10 July 2025

Electricity Authority
Level 7
AON Centre
1 Willis Street
Wellington, 6011
By email: digitalisation@ea.govt.nz **Subject:** Digitalisation paper

Vector's submission to Consultation on *Our future is digital*

1. This is Vector's submission to the Consultation on *Our future is digital* being conducted by the Electricity Authority in Aotearoa, New Zealand.

2. No part of this submission is confidential, and we are happy for it to be published with contact details removed.

3. Vector owns and operates the electricity distribution network within the wider Auckland region. This consists of more than 19,000 km of electricity lines and over 22,500 distribution transformers, delivering power to over 624,000 homes and businesses.

4. Vector's strategy for our electricity distribution business is to orchestrate distributed energy resources, such as manageable electric vehicle (EV) charging and hot water effectively, to reduce the need for additional spend on infrastructure. This strategy reduces the traditional approach of constructing physical infrastructure, such as distribution transformers, to meet increasing peak demand.

5. We agree that the opportunity of digitalising the energy sector could deliver significant benefits to consumers. By enabling better data sharing and system visibility, we expect to uncover efficiencies and deliver more value from assets consumers already pay for such as smart meters and network infrastructure.

6. The electricity sector is highly complex, and we will need a high degree of sophistication to leverage big data and deliver benefits to consumers. With diverse participants and systems, unlocking the value of existing data requires advanced tools, shared standards, and flexible architectures. The solutions will need to match the complexity of the system and not oversimplify it.

7. The electricity industry in New Zealand needs to make a step change in our collective sophistication around data. The sector must evolve beyond the fragmented data practices and legacy systems that have worked during a period of predictable growth. A coordinated uplift in data capability spanning governance, standards, and technology is essential to meet the demands of the modern, decarbonising energy system.

creating a new energy future

8. There appears to be a collective lack of ambition across the sector, because progress is being held back by fragmented incentives, regulatory misalignment, and a reluctance to work towards a common digital framework. A major challenge we have as a sector is that several regulators and government agencies are involved in influencing the energy system without coordinated principles. Accordingly, we often end up in the bureaucracy of consultations, which rarely result in timely solutions to fast-changing situations. A more ambitious, whole-of-system approach is needed to realise the full benefits of digitalisation.

Survey Questions in the Consultation

Submitter
Matt Smith
Who are you responding as?
Industry participant
Organisation and position
Vector Ltd
Policy Advisor
Q1. What could stop or slow digitalisation of the electricity system? What would make it successful? How far should digitalisation go?

There is significant complexity inherent in the design of the existing energy system. Digitalisation will require relationships to be built between multiple parties, often with competing interests, and investments to be made by each of those parties so that information can be created, stored, and shared more efficiently.

We've already seen how a lack of enforceable standards (large parts of EIEP being voluntary) and arbitrarily restrictive regulation (the DDA's data use provisions) have slowed the use of data in recent years. We've also seen how the different capabilities and roadmaps of the smart meter fleet in Auckland are limiting the rollout of new products and services to customers from retailers and result in Vector dealing with fragmented data capabilities of different meters. Retailers have a limited business case for a rollout of more technically capable smart meters and regulatory structures have limited distributors and third-party data users from contributing to the deployment of more capable meters and directly utilising the data.

Even with a high penetration of smart meters collecting 30-minute interval data in New Zealand, retailers are not required to use this data for settlement. This disconnect undermines the value of smart meter infrastructure and limits the benefits that could be delivered to consumers and the wider system, while at the same time Australia has moved ahead with an obligation for 5-minute settlement.

While the principle for "simple solutions" is an attractive ideal, we disagree with this principle because the solutions will need to be complex to address the complexity of the electricity system. A better principle would be to have regulatory processes, systems, and contracts that are designed to rapidly adapt to change. The one thing that is clear from the last 20 years of technology development is that we are in a period of rapid change. We've seen it in the way

data is stored and analysed, the capabilities of computing, the availability of low cost sensors and monitoring devices, and the cost and capabilities of devices that end up in homes and businesses.

