

# Our future is digital: system map

Supporting note

8 July 2026

## Executive summary

### Consumers benefit from a digitalised future

In the future, New Zealand's electricity system, and the operations and processes that underpin it, will become more data-driven, automated and digital.

Digitalisation will make the system more affordable and reliable:



**Affordable:** consumers and their agents can use data to make smart electricity use choices (eg, in time of use or plan types that better facilitate cost saving, or more informed spending on home solar or battery storage). New technologies and business models enabled by accessible data and interoperable systems can also improve efficiency and reduce cost



**Reliable:** greater access to data and information about networks, consumption and distributed energy resources supports an increased quantity and diversity of localised generation, making consumers' electricity supply more resistant to shocks. Access to data also allows network operators to work with consumers to shift when they consume electricity, reducing or deferring the need for network upgrade.

Digitalisation presents new opportunities for participation and innovation across the electricity system; and our role as a regulator is to ensure the regulatory settings support realising these opportunities so New Zealanders benefit in the long term.

### A system map to guide future action

To help prepare for this future, the Electricity Authority Te Mana Hiko has developed a system map that documents what needs to be done to help achieve a digitalised future for consumers. This includes where parties across the electricity system can align effort or work together to unlock greater benefits for consumers.

To do this, we sought feedback on our discussion paper [Our future is digital](#), supported by a series of public workshops in 2025.

We used these platforms to test our ideas, and explore new ones, on transitioning Aotearoa New Zealand to a more data-driven and technology-enabled electricity system that benefits everyone.

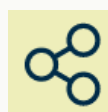
This paper describes the evolution of our thinking and presents the first iteration of the system map. It presents a collective vision of digitalisation for the electricity system from industry, innovators, and government agencies, and lists possible initiatives and sector actions to help accelerate it.

## The key features of the system map link the goals for a digitalised electricity system to specific actions

We are aiming for an electricity system that is, in principle:



**Accessible**



**Interoperable**



**Customer-  
centric**



**Adaptive**



**Resilient**

Translated into outcomes, this looks like:

The sector has strong data governance and management that provides the foundation for safe and secure data access and sharing

New and existing participants develop innovative solutions and share what they learn across the industry

The system has the right data access, communication protocols, technology standards and roles in place to integrate flexibility

The electricity system integrates new connected technologies easily and safely

Data exchange is secure and timely, with high-quality, high-frequency and granular data supporting automated action

Solutions are designed with consumers' specific needs in mind

Network data is accessible and is used to improve processes and systems, and information from distributors and Transpower gives other parties the confidence to connect and invest

Market and settlement processes are as accurate as possible and reduce barriers to entry

The digital infrastructure used in emergencies is robust and reliable

Consumers or their agents have access to data and clear information that can help them make decisions about their electricity use and management

All of the enablers (which deliver benefits beyond a single initiative) and initiatives in the system map aim to deliver directly on these outcomes.



**You can view the system map [here](#) or on our [website](#)**

We expect this system map to change over time as we learn more and as initiatives are delivered across the sector. For now, we will use it to inform our future work programme and help monitor progress across the electricity sector to achieve system digitalisation.

We invite others to continue engaging with us to better inform actions across the sector as we work towards enabling this vision of a digital future.

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# 1. The electricity system's digitalisation journey has already begun

## Digitalisation supports an affordable and reliable electricity system

- 1.1. New Zealanders are increasingly using interconnected smart technologies to manage their electric appliances, electric vehicle charging, heating and other devices in their homes and businesses to give them more choice and flexibility and to lower their costs.
- 1.2. But this is only the beginning. Digitalisation offers new opportunities for participation, innovation and greater efficiency across the electricity system and consumers will adopt new technologies and services delivered through new business models.
- 1.3. While digitalisation can seem distant for consumers – with complex systems, process and technology changes behind the scenes – it supports work by the Electricity Authority Te Mana Hiko (Authority) to create an electricity system that serves New Zealanders better through increased competition and greater efficiency and reliability. Data and digital infrastructure are also critical inputs for efficient network and system operation.
- 1.4. The wider electricity regulatory system also has a big part to play in the success of digitalisation of the sector. The Energy Efficiency & Conservation Authority (EECA), Commerce Commission, and Ministry of Business, Innovation and Employment (MBIE) have leadership or supporting roles to deliver a future digitalised electricity system alongside the Authority, and are working together to do so.

By harnessing the power of data and new technologies, digitalisation can help to efficiently deliver an affordable and reliable electricity system to benefit consumers:



**Affordable:** consumers and their agents can use data to make smart electricity use choices (eg, in time of use or plan types that better facilitate cost saving, or more informed spending on home solar or battery storage). New technologies and business models enabled by accessible data and interoperable systems can also improve efficiency and reduce cost



**Reliable:** greater access to data and information about networks, consumption and distributed energy resources supports an increased quantity and diversity of localised generation, making consumers' electricity supply more resistant to shocks. Access to data also allows network operators to work with consumers to shift when they consume electricity, reducing or deferring the need for network upgrade.<sup>1</sup>

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<sup>1</sup> [EECA's recent study into the potential of flexibility in New Zealand](#) calculates the potential impact of demand-side flexibility on national peak demand is between 1,700 and 1,900 MW, corresponding to an estimated total value of almost \$3 billion of avoided investment in generation and network infrastructure.

## **We sought feedback on our ideas for more data-driven and technology-enabled electricity system**

- 1.5. The Authority sought feedback on the discussion paper [Our future is digital](#) in 2025 to test our ideas on a more data-driven and technology-enabled electricity system, which will ultimately benefit consumers.
- 1.6. This was an opportunity for the energy industry, technology sector, innovators and others to challenge the status quo and imagine how data and technology could shape our future electricity system and the ways New Zealanders participate in it.
- 1.7. We received excellent feedback and ideas on our discussion paper and received a wealth of further feedback from a series of workshops<sup>2</sup> discussing our progress on developing a system map with a collective vision of electricity system digitalisation.
- 1.8. A summary of the feedback received through submissions and workshops is presented in Appendix A.

## **This paper presents our first iteration of a digitalisation system map**

- 1.9. The purpose of the proposed system map is to provide a whole-of-system view of what is needed to deliver a digitalised electricity system in order to accelerate action.
- 1.10. The system map will help support the work of the Authority and others across the electricity system who have already been working in this space and who will continue to have a significant role to play. It will also help support new parties to join in to drive digitalisation of the sector forward.
- 1.11. This paper describes the evolution in our thinking and presents the first iteration of our system map of initiatives to help accelerate digitalisation.

