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Electricity Authority

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Our future is digital : Transitioning to a smarter, more connected, and data-driven electricity system

Transpower welcomes the opportunity to respond to the Electricity Authority's consultation *Our future is digital: Transitioning to a smarter, more connected, and data-driven electricity system*, published 12 June 2025.

This submission covers both System Operator (SO) and Grid Owner perspectives. Our high level comments on the three principles proposed – data visibility, interoperability and simplification – are set out below.

Data visibility and the informational value derived from it, will underpin supplier and network investment, generation and system operations, and consumer choice. We agree with this principle. Previous submissions by Transpower on this issue are:

- [future operation of New Zealand's power system](#) (Electricity Authority)
- [Consumer electricity data right](#) (Ministry of Business Innovation and Employment)

The Authority states “*Accessible data supports a fairer electricity system*”¹ but what isn't contemplated is how that data access should be charged for and/or funded; is it to be viewed as a public good that could have cost recovery socialised (open access and free at the point of that access) or as a private good that requires specific cost recovery policies (open access that is paid for at the point of access). We discuss visibility and access at greater depth in questions 3, 4 and 5.

Interoperability will unlock value to the consumer and to the system interoperability will be crucial to enable customers to maximise their choices. We agree with this principle.

Data will need to be moved across the layers of industry. Standards, particularly around open access need to be established, kept up to date, and adhered to in order to ensure interoperability and reduce the risk of stranded assets and obsolescence. Communication standards need to apply across a broad range of devices from DER to smart EV charger to grid scale inverters.² The OpenADR Alliance for the OpenADR 2.0 standard provides a good starting point.³ We describe our work in greater depth at question 6 and 7.

¹ [Digital Future Consultation](#) page 10.

² WE note MBIE's current consultation on standards around smart EV chargers.

³ The standard is IEC 62746-10-1 ED1. The IEC is the world's leading organization that prepares and publishes globally relevant International Standards for all electric and electronic devices and systems

Simplification is important as well; however it should recognise that it is the right level of simplification that is required for the different participants. Simplification does not necessarily mean that there should be a reduction in information provided to consumers, it is tailoring the right information for the different types of consumers. A simplification principle should not lead to restrictions that could stifle innovation and consumer choice. See question 8.

Networks already disclose capacity and constraint information

The Authority describes that as part of data visibility it may “*Require electricity distributors to publish detailed data on network capacity, assets and performance, along with other relevant information.*”

The Authority should ensure that its requirements work alongside, rather than duplicate, the Commerce Commission’s information disclosure requirements for electricity distribution businesses and Transpower. Expanding data collection and information provision would need appropriate funding through the Commission’s network regulation.

Transpower already publishes capacity and constraint information through its Transmission Planning report⁴ and the online tool *Envision*⁵ which comprises two geospatial tools that provides information about Transpower’s high-voltage network in an interactive form.

A digital electricity system requires an updated Code

The Future Security and Resilience work stream is moving forward to integrate inverter-based resources into the system, but many other parts of the system are governed by the Code written for analogue technology and practices. World-wide, traditional analogue technology for protection, automation and control is being replaced by networked digital technology solutions. We consider analogue meters that use voltage and current inputs to produce active and reactive energy measurements will follow the same path.

Digitisation is also changing the design of substations. Traditional wiring is being replaced by digital networks where Sampled Values (SVs) representing points on a sine wave or control signals are exchanged in a digital format between devices. This change brings with it new components and new ways of thinking. For example, a device referred to as a merging unit (MU) can be installed in a switchyard to transform secondary voltage or current waveforms into SVs. These SVs are broadcast over a substation network and can be received by any number of listening devices for processing. Alternatively, SVs may be produced from a device measuring primary values eliminating the need for a traditional measurement transformer entirely.

Transpower as Grid Owner has an internal project called “Digital Substation” and aims to deploy digital devices in a trial substation to gain experience in their use and to compare measurements to the traditional Grid Metering installation. We would be happy to share our progress with the Authority to be ready to advise on a Code that is fit for purpose for a digitalised electricity system.