Customers' digital experiences are being driven by sectors that can be less conservative than the electricity industry. Those providers are shaping consumer expectations, and we must be able to adapt at a pace that is suitable for the critical service that our industry provides.

Success will come from having a technology landscape and architecture that is principle-led with enough flexibility to account for new use cases, technologies, and expectations from end customers. We need to balance the risk of standardising and being stuck in structured, hard to change, defined ecosystems of specific products, applications, or systems.

What digitalisation looks like is not going to be defined by the energy sector. Customer demands are being driven by the world's largest technology companies developing the data structures, communication methods, infrastructure and analytical tools that offer more personalised solutions. The energy system will be challenged to keep up to speed and develop in accordance with the end customer's desires.

Q2. Do you agree with how we have defined 'data' and 'information', especially in the context of making data more visible?

While the strict definitions are adequate, the paper seems to lean towards data from the distribution sector as needing to be more visible. However based on the way data and information are defined, it seems that what is being requested of distribution networks would be considered information, which requires the combination and analysis of multiple sources of data. We agree that data sharing needs to be improved across the entire industry and the apparent focus on the distribution networks in this paper should expand to focus on the whole system.

Q3. What data do you think needs to be more visible?

As previously noted, the whole sector has data visibility issues, driven by the competing interests of data creators, owners and users. Some examples could be:

- DER capabilities, locations, and forecasted behaviour will be needed for the operation of the wholesale energy market and distribution networks
- Metering assets, capabilities and future roadmaps will be needed to understand whether distribution businesses need to invest in their own monitoring devices to improve the LV visibility that the EA has noted.
- Information about consumer tariffs should be improved so that EDBs can understand and model anticipated consumer behaviours. The EA could better understand the competitiveness of the retail market with this information as well with an understanding of tariff details like when the tariff started, details about pricing across the country, consumer qualification number of customers on those tariffs, etc.

- For data that is already created and collected we need better avenues for approved parties to get access to that data. The prime example is the challenges that distribution businesses faced (and some are still facing) of getting access to HHR consumption data as well as the power quality data from smart metering. The existing regulatory relationships and structures make it difficult for distributors to get access to that data directly from MEPs. Furthermore, the data use provisions in the DDA make it difficult for EDBs to link that data with other data sources without gaining permission from each retailer, even if it is for an approved purpose and delivers benefits to consumers.

An end-state for digitalising the sector is to have a detailed view of the system from generation through to retail, including DER. The information needs to be of a high enough quality and available at a timeliness that enables near-real time awareness and control of end point consumption devices. It is still unclear what aspects of awareness and control need to be centralised and how much of that data needs to be available real-time to which parties. This uncertainty adds to the complexity, but enabling this visibility should be a priority and can initially focus on supporting the existing structure of the energy sector if the principle that enables rapid adaptation is in place.

Q4. What challenges do you think we might face in trying to increase visibility?
What considerations need to be given to data privacy or cybersecurity?
How could increasing visibility create more opportunities for consumers, participants and innovators?

As previously noted, the energy system is complex and is currently undergoing a significant transition on both the demand and supply sides of the equation. This means that the principles on which our approach is based should be well thought out and reflect these circumstances rather than take a prescriptive approach.

These principles need to consider that there are a multitude of companies already in the energy sector with different systems, processes, and capabilities. This complexity means we may not be able to move the whole energy system at the same pace and achieve everything at once. A barrier for distribution businesses is that there is an inconsistency between regulated allowances from the Commerce Commission and what the Electricity Authority would like to achieve. These need to be well coordinated so that data and systems investments can be funded when they are needed and are not held up by existing regulatory processes.

The mapping of data across the system will be challenging, because we need to understand how data is categorized, mapped, and modelled by different parties. Someone needs to look at this in a holistic sense, but data are currently siloed across different players in the sector. The incentives are simply not there to participate and contribute to a 'whole energy system' rather than each party's individual silo.

