



Delivering the Flexibility Plan: assessment of the urgency of each task

Main points

The Flexibility Plan 1.0 identifies 39 steps or tasks required to enable households, communities or businesses (or someone working on their behalf) to discover, assess, implement and operate flexible consumer and distributed energy resources (CDER) suited to their preferences and circumstances. The tasks involve:

- implementing a capability, process or practice that is well understood and is required to achieve a specified outcome
- exploring the range of options for delivering a capability, process or practice needed to achieve a desired outcome.

The Flexibility Plan does not assign priorities or timeframes to each task.

Consensus on the priority of many tasks, but not all

In March 2023 the FlexForum completed a qualitative and quantitative assessment of the criticality of each step to inform decisions about priorities and allocation of effort to progress the delivery of the Flexibility Plan.

The assessment indicates there are five categories of tasks with broad consensus on the priority of some specific tasks but diverging views on the priority of other tasks. Differing priorities across the sector is expected. The FlexForum was created to come up with ways to bridge those differences and enable joint discovery to enable a whole-of-system response that ensures flexibility is available to:

- support affordable and reliable operation of the electricity market and power system
- enable accelerated electrification by households and businesses as part of the transition to a zero emissions economy.

Five categories of task

Five categories of task emerged from the discussions of what to do and when.

1. **Coordination** was seen as a foundational output needed to achieve effective learning, updating regulatory settings and implementation.
2. **Flexible resource integration and visibility** refers to the capabilities, processes and practices to be developed by distributors to integrate CDER into their low voltage networks to support the use of flexibility across the supply chain.
3. **Consumer decision making and participation** relies on a set of tasks which affect the ability for consumers (or their agent) to make decisions about CDER and flexibility. In most cases, the output is information produced by a distributor or other participant of the electricity supply chain which consumers (agent) could use to make more informed decisions.
4. **Frameworks for transacting flexibility** refers to a set of tasks which collectively would result in a common approach to procuring, contracting, dispatching, and paying for flexibility.
5. **Developing flexibility-based products and services** refers to three tasks in the Flexibility Plan focused on developing practical experience about what products and services might delight the customer.

These categories are broadly like the groupings used in the Flexibility Plan¹, but are more outcome focused and bring together the various tasks associated with delivering an outcome. For example, the Flexible resource integration and visibility category brings together the information, technical, enabling and regulatory tasks required to achieve that outcome.

Four areas which need coordination and collaboration

There are four areas which require coordination and collaboration to ensure the Flexibility Plan is delivered at pace, solutions reflect a whole-of-system view, are informed by practical experience and learning-by-doing, and guide targeted and timely updates to regulatory settings.

1. **Flexible resource integration and visibility** – this would be about tracking progress with the activities of individual distributors, the ENA Future Networks Forum (FNF), and the regulators, and developing a whole-of-system perspective (ie, advice) on the outputs of those activities given the FlexForum objective and the programme set out in the Flexibility Plan.
2. **Consumer information** – this would be about tracking progress of the activities of industry participants and regulators, particularly the Electricity Authority, to provide consumers and their agents with streamlined (automated) access to the information useful to consumers for decisions about CDER, flexibility and electrification generally, and developing a whole-of-system perspective (ie, advice) on the outputs.

Focusing specifically on progress with improving the availability of information for consumer decision-making will ensure 'the industry' keeps its eye on the prize and doesn't get distracted by its own wants and needs.

3. **Market frameworks** – this would be about tracking progress of activities relating to the transaction lifecycle for flexibility and developing a whole-of-system perspective (ie, advice) on the outputs, including to the Electricity Authority about pricing.
4. **Digitalisation** – this would be about tracking progress and providing whole-of-system advice about activities relating to communications and connectivity capability. These are common to each of the above three areas. Focusing specifically on progress with digitalisation would assist to join the dots across the different functional siloes.

¹ The five categories used in the Flexibility Plan are:

- information and data to ensure electricity sector participants and consumers are enabled to access and share appropriate data and information
- technical requirements to ensure safe, reliable and efficient operation of the power system
- Enabling processes to ensure easy to access pathways to value and use flexibility
- regulatory settings that remove or avoid barriers to enabling consumers to make choices about flexibility and provide clarity to industry participants as to resources, roles, and responsibilities
- coordination and collaboration. Overarching steps to facilitate the collaboration and coordination needed for delivering the Flexibility Plan

Framework and approach for identifying the criticality of each step

The FlexForum completed a qualitative and quantitative assessment of the criticality of each step to inform decisions about priorities and allocation of effort to progress the delivery of the Flexibility Plan. During March 2023, three separate groups of FlexForum participants gave a qualitative assessment of:

- **the impact of not undertaking the step** based on judgements about the effects on reliability, affordability, customer satisfaction, and emissions. The reference point for the size of the impact is the Interim Climate Change Committee's (ICCC) estimate that each year of delayed electrification will increase New Zealand's cumulative emissions by 1% and costs by \$1 billion.
- **the timing of the impact** of not undertaking the step.

Each group also gave a quantitative assessment by scoring the timing and impact of each task on a 1 to 5 scale.

Rank the impact on a scale of 1 to 5 given the qualitative assessment.	Rank the timeframe on a scale of 1 to 5 given the qualitative assessment.
<ul style="list-style-type: none"> • small (1) • noticeable (2) • material (3) • significant (4) • ginormous (5) 	<ul style="list-style-type: none"> • sooner - next 12 months (1) • 2024-25 (2) • 2026-27 (3) • 2028-29 (4) • later - after 2030 (5)

The three groups reflected the diverse participation and perspectives within the FlexForum.

- Group 1: Jeremy Levy (Mercury), Eric Pyle (solarzero), Scott Scrimgeour (Wellington Electricity), Matt Smith (Vector)
- Group 2: Luke Cartmell-Gollan (Simply Energy), Murray Henderson (Transpower – SO)
- Group 3: Shay Brazier (revolve), Terry Paddy (Cortexo), Tom Rose (evnex), Evie Trolove (Orion).

The collated perspectives of the three groups are provided in Appendix A.

Summary of quantitative assessment: consensus on timing of tasks with whole-of-system implications

The overarching insight from the quantitative assessment is that the identification of priorities is not a simple exercise and setting priorities based on an 'average' view will underplay the importance and urgency of steps most relevant to testing innovative ideas and new ways of doing things.

Figure 1 shows the averaged timing and impact score for each step. The more critical tasks are the steps in the upper left corner.

Based on the averaged view the most critical task is #13 to ensure distributors have sufficient incentives to invest in low voltage management capability. The Commerce Commission is responsible for delivering this task.

Other critical tasks include:

- #6 to develop common flexibility service definitions
- #31 to determine measurement, communication and connectivity requirements for flexible resources
- #9 (connection requirements), 18 (regulatory settings provide network operators ability and incentive to use flexibility), 19 (demonstrate effectiveness of flexibility for networks), 21 (common method for valuing flexibility), 26 (technical standards for devices remain up to date) and 28 (a flexibility resource register).

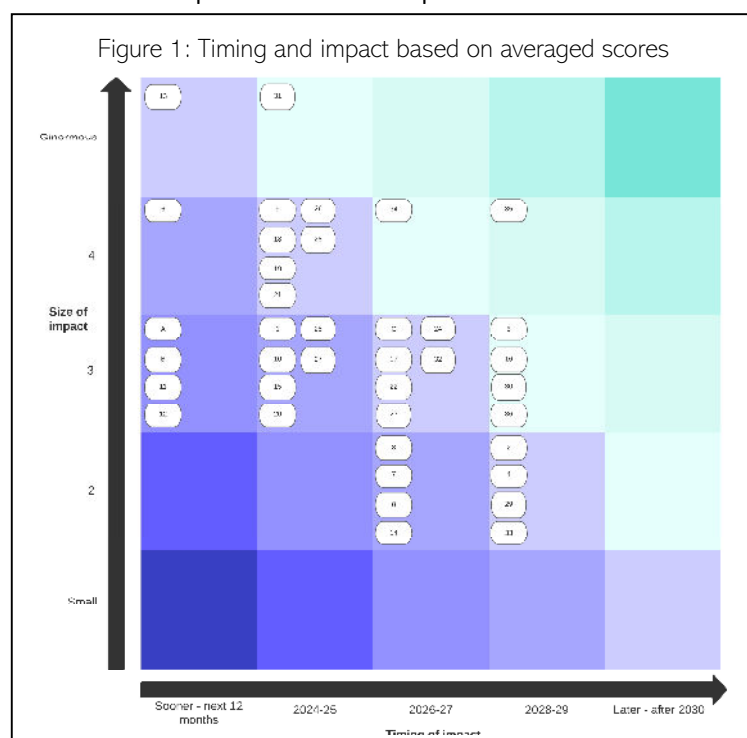


Figure 1 highlights that learning and implementation will be front-loaded and tasks completed in parallel because the consensus view is that all tasks need to be started in the coming five years to 2027 to avoid material adverse impacts or to realise material gains.

Figure 2 shows the difference between the highest and lowest timing and impact score for each step.

Broadly, scores were relatively consistent for steps relating to activities with whole-of-system effects and expected benefits, eg, tasks relating to low voltage management capability (#10-13).

Scores diverge for steps relating to the activities of a specific part of the electricity ecosystem and activities intended to improve the ability of consumers to obtain information:

- #C to undertake customer journey mapping to inform thinking about design of services, processes and associated regulatory settings
- #2, 3, 4, and #7 which are about providing consumers (or their agent) with better access to information about consumption, granular network performance, emissions intensity data, and retail pricing
- #5 to provide consumers the ability to contract with multiple electricity services suppliers
- #14 and #15 about voltage information and fit-for-purpose voltage limits
- #22 and #23 to ensure regulatory settings give the SO the ability and incentive to use flexibility, and to demonstrate the effectiveness of flexibility for ancillary services.