Yours sincerely

Joel Cook
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⁴ [Transmission Planning | Transpower](#)

⁵ [Envision spatial tools | Transpower](#)

Appendix – Questions

Question	Transpower's response
<p>Q1. What could stop or slow digitalisation of the electricity system? What would make it successful? How far should digitalisation go?</p>	<p>A Code change process that is not flexible or responsive enough to keep up with technology changes, such as the move from analogue to digital technologies and measurement (outlined below); and different standards for participant systems that prevent interoperability.</p> <p>The Future Security and Resilience work stream is moving forward to integrate inverter-based resources into the system, but many other parts of the system are governed by the Code written for analogue technology and practices. World-wide, traditional analogue technology for protection, automation and control are being replaced by networked digital technology solutions. Traditional analogue technology for Protection, Automation & Control is (or has been) replaced by networked digital technology solutions. We consider analogue meters that use voltage and current inputs to produce active and reactive energy measurements will follow the same path.</p> <p>Digitisation is also changing the design of substations. Traditional wiring is being replaced by digital networks where Sampled Values (SVs) representing points on a sine wave or control signals are exchanged in a digital format between devices. This change brings with it new components and new ways of thinking. For example, a device referred to as a merging unit (MU) can be installed in a switchyard to transform secondary voltage or current waveforms into SVs. These SVs are broadcast over a substation network and can be received by any number of listening devices for processing. Alternatively, SVs may be produced from a device measuring primary values eliminating the need for a traditional measurement transformer entirely.</p> <p>Transpower as Grid Owner has an internal project called “Digital Substation” and aims to deploy digital devices in a trial substation to gain experience in their use and to compare measurements to the traditional Grid Metering installation. We would be happy to share our progress with the Authority to be ready to advise on how Part 10 of the Code (Metering) can be fit for purpose for a digitalised metering system.</p>
<p>Q2. Do you agree with how we have defined ‘data’ and ‘information’, especially in the context of making data more visible?</p>	<p>Yes.</p>

Question	Transpower's response
Q3. What data do you think needs to be more visible	<p>Data visibility needs depend on who is looking and for what purpose. For Transpower, our previous submission Future operation of the power system identifies that establishing a common digital capability for access to data will support more real time operations and system planning; and that systems and processes that enable the clear and efficient exchange of data and operability between the SO and future Distribution system operator layers.</p> <p>Specifically, real-time operations during grid emergencies require visibility of, and access to, controllable load. Currently six of 33 connected asset owners (all obliged to provide controllable load) can indicate their controllable load to the System Operator control rooms via secure inter-control centre communications protocol (ICCP) links and is a good first step for visibility; and the System Operator is continuing to progress obtaining such indications on a bilateral basis.</p> <p>However visibility on the amount of controllable load available for grid emergencies is being limited because retailers are increasingly taking control of hot water cylinders using smart devices, with no Code obligation to make this controllable load available to the System Operator. Without visibility of this retailer-controlled resource the SO cannot confirm or forecast the level of retailer demand side flexibility likely to respond in a tight capacity situation or grid emergency.</p> <p>Further, discussions with metering equipment providers (MEPs) indicate they have the best visibility of what controllable load is available and who has access to it, they also have no obligation to provide this data to the System Operator.</p> <p>In the short term, we suggest that the System Operator should be able to require retailers and aggregators to provide information on available controllable load as difference bids when requested to, and to disconnect the load if requested or instructed by the System Operator during a grid emergency. (This approach would replicate the current obligations on distributors and direct connects under the Code.)</p> <p>Longer term, we propose the Authority consider amending the Dispatchable Demand and/or Dispatch Notified Load products (neither product currently being used effectively) as the way to provide controllable load information to the System Operator. Neither of these products is being used meaningfully, and trials progressed by Ara Ake have concluded energy price avoidance alone seems to be insufficient financial incentive for participation. The Ara Ake trial also surfaced operational difficulties integrating aggregated demand-side participation in the wholesale market, which prompted the Authority to change the Code. Implementation of this Code change beyond a very small scale also requires investment in System Operator tools that is yet to be funded.</p>