Cybersecurity Considerations

Data privacy, security and overall governance must be considered as the use of AI-driven tools increases in the energy system and its operations. Vector's network interacts with devices on the edge with a zero-trust model, meaning any data sharing must encompass secure APIs,

encryption, data standards and protocols throughout. As we interact with more devices at the edges of the grid, there are more potential areas of exposure to cybersecurity risks, and all parties will benefit from an industry standards-based approach to improve cybersecurity for the whole system.

While cybersecurity risks need to be considered, we should understand those risks and ensure that we don't develop bespoke cybersecurity or privacy requirements but rather leverage global expertise and standards.

Opportunities for consumers, participants and innovators

The consultation presumes a world with universally high customer involvement and engagement with the energy industry. While this may be an aspirational goal, consumers have largely shown apathy in direct participation in the energy industry (low retail switching rates, slow adoption of energy efficiency for appliances and building envelopes, limited solar & battery installations). Thus, rather than strictly focussing on how to enable information to consumers the digitalisation work should focus on the B2B relationships in the sector.

B2B relationships including innovators and industry participants will be driving consumer experiences and this is where the value of digitalisation will likely come. The transition to electrification and the complexity inherent in the system will inevitably expose areas for efficiency gains, improvements in affordability, and enhancements in security and reliability. What we need to ensure is that the design and application of the principles to make it easier for parties to create and share data rather than create additional barriers like the approach taken for access to half hourly consumption data.

Experience from the UK highlights the risk of well-intentioned regulation creating unintended barriers to effective system operation and innovation. Restrictions such as mandatory aggregation of smart meter consumption data before it can be used, or limitations on access to power quality data, have hindered the ability of distribution businesses and market participants to fully leverage the value of smart meter infrastructure. These constraints make it harder to identify and manage localised network issues, integrate low-carbon technologies, and enable flexibility services. As New Zealand continues to evolve its regulatory approach, it is critical to balance privacy and security objectives with the operational and market benefits of granular data access. If parties cannot access the data they need to fulfil their roles, we risk recreating structural limitations that slow innovation, delay decarbonisation, and miss out on opportunities to deliver benefits to consumers.

Q5. What work are you planning or doing to increase visibility within the electricity system? Are you aware of any work that contributes to this goal?

Vector is actively working on improving access to data that gives us better visibility of our low-voltage networks through the use of data from smart metering providers and other network monitoring devices. We've found that current arrangements for consumption data are problematic, because we need daily feeds of information which are more easily received

directly from metering providers. We have seen contractual and relationship barriers with trying to obtain power quality data from smart metering providers.

Traditional relationships for metering providers are with retailers to provide specific data sets. The value that can be derived from smart meter data has evolved such that distributors have new opportunities for operational efficiencies, however distributors face a myriad of issues from contracting with dozens of retailers, plus significant technical gaps between smart metering fleets within each MEP and across the different MEPs in Auckland and across New Zealand. Furthermore there is uncertainty around the roadmaps to deploy new meters or upgrade the capabilities of existing meters so that consumers can realise the benefits from smart meter data. These are complex challenges which are playing out at distributors across New Zealand. If we can solve these challenges, we will be able to deliver more value from assets consumers already pay for such as smart meters and network infrastructure.

Vector Technology Solutions is also looking to help solve these challenges through Diverge, a cloud-native energy data platform designed to unlock the value of distributed data sources such as smart meters, IoT sensors, and other low-voltage monitoring devices. Diverge provides a scalable and secure foundation for integrating data across systems and parties, enabling near real-time network visibility, advanced analytics, and improved operational decision-making. By bridging technical fragmentation in the data landscape, Diverge supports a more efficient, flexible, and decarbonised electricity system. Realising the full potential of this approach would be aided by a less fragmented and more coordinated contractual environment.