## **We are already moving forward**

- 1.12. The Authority is already working on projects that deliver digitalisation and relate directly to the initiatives in this system map.
  - (a) We have sought feedback on proposals to improve 'network visibility' – where more information about network constraints and capacity is made publicly available and is accessible, starting with high-voltage distribution networks.<sup>3</sup>
  - (b) The Power Innovation Pathway is our 'front door' for regulatory support to accelerate innovation. As part of this, we are investigating regulatory sandboxes to test policy and innovative ideas in the electricity market under relaxed regulatory requirements at smaller scale, on a time-limited basis and with appropriate safeguards in place.<sup>4</sup>

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<sup>2</sup> The summary of feedback across all digitalisation workshops held in September 2025 is on our website: [Summary of digitalisation workshop feedback.pdf](#)

<sup>3</sup> [Improving information on high-voltage network capacity | Our consultations | Our projects | Electricity Authority](#)

<sup>4</sup> [Power Innovation Pathway | Electricity Authority](#)

- (c) We are developing product<sup>5</sup> and consumption data standards to improve data exchange between consumers, retailers, and accredited third parties, supporting new products and services.<sup>6</sup> This includes supporting MBIE to develop a consumer data right for electricity.
- (d) We recently decided to require retailers to use half-hourly metered data for reconciliation purposes where this data is available, instead of using a deemed profile of consumption to shape the data used.<sup>7</sup>
- (e) We have recently launched a new comparison and switching service, [Billy](#), that provides consumers with more information and choices about their electricity use and management.<sup>8</sup>
- (f) We sought feedback on three alternative models for distribution system operation (DSO).<sup>9</sup> We published our roadmap for this work in July 2026.

## The digitalisation system map is a living document

- 1.13. This system map is designed to change over time as initiatives are progressed, and as we learn more and iterate on solutions as a system. We expect to review the system map in FY2027/28.
- 1.14. For now, we will use it to guide our pathway forward, informing decisions about our future work programme, and help monitor progress across the sector on a quarterly basis. It will also help inform other agencies with the relevant remit about the initiatives they could take to improve outcomes.
- 1.15. We invite others to continue engaging with us on the system map to better inform initiatives as we all work towards enabling this collective vision of a digitalised electricity system.
- 1.16. **Email us:** You can share any commentary or feedback via email to [digitalisation@ea.govt.nz](mailto:digitalisation@ea.govt.nz), with 'system map' in the subject line.
- 1.17. **Come talk to us:** We're also open to hearing your feedback over the phone or in person. To arrange a time, email us at [digitalisation@ea.govt.nz](mailto:digitalisation@ea.govt.nz) with 'system map' in the subject line.

## How to read this document

- 1.18. Chapter 2 of this document describes our high-level principles for a digitalised electricity system, which have been revised following discussion paper and workshop feedback.
- 1.19. Chapter 3 contains the digitalisation system map. The system map shows the goals for a digitalised electricity system, and links these to a set of outcomes and specific actions.

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<sup>5</sup> Product in this context relates to electricity plans and tariffs. End-use devices, eg, hot water systems, are also products.

<sup>6</sup> [New Electricity Information Exchange Protocol EIEP14A for product data published | Electricity Authority](#)

<sup>7</sup> [Half-hourly volume data must be submitted for reconciliation | Electricity Authority](#)

<sup>8</sup> [Improving consumer choice | Our projects | Electricity Authority](#)

<sup>9</sup> [Future system operation: DSO models | Our consultations | Our projects | Electricity Authority](#)

## 2. Principles for a digitalised electricity system

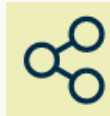
### We have updated and expanded our principles for a digitalised system

2.1. In our discussion paper, we identified three principles critical for building a digitalised system.



#### Data visibility

Visibility increases the amount of observable data, improving decision-making across the system. It also avoids participants gaining an unfair advantage from unequal access to data, where sharing is necessary.



#### Interoperable systems

Interoperability makes it possible to share data and information across systems. Consolidating and standardising data, especially at the points of connection, can reduce connectivity challenges between market participants.



#### Simple solutions

Simplification improves consumer engagement. It makes information, options and actions clearer. This gives people and communities more choice and say in how the electricity sector evolves.

2.2. These principles form the first layer of the framework that underpins a digitalised electricity system. They are what we are 'aiming' for when we are looking to digitalise, in simple terms.

2.3. After receiving comprehensive feedback from discussion paper submissions and workshops, we have updated and expanded these principles to reflect an increased focus on customers, adaptability and resilience.

2.4. Using submission and workshop feedback, we decided to:

- (a) adapt our principle for simple solutions to focus on customer experience, reflecting that different consumers will need different solutions
- (b) include an additional principle to reflect a need for regulatory and system adaptiveness as our environment continues to evolve
- (c) include an additional principle to emphasise the importance of resilience, particularly as infrastructure becomes increasingly critical for health, communications, transport, and wellbeing
- (d) simplify and strengthen the descriptions of the first two principles – data visibility and interoperable systems – for more accurate descriptions that are easier to understand.

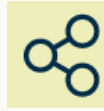
2.5. The revised set of digitalisation principles are below.



### **Accessible**

Visibility means increasing the amount of observable data, which along with lifting data quality, improves decision-making across the system.

Enabling greater access to data avoids parties gaining an unfair advantage, where sharing is necessary and supports competition.



### **Interoperable**

Interoperability makes it possible to share data and information across systems with machine-to-machine connection.

Standardising data and its exchange, especially at the points of connection, can reduce connectivity challenges between market participants and improve efficiency.



### **Customer-centric**

Make the most effective solutions for customers across the system by understanding their needs.

Choose solutions that give the best outcomes for New Zealanders at least cost.

Build trust by educating and empowering customers and removing complexity.



### **Adaptive**

The system and rules need to provide certainty, while being more adaptable, responding to learn-by-doing.

By monitoring, testing and iterating, we invite a greater range of people to participate in the system and can more easily identify pragmatic, low-cost solutions.



### **Resilient**

Ensuring people can access electricity, particularly in times of emergencies, is critical.

Systems need to remain secure as they interconnect, particularly where data is of a personal or sensitive nature.

2.6. Further detail on the changes to the principles are in Appendix B.

2.7. The principles for a digitalised system are high-level or general. For the system map, these are translated into tangible outcomes.