Question	Transpower's response
	<p>The System Operator acknowledges there would be increased cost and complexity to participants to move to use these products. Similarly, there would be a significant time and cost for System Operator to implement this change. A funded and well-planned transition would be required allowing the System Operator time to prepare its tools and processes. and support industry participant implementation</p>
<p>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</p>	<p>One of the most significant challenges in increasing data visibility across the electricity system is the issue of cost and cost recovery. While the benefits of interoperable, connected, and accessible data are widely acknowledged—supporting better investment decisions, system operations, and consumer choice—the full value of such data is only realised when a large proportion of the system's data is connected and accessible. This creates a network effect: the more data that is visible and usable, the greater the collective value.</p> <p>However, the costs of achieving this level of visibility—through infrastructure upgrades, system integration, and ongoing data management—are often borne privately, while the benefits are distributed more broadly across the sector and society. This asymmetry means that individual actors may struggle to justify the investment, especially if the only path to cost recovery is through charging for data access. Such pricing models risk limiting access and undermining the very visibility needed to unlock system-wide value.</p> <p>This situation is a classic case of a social good: the public and sector-wide benefits of open, accessible data are high, but the private returns may be insufficient to incentivise participation at scale. If access costs are pushed up to recover investment, it could reduce uptake and stifle innovation, particularly among smaller participants and new entrants.</p> <p>To overcome this barrier, a viable solution would be to treat foundational data infrastructure as a regulated public utility—funded through socialised cost recovery mechanisms. This could include centralised funding models, regulatory allowances, or coordinated investment frameworks that recognise the shared value of visibility. Such an approach would ensure that data access remains open and equitable, while enabling the scale of participation needed to realise the full benefits of digitalisation.</p> <p>In a recent discussion with representatives from Australian Energy Market Operator (AEMO) covering their lived experiences of CER/DER and DSO models a clear recommendation made was to start the data exchange journey as soon as you can. It was also noted there will be some data exchange which is common across all possible future operational arrangements, consequently no regrets choices can be made once this data is identified. This is a point System Operator staff have made to Authority staff in relation to the Authority's Future System Operation consultation. Finally, an</p>

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	<p>observation we made following the discussion is while there is a cost to data exchange, there is also a cost to not sharing data; in the absence of access to Consumer and Distributed Energy Resource (CER/DER) data, CER used publicly available data and built forecasting tools to get 'visibility' of CER/DER within distribution networks.</p> <p>We take it as given that any system designed to increase data visibility—whether centralised or distributed—must have privacy and cybersecurity embedded at its core. The trust of consumers, participants, and innovators depends on robust protections that ensure data is handled securely, with appropriate consent and governance. Visibility should never come at the expense of safety or privacy; instead, it must be built on a foundation of secure architecture, transparent protocols, and compliance with best-practice standards. This is not a trade-off, but a prerequisite for meaningful and sustainable digitalisation.</p> <p>Additionally, identifying and engaging with new participants and business models may prove challenging as technologies proliferate. For example an EV smart charger may include remote control abilities which the seller of the charger on sells to a 3rd party. Under these sorts of arrangements parties may not be clear who is responsible for data provision, if any, obligations.</p>
<p>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?</p>	<p>Transpower also already publishes capacity and constraint information through its Transmission Planning report⁶ and the online tool <i>Envision</i>⁷ which comprises two geospatial tools that provides information about Transpower's high-voltage network in an interactive form.</p> <p>Transpower is actively progressing its FlexPoint™ Distributed Energy Resource Management System (DERMS), with a focus on enabling flexible, responsive grid management through open access digital infrastructure. FlexPoint is built around certified OpenADR 2.0 standards and APIs, allowing integration with a wide range of DER assets and third-party platforms. Recent work includes collaborative trials with Ara Ake and Counties Energy, where FlexPoint has been deployed to support demand response and flexibility services. These trials are exploring both one-way and two-way communication protocols between electricity distribution businesses and flexibility suppliers, with the goal of standardising industry approaches to active managed charging and DER dispatch. These efforts are part of a broader roadmap that includes regulated and customer-requested DERM programmes, EV charger pilots, and post-contingent battery trials. FlexPoint's architecture</p>

⁶ [Transmission Planning | Transpower](#)

⁷ [Envision spatial tools | Transpower](#)

Question	Transpower's response
	<p>supports programme design, event management, and post-event measurement and verification, positioning it as a foundational tool for New Zealand's digital electricity future.</p> <p>As System Operator, we are working closely with a range of electricity distribution businesses (EDBs) to establish real-time visibility of controllable load via Inter-Control Centre Communications Protocol (ICCP). This protocol is a generally standard approach around the world to secure interface for real-time data. For anything from EDBs and direct connects it could be what is used and could also be modified to deliver at lower cost for smaller participants. Inter-Control Centre Communications Protocol (ICCP) Transpower</p> <p>These initiatives support improved demand management and system resilience, particularly during grid emergencies and aim to standardise and streamline the provision of real-time load data, enabling more responsive and coordinated system operations across the national grid.</p>
<p>Q6. What challenges do you think we might face in increasing interoperability? What other opportunities do you think greater interoperability will bring</p>	<p>One of the key challenges in increasing interoperability is the coordination required across a diverse set of technologies, standards, and stakeholders. The electricity system comprises a wide range of participants—generators, distributors, retailers, consumers, and third-party service providers—each with different systems, capabilities, and commercial drivers. Achieving interoperability means aligning these systems to communicate effectively, securely, and reliably, which can be technically complex and commercially sensitive. The risk of parties doing their own thing is amplified by the number of parties across the system who could make such a decision to have their own bespoke interface.</p> <p>Another challenge is determining which interoperability standards should be adopted and who decides. Competitive discovery can lead to fragmentation, where different platforms or protocols emerge (e.g., Apple vs. Android, VHS vs. Betamax), making it harder to achieve system-wide integration. This risk is particularly relevant in the context of DER management, where multiple vendors and platforms are emerging.</p> <p>Despite these challenges, greater interoperability offers significant opportunities. It enables more efficient coordination of distributed energy resources, supports innovation in energy services, and allows consumers to engage more meaningfully with the electricity system. For example, Transpower's FlexPoint™ platform is built on open standards (OpenADR 2.0) and APIs, allowing integration with a wide range of DER assets and third-party platforms. This approach supports scalable, flexible grid management and lays the groundwork for broader industry alignment.</p>

Question	Transpower's response
	To overcome interoperability barriers, a collaborative approach is needed—one that includes industry-led standardisation, regulatory support, and open access infrastructure. This will help ensure that interoperability is not just technically feasible but also commercially viable and inclusive.
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	<p>FlexPoint is Transpower's Distributed Energy Resources (DER) Management System to co-ordinate distributed energy resources for grid management together with DER providers as DER owners, or as flexibility traders aggregating DER. FlexPoint is an open access platform built around application programming interfaces (APIs) and is certified by the OpenADR Alliance for the OpenADR 2.0 standard.⁸</p> <p>We are actively engaged with FlexForum and ENA's Future Network Forum where data sharing and access are frequent topics of discussion.</p>
Q8. What challenges do you think we might face in simplification? How could simplifying create more opportunities?	<p>The complex yet highly reliable electricity system supplies millions of consumers each with different capabilities, capacities and care for how it gets to them and how they use it. We consider market processes are better ways to establish the level at which consumers want to engage with the electricity market including through tariff choices, energy tools and services, bill communication and customer support.</p> <p>Any communications now risk misinformation, such as creating fears of "Big Brother" control of an individual's electricity usage. Any such automation or AI must be assessed in an ongoing manner to ensure it continues to deliver best outcomes for the consumer.</p>
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?	Our own communications always aim for information provision that is clear, accessible and understandable.
Q10. Do you have any other comments on this paper?	No.

⁸ (IEC 62746-10-1 ED1).