Q6. What challenges do you think we might face in increasing interoperability? What other opportunities do you think greater interoperability will bring?

As previously mentioned, there is a big challenge to mapping and modelling data across the energy sector. There will no doubt be significant data quality issues, which will require an adaptable approach to digitalisation to ensure that as a sector we are not waiting for all parties to reach the same level.

We do not have common data standards to adhere to across the sector. In both distribution and retail we have a range of players from large to small who will have different capabilities to invest significant amounts of time and resources into digitalisation. Smaller players with adequately functioning legacy based systems will resist moving quickly and may make interoperability difficult and, in some cases, not possible.

There are a significant number of participants in the current electricity system, with more to come with electrification and DER growth. It will be very difficult to completely avoid vendor lock-in and closed architectures, and therefore universal system-to-system interoperability will not be easily achieved.

Given the fragmentation in the sector, central governance of data standards and access controls would support a more enduring, adaptable framework for data interoperability. We do not support creating a centralised data storage system, as we've already seen how difficult it is to adapt the ICP registry to keep up with technological and use case changes.

If we were to be successful at highly interoperable systems, we would anticipate benefits across the sector such as:

- the near real-time grid visibility and operation
- accelerated DER integration
- reduced duplication of investments in sensors and monitoring equipment
- more opportunities for AI-driven operations and automations
- streamlined regulatory reporting and compliance

Q7. What work are you planning or doing to increase interoperability within the electricity system? Are you aware of any work that contributes to this goal?

One way Vector is increasing interoperability is through Diverge, our cloud-native energy data platform designed with flexibility in mind and guided by principles of standards-based, API-led integration. While still evolving, Diverge is built to connect diverse systems and data sources across the electricity sector. This approach aligns closely with the goals of the Electricity Authority, EECA, and Ara Ake to improve data access and support DER integration. While not formally part of those programmes, Diverge demonstrates the type of cross-system capability and forward-looking design these initiatives are aiming to promote. Greater national alignment on data standards and interoperability would help amplify such efforts across the sector.

Vector is adopting Snowflake within its modern data platform to enhance interoperability and data-driven decision-making. Snowflake's architecture enables seamless integration of structured and unstructured data from diverse sources, supporting real-time analytics and scalable data sharing.

This approach supports interoperability by allowing different systems and stakeholders to connect through secure APIs and shared data standards. Internally, Snowflake is integrated with Vector's identity management systems ensuring role-based access control and adherence to cybersecurity protocols. Snowflake's security model aligns with Vector's zero-trust approach to edge device integration and its commitment to industry-wide cybersecurity standards.

By leveraging Snowflake, Vector is improving our internal data agility and supporting a more interoperable and secure energy ecosystem.

Q8. What challenges do you think we might face in simplification? How could simplifying create more opportunities?

In general, we disagree with the principle of "simple solutions" as we feel it is too optimistic and infeasible given the complexity of the energy sector participants are already creating 'simple' solutions in bilateral arrangements which are not necessarily scalable or aligned with a whole of system view. One major challenge we have as a sector is that several regulators and government agencies are involved in influencing the energy system without coordinated principles. Accordingly, we often end up in the bureaucracy of consultations, which rarely result in timely solutions to fast-changing situations.

Q9. What work are you planning or doing to increase simplification within the electricity system? Are you aware of any work that contributes to this goal?
Vector is actively involved in the FlexForum and ENA's Future Network Forum which are working collaboratively to solve problems across the electricity industry. While we are not necessarily looking to increase simplification, we are trying to address complexity with appropriate solutions.
Q10. Do you have any other comments on this paper?

9. As this is one of many consultations with overlapping concepts currently active at the Electricity Authority, we may provide more detail on this topic in our other responses. We are happy to arrange additional conversations with our staff to provide clarifications or input on additional questions. Please contact Matt Smith (Policy Advisor) at ▮▮▮▮▮▮▮▮▮▮ in the first instance.

Kind regards

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Matt Smith
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