that will become increasingly important, this technology is often expensive and still developing therefore making it an unreliable option in a security of supply sense.

Many EDBs are currently researching or trialling non-network solutions and exploring the possibility of third-party solutions. One example is an EDB exploring diesel generators that run off bio diesel.

There is a group established in the South Island that is actively exploring these technologies, how they might fit in the future, and any possible quick wins. This group focusses on learning together, exploring what exists, and stimulates interest in third parties.

While these options are currently very expensive, when demand increases and creates a reliable market for these technologies the price should decrease. This would also allow third party providers the room and security to grow their offerings. An example provided was that using traditional diesel



generation for planned maintenance cost around \$700,000 where batteries were likely to cost around \$1.1 million.

It was suggested that the Authority could explore the possibility of a contestable market for innovative solutions (like serviceable batteries). This would include developing an understanding of constraints and standards that would be involved. Another suggestion was that the Authority could look at replicating initiatives undertaken overseas (ie. the standardisation of smart chargers in the United Kingdom).

Recommendations

- The Authority could explore ways to help improve the market for non-network or non-line solutions. This could include exploring a contestable market or replicating initiatives undertaken overseas.

Regulatory Costs

Many EDBs raised concerns around regulatory risk where legislation does not consider the emerging and future issues that EDBs, and the sector, are or have to face in the future. This is a risk given the sheer amount of change and considerations that are on the horizon. One EDB suggested that it costs approximately \$2 million per year to comply with Commerce Commission regulations. This is particularly concerning in the climate change space with the level of change required to meet the Climate Change Commission's advice and standards for the sector. It was suggested that the Commerce Commission's approach (based on past evidence) is not fit for purpose in a future where you have significant disruptors that will impact demand (ie electrification).

It is worth noting, however, that there seemed to be a perception amongst EDBs that the only way to invest significantly in their network was through a custom price path agreement with the Commission, and that the default price path (a lower overhead and simpler process) was inflexible and unsuited to times where greater investment was needed. This seemed a broadly held view, but is an assumption worth testing, particularly as the Commission itself views the default price path regime as having a fair degree of inbuilt flexibility to allow for anticipated network needs.

It was mentioned that there have been issues investing in emergency management (ie. earthquake) resilience and managing the security of supply in networks post emergency, EDBs mentioned that they have struggled to get agreement to invest in these areas based on the level of investment actually required and had to use alternate legislative arrangements (ie provisions in the Emergency Management Act) to get investments approved.

In addition to competition regulation, EDBs also noted ongoing issues with the resourcing consenting process when looking to upgrade their networks which causes increased costs and delays.

Those who are exempt from regulatory restrictions around investment find that they do not have a challenge investing in the right solution, at the right time, for the right cost. They can fund and finance investment themselves and prioritise as needed, and largely answered to boards receptive to investing in future needs.

Recommendations

- There would be value in explicitly looking into the mismatch in perceptions around the regulatory regime, to ensure distributors fully understand the price path options available to them so they can make appropriate levels of investment.