### 3. Our digitalisation system map

#### The digitalisation system map sets out initiatives over short-, medium-, and long-term horizons

- 3.1. The first iteration of this system map lists the various outcomes, enablers and initiatives that would support a digitalised electricity system across the three future time horizons.
- 3.2. We present 10 key outcomes of a digitalised future. These outcomes are the high-level principles for a digitalised system translated in a tangible or visible way.
- 3.3. Note there may be other drivers that contribute to these high-level outcomes not included in the system map, eg, the relationship of quality standards with reliable supply.
- 3.4. We then present the key enablers of change in the electricity system. These are actions that have benefit beyond a single initiative, providing the foundations for many other changes to occur.
- 3.5. Possible individual initiatives are then presented across the three future time horizons. The status of these initiatives is varied – from being currently underway across the sector, included in upcoming work programmes, or not currently being considered.
- 3.6. These enablers and initiatives were developed using earlier research and discussion paper feedback and were then iterated upon during workshops with stakeholders.
- 3.7. Within the system map, the initiatives span both inside and outside of the system:
  - (a) Initiatives may be digitalisation-specific, or digitalisation-adjacent (where they are relevant to digitalisation, but are part of another work programme).
  - (b) Initiatives outside the system are noted if they can bring benefit to consumers and parties inside the electricity system. Even though they may be outside of the electricity sector's control, it is worth supporting these initiatives to occur. For example, understanding housing characteristics can help improve energy efficiency, but this data is not exclusively relevant to the electricity sector. We will monitor these and support other parties to carry them forward.
  - (c) Initiatives within the system are categorised into short-, medium- and long-term horizons to give an approximate indication of which initiatives were identified by submitters and workshop participants as being of critical importance to undertake early.
- 3.8. We have also categorised initiatives as being related to either 'platforms' or 'people', consistent with stakeholder feedback:
  - (a) **'Platforms'** indicate areas where technical changes are needed: either technology (hardware or software), process or protocol
  - (b) **'People'** indicates areas where changes are of a more social nature: understanding behaviour, education, or investing in the skills and capabilities necessary to deliver on changes.
- 3.9. The responsibility for individual initiatives sits with different parties in and outside the electricity system. We have also indicated in bold initiatives that we are currently

progressing. Other initiatives will be considered as we further develop our wider work programme.

- 3.10. Some initiatives may be led by one party, but also interact with the remit of others – in these instances, a commitment to working closely will be key to achieving the outcomes best for consumers.
- 3.11. We note that initiatives in the medium- and long-term horizons may require preparatory work within earlier time frames to ensure success. This preparatory work may only become apparent as each initiative is scoped further and will be added to the system map as it is identified.
- 3.12. We also note there is no specific initiative for privacy or cybersecurity uplift. This is because privacy and cybersecurity must be a part of progressing every enabler and initiative to digitalise if consumers are to have trust in a digitalised electricity system. The extent to which privacy and cybersecurity are relevant will be a component of further scoping for each enabler or initiative.

**You can view the system map [here](#) or on our [website](#)**

- 3.13. Further detail on the guiding criteria and considerations that we use to help us prioritise initiatives are in Appendix B. Further details on the initiatives in the system map are in Appendix C.
- 3.14. From here, the Authority will consider how we prioritise and then scope the relevant enablers and initiatives in our wider work programme.

## Appendix A Discussion paper and workshop feedback summary

A.1. We received feedback on our discussion paper that suggested:

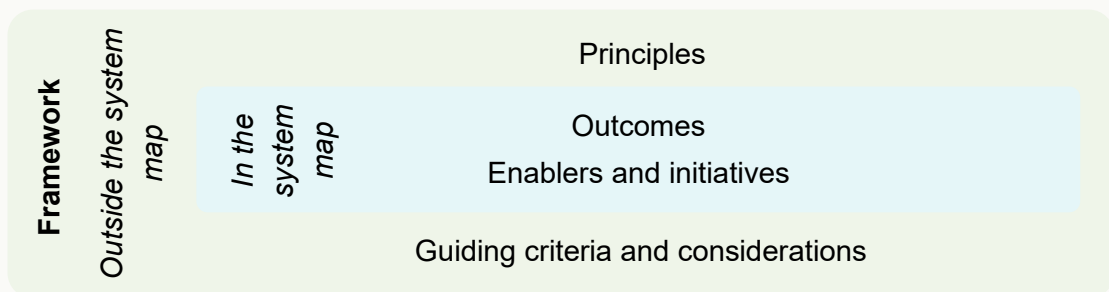
- (a) working collaboratively with government agencies and industry to design solutions, and leveraging off international experience for standardising formats and protocols
- (b) the need for a clear framework for decision-making on digitalisation initiatives, including problem definitions, and to establish a regulatory sandbox to aid innovation
- (c) regulation, systems and processes need to be faster and adaptable
- (d) being careful not to limit innovation, experimentation and choice (in the context of making sure interoperability is flexible, and removing complexity while avoiding oversimplification)
- (e) digging deeper into the needs of different types of consumers; ensuring inclusive access to data and services, and supporting those who are disengaged or vulnerable
- (f) being clear about who owns data, who holds it and who can access it; and distinguishing between data, information and insights
- (g) centralised vs decentralised data infrastructure and cost-recovery mechanisms where data may be a public good, along with establishing expectations of behaviour (eg, in data access/sharing/preserving privacy)
- (h) the immediate need for access to product, consumption, network and distributed energy resources data, as timely and granular as possible.

A.2. Feedback from workshops included:

- (a) emphasising trust, consent to data-sharing and access and the need for data exchange standards
- (b) understanding diverse customer needs, particularly to build out potential use cases
- (c) consideration of resilience, risk management and wider public good, eg, decarbonisation and wellbeing
- (d) using single-word principles for emphasis: “accessible, interoperable, agency, adaptive”
- (e) consideration of competition, efficiency and cost, taking a comprehensive market/system lens
- (f) linking in the critical nature of electricity, particularly for emergencies
- (g) providing certainty, rigour and robustness alongside adaptability, and the importance of monitoring, enforcement and iterative action.

## Appendix B Our framework for a digitalised electricity system

- B.1. In this section, we provide more detail on parts of the framework for a digitalised electricity system:
- The principles form the first layer of the framework that underpins the digitalisation system map. They are what we are aiming for when we are looking to digitalise, in simple terms
  - The outcomes are these high-level principles, translated in a tangible or visible way. These outcomes link the actions – the initiatives and the enablers – to the principles inside the system map
  - In response to discussion paper feedback about the importance of sequencing initiatives, we also developed a set of guiding criteria and considerations. These sit behind the system map to support prioritisation.



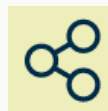
- B.2. The following sections provide further detail about changes to the principles for a digitalised electricity system and the guiding criteria and considerations.

### Our updated principles reflect an increased focus on customers, adaptability and resilience

- B.3. Following feedback from discussion paper submissions and workshops, we have updated and expanded the principles for a digitalised electricity system.
- B.4. The revised set of digitalisation principles are:



**Accessible**



**Interoperable**



**Customer-  
centric**



**Adaptive**



**Resilient**

- B.5. The following sub-sections provide more detail on the changes to the principles.

#### Customer-centric

- B.6. We originally identified ‘simple solutions’ as one of the principles to support digitalisation. While simple solutions can be good for some consumers, simple solutions aren’t necessarily always going to be the answer for other consumers.
- B.7. It is more important that digitalisation is done with *customers* in mind, and that complexity is removed where possible.