Figure 3 shows the timing and impact score for each step using the highest score. The biggest difference between Figure 1 and Figure 3 is the timing of action. The red arrows show the shift in scores from the averaged view.

The shift mostly results to differing views on the urgency of identifying and providing capability, processes and practices required to enable flexibility suppliers and consumer-facing firms to participate and to develop flexibility services and products. Based on the commentary and ranking exercise, existing industry players consider these steps as being less urgent and having lower benefits compared to the smaller players and flexibility suppliers.

From the perspective of the smaller players and flexibility suppliers, the most critical tasks (top left corner) are #13, plus:

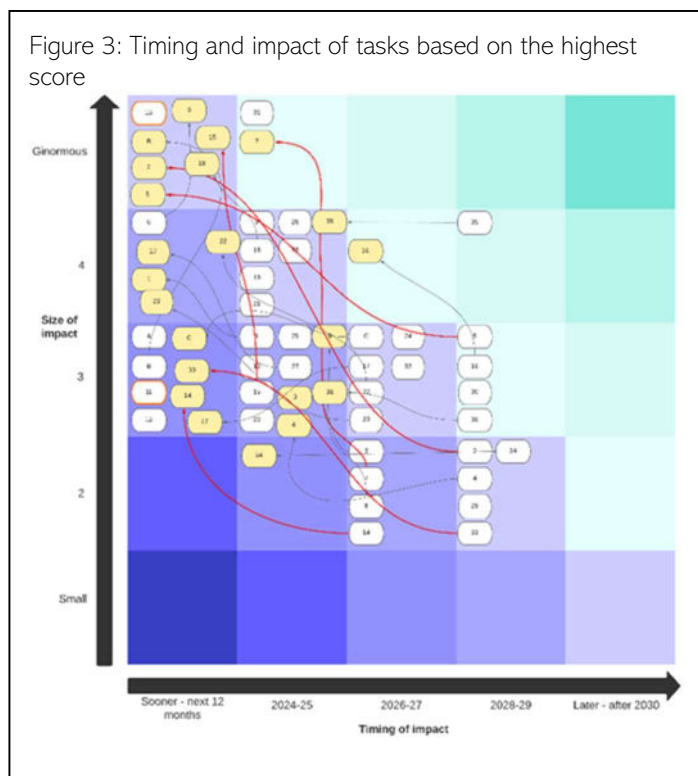
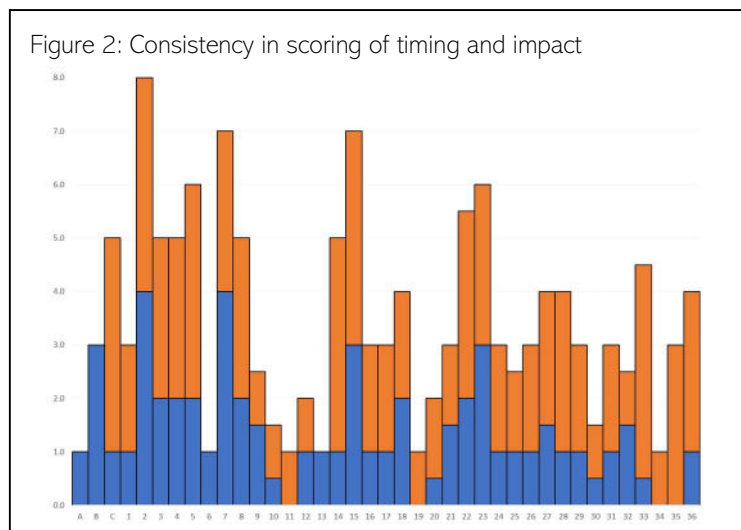
- #B to improve support for learning-by-doing
- #2 to improve consumer access to consumption information
- #5 to provide consumers the ability to contract with multiple electricity services suppliers
- #6 to develop common flexibility service definitions
- #15 to have fit-for-purpose voltage limits
- #18 to ensure regulatory settings provide network operators ability and incentive to use flexibility.

Overall, taking the fast-mover view increases the priority of steps relating to decision-making by consumers about flexibility and steps to enable development of flexibility-related products and services.

The tasks can be grouped into five categories

Five categories of outputs emerged from the discussions of what to do and when.

1. **Coordination** was seen as a foundational output needed to achieve effective learning, updating regulatory settings and implementation. Tasks central to this output are #A, B and C, plus two tasks relating to consumer device standards.



- Flexible resource integration and visibility** refers to the capability, processes and practices network operators need to integrate CDER into low voltage networks to support the use of flexibility across the supply chain. Tasks central to this output are #9-11, 13, 15 and 35.
- Consumer decision making and participation** relies on a set of tasks which affect the ability for consumers (or their agent) to make decisions about CDER and flexibility. In most cases, the output is information produced by a distributor or other participant of the electricity supply chain which consumers (agent) could use to make more informed decisions. Tasks central to this output are #1-4, 7, 8, 12, 14 and 27.
- Frameworks for transacting flexibility** refers to a set of tasks which collectively would result in a common approach to procuring, contracting, dispatching, and paying for flexibility.
- Developing flexibility-based products and services** refers to three tasks in the Flexibility Plan focused on developing practical experience about what products and services might delight the customer.

More detail on each category is given in the next sections. The sections include a table listing each task in the category, the averaged and fastest timings, and an overview of the perspectives underpinning the proposed timing. The timings are colour-coded as follows.

2023 - next 12 months	2024-25	2026-27	2028-29	later - after 2030
-----------------------	---------	---------	---------	--------------------

More consensus on timing = lighter shades of green. Less consensus on timing = darker shades of green.

Coordination of learning, updating regulatory settings and implementation

Commentary highlighted the importance of ensuring effective coordination of learning, updating regulatory settings and implementation.

Perhaps expected from FlexForum members, everyone agreed that **an entity to coordinate delivery of the tasks in the Flexibility Plan (#A)** needs to be established in 2023 to provide whole-of-system coordination across industry siloes and regulatory jurisdictions.

Similarly, everyone agreed **more effective support for learning-by-doing (#B)** is needed in 2023 to increase the amount and quality of learning-by-doing. Views on the impact of not improving learning-by-doing ranged from material to ginormous. The impact was seen as greater by parties more focused on trying new things.

The **customer journey mapping** task (#C) was seen in two ways. One perspective was that it should be a commercially driven activity undertaken by individual firms. The other perspective is it a common input to decisions about design of regulatory settings and market rules, processes and practices. The impact of not undertaking journey mapping for the latter reason is considered material.

The tasks about **technical standards for devices** (#25 and 26) are included in the coordination category because they rely on actions across industry sectors and by the government to define and formalise standards.

#	Task	Timing		Perspectives
		Averaged	Fastest	
A	Scope and confirm a delivery Model for the Flexibility Plan	24-25	2023	An entity to coordinate activity is required now (2023) to avoid a material impact
B	Ensure coordination between agencies and bodies with a role in supporting learning-by-doing.	2023	2023	More effective learning-by-doing frameworks are needed now (2023) to avoid a material impact. Faster movers think the impact of not acting is ginormous.
C	Complete a customer journey mapping exercise to inform further iterations of the Flexibility Plan	26-27	2023	Customer journey mapping is needed in the near term (2023), and as an ongoing practice, to avoid a material impact by ensuring rules are designed to reflect consumer expectations.
25	Identify minimum technical standards for devices such as EV chargers to make flexibility accessible and available	24-25	2023	The timeframe for action ranged from now (2023) to 2024-25. Acting sooner reduces the prospect of devices not having desired capability, resulting in increased costs overall.
26	Ensure technical standards for devices remain up to date and interlinked with international standards	24-25	2023	The timeframe for action ranged from now (2023) to 2025-26. The preference of action in the near to medium-term reflects perspectives that it is important to keep things up to date, particularly for internationally used standards which drive manufacturing decisions.

Flexible resource integration and visibility

People agreed that effort is required from 2023 to enable distributors to invest in low voltage management capability to enable flexible resource integration and visibility.

The investment is develop capability, processes and practices relating to the types of things which can be connected to the network, the connection process, management of network capacity, and network planning practices.

The most important task is for the Commerce Commission to **ensure distributors have the ability and incentive to invest in capability to obtain and produce network information (#13)**. The scope and pace of efforts to develop LV management capability depends on this task. Unfortunately, the outcome depends on decisions from the regulatory processes² which will not be made until late 2024 and will not be implemented until April 2025.

LV management capability is an input to multiple other steps and outcomes, particularly to provide information needed for consumer decision making and to support frameworks for transacting flexibility. Given these interdependencies, these LV management capability tasks warrant urgency and a collaborative approach to delivery.