- B.8. This feedback led to us reframing the third principle as ‘customer-centric’ to reflect the diversity of consumers’ needs and experiences. Some will be early adopters, while some will prefer to wait for solutions to be tried and tested with clear benefits. For example, with standardised and timely consumption data, some consumers will want to use data to manage their usage on their own, and others may prefer a third party to use the data to manage their consumption (and generation, if any) on their behalf. Regardless, consumers should have control over their data and who it is made available to.

### Adaptive

- B.9. The impact and pace of change in the electricity system will be unpredictable, but change will likely affect existing arrangements. Change applies to how guidance, regulations and policy mechanisms adapt as the system evolves.
- B.10. We understand having certainty of rules is beneficial for parties who need confidence to invest, and for maintaining confidence in market (settlement) outcomes. As a regulator, we can provide certainty about the outcomes we are aiming for, take a robust approach to how we develop and prioritise solutions, and be open about the signs we will look for to trigger action.
- B.11. A regulatory environment that facilitates testing solutions and ‘failing fast’, rather than implementing a solution or direct regulation in every instance, may support better outcomes for consumers in some circumstances. It can also prevent distortion of investment signals and lower the barrier for smaller parties to participate in the system.
- B.12. However, adaptability must not be used as an excuse to make incremental changes when bold and decisive action is needed.

### Resilient

- B.13. We received a significant amount of feedback in the workshops highlighting the importance of system resilience and being able to withstand and bounce back from shocks.
- B.14. While resilience is a core component of the Authority’s strategic outcomes, we consider it is a key part of delivering digitalisation and warrants being visible in these principles.
- B.15. Electricity, and by extension the infrastructure used to create and transport it, is becoming increasingly important for people’s health and wellbeing. For example, electricity is also important to our ability to communicate with each other (an internet connection at home will also need power, and some home energy management systems require an internet connection). This means ensuring people can access electricity, particularly in times of emergencies, is critical.
- B.16. As we digitalise interactions in the electricity system, cybersecurity and information security will become just as important as physical security.<sup>10</sup> Exchanging data so systems operate and remain secure, particularly where data is of a personal nature, will be important for consumer trust and efficiency.

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<sup>10</sup> The Department of Prime Minister and Cabinet [recently consulted on measures to enhance the cyber security of New Zealand’s critical infrastructure system](#). The discussion paper noted technology – through convergence of operational technology (OT) and information technology (IT) systems – exacerbates cyber risks and the continued use of legacy infrastructure can create vulnerabilities.

## We have also developed guiding criteria and considerations to help sequence initiatives

- B.17. In response to feedback about the importance of sequencing initiatives, we have developed a set of criteria for prioritising the work listed in the system map. This includes prioritisation across short-, medium-, and long-term time horizons.
- B.18. The criteria and considerations will help the Authority prioritise, support and monitor initiatives consistently over time. Being clearer about the criteria and considerations will help people understand why something might be important to do sooner rather than later.
- B.19. The criteria and consideration have been developed based on feedback from stakeholders.

### There are three criteria and seven considerations

- B.20. We have developed three criteria to help determine how initiatives are prioritised. We have seven considerations to resolve conflicting approaches to delivering a given outcome.
- B.21. Our criteria are:
  - (h) **Principle alignment:** To build a digitalised system, an initiative proposed in the map needs to contribute to at least one of the five principles: accessible, interoperable, customer-centric, adaptive and resilient.
  - (i) **Benefits outweighing costs:** From a system-wide perspective, the benefits associated with an initiative should outweigh the cost over the life of the technology or solution being implemented. The benefits should include an acknowledgement (if not a quantification) of public good, non-tangible benefits and benefits that fall outside the sector if relevant
  - (j) **Statutory objective alignment:** Initiatives led by government agencies must be within their statutory framework. For initiatives being led by the Electricity Authority, these must align with our statutory objectives<sup>11</sup>. Agencies will work together where actions touch more than one remit.
- B.22. Our considerations are:
  - (a) **Value-seeking:** Prioritising initiatives that are widely considered to be non-controversial or high-value, or where a 'fail fast' or iterative approach would easily help discover and establish value early (or identify where an initiative should be stopped or deferred). This can help encourage the testing of solutions or tools currently used in other countries, and avoid pursuit of only large, long-duration projects where benefits take time to realise and require significant cases to establish.
  - (b) **Evolution:** While value-seeking is important, understanding the future of an initiative (eg, lifetime cost, governance, change management) is important to maximise benefit and buy-in and to avoid inefficient actions, or actions being taken out of order.

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<sup>11</sup> The Authority's statutory objectives are to promote competition in, reliable supply by, and the efficient operation of, the electricity industry for the long-term benefit of consumers; and to protect the interests of domestic consumers and small business consumers in relation to the supply of electricity to those consumers.

- (c) **Minimising risk:** Consideration of cybersecurity and privacy must be at the heart of all initiatives. Avoiding deliverability risks is also crucial in large or long-duration projects where skill and capability building is required.
- (d) **Accommodating intermittency:** As renewable generation and the use of distributed energy resources (DERs) increases, the system must be able to handle more frequent and less predictable variations in supply. Initiatives should consider ways to measure, manage, and integrate intermittency into decisions and market systems, and enable better anticipation and response to fluctuations.
- (e) **Realising dependencies:** We want to recognise when an initiative is the enabler for another action or can have a positive effect beyond the electricity sector.
- (f) **Driving innovation and efficiency:** Initiatives should be able to help provide new evidence to drive regulatory or policy change, if it has the potential to grow markets or create new ones (even beyond the electricity sector), or help improve the operation of existing markets and the electricity system. To support this, parties should collaborate on initiatives where it would help improve efficiency.
- (g) **Equity:** The parties that benefit from an initiative should bear its cost. Initiatives should not exclude or create barriers to access for people and ideally would make it easier for people who are disadvantaged to access electricity and related data and participate in the system if they wish. We acknowledge this will be challenging to give effect to, but keeping equity in mind ensures we deliver an electricity system for *all* consumers.

B.23. In Appendix C, we have indicated the principle alignment of the initiatives in the system map across the three future time horizons.

## Appendix C Further detail on system map initiatives

- C.1. The tables below provide further details on the enablers and initiatives in the system map.
- C.2. Regarding delivery, while the Authority might be best positioned to lead an initiative, it is implied that industry would participate and support in its delivery or implementation.
- C.3. As noted earlier, there may be other drivers that contribute to the high-level outcomes that are not included in the system map, so these are not included in the table of enablers and initiatives below.

### Enablers

- C.4. Enablers are activities that provide the foundation for (many) other initiatives.