#	Task	Timing		Perspectives
		Averaged	Fastest	
13	Ensure distributors have the ability and incentive to invest in capability to obtain and produce network information to enable consumer decisions	2023	2023	Everyone agreed this outcome is needed now (2023) to avoid ginormous impacts. This step is fundamental to progress with electrification and flexibility and a condition precedent for all the steps relating to LV management capability (#12, 11, 10), plus others. The Commerce Commission is responsible for delivering this step via the IM review Determination (due November 2023) and 2025 DPP Determination (due November 2024).
9	Review whether connection requirements enable rapid uptake of DER	24-25	2023	Everyone agreed that connection requirements should be considered either this year (2023) or in 2024-25 to avoid significant impacts. The general view was effort is required sooner than later to be prepared for an expected surge in connection applications due to electrification and people installing DER
10	Review after diversity maximum demand (ADMD) assumptions	24-25	2023	Everyone agreed that ADMD assumptions should be considered either this year (2023) or in 2024-25 to avoid a material impact. The step is related on work to understand how DOEs (step #11) and flexibility etc will alter planning assumptions and practices (steps #13, 19 and B) and connection decisions (step #9).
11	Explore the use of dynamic operating envelopes (DOEs)	24-25	2023	Everyone agreed that work to explore DOEs should start either this year (2023) or in 2024-25 to avoid a material impact.
15	Review voltage limits to ensure they do not create a barrier to uptake of DER	24-25	2023	A majority agreed the voltage limits for distribution networks need to be changed now (2023), but average skewed by a perspective action is not needed until after 2030. The ENA asked MBIE in February 2022 to amend the voltage limits to align with those in Australia. Impact was noticeable for traditional industry, but significant or higher for flexibility suppliers/consumer-facing parties (ie, harm/impact is borne by consumers).
27	Review whether connection application processes and connection standards enable rapid uptake of DER	24-25	2023	The timeframe for action ranged from now (2023) to 2025-26. The preference of action in the near to medium-term reflects perspectives that application processes do not provide relevant information and timeframes are inefficiently long
35	Identify the coordination capability, roles and functions required for distributors and the System Operator to optimise network and power system operation	28-29	24-25	The timeframe for delivering the outcome ranges from 2024-25 to after 2030 to avoid significant impacts. This step will require considerable effort over time, but the roles and functions will not be needed until after 2030

² The two regulatory processes are the Commerce Commission Input Methodology review and the subsequent Default Price Path Determination for 2025-2030

Consumer decision-making and participation

Commentary highlighted a divergence in views on the urgency required for tasks to improve the ability of consumers (or their agent – from here on, consumer includes their agent) to obtain information to assist decision-making about CDER and flexibility.

The pieces of information the Flexibility Plan identifies as being useful to consumers for decision making are:

- historical consumption data available to the consumer or their agent from the retailer through a streamline (automated) exchange process
- network reliability and resilience performance data relevant to the point of connection (ie, much more granular than the existing network wide SAIDI and SAIFI information)
- emissions intensity data for energy sources (electricity and other fuel source choices)
- retail pricing and power purchase information
- wholesale market price information
- current and forecast network capacity and constraint information relevant to the point of connection
- reference information about historical voltage performance of the LV network.

Each of these pieces of information are produced by a distributor or other participant of the electricity supply chain. Existing industry players in some cases saw the steps to provide information as being less urgent and having lower benefits compared to the smaller players and flexibility suppliers. Several times, conflicting views were presented on whether there would ever be many consumers asking for a piece of information, eg, information from distributors about voltage performance on a feeder.

There are three challenges.

1. the information may not yet be available. This is sometimes the case for distribution-related information, eg, granular network reliability and resilience performance data, because obtaining the information depends on the distributor obtaining LV management capability.
2. the information holder needs to agree to provide the information. Regulatory intervention was required to make historical consumption data more available, but the intervention was not sufficient to achieve streamlined (automated) data exchange.
3. Parties providing and receiving information need to have the capability and processes to enable the streamlined (automated) exchange of information, taking account of privacy and cybersecurity. This challenge is linked to several other tasks which also rely on the digitalisation of the electricity sector, eg, #31, 35, and 36, plus the LV management capability tasks.

A further consideration is the sentiment expressed several times through the discussions that starting early to provide better information will enable more information choices and investments which reduce the proportion of inflexible/inappropriate CDER entering the ecosystem.

#	Task	Timing		Perspectives
		Averaged	Fastest	
1	Identify what information and education can be provided to consumers	24-25	2023	Work should start either 2023 or by 2024-25. Starting early will reduce the proportion of inflexible CDER entering the ecosystem and avoid inappropriate investments by consumers.
2	Ensure consumers and their agents have streamlined (automated) access to historical consumption information	28-29	2023	<p>The timeframe for action ranged from immediately to mid-decade to 2030 and later reflecting variation in views on the benefits of the task.</p> <ul style="list-style-type: none"> • people from firms operating new business models saw the task as urgent because the capability as critical to consumer-friendly innovation • people from firms in the traditional supply chain saw the impact as small because the capability is not critical to how they operate their businesses and, in some cases, delivering the capability would cause them to incur costs • people from distributors saw value in streamlined access to consumption data to support network planning and design activities (see steps #12, 13 & 14) <p>Electricity Authority needs to amend the Code</p>
3	Provide consumers with information on reliability and resilience performance relevant to their point of connection	26-27	24-25	The timeframe for action ranged from 2024-25 to 2028-29 reflecting the varying views of the benefits of action. People

#	Task	Timing		Perspectives
		Averaged	Fastest	
				advising consumers want faster action. Other views noted the action is dependent on LV management capability
4	Provide consumers with emissions intensity data for energy sources	28-29	24-25	The consensus view is this step has been achieved and effort in this area is not a priority.
7	Assess whether consumers making choices about DER have streamlined access to sufficient information about retail pricing and power purchase options	26-27	24-25	The timeframe for action ranges from 2024-25 to 2028-29 or 2030 and later reflecting the varying perspectives of the benefits of the task. <ul style="list-style-type: none"> people from firms operating new business models saw the capability as very important people from firms in the traditional supply chain saw the impact as small because the capability is not critical to how they operate their businesses
8	Assess whether consumers making choices about DER have streamlined access to sufficient wholesale market information	26-27	24-25	The timeframe for action ranges from 2024-25 to after 2030 reflecting the perspectives of the benefits of action. This information is important, but the impact of not progressing this step was considered low because wholesale information is available now via WITS and EMI, but is not streamlined, ie not necessarily easy to get. Also, there was a view that flexibility suppliers should be market participants and therefore able to access information available to market participants
12	Improve the availability to consumers of information about current and forecast network capacity and constraints	2023	2023	Everyone agreed that work to provide consumers with more information about network capacity and constraints should start this year (2023) or in 2024-25. Type and extent of information is dependent on LV management capability.
14	Provide consumers with reference information and education about historical voltage performance for the LV layer of the network	26-27	2023	The timeframe for action ranged from now (2023) to after 2030 reflecting the perspectives of the benefits of the task, with a view these would mostly accrue to consumers/PV ecosystem and so shouldn't be a priority. Dependent on LV management capability.
16	Make sure information about current and forecast network capacity and constraints is presented in an easy-to-access and understand way	28-29	26-27	The timeframe for action ranged from 2026-27 to 2028-29 or later, with a perspective the task is not practically achievable before 2025 (due to a dependence on LV management capability). Some questioned the extra value of information being presented in a particular way.

Frameworks for transacting flexibility

The Flexibility Plan identifies five options or use cases available to a household, business or community for their CDER. Four of the options directly benefit the consumer through reducing energy costs, reducing emissions and enhancing resilience and reliability. One option is to realise extra value from supplying energy, network and system (ancillary) services.

Supplying energy, network and ancillary services puts the resource (ie, flexibility) in 'market' territory and needing to participate in the frameworks for procurement, contracting, dispatching and paying for the relevant service being supplied.

The tasks have been arranged in the table based on their place in the transaction life cycle:

- **define the services to be supplied** and associated performance specifications (6). Energy and ancillary services are well defined and are formalised. Network-related services are not.
- **pricing and valuing of flexibility** (20, 21). The commercial mechanisms for compensating provision of flexibility need to clear for people to make informed decisions about their investment in flexibility.
- **ability to participate** (28, 30). The ability of resource owners to participate will be made easier by formalising the role of flexibility suppliers and providing visibility of resources to flexibility suppliers and to potential buyers to make aggregation easier, to inform choices about using flexibility, to streamline settlement, and to provide the resources owners with access to more buyers.

- **the procurement process** (24, 32 and 33). Having a clearly documented process for procuring the specific service will make it easier for parties to identify opportunities to participate and invest accordingly.
- **contract terms** (29, 34). These should be consistent for each service across the country. However, consistency should emerge from experience.
- **measuring and paying for services** (31, 36). Measuring delivery of the service and calculating payment relies on communication of information. Data exchange should be streamlined, automated and digitalised by default. Identifying the principles for communication now will accelerate the digitalisation process. The electricity sector needs to digitalise to realise significant benefits.
- **regulatory settings are fit for purpose** (18, 22). The regulatory settings need to be fit-for-purpose to enable the other tasks.

#	Task	Timing		Perspectives
		Averaged	Fastest	
6	Develop a common definition for network services which could be supplied using flexibility, including minimum communication and technical requirements	2023	2023	Everyone thinks this task is urgent. Starting now to develop common product definitions for using flexibility means the resources will become available sooner. Both buyers and suppliers of flexibility want the framework ready ahead of time rather than just in time. This task is particularly critical as it informs choices about several other aspects of the frameworks for transacting flexibility, eg, procurement (33) and measurement and communication (31).
17	Provide clarity around the intent and criteria for using flexibility by network operators	26-27	2023	Most people indicated the outcome is needed by 2026-27, but it was suggested the outcome would result soon (2023) by impending changes by the Commerce Commission to Information Disclosure requirements.
20	Understand the interaction between price-based flexibility and contracted flexibility	24-25	2023	People thought this step should be started in 2023 or 2024-25 because clarity about revenue streams is critical to establishing incentives for efficient supply of flexibility.
21	Develop a common method for valuing flexibility used for network services	24-25	2023	People thought this step should be started 2023 or 2024-25 to provide people with robust pricing/revenue information to make choices about where they supply flexibility. Distributors are working on common methods. This step is dependent on step #6.
28	Explore how to deliver a flexibility resource register	24-25	2023	The timeframe for action ranged from now (2023) to 2028-29. The averaged impact is considered significant. The longer you wait, the more resources there will be not in the tent (and it will be difficult to get them in). A record of resources is needed to have a scalable framework for transacting flexibility because it enables the transition from bespoke and bilateral exchanges to multilateral exchanges which will deliver more benefits to consumers. The 2028-29 timing is when the task is scheduled for the FSR project, and the timing reflecting the needs of the SO.
30	Establish fit-for-purpose participation requirements for flexibility suppliers	28-29	26-27	The timeframe for action ranged from 2025-26 to 2027-28. The view that this step is not required until later in the decade is based on taking a gradualist approach to involving new types of participants in electricity markets based on risk and impact. Action would be warranted sooner if barriers to entry to markets are low OR uptake of resources is delayed by participation requirements
24	Develop a method for providing technical qualification of DER (at scale) to provide ancillary services	26-27	24-25	The timeframe for action ranged from 2024-25 to 2028-29. Most considered the task should occur sooner, but the FSR project has it scheduled for later in the decade.
32	Identify an easy-to-use method and process for providing visibility of and access to opportunities to supply flexibility for network reasons	24-25	24-25	The timeframe for delivering the outcome ranged from 2026-27 or 2028-29. A common platform will be important later (2025+), but initially the focus should be on adopting a common process and method This step is connected to the LV management capability tasks.

#	Task	Timing		Perspectives
		Averaged	Fastest	
33	Develop a scalable and accessible process for procuring flexibility for network reasons	26-27	2023	The timeframe for delivering the outcome ranged from now (2023) to after 2030 <ul style="list-style-type: none"> sooner, because starting small but with the intention to scale up means suppliers can see what the decision-making process looks like now, then, and later later, because RFP processes are suitable now and we can learn over time.
29	Identify a common approach to risk management in consumer contracts	28-29	25-26	The timeframe for action ranged from 2025-26 to after 2030. The view that action is not required until mid-to-late decade is mostly due to hesitancy to commit to specific arrangements while flexibility is in its early days.
34	Identify a common approach to options for risk management in contracts to supply flexibility for network reasons	28-29	26-27	The timeframe for delivering the outcome ranges from 2026-27 to 2028-29 because contracting arrangements and terms will evolve over time.
31	Identify the measurement, communication and connectivity requirements for devices supplying flexibility	24-25	2023	The timeframe for delivering the outcome ranged from 2025-26 to after 2030, but several people said progress should start now because the outcome will require several years. The task is part of the digitalisation of the sector.
36	Identify a common process for validation and settlement of services using flexibility to supply network services and ancillary services	28-29	24-25	The timeframe for delivering the outcome ranges from 2024-25 to after 2030. <ul style="list-style-type: none"> sooner, because it is useful for suppliers to know what things might look like to design their systems later because existing processes are working.
18	Ensure regulatory settings provide Transpower and distributors with sufficient resources, incentives, and permission to explore and use flexibility options	24-25	2023	Majority agreed more effective incentives are needed now (2023) so network operators are involved in learning-by-doing relating to flexibility (and other things). The outcome is dependent on Commerce Commission decisions about the default price path.
22	Ensure regulatory settings enable System Operator to use flexibility options	26-27	2023	The timeframe for action ranged from now (2023) to 2024-25 to 2028-29. The range reflected various perspectives about the right time to start working on this task, including the FSR project has tasks considering new ancillary services and performance requirements which are scheduled for later in the decade and it takes 18 months to 2 years to establish a new co-optimised ancillary service, so it is worth starting early to get ahead of the need.

Developing and delivering DER and flexibility products and services

Flexibility is currently a fringe product, particularly flexibility obtained from small-scale suppliers.

Several electricity services suppliers are developing products which use existing DER and flexibility. However, not many households, businesses or communities currently have the ability or incentive to supply flexibility to support operation of the power system, either because they don't have a resource (eg, solar, battery or EV charger), the resource isn't flexible, or the incentives are insufficient (eg, no-one wants to purchase the flexibility).

We do not know if, how or when flexibility will be supplied and used at scale. Some flexibility use cases will become a mass-market product. Some will remain niche. Finding out requires trying out new things. Three steps in the Flexibility Plan are focused on trying things out:

- provide consumers with the ability to choose across the range of options for buying and selling electricity services with separate providers (5)
- demonstrate the effectiveness of using flexibility for network reasons (19)
- demonstrate the effectiveness of using flexibility for ancillary services (23).

#	Task	Timing		Perspectives
		Averaged	Fastest	
5	Provide consumers with the ability to choose across the range of options for buying and selling electricity services with separate providers	28-29	2023	The timeframe for action ranged from now (2023) to 2028-29 or after 2030 reflecting varying views of the benefits of the task. Parties focused on developing new consumer facing products see the task as more urgent. The KO and MTR pilots are underway.
19	Demonstrate the effectiveness of using flexibility for network reasons	24-25	2023	Everyone agreed this outcome is needed now (2023) or 2024-25.
23	Demonstrate the effectiveness of using flexibility for ancillary services	26-27	2023	The timeframe for action ranged from now (2023) to 2024-25 to 2028-29. The range is based on views that: <ul style="list-style-type: none"> flexibility is already used for ancillary services, and you either meet the procurement requirements or you don't flexibility isn't a first-choice option following the digitalisation of special protection schemes

Appendix A: notes on the expected timing and impact of not undertaking each step in the Flexibility Plan 1.0

This table collates the commentary of the three separate groups of FlexForum participants regarding the timing and impact of delivering each step in the Flexibility Plan.

#	Step	Expected outcome	Timing - when is the outcome needed?	What is the impact of not delivering the outcome?
A	Scope and confirm a delivery Model for the Flexibility Plan	A delivery model for the Flexibility Plan which ensures there is coordinated action, collaboration and accountability	An entity to coordinate activity is required now (2023). Coordination is critical to efficient and timely delivery of all the other tasks in the Flexibility Plan.	An entity to coordinate activity and provide leadership is necessary to enable a clear overarching narrative, collaboration and coordination. All 3 groups considered the impact would be material (3). The impact of going without a coordinating entity will be delayed progress towards electrification and uptake of flexibility, particularly due to a continued reliance on regulatory processes to resolve conflict between opposing views advocating outcomes driven by self-interest. Electrification will occur and flexibility will emerge, but both will take more time and will be more expensive. Electricity services will be less reliable and less affordable, and decarbonisation will take longer.
B	Ensure coordination between agencies and bodies with a role in supporting learning-by-doing.	Learning-by-doing is easier, particularly for business model demonstration and commercialisation	More effective learning-by-doing frameworks are needed now (2023) because they are critical to accelerating progress and are currently inadequate. As an example of the problem and opportunity: <ul style="list-style-type: none"> flexibility is technically capable and available to assist in resolving the 2023 winter peak problem it is not being offered due to the absence of incentives and dispatch processes an effective learning-by-doing framework would provide a pathway to use flexibility in winter 2023 and understand how to make it BAU in subsequent years. 	Learning-by-doing is critical to the electrification transition and flexibility. The underpinning frameworks are a key requirement. Success in this area in Australia, United Kingdom etc is directly linked to the learning-by-doing funding models The impact was considered material (3) by two groups and ginormous (5) by the third. Without adequate support for learning-by-doing a firm needs to leap to defining a solution without properly understanding the situation and options. This will slow everything down because firms are reluctant to invest in new methods and solutions. It will also increase costs because there will be more duplication of effort.

#	Step	Expected outcome	Timing - when is the outcome needed?	What is the impact of not delivering the outcome?
				Electricity services will be less reliable and less affordable, and decarbonisation will take longer.
C	Complete a customer journey mapping exercise to inform further iterations of the Flexibility Plan	An example is in the UKPN Whole systems strategy (from p16)	Customer journey mapping is needed in the near term 2024-25, and as an ongoing practice, to ensure rules are designed to reflect consumer expectations. Journey mapping by individual firms for their end customers is less time critical (5). This research may not be shared due to commercial reasons.	Perspectives on the importance of customer journey mapping varied based on assumptions about its role. The impact assessment ranged from noticeable (2) to material (3) based on whether journey mapping is seen as something best done by individual firms for commercial reasons (and so most likely kept in confidence), or its purpose is to ensure a consumer lens on design of processes, practices and rules for proposed market settings. Implicitly, the journey mapping outcomes would be shared widely. The impact of not thinking about how consumers and customers may interact with existing and proposed market settings was considered material.
1	Identify what information and education can be provided to consumers and to their advisers to assist decisions about DER and flexibility	People advising consumers about DER and flexibility options have access to authoritative and useable information about obligations and options associated with using DER and flexibility	The first step is to get the sector on the same page, and then look at what is needed. This should start either this year or by 2024-25. Initial information is likely to be energy literacy, and then framing flexibility in a way that means something to consumers. It's important to start soon because each year things are not clear, a growing proportion of DER and buildings will not be flexibility capable or designed around electrification. <ul style="list-style-type: none"> information and advice are provided to commercial and industrial customers by their advisers or suppliers. But the information isn't always acted on because the decision-maker is not the site/operator, eg, landlord v tenant it will take time to work out how to provide information effectively and be confident the relevant messages are getting through (versus a hit and hope approach) existing information sets and delivery channels are not fit-for-purpose, eg, GEN-less is to high level, Powerswitch not a source for this type of information. A key element of this step is joining the dots between the hardware/equipment suppliers and installers and flexibility	Identifying the information the sector should provide to consumers and their advisers will be an ongoing exercise. Different segments will have different requirements. The impact of not providing information ranged from material (3) to significant (4). The impact of not doing something was seen as greater by people dealing directly with consumers (particularly households and smaller businesses) making long-lived decisions, and not necessarily thinking about electrification and flexibility. As a reference point, 45,119 new houses were consented in 2020-21. Some proportion of these will not be electrification ready. Flexibility suppliers are not involved at this point. The major impacts of not progressing this step are the opportunity cost of DER which is not flexibility capable and the costs of rewiring and reconfiguring things later. <ul style="list-style-type: none"> DER will be under-used resulting in higher electricity costs and greater risk of reduced reliability because there is not sufficient flexibility. The impact is evident in Australia where most solar PV has been installed without capability to be flexible

#	Step	Expected outcome	Timing - when is the outcome needed?	What is the impact of not delivering the outcome?
			suppliers. Currently there are few packaged product offerings, so there is no guarantee consumers of any size are getting good advice at point of sale about capability needed to leverage the market value of flexibility. Packaging things incorrectly will lead to different decisions and will affect the amount of flexibility resources available in the future.	<ul style="list-style-type: none"> households and businesses will need to rewire and reconfigure their situation – this means they either incur extra costs for no extra utility, eg, substituting a gas stove for an electric stove, or slower reduction in carbon emissions (ie, the gas is still be used).
2	Ensure consumers and their agents have streamlined (automated) access to historical consumption information	<p>Consumers and their agents have streamlined access to:</p> <ul style="list-style-type: none"> historical consumption data connection-related data 	<p>The timeframe for action ranged from immediately to mid-decade to 2030 and later reflecting variation in views on the benefits of the task.</p> <p>The outcome was seen as a potential output of digitalisation and the sector ceasing to rely so heavily on manual data exchange processes. However, sector-wide digitalisation is likely to require several years at least to achieve, and while it should provide the relevant capability will not necessarily result in the relevant processes.</p>	<p>There was a divergence of perspectives on the impact of not delivering this step from small (1) to ginormous (5).</p> <ul style="list-style-type: none"> people from firms in the traditional supply chain saw the impact as small because the capability is not critical to how they operate their businesses and, in some cases, delivering the capability would cause them to incur costs people from distributors saw value in streamlined access to consumption data to support network planning and design activities (see steps #12, 13 & 14) people from firms operating new business models saw the capability as critical to consumer-friendly innovation, giving examples of business models and services which foundered in the absence of streamlined data. <p>The juxtaposition in the perspectives potentially reflects the long-standing debate about the processes for exchanging consumer data.</p> <p>The benefits of streamlined data were greater innovation because you cannot undertake consumer friendly innovation on slow data. The value is ability to develop new products and services, including lower value services due to the significant difference to input costs of automated data exchange (cents/transaction) versus manual options (\$10-100's/transaction).</p>
3	Provide consumers with information on reliability and resilience performance relevant to their point of connection	Consumers (or their advisers) have information on reliability and resilience outcomes related to	<p>The timeframe for action reflected the perspectives of the benefits of action, ranging from 2024-25 to 2028-29.</p> <p>However, regardless of the perspectives on when the impacts will be experienced, the timing for action is depends on Commerce Commission decisions:</p>	<p>There was a divergence in the impact ranging from small (1) to material (3).</p> <ul style="list-style-type: none"> people from distributors – the source of the information – noted providing it relies on low voltage management capability, and did not consider there was much benefit

#	Step	Expected outcome	Timing - when is the outcome needed?	What is the impact of not delivering the outcome?
		their point of connection	<ul style="list-style-type: none"> to require distributors through Information Disclosure rules to provide more reliability information. Distributors could provide SAIDI and SAIFI data at the HV and MV layers (ie, by substation), but don't currently because it is not required. to provide the ability and incentives for distributors to invest in low voltage management capability (steps #12 and 13). Distributors don't have the capability to collect SAIDI and SAIFI data for the LV layer. 	<p>of providing granular reliability/resilience information available now</p> <ul style="list-style-type: none"> people advising consumers about investing in DER, eg, EV charging or site configuration, see the information as relevant to specific investments in specific locations, eg, DER for onsite flexibility. <p>Reliability and resilience information is an input to decision-making (see step #1). The extent to which the availability/lack of this information affects consumer decisions (ie, the costs of various options for obtaining a specific level of reliability) is not known.</p> <p>For individual customers making decisions now (without this information), the impact is material because it affects long-lived investment decisions. The individual impacts will accumulate over time, particularly with electrification of small and medium sized businesses.</p>
4	Provide consumers with emissions intensity data for energy sources	Consumers can access emissions intensity data to inform choices about energy sources	The consensus view is this step has been achieved and effort in this area is not a priority.	<p>The consensus view is consumers have access to emissions intensity data for electricity generation via the EM6 tool and MfE-produced factions on other fuel sources.</p> <p>A nice to have would be information on the forecast emissions intensity of the next unit of generation to understand the emissions impact of not operating.</p>
5	Provide consumers with the ability to choose across the range of options for buying and selling electricity services with separate providers	Consumers can choose across a range of options for buying and selling electricity services, ie, amendments to the Code to support multiple trading relationships, plus associated changes to market system functionality	<p>The timeframe for action ranged from now (2023-24) to 2028-29 or after 2030 reflecting varying views of the benefits of the task.</p> <p>Several people noted the solution was known and quite straight-forward to implement, simply involving working out how to meter and settle different services.</p>	<p>There was a divergence of perspectives on the impact of not delivering this step ranging from noticeable to significant.</p> <p>The perspective the ability to have multiple suppliers is not important was due to a view the issue is easily solved, just requiring effort to work out how to meter and settle several services or is not immediately relevant to uptake of flexibility.</p> <p>Electrification and flexibility would emerge, but the options available to consumers to maximise value of DER would be reduced (ie, less consumer choice/value).</p> <p>The impact was significant for people who see benefits from the ability to offer consumers the contract with more than</p>

#	Step	Expected outcome	Timing - when is the outcome needed?	What is the impact of not delivering the outcome?
				<p>one supplier of electricity services at a time. The impacts of not providing this ability included:</p> <ul style="list-style-type: none"> restricting energy management options (including flexibility) with every new and existing commercial building restricting the development of community energy schemes reduce use of DER and less value to consumers due to less competitive pressure, ie, less innovation to develop more complex future services and business models.
6	Develop a common definition for network services which could be supplied using flexibility, including minimum communication and technical requirements	An initial common specification for network services which can be supplied via flexibility	<p>Starting now to develop common product definitions for using flexibility means the resources will become available sooner. Both buyers and suppliers of flexibility want the framework ready ahead of time rather than just in time.</p> <p>No one took the view that a common product definition existed right now. Dependencies include step #20 on valuing and pricing flexibility.</p>	<p>Everyone agreed the benefits of developing a common definition for flexibility services are significant (3 or greater), noting that the definition will be a product of iterative learning-by-doing.</p> <ul style="list-style-type: none"> estimates of the value of DER indicates the three biggest sources of value are network-related, and product definition are critical to establishing revenue streams by providing clarity about requirements across the country support design and product development choices by original equipment manufacturers and customers regarding site configuration support development of communication and connectivity capability by buyers and sellers of flexibility. <p>Without common product definitions, electrification and flexibility will emerge, but both will take more time and will be more expensive. Electricity services will be less reliable and less affordable, and decarbonisation will take longer.</p>
7	Assess whether consumers making choices about DER have streamlined access to sufficient information about retail pricing and power purchase options	Consumers (or their agents) have streamlined access to retail pricing and power purchase information	The timeframe for action ranges from 2024-25 to 2028-29 or 2030 and later reflecting the varying perspectives of the benefits of the task.	<p>There was a divergence of perspectives on the impact of not delivering this step from small to ginormous. Views were like those given for step #2.</p> <ul style="list-style-type: none"> people from firms in the traditional supply chain saw the impact as small because the capability is not critical to how they operate their businesses, or the outcome is difficult to deliver given assumptions about use cases

#	Step	Expected outcome	Timing - when is the outcome needed?	What is the impact of not delivering the outcome?
				<p>(eg, investment in Powerswitch to help households make choices has not obviously delivered much), or action should be driven by competition and market dynamics</p> <ul style="list-style-type: none"> people from firms operating new business models saw the capability as very important to DER planning/investment decisions and in automating the management of DER. <p>Without streamlined access to retail pricing information, electrification and flexibility will emerge. However, there may be less consumer-focused innovation and fewer new products and services which help to maximise the benefits to consumers of flexibility.</p> <p>The outcome of this step is an input needed for step #1 and enabling households and businesses to make well informed choices about DER and flexibility.</p>
8	Assess whether consumers making choices about DER have streamlined access to sufficient wholesale market information	Consumers (or their agents) have streamlined access to wholesale market information	The timeframe for action ranges from 2024-25 to after 2030 reflecting the perspectives of the benefits of action.	<p>The ability to access wholesale price information was considered important to supporting automation and developing services.</p> <p>However, the impact of not progressing this step was considered low because wholesale information is available now via WITS and EMI, but is not streamlined, ie not necessarily easy to get.</p> <p>The low impact reflected a view that flexibility suppliers should be market participants and therefore able to access information available to market participants.</p> <p>The outcome of this step is an input needed for step #1 and enabling households and businesses to make well informed choices about DER and flexibility.</p>
9	Review whether connection requirements enable rapid uptake of DER	Connection requirements (policies) support accelerated electrification through fit-for-purpose network access by DER and flexibility	<p>Everyone agreed that connection requirements should be considered either this year (2023) or in 2024-25. The general view was effort is required sooner than later to be prepared for an expected surge in connection applications due to electrification and people installing DER.</p> <ul style="list-style-type: none"> a view that the variation in processes and requirements across distribution networks increases the time and 	<p>The general view is that the fit-for-purpose connection requirements will deliver significant benefits.</p> <ul style="list-style-type: none"> they provide an tool set for building engineers and designers (eg, HVAC and building services) to calculate consumption from a time of use basis existing connection requirements assume an N-1 reliability standard. Applications are difficult and time-

#	Step	Expected outcome	Timing - when is the outcome needed?	What is the impact of not delivering the outcome?
			<p>costs of connection applications. This issue is connected to step #27.</p> <ul style="list-style-type: none"> a need to build understanding and develop practices so distributors can adopt requirements which enables the safe and secure connection of large DER ahead of an expected surge in connection applications. A key question is working out what size DER is 'large' because distributors are not able to assess every connection application. This issue is connected to step #10 & 11. 	<p>consuming if asking from something different, eg, for C&I customers, based on using flexibility to keep down connection and operating costs.</p>
10	Review after diversity maximum demand (ADMD) assumptions	Network planning and design assumptions (eg, ADMD) take account of the impacts and capability of DER and flexibility in making trade-offs between affordability, reliability and customer expectations and preferences	<p>Everyone agreed that ADMD assumptions should be considered either this year (2023) or in 2024-25.</p> <p>Thinking about ADMD assumptions is a part the effort to build LV management capability and an input to changes to planning and forecasting assumptions which underpin network design.</p> <p>The step is dependent on work to understand how DOEs (step #11) and flexibility etc will alter planning assumptions and practices (steps #13, 19 and B) and connection decisions (step #9).</p>	<p>Everyone agreed that fit-for-purpose ADMD assumptions would deliver a significant benefit.</p> <p>The impact of keeping the same assumptions is to bake in existing practices/costs compared to a potentially cheaper alternative which takes account of DER and flexibility. However, there currently is no experience or evidence on which to base change.</p> <p>Electrification will occur and flexibility will emerge, but both will take more time and will be more expensive. Distribution networks will be less reliable and higher cost due to less efficient use of network capacity. At the same time, consumers will be constrained from connecting and using DER causing decarbonisation to take longer.</p>
11	Explore the use of dynamic operating envelopes (DOEs)	Progress towards offering varying (dynamic) levels of network access to make better use of existing network capacity	<p>Everyone agreed that work to explore DOEs should start either this year (2023) or in 2024-25.</p> <p>This work is a part of the effort needed to build LV management capability.</p>	<p>Everyone agreed that distributors need to develop the capability to use DOEs, and that the development should involve flexibility suppliers, retailers etc who will be using DOEs.</p> <p>Electrification will occur and flexibility will emerge, but both will take more time and will be more expensive. Distribution networks will be less reliable and higher cost due to less efficient use of network capacity.</p>
12	Improve the availability to consumers of information about current and forecast network capacity and constraints	More information is available consumers (or their agents) about network headroom at the HV, MV and LV layers	<p>Everyone agreed that work to provide consumers with more information about network capacity and constraints should start this year (2023) or in 2024-25.</p>	<p>Everyone agreed there are material (3) or significant (4) benefits to be had from providing consumers (or their advisers) with network capacity and constraint information.</p> <p>Not having visibility limits options. Recent distributor RFPs highlight the benefit of signalling opportunities to use flexibility. Knowing two years in advance means flexibility</p>

#	Step	Expected outcome	Timing - when is the outcome needed?	What is the impact of not delivering the outcome?
			<p>This work is a part of the effort needed to build LV management capability – it will show where flexibility is viable and useful.</p> <p>Regardless of the perspectives on when the impacts will be experienced, the timing for action is depends on Commerce Commission decisions to provide the ability and incentives for distributors to invest in low voltage management capability (step #13). This will not happen until 2025.</p>	<p>suppliers can pre-invest to recruit resources. The impact is the lost opportunity to use flexibility in specific cases, and slower development of flexibility resources (due to less investment).</p> <p>Electrification will occur and flexibility will emerge, but both will take more time and will be more expensive. Distribution networks will be less reliable and higher cost due to less efficient use of network capacity. Decarbonisation will be slower due to reduced incentives to invest in electrification and DER.</p> <p>The information provided through this step should also satisfy the outcome of step #3.</p>
13	Ensure distributors have the ability and incentive to invest in capability to obtain and produce network information to enable consumer decisions	Explicit and unambiguous incentives (funding) exist for distributors to obtain and use historical consumption and power quality data and operational (real-time) consumption and power quality data.	<p>Everyone agreed this outcome is needed now (2023). This step is fundamental to progress with electrification and flexibility and a condition precedent for all the steps relating to LV management capability (#12, 11, 10), plus others.</p> <p>The acknowledged challenge is the timing for action is depends on Commerce Commission decisions to provide the ability and incentives for distributors to invest in low voltage management capability. This will not happen until 2025.</p>	<p>Everyone agreed there are ginormous benefits to be had from ensuring distributors have the ability and incentive to invest in LV management capability.</p> <ul style="list-style-type: none"> every distributor talking about this matter – it is a critical task nothing will happen in the distribution space without the visibility enabled by investment in LV management capability
14	Provide consumers with reference information and education about historical voltage performance for the LV layer of the network	Consumers (their agents) have access to historical voltage performance for the LV layer of the network	<p>The timeframe for action ranged from now (2023) to after 2030 reflecting the perspectives of the benefits of the task.</p> <p>The outcome is dependent on LV management capability, though some people noted that flexibility suppliers are collecting voltage information through inverters.</p>	<p>There was a divergence of perspectives on the impact of not delivering this step ranging from noticeable (2) to material (3).</p> <p>People from firms in the traditional supply chain saw the impact as noticeable as it only affects people with solar.</p> <p>People offering or advising about solar-related services noted the lack of this information impacts decisions to invest, including understanding the extent it might be curtailed.</p> <p>There are wide-spread issues with distributors meeting voltage obligations. Voltage information would enable distributors to advise appropriate volt-Watt/volt-Var settings for inverters.</p> <p>The impact will be slower uptake of solar (and small-scale battery storage, to the extent that is paired with solar). The effect will grow as more people install solar.</p>

#	Step	Expected outcome	Timing - when is the outcome needed?	What is the impact of not delivering the outcome?
15	Review voltage limits to ensure they do not create a barrier to uptake of DER	The most straight-forward solution is to adopt the voltage limits being introduced in Australia and allow voltage to be 10% above and 6% below the 200-250V range.	<p>Everyone agreed the voltage limits for distribution networks need to be changed now (2023).</p> <p>The ENA asked MBIE in February 2022 to amend the voltage limits to align with those in Australia.</p> <p>This step is connected to #14 but is not dependent.</p>	<p>The perspectives on the benefit of updating existing voltage limits ranged from noticeable to ginormous.</p> <p>People from firms in the traditional supply chain saw the impact as noticeable as it only affects people with solar.</p> <p>People offering or advising about solar-related services indicated the existing voltage limits are already exceeded in many networks, causing solar production to be inefficiently curtailed. Network operating practices do not account for current (low) uptake of solar and DER.</p> <p>The impact is the value of DER (solar) is unnecessarily reduced. This has a direct cost to existing DER owners and discourages new investment in solar. Updating the voltage limits to reflect international practice, eg, Australian standards, would result in more efficient use of existing network capacity and encourage additional investment in solar.</p>
16	Make sure information about current and forecast network capacity and constraints is presented in an easy-to-access and understand way	Network capacity and constraint information is accessible and easy to use by consumers (or their agents)	<p>The timeframe for action ranged from 2024-25, noting it is not practically achievable before 2025, to 2026-27 or 2028-29.</p> <p>The range reflects perspectives on dependencies and the extra value of information being presented in a particular way.</p> <p>This step is dependent on steps #13 and #12 and linked to step #17.</p> <ul style="list-style-type: none"> • #13 is to make sure distributors have the ability and incentive to invest in LV management capability • #12 is to ensure distributors use their LV management capability to, amongst other things, provide network users (consumers and their advisers) with better/more information about network conditions, eg, constraints etc • #16 (this step) is to make sure the information provided to network users is easy to understand and use 	<p>People agreed the benefits of providing useful and usable information about network conditions were material (3) to significant (4).</p> <p>People indicated the value derives from people having the ability to know when and where, with sufficient notice, that flexibility might be called for or to understand the factors affecting choices to electrify in a particular location (eg, amount of spare capacity).</p>

#	Step	Expected outcome	Timing - when is the outcome needed?	What is the impact of not delivering the outcome?
			<ul style="list-style-type: none"> #17 is to provide clarity about when, where and why a distributor will decide to consider using flexibility. 	
17	Provide clarity around the intent and criteria for using flexibility by network operators	Criteria documenting when, where and how flexibility could be used by a distributor are available to consumers, flexibility suppliers etc	Most people indicated the outcome is needed by 2026-27, but one person suggested the outcome will be required soon (2023) by impending changes by the Commerce Commission to Information Disclosure requirements.	<p>People agreed there are noticeable to material benefits from network operators using a clear process for deciding when and where flexibility may be used, and from having a single set of communication tools (versus bespoke RFP processes).</p> <p>The outcome is expected to accelerate electrification and uptake of flexibility by providing greater certainty about the triggers and timing for using flexibility, which will drive investment in flexible DER. Flexibility suppliers repeatedly highlighted the importance of receiving forward notice, eg, 18 months to 2 years.</p>
18	Ensure regulatory settings provide Transpower and distributors with sufficient resources, incentives, and permission to explore and use flexibility options	Transpower and distributors are actively engaged in learning-by-doing to use flexibility because there are explicit and unambiguous expectations to build experience with using flexibility, including through supporting business model development	<p>Everyone agreed more effective incentives are needed now (2023) so network operators are involved in learning-by-doing relating to flexibility (and other things).</p> <p>The outcome is dependent on step #B and on Commerce Commission decisions about the default price path from 2025.</p>	<p>Everyone agreed there are ginormous benefits available from introducing effective incentives for network operators to get involved in learning-by-doing.</p> <p>Incentives are currently inadequate, particularly for collaborative and experimental projects.</p> <p>Without adequate support for learning-by-doing distributors are reluctant to invest in new methods and solutions, particularly those involving third parties and uncertain performance. Electricity services will be less reliable and less affordable, and decarbonisation will take longer.</p>
19	Demonstrate the effectiveness of using flexibility for network reasons	Progress towards flexibility becoming a BAU network management tool for making better use of existing network capacity	Everyone agreed this outcome is needed now (2023) or 2024-25. It is linked to steps #B and #18 because demonstrating the effectiveness of flexibility solutions involves learning-by-doing.	<p>Everyone agreed there are significant impacts of not demonstrating the effectiveness of flexibility solutions.</p> <p>Investing in learning-by-doing means we move up the learning curve faster and realise the benefits of learning sooner. Several people suggested that network planners are not yet confident in flexibility solutions, even with the demonstration projects undertaken to date by Aurora and Powerco.</p> <p>Electrification will occur and flexibility will emerge, but both will take more time and will be more expensive. Distribution networks will be less reliable and higher cost</p>

#	Step	Expected outcome	Timing - when is the outcome needed?	What is the impact of not delivering the outcome?
				due to less efficient use of network capacity. Decarbonisation will be slower due to reduced incentives to invest in electrification and DER.
20	Understand the interaction between price-based flexibility and contracted flexibility	Pricing for wholesale, ancillary transmission, network services provide ability and incentive for people to supply flexibility	The timing for progress on this step was this year (2023) or 2024-25 because clarity about revenue streams is critical to establishing incentives for efficient supply of flexibility.	<p>People agreed the benefits of this outcome are material because pricing frameworks and signals underpin investment in flexibility and DER.</p> <ul style="list-style-type: none"> existing price signals are not sufficient to get the desired flexibility response, eg, a limited portion of consumption is exposed to the wholesale price so hoping for a price response is crossing your fingers pricing signals provide a measure of confidence to the buyer about the prospect of a response and to the seller about the prospect of a bankable value stream the source of the pricing signal influences the accessibility of the value stream, eg, there is a difference between contracted flexibility and price-based flexibility (via the spot price and retail tariffs) services need to be recognised and compensated, eg, if voltage is outside legislated thresholds, then the automated inverter volt-watt and volt-var response is effectively free flexibility (to correct voltage). <p>Electrification will occur and flexibility will emerge, but both will take more time and will be more expensive. Decarbonisation will be slower due to reduced incentives to invest in electrification and DER.</p>
21	Develop a common method for valuing flexibility used for network services and making associated investment decisions	Consumers and flexibility suppliers have information on price ranges for flexibility	The timing for progress on this step was this year (2023) or 2024-25. Distributors are working on common methods. This step is dependent on step #6.	<p>The benefits of a common approach were considered significant by most people as an input to regulatory decisions about revenue allowances and to indicate how much value could be found across revenue streams. The latter would enable scaling and portfolio growth.</p> <p>The perspective that the benefit was less (noticeable) was based on the difference between having a common method versus many methods. Each scenario provides clarity about the breakeven price of flexibility (for the network operator), but one involves greater transaction costs.</p>

#	Step	Expected outcome	Timing - when is the outcome needed?	What is the impact of not delivering the outcome?
				Several people suggested they don't mind how the numbers are worked out they just want to know the number. (It was agreed that some people would be interested in the black box.) A further perspective was to focus on learning first, then develop a method(s).
22	Ensure regulatory settings enable System Operator to use flexibility options	Framework for procuring ancillary services does not create barriers to the System Operator using flexibility for existing or new reasons	<p>The timeframe for action ranged from now (2023) to 2024-25 to 2028-29.</p> <p>The range reflected various perspectives about the right time to start working on this task, including the FSR project has tasks considering new ancillary services and performance requirements which are scheduled for later in the decade and it takes 18 months to 2 years to establish a new co-optimised ancillary service, so it is worth starting early to get ahead of the need.</p> <p>This step is connected to steps #23 and #24.</p> <ul style="list-style-type: none"> • #22 (this step) is about enabling the SO to obtain new ancillary services and ensure existing services can use flexible resources • step #23 is about providing the SO with the ability to test new resources (flexibility) and prove the performance • step #24 is about the SO incorporating its experience and standardising the process for that class of product/service. 	<p>People consider the benefits of this task range from noticeable to significant.</p> <ul style="list-style-type: none"> • people viewing the benefits as on the low side suggested it's not as easy as it could be to offer flexibility into ancillary services markets, but things are better than they were (since the Code has become more technology agnostic). • people viewing the benefits on the high side consider that settings which don't permit flexibility have a fundamental impact on suppliers, particularly because ancillary services are an existing revenue stream and a pathway to scaling the use of flexibility. <p>The impact of this task depends on whether it is seen in isolation or more widely as an enabler of more.</p> <ul style="list-style-type: none"> • with the siloed view delay on progressing this task has a lesser impact because the value of ancillary services is not significant and 'we can shoehorn flexibility into existing arrangements, but this is hard and will get harder' • with the broader view the impact is much greater because working to integrate flexibility into existing or new ancillary services provides a doorway to scaling flexibility (even if the value is not great), particularly because they are island-wide (easier to do) and getting paid is the fastest way of bringing things to market.
23	Demonstrate the effectiveness of using flexibility for ancillary services	More experience through learning-by-doing is required to prove when, where and how flexibility can be used to provide ancillary	<p>The timeframe for action ranged from now (2023) to 2024-25 to 2028-29. The range reflected perspectives that:</p> <ul style="list-style-type: none"> • flexibility is already used for ancillary services, and you either meet the procurement requirements or you don't 	<p>People consider the benefits of this task range from small to significant depending on whether flexibility is seen as a reasonable option for ancillary services.</p> <p>Some people thought use cases are being demonstrated, but nagging doubt remains and there is a fair bit of learning to do before bedding down repeatable processes.</p>

#	Step	Expected outcome	Timing - when is the outcome needed?	What is the impact of not delivering the outcome?
		services, and how that use might impact distribution network operations.	<ul style="list-style-type: none"> flexibility isn't a first-choice option following the digitalisation of special protection schemes (involves taking on a higher risk profile for a short period of time). 	This step is very dependent on the choice made for step #22.
24	Develop a method for providing technical qualification of DER (at scale) to provide ancillary services	The Procurement Plan is updated to include fit-for-purpose testing and qualification processes suited to streamlined participation of small-scale flexibility resources	<p>The timeframe for action ranged from now (2023) to 2024-25 to 2028-29. The range reflected perspectives that:</p> <ul style="list-style-type: none"> sooner, because clarity about expectations of a qualification process is needed sooner because it affects decisions about technical capability and functionality, and knowing what the requirements are will inform investments in the capability of flexibility suppliers sooner, because the volume of flexible resources interested and able to supply ancillary services is growing, and a scalable qualification process should help to avoid a participation queue, and higher ancillary services costs due to resources being left out in the cold later because the task is part of the FSR project and scheduled for later in the decade. 	<p>The benefits of progressing this task ranged from noticeable to material.</p> <p>The key impacts of this step are to restrict the ability of flexibility suppliers to access a revenue stream and more expensive ancillary services due to constrained supply.</p> <p>The source of the impact is limits on the ability of flexibility resources to qualify to supply ancillary services given expectations about the growing volume of resources and insufficient qualification capacity to cope with this volume.</p>
25	Identify minimum technical standards for devices such as EV chargers to make flexibility accessible and available	<p>Households, businesses and DER suppliers can refer to minimum technical standards when making choices about the various brands and models of EV charger, solar panels, inverters etc</p> <p>A view on what minimum technical standards are needed for devices capable of supplying flexibility</p>	<p>The timeframe for action ranged from now (2023) to 2024-25 to 2028-29. The preference of action sooner than later reflected perspectives that:</p> <ul style="list-style-type: none"> people are making choices about DER right now, and each year we do not having a view on minimum technical standards and capability raises the risk that DER, eg, chargers, will not have the capability you would like the UK approach signalled expectations well ahead of time, and there was a time limited subsidy for people to scale up operations to avoid price shock a more thoughtful and consumer-focused solution might be more enduring than relying on regulated standards, but will take more time if flexibility suppliers (including OEMs) and consumers are confident that flexibility will deliver value equivalent 	<p>People considered the impact of this outcome ranged from noticeable to material, while noting the outcome requires some difficult decisions which impact future capability and availability of resources.</p> <ul style="list-style-type: none"> smartness in an EV charger incurs an extra \$300-\$500 costs. The supplier and consumers currently must hope that value obtained from flexibility will make this extra cost worthwhile, but people also need to know about the opportunity and be confident the extra expense is worth it in 10 years we expect unmanaged EV charging will cost us all through worsening reliability and higher network charges. Using technical standards would shift these future costs from everyone to individuals now. <p>A further perspective was to reframe the question to focus on how to achieve high participation rates (rather than focus on</p>

#	Step	Expected outcome	Timing - when is the outcome needed?	What is the impact of not delivering the outcome?
		A view on whether the minimum standards need to be mandated	<p>to the cost of obtaining the capability, then products and consumer preferences will emerge that deliver the desired outcome. If this confidence is not there, then people will not invest in the capability and reactive, bottom of the cliff mandates will be rushed into place</p> <ul style="list-style-type: none"> reacting to events as they happen is very expensive and mandates can backfire. <p>This step is connected to #31 on communication and connectivity and to #9 on connection requirements.</p>	technical standards), particularly given retro-fitting is very costly.
26	Ensure technical standards for devices remain up to date and interlinked with international standards	Technical standards should always remain up to date.	The timeframe for action ranged from now (2023) to 2025-26. The preference of action in the near to medium-term reflects perspectives that it is important to keep things up to date, particularly for internationally used standards which drive manufacturing decisions.	<p>The expected impact of this outcome is material to significant because device standards:</p> <ul style="list-style-type: none"> represent best practice for safety inconsistency causes confusion and uncertainty, which may discourage manufacturers and suppliers <p>An example shared was that about 25% of connections on a network with solar experience regular over-voltage events due to unnecessarily tight voltage thresholds, with these DER owners experiencing reduced yield and value (by up to 80% at peak generation times).</p>
27	Review whether connection application processes and connection standards enable rapid uptake of DER	Connection processes avoid resourcing issues for distributors and avoid delays and unsatisfactory experiences for consumers as more requests for new or upgraded connections are received.	<p>The timeframe for action ranged from now (2023) to 2025-26. The preference of action in the near to medium-term reflects perspectives that:</p> <ul style="list-style-type: none"> application processes are not currently fit-for-purpose because the information needed by people wanting to connect (about various connection sizes etc) isn't available applications timeframes are longer than desirable. It can take 9 months or more to get answers to questions (and longer for a response). the outcome depends on LV management capability to automate assessment of new/upgraded connections on hosting capacity, plus having a reliable mechanism for collating information about the location/capability of DER. 	<p>The expected impact of this outcome ranges from noticeable to significant because of the cost of time and effort associated with connection processes.</p> <ul style="list-style-type: none"> it can take months currently to get answers to application requests, which slows down electrification and decarbonisation application processes based on historical network use, ie, without flexibility, mean alternative proposals, ie, with flexibility take longer and involve extensive back and forth extended timeframes for finalising applications raise costs of connecting parties due to paperwork and cost of time. The timeframes reflect insufficient capacity and capability to assess applications, with slow responses due conservative decision-making in the absence of good information about network conditions (and the impacts

#	Step	Expected outcome	Timing - when is the outcome needed?	What is the impact of not delivering the outcome?
			This step is connected to #9 on connection requirements, #28 (having a register) and partly dependent on building LV management capability.	<p>of connecting DER in a location where conditions may be adversely affected).</p> <p>People also highlighted the potential for increased costs (in effort and time) due to application processes extending to cover DER which is currently not subject to these requirements.</p> <p>The issue applies to both distribution and transmission.</p>
28	Explore how to deliver a flexibility resource register (including DER other than distributed generation)	<p>Identify extra registry fields needed for extra visibility DER and flexibility</p> <p>Options should be explored and tested to ensure the most reasonable approach is selected to balance the trade-offs between the costs and intrusion into consumer affairs and benefits of visibility of DER.</p>	<p>The timeframe for action ranged from now (2023) to 2028-29. The diverging views on the timing for action reflect perspectives that:</p> <ul style="list-style-type: none"> • sooner, the longer you wait, the more resources are not in the tent (and it will be difficult to get them in). It would be most useful to have a list of resources now, including to support learning-by-doing • later, because the task is part of the FSR project and scheduled for later in the decade (because this is when the SO thinks it will need the information; noting there are other more pressing use cases). 	<p>The expected impact of this outcome ranges from material to significant because visibility (in an accessible record) or flexibility resources will spur their use and leveraging any value. (Put another way, what you don't know about you cannot use, and may hurt you)</p> <p>Most of the commentary related to design and implementation, such as the threshold for including resources and granularity.</p>
29	Identify a common approach to risk management in consumer contracts for services relating to flexibility which ensures a fair and reasonable allocation of risk	<p>Common and fair terms of trade for flexibility, particularly relating to risk management</p> <p>In the longer-term, standardisation of contracting arrangements.</p>	<p>The timeframe for action ranged from 2025-26 to after 2030. The view that action is not required until mid-to-late decade is mostly due to hesitancy to commit to specific arrangements while flexibility is in its early days, and a question whether any action is needed given existing consumer protection laws.</p> <p>Linked to #34.</p>	<p>The expected impact of this outcome is small to noticeable due to the existence of existing consumer protection legislation and the benefits of building experience before committing to contractual arrangements.</p>
30	Establish fit-for-purpose participation requirements for flexibility suppliers	<p>A view on the adequacy of the currently defined list of participants in the Electricity Industry Act and whether these enable 'participation' by</p>	<p>The timeframe for action ranged from 2025-26 to 2027-28. The view that this step is not required until later in the decade is based on taking a gradualist approach to involving new types of participants in electricity markets based on risk and impact.</p>	<p>The expected impact of this outcome is material to the extent participation requirements prevent participation, thereby stifling innovation and development of new products and services, including those using flexibility.</p>

#	Step	Expected outcome	Timing - when is the outcome needed?	What is the impact of not delivering the outcome?
		large numbers of small entities with DER and flexibility		<ul style="list-style-type: none"> participation is blocked by existing participation requirements, eg, parties are not able to integrate into market systems parties get involved without being subject to the rules and obligations in place to ensure people behave in a way conducive to the smooth operation of a market. 'It is vital' for market participants to have interfaces the other parts of the market and system.
31	Identify the measurement, communication and connectivity requirements for devices supplying flexibility	An initial view on the measurement, communication and connectivity requirements for devices supplying flexibility	<p>The timeframe for delivering the outcome ranged from 2025-26 to after 2030, but several people said progress should start now because the outcome will take until later in the decade.</p> <ul style="list-style-type: none"> need to signal expectations and a pathway for communications and connectivity so DER bought today are capable market systems and processes are based on communication, so thinking about B2B and B2M interfaces needs to start now to the systems/processes are fit-for-purpose, including being adaptable to change standardisation should not be pursued too soon (or at all in some cases). 	<p>The expected impact of this outcome ranged from material to significant based on the outcome being a common digital infrastructure and digitalisation, which is a critical enabler of electrification and flexibility.</p> <p>This step is equivalent in impact to #13.</p> <p>Without digitalisation the barrier to entry for DER and flexibility will be very high and electrification will be more expensive and less reliable and take longer.</p>
32	Identify an easy-to-use method and process for providing visibility of and access to opportunities to supply flexibility for network reasons	A common approach to presenting opportunities to supply flexibility for network reasons at the HV, MV and LV layers	<p>The timeframe for delivering the outcome ranged from 2026-27 or 2028-29.</p> <ul style="list-style-type: none"> a common platform will be important later (2025+), but initially the focus should be on adopting a common process and method there are several options for a common platform, the right time to make a choice will be when flexibility is being requested routinely. <p>The step is dependent on LV management capability.</p>	<p>The expected impact of the outcome is noticeable to significant because it provides DER owners and flexibility suppliers with information about where opportunities are – it is needed to support the market for flexibility.</p> <p>There are a range of factors to consider. Congestion maps are near worthless because many other things influence investment choices.</p> <p>This step is connected to the steps relating to trading of flexibility.</p>
33	Develop a scalable and accessible process for procuring flexibility for network reasons	The procurement journey for flexibility for network reasons is transparent, simple and repeatable, including	The timeframe for delivering the outcome ranged from now (2023) to after 2030. The	The expected impact of the outcome is material because resources will not be available or will be less available without some way of matching buyer and seller - tenders will not find bidders and suppliers will be less interested in participating.

#	Step	Expected outcome	Timing - when is the outcome needed?	What is the impact of not delivering the outcome?
		publication (visibility) of flexibility opportunities based on network constraints analysis and the ability to participate	<ul style="list-style-type: none"> sooner, because starting small but with the intention to scale up means suppliers can see what the decision-making process looks like now, then, and later later, because RFP processes are suitable now and we can learn over time. <p>This step is dependent on #6 and product definitions.</p>	This step is connected to the steps relating to trading of flexibility. These should be considered as a package.
34	Identify a common approach to options for risk management in contracts to supply flexibility for network reasons	Common and fair terms of trade for flexibility, particularly relating to risk management In the longer-term, standardisation of contracting arrangements.	The timeframe for delivering the outcome ranges from 2026-27 to 2028-29 because contracting arrangements and terms will evolve over time. Linked to #29.	The expected impact of this outcome is noticeable due the benefits of building experience before committing to contractual arrangements. However, realising the benefits are contingent on innovation funding (step #B) and a commitment to learning-by-doing.
35	Identify the coordination capability, roles and functions required for distributors and the System Operator to optimise network and power system operation	A view on the coordination capability, roles and functions required for distributors and the System Operator to optimise network and power system operation	The timeframe for delivering the outcome ranges from 2024-25 to after 2030. This step will require considerable effort over time, but the roles and functions will not be needed until after 2030. The first step is developing LV management capability and thinking about DSO/SO interfaces and a hierarchy of needs and who does what and when.	The expected impact of the outcome is significant due to the importance of effective coordination between distribution and transmission layers to maintain security of supply <ul style="list-style-type: none"> security and reliability will be adversely affected from poor coordination and poor visibility from increased number of parties managing assets the impact derives from inefficiency in the wholesale market and reduced resilience and reliability (including due to inaccurate forecasts).
36	Identify a common process for validation and settlement of services using flexibility to supply network services and ancillary services	Market processes include measurement and settlement of services supplied using flexibility	The timeframe for delivering the outcome ranges from 2024-25 to after 2030. <ul style="list-style-type: none"> sooner, because