Outcome	Activity	Problem/opportunity	Principle alignment	Delivered by
Data exchange is secure and timely, and data is of a high quality, frequency and granularity, which supports automated action	Modernise (and establish standards for) data access, including Electricity Information Exchange Protocols (EIEPs)	If data exchange processes in the electricity industry were API-first, or used modern message queues, it would allow better scaling and automation with far faster transfer of data between parties. This unlocks the possibility of consumers (and participants) making much more timely responses to market signals. To do this effectively will likely also include “tidy up” of deprecated data.	Accessible, interoperable	EA
	Develop data-sharing infrastructure	The electricity industry lacks a foundational infrastructure that facilitates wide sharing of data; sharing occurs point-to-point and even simple sharing transactions take time to establish. Data-sharing is often untimely, and not of the right quality or granularity to support consumer or participant decision-making. Data-sharing infrastructure can give data creators and holders more control over the data that exists/is being collected about them, through a formal mechanism to grant access to other parties. It also makes it easier for parties to seek access to the data from its source (or as close to its source as possible), rather than retrieving the data via another trader - making data sharing quicker and simpler. There is a range of options for the implementation model – decentralised to centralised – that will need to be considered.	Accessible, interoperable	MBIE, EA
	Explore development of accreditation/consent model for data sharing	Without consistent automated processes for accreditation or verification of consent to access data, it takes more time for parties to access the data they are seeking. This removes the possibility for timely action to be taken by any party other than the original data holder. This action relates to the enabler <i>Develop data-sharing infrastructure</i> .	Accessible, interoperable, resilient	MBIE leading, EA supporting
Our electricity system integrates new connected technologies easily and safely	Enable regulatory sandboxes to allow innovation and test policy, practice and procedures	Innovative parties within and outside the electricity sector may be interested in providing a product or service that is beyond existing rules. Regulators can provide time-limited exemptions to these rules to better understand the costs, benefits, and risks of the product or service in a way that limits any potentially	Customer centric, adaptive	EA, EECA, and Commerce Commission observing

Outcome	Activity	Problem/opportunity	Principle alignment	Delivered by
		<p>negative consumer impact. However, if any exemption from the rules is specific to the party seeking it, it makes it difficult for other parties to conduct the same testing.</p> <p>Regulatory sandboxes across all relevant regulatory agencies with clear parameters can create an open, coordinated but controlled testing environment, to allow providers of solutions to accelerate innovation and share what they learn across the entire industry. Sandboxes can also enable policy solutions to be tested before they're rolled out, which can improve the quality and flexibility of regulatory decisions.</p> <p>We note that some regulators may initially observe to identify any regulatory barriers that may not be apparent at the outset (rather than exercising their powers).</p>		
	Develop a system-wide architecture framework to guide how technologies connect and operate	An overarching architecture framework showing a clear pathway of change to systems and processes over time and the capability required to deliver it, would support digitalisation to proceed in a structured way. This would avoid duplication of effort and minimise cost where actions can be taken jointly and collaboratively and help make it easier for participants and other parties to invest in their systems at the right time. This links strongly to the enabler <i>Collaboratively develop a data governance framework, common across the sector.</i>	Accessible, interoperable, adaptive, resilient	Joint industry and regulator
	Encourage update of the Energy Efficiency and Conservation (EEC) Act so products can be regulated for demand flexibility capability	<p>The EEC Act provides the statutory basis for promoting energy efficiency and allows minimum energy efficiency standards and labelling requirements to be set for energy-using products and services, including vehicles. EECA considers the Act is no longer fit for purpose. Work is underway to amend the Act to support two core objectives:</p> <ul style="list-style-type: none"> <li>Streamlining processes to make sure New Zealand can keep pace with other developed countries (including Australia) and have a fit-for-purpose regime.</li> <li>Future-proofing the regime by setting standards for demand flexibility and energy systems and addressing existing loopholes. Demand flexibility is the ability for consumers to use smart devices, such as EV chargers, to shift their electricity use away from peak times.</li> </ul>	Interoperable, adaptive	MBIE, EECA
The sector's data governance and management provide the foundation for safe and secure data access and sharing	Collaboratively develop a data governance framework, common across the sector	<p>The system lacks the 'trust', eg, common understanding of roles, responsibilities and privacy settings required to share data within it. This means not all parties have access to the data they need to make decisions.</p> <p>Lack of clarity regarding data ownership and parties responsible for managing the data - eg, Metering Equipment Provider (MEP), retailer, consumer - prevents consumers from exercising full rights over their data (eg, opting out of their data being used for marketing or price discrimination).</p> <p>Clarity of roles and responsibilities enables consumers to exercise rights over their data and for participants and innovators to understand what they are permitted to do with it.</p>	Accessible, interoperable, resilient	Joint industry and regulator

Outcome	Activity	Problem/opportunity	Principle alignment	Delivered by
	Identify roles and access levels: data holders, creators and users etc	The types of data that would be of value to different parties across the industry is not always available to them. Data of interest to one party might not be collected by the party that creates it, even though it would be of benefit to others. Data may not be made accessible by the parties that collect it (whether they create the data).	Accessible, interoperable, resilient	EA, MBIE, FlexForum
	Adopt or establish data best practice guidance, to support consistent, secure data management	Inconsistent practices across industry for handling, storage, sharing/use and removal of data creates risks of improperly informed decisions and privacy breaches. With guidance on best practice, approaches can be made more consistent across the sector, increasing transparency and trust between parties inside the industry and with consumers who can trust that their privacy is being respected. In relation to sharing/use, best practice guidance should also include expectations of data quality, cleanliness and timeliness (depending on the type of data). High quality, clean data enables better analysis to drive decision making, within the industry and by consumers. This links strongly to the enabler <i>collaboratively develop a data governance framework, common across the sector.</i>	Accessible, interoperable, resilient	Joint industry and regulator

## Initiatives

### Platform-focused

C.5. These are initiatives where technical changes are needed: either technology (hardware or software), process or protocol.

Outcome	Timeframe	Activity	Problem/opportunity	Principle alignment	Delivered by
Consumers or their agents have access to data and clear information that can help them make decisions about electricity use and costs	Short term	Set minimum standards for customer (plan) information	The information consumers require for decision-making around their electricity bills is inconsistent and coupled with unclear plan information makes it difficult to compare to other retailers' propositions, reducing competition. By standardising content, requiring plain-language and ensuring logical lay-outs so bills are easier to understand, consumers will have the information they need to compare plans across the electricity market and switch retailers, increasing competition and supporting them to lower their costs.	Accessible, interoperable, customer-centric	EA <i>In progress</i>
	Medium term	Further comparison and switching service enhancements, eg, modelled guidance	The Authority has developed a new comparison and switching service, and the quality and type of advice it can provide to consumers could be improved as consumer data becomes available in a more timely format (and access is granted to it), eg, nudges to change behaviour based on predicted usage patterns.	Accessible, customer-centric	EA

Outcome	Timeframe	Activity	Problem/opportunity	Principle alignment	Delivered by
Data exchange is secure and timely, and data is of a high quality, frequency and granularity, which supports automated action	Short term	Establish key use cases, including any that require centralisation or public access	Development of overarching infrastructure, processes and systems can be approached iteratively if there are use cases to anchor to. Delivering on centralised or public access use cases (eg, to support community energy schemes) also allows parties to access data and innovate widely, realising benefit earlier.	Accessible, interoperable, adaptive	EA
	Short term	Investigate contractual mechanisms for data-sharing – existing and use cases	Existing long-term contracts between MEPs and retailers limit the ability to introduce new data-sharing requirements, making it difficult for other parties (eg, distributors) to gain access or for the data to be made widely available, limiting competition and efficiency. Addressing or resetting legacy contractual arrangements to allow wider data-sharing will accelerate innovation and competition (including in the MEP market), lowering cost to consumers and providing them with increased choice of services.	Accessible, interoperable	EA
	Short term	Implement a consumer data right for electricity, including data standards	Third parties seeking to provide services to consumers can request plan and consumption information from a consumer's retailer under the Electricity Industry Participation Code 2010 (Code). However, since retailers have five days to respond to requests, third parties cannot use the data to deliver services that enable consumers to make <i>timely</i> decisions. A consumer data right for electricity will enable a consumer to authorise a third party to access detailed data about the electricity products they purchase and information about them as a customer. They can choose to use the data for household decision-making and grant access to the data easily to third parties, who can use it to provide new or different services to them.	Accessible, customer-centric, adaptive	MBIE, EA <i>In progress</i>
	Medium term	Modern update to registry, Reconciliation Manager and data transfer and validation processes	Current registry and Reconciliation Manager processes can be complex, compliance-heavy and prone to settlement errors or revisions, increasing system cost. Access to timely and reliable meter readings remains inconsistent. A digitally enabled replacement of the registry could reduce costs for participants through automation and improved data quality, and support transparent, verifiable trading of flexibility. If MEPs provided data directly to the Reconciliation Manager, this could also help reduce compliance costs, minimise settlement errors and revisions and create a more competitive market (through reduced overheads and greater data reliability lowering barriers to entry).	Accessible, interoperable	EA
Market and settlement processes are as accurate as possible and reduce barriers to entry	Medium term	Consider treatment of distributed unmetered load	Current settlement methods for distributed unmetered load are inefficient and can distort accuracy of market settlement. Improving settlement of distributed unmetered load would increase market efficiency by improving cost allocation (reducing settlement errors, improving the accuracy of invoicing).	Accessible	EA

Outcome	Timeframe	Activity	Problem/opportunity	Principle alignment	Delivered by
	Medium term	Investigate reducing settlement timeframes	Wholesale settlement currently occurs monthly so significant amounts of money are tied up for that time, exposing participants to long periods of financial risk. This can lead to smaller participants facing liquidity challenges. Moving to weekly settlement periods could significantly reduce the required monetary outlay. This could lower barriers to entry for retailers and service providers, improve cashflow management across the market and reduce systemic risk by limiting the build-up of exposure.	Accessible	EA
	Long term	Investigate within-day switching (and implement if desired)	When consumers can't receive price signals from different traders or third parties, they are unable to switch to a trader providing a time-limited offer or product. Faster switching processes could encourage competition as third parties offering services to consumers would be driven to do so in a more timely manner.	Accessible, interoperable, customer-centric	EA (with technical group support)
Network data is accessible, and information provided by distributors and Transpower gives parties the confidence to connect and invest	Short term	Provide guidance to publish standardised connection and constraint information	Those wanting to connect to networks or change the nature of their connection by installing DER, do not have easy access to the data to help inform decisions about the size and location of their connection, or whether it would incur significant costs. This could lead to suboptimal investment choices, eg, their generation export being limited. If networks published standardised connection and constraint information, it would be easier to see where parties could connect their assets or how those assets could be best scaled to avoid additional network investment or indicate where further investigation would be needed. Overall, this would lead to quicker and easier decision-making by connecting parties.	Accessible, customer-centric	ENA, EA, EEA, Commerce Commission  <i>In progress</i>
	Short term	Standardise national connection guidelines	Inconsistent network connection approaches across distributors make it more difficult for parties seeking connection to do so in a streamlined way. With a national set of guidelines, connection processes would be more transparent to connecting parties and standardisation could help realise process efficiencies across distributors.	Accessible, interoperable, customer-centric	ENA, EEA  <i>In progress</i>
	Short term	Improve consistency in connection queue management	Common approaches to queue management policy across distributors and Transpower could help increase transparency for parties interested in connecting across the country, supporting their investment decision making.	Accessible, interoperable	ENA, distributors  <i>In progress</i>
	Medium term	Establish expectations for provision and use of network (reliability, quality, performance) data, including timeliness	High quality, reliable power quality data of the right recency and frequency can help support distribution system operation and flexibility service provision to develop in a coordinated way. Better understanding of network characteristics could be used to support network maintenance and investment for resilience.	Accessible, interoperable, resilient	EA, ENA, Commerce Commission

Outcome	Timeframe	Activity	Problem/opportunity	Principle alignment	Delivered by
Our electricity system integrates new connected technologies easily and safely	Long term	Enable system-wide sharing of network data	Greater availability of granular, timely data about network characteristics could help support innovators create new services for distributors and consumers.	Accessible, interoperable, customer-centric	EA, ENA, distributors, Commerce Commission
	Short term	Explore multiple trading relationships to enable import and export splitting	Consumers are unable to have different retailers for different services in their homes and businesses. This reduces competition and limits innovation in service offerings. By enabling import and export splitting, retailers and innovators would be able to offer consumers new products and services and the consumer could choose the most cost-effective combination for them. It would also encourage investment in distributed generation, which would provide benefits to consumers both directly (through generation revenue) and indirectly by reducing distributor costs and through increased regional resilience.	Accessible, adaptive, customer-centric	EA <i>In progress</i>
	Short term	Progress adoption of inverter and device standards and communication protocols	By establishing a set of inverter and device standards and communication protocols across the sector, integration of new products or services for system use could be streamlined with hierarchies of control (including for emergencies) properly considered.	Interoperable	EECA
	Medium term	Metering infrastructure uplift	Uncertified metering installations remain in operation, undermining data quality and market efficiency. A lack of standardised requirements for metering installations presents barriers to cost efficiency. Many back-office systems and metering devices are not configured for modern flexibility requirements. Reprogramming is possible, but meters tend to be replaced instead, driving unnecessary cost into the system and ultimately onto consumers. Encouraging uncertified metering installations to certify, replace or update would help improve data quality and market efficiency. Setting standards for metering or minimum capability requirements could help improve efficiency across the system. Encouraging reprogramming of advanced metering infrastructure (AMI) meters remotely to enable flexibility requirements could reduce costs to consumers and enable them to participate in the electricity system.	Accessible, interoperable, customer-centric	EA, MEPS, Commerce Commission
	Medium term	Interoperability considerations for home energy management systems	Ensuring interoperability of devices within the home could help improve the quality of information made available to consumers for decision making across all their energy use and improve efficiency across the home. It could also help improve visibility of flexible devices to distribution system operators.	Interoperable	EA, EECA
	Long term	Develop a standards testing regime	Without a clear process to test new standards for data, communication methods or products, we risk testing inconsistently or implementing solutions that don't deliver on the benefits being sought by the standard.	Interoperable, adaptive	EA, EECA

Outcome	Timeframe	Activity	Problem/opportunity	Principle alignment	Delivered by
	Long term	System simulator to quantify and interrogate the impact of ideas and policy	A simulator that couples a future scenario framework and network emulation could allow robust testing of ideas and policy on consumers, markets and the system. This would enable better understanding of the impact of policy or regulation choices, or the benefit that new products and services could deliver, with a set of consistent underlying assumptions. This would be contingent on developing public trialling capability.	Accessible, interoperable, adaptive	Joint industry and regulator
	Long term	New hardware testing and integration programme	Without a process to test and integrate new hardware consistently into the system, risks exist in introducing hardware that doesn't meet the technology standards desired by the system as a whole (eg, product response for flexibility services or permitting multiple trading relationships). A new hardware testing and integration regime would give a clear pathway for new products to be brought into the market and system with maximum effect.	Interoperable, customer-centric, adaptive	EECA
The digital infrastructure needed in emergencies is as robust and reliable as possible	Short term	Develop a common emergency load management protocol	A common load management protocol would ensure that controllable load is made available for system security, like grid emergencies or events that threaten public safety. The Code also supports broader arrangements for the use of controllable load. These arrangements can include provision of services to distributors or providing benefits directly to consumers. However, the rules require traders at all times to operate controllable load in reasonable and prudent manner in accordance with good electricity industry practice.	Interoperable, resilient	ENA  <i>In progress</i>
	Short term	Implementing Data Quality Framework and Common Information Model (CIM)	Using the CIM as a data standard, alongside a data quality framework would help reduce transaction costs, improve coordination and support innovation that relies on quality and clean data.	Accessible, interoperable	EEA
	Medium term	Improve communications resilience	The electricity system is increasingly dependent on digital communication to trigger participant and consumer actions. Failure of these communications systems could limit participant and consumer ability to respond to price signals and in the worst case could leave people without power.	Interoperable, resilient	EA, Transpower, distributors
The sector's data governance and management provide the foundation for safe and secure data access and sharing	Short term	Develop common glossary of terms for data definitions and metadata requirements	The electricity industry lacks a common definition of data requirements, particularly around availability, granularity and frequency of updates. Without an agreed standard, MEPs, distribution system operators, flexibility providers and other market participants face uncertainty about what to design for, which discourages investment in new services. Establishing industry-wide standards for data - specific to types required (eg, consumer vs industry data, flexibility data) and standards for quality, granularity, timeliness, availability and	Accessible, interoperable	Joint industry and regulator

Outcome	Timeframe	Activity	Problem/opportunity	Principle alignment	Delivered by
			accessibility - would provide clarity and encourage investment in digital platforms and services to lower system cost. As a key aspect of data governance, this could also help prevent individual policies from conflicting with accessibility/sharing of data.		
	Short term	Develop data access/ management principles (and policies as needed)	The system lacks rules around collection, storage, validation, use/access and disposal of data (and the security aspects of these). This means the validity and accuracy of data cannot be guaranteed, making it difficult to make evidence-based decisions. With a common understanding of allowed levels of data access and management, data could be made open for use while people could be confident their data is shared and used appropriately.	Accessible, interoperable	Joint industry and regulator
The system has the right data access, communication protocols, technology standards and roles in place to integrate flexibility	Short term	Determine structure for sharing of flexibility asset (eg, product response and status information) and market and forecast data	Visibility of flexibility assets, including distributed energy resources, is critical for enabling consumers to participate in flexibility markets as they develop, and to support efficient operation, planning and investment in networks. This data could also unlock opportunities for innovation in pricing and services offered to consumers.	Accessible, interoperable	EA, EECA, FlexForum
	Short term	Establish demand-side flexibility protocols and product criteria	Without standards and protocols to enable interactions between the range of participants in the demand-side flexibility market and an inconsistency of DER product requirements, consumers may invest inefficiently and be unable to participate effectively in the electricity system. Standards and protocols could enable consumers to participate and invest efficiently in DER assets. The system would also benefit from flexibility as it could reduce network investment and wholesale prices.	Accessible, interoperable	EA, EECA
	Short term	Establish information exchange protocols across distribution <b>and</b> transmission	Information exchange protocols across distribution and transmission system operation would help improve the sharing of data and cross-system coordination of distributed energy resources and flexibility, putting them to their best use and lowering overall system cost.	Interoperable	EA, Transpower, ENA, distributors
	Short term	Establish distribution system operation (DSO) framework	Distribution networks are considering distribution system operation in different ways, embedding different processes and communication methods. Without a common framework, it is difficult to develop consistent market design, data requirements and flexibility mechanisms that will work effectively across the various networks. By explicitly acknowledging the potential role of distribution system operators and clarifying how their functions fit in with those of the System Operator, distribution network operators and flexibility service providers, we could ensure that market design, data requirements and flexibility mechanisms account for their needs - enabling effective planning and operating of their networks.	Accessible, interoperable, adaptive	ENA, distributors, EA <i>In progress</i>

Outcome	Timeframe	Activity	Problem/opportunity	Principle alignment	Delivered by
	Short term	Monitor need for flexibility market coordination (and implement if required)	As participation in flexibility services becomes more common, coordination within the power system becomes increasingly important to allow efficient network and system operation, as well as for those participating to be able to realise the value of their investment or action.	Interoperable, customer-centric, adaptive	EA, FlexForum, Commerce Commission  <i>In progress</i>
	Short term	Investigate price signals to incentivise flexibility	Without clear price signals to give an indication of the value of flexibility to potential buyers and sellers, there is less incentive for them to invest and participate if the value to other parties in the system matches their expectations.	Accessible, interoperable, customer-centric	FlexForum, EA
New and existing participants develop innovative solutions and share what they learn across the entire industry	Short term	Assess Innovation and Non-Traditional Solutions Allowance (INTSA) applications	In the absence of an additional allowance, some distributors innovation or non-traditional solutions (NTS) projects or programmes may not progress due to low or uncertain likelihood of benefits arising within the related default price-quality path (DPP) timeframe. This is related to the enabler <i>Enable regulatory sandboxes to allow innovation and test policy, practice and procedures.</i>	Adaptive	Commerce Commission  <i>In progress</i>
	Medium term	Maintain basic set of common forecasting assumptions	Without a basic set of common forecasting assumptions, eg, localised demand, DER uptake and availability increase the risk of incorrect or poorly timed investment decisions, increasing overall system cost. A basic set of common forecasting assumptions could lower the threshold to new market entry and stimulate competition by helping participants understand the power system and market and how they may evolve.	Accessible, adaptive	Joint industry and regulator

## People-focused

C.6. These initiatives are of a more social nature: understanding behaviour, education, or investing in the skills and capabilities necessary to deliver on changes.

Outcome	Timeframe	Activity	Problem/opportunity	Principle alignment	Delivered by
Consumers or their agents have access to data and clear information that can help them make decisions about electricity use and costs	Short term	Educate customers on how to maximise the value of their electricity choices	If consumers don't have the information needed to make DER investment decisions, they miss out on opportunities to improve their energy efficiency, reduce their energy costs and participate in the electricity system, eg, by providing flexibility services, and being rewarded for it.	Accessible, customer-centric	EA, EECA, FlexForum  <i>In progress</i>
	Short term	Investigate options to increase consumer voice	The household consumer does not have a strong voice within decision-making processes in the electricity system, and no feedback loop exists. This means that market design risks being overly shaped by participants rather than the end-users.	Accessible, customer-centric, adaptive	MBIE, EA

Outcome	Timeframe	Activity	Problem/opportunity	Principle alignment	Delivered by
			A strong voice for consumers consistently represented in electricity market development and regulatory decisions mean the market and system would be better tailored to their needs.		
	Short term	Communications campaign to build consumer confidence in the benefits of digitalising the electricity system	If people are unaware or don't understand the benefits of digitalising the electricity system, it will be more difficult to coordinate potential flexibility and consumer energy resources within the system, missing opportunities to lower overall system cost or create opportunities for additional consumer and community value.	Accessible, customer-centric	EA, EECA
	Short term	Establishing framework for agents to manage and action data on a consumer's behalf	As increasing amounts of data become available to consumers, they may wish to have agents or third parties use it (with their consent) to take action on their behalf. A framework that established what agents or third parties are allowed to do would mean that consumers could trust them to behave consistently with their data. This initiative links closely to the initiatives <i>Develop data access/management principles</i> and <i>Implement a consumer data right for electricity, including data standards</i> .	Accessible, customer-centric	EA
Network data is accessible, and information provided by distributors and Transpower gives parties the confidence to connect and invest	Short term	Connection journey mapping	By understanding the journey of parties interested in connecting to networks, distributors could identify where processes, systems and data accessibility for them and for connecting parties can be improved. This could encourage collaboration between distributors as well as connecting parties and improve connection efficiency.	Accessible, interoperable, customer-centric	ENA, distributors
	Medium term	Create template commercial contracts	Using template commercial contracts across distributors for medium to large scale connections would support more straightforward connection of distributed generation and large load.	Accessible, interoperable, customer-centric	ENA, distributors, EA
	Long term	Develop access seeker data and information portal (eg, with capacity and congestion forecasts)	Parties seeking to connect to a network don't have a clear understanding of where there may be capacity constraints. This may lead them to connect in congested parts of the network or avoid connection of their desired scale and location. If parties looking to connect to networks have a clear view of future capacity and constraints, and their potential impact on these, they would be able to invest in connecting with more confidence.	Accessible, customer-centric	ENA, distributors, EA
Parties in the system develop solutions created with consumers' specific needs in mind	Short term	Undertake customer behaviour, and sentiment research (and persona development; journey mapping) to identify specific preferences and problems	Regulators and participants have limited understanding of customers, including consumers, making it difficult to identify and resolve the full range of their issues and reducing efficiency. By undertaking <b>detailed</b> research into consumer behaviour, testing along the way with data users and then sharing data across the sector, the entire sector would become better equipped to create solutions for consumers. Care with data use and control and allowing consumers to have sovereignty over their information within this (and other) initiative would build consumer trust in the electricity system.	Customer-centric	EA, EECA

Outcome	Timeframe	Activity	Problem/opportunity	Principle alignment	Delivered by
	Medium term	Establish grant funding for publicly driven solutions	Small, community-driven public-good initiatives that can help support an affordable, secure and resilient power system for consumers are unlikely to receive the initial funding to encourage research and uptake, particularly when developed by parties that are not traditional industry participants, eg, community groups. Grant funding could support progress to more quickly or sustainably realise consumer value.	Customer-centric, adaptive	EECA
	Medium term	Develop public trialling capability to inform solution development	Without the ability to test or trial solutions publicly at scale, it is difficult to quantify the effect of new products or services, or whether they could be improved to deliver better value. Public trialling could enable better understanding of the impacts and benefits of their ideas in practice, in a testing environment. This could allow them to make changes and resolve issues not anticipated in desktop study.	Customer-centric, adaptive, resilient	Joint industry and regulator
The system has the right data access, communication protocols, technology standards and roles in place to integrate flexibility	Short term	Mapping data required for decisions and actions in flexibility journey	Mapping the flexibility journey would help ensure the right data is made available to parties to participate in flexibility – from their investment decisions through to how they choose to operate flexibility assets (or allow agents to do this on their behalf). This would lower the barrier to consumers to participate in the electricity system and could indicate to parties across the system where further value could be realised by providing new services or incentives.	Accessible, interoperable, customer-centric	EA, FlexForum
	Short term	Identify capability and roles for coordinating multi-directional power flows and flexibility	To deliver a flexible power system and coordinate multi-directional power flows, distributors and Transpower (both grid owner and system operator) will need to take on different roles than the ones that have delivered New Zealand's electricity system thus far. By identifying the capabilities and (delineations to) roles required, the additional skillsets and tools required could be cultivated or procured efficiently.	Interoperable, adaptive	EA, Transpower, ENA, distributors <i>In progress</i>
New and existing participants develop innovative solutions and share what they learn across the industry	Medium term	Develop Code FAQ or common interpretation Q&A	New participants may lack resources or find it difficult to navigate the Electricity Industry Participation Code, presenting high barriers to entering the industry. Plain language guidance on commonly referenced aspects of the Code would lower the barrier to entry to participate in the electricity system, increasing competition.	Accessible, customer-centric, adaptive	EA

## Appendix D Glossary of abbreviations and terms

Authority	Electricity Authority Te Mana Hiko
AI	Artificial Intelligence
AMI	Advanced metering infrastructure
API	Application programming interface
BESS	Battery energy storage system
Code	Electricity Industry Participation Code 2010
CER	Consumer energy resources
DER	Distributed energy resources
DPP	Default price-quality path
DSO	Distribution system operation
EEA	Electricity Engineers' Association
EECA	Energy Efficiency and Conservation Authority
EEC Act	Energy Efficiency and Conservation Act 2000
EIEP	Electricity information exchange protocol
EV	Electric vehicle
ICP	Installation control point
INTSA	Innovation and non-traditional solutions allowance
IT	Information technology
MBIE	Ministry of Business, Innovation and Employment
MEP	Metering equipment provider
OT	Operational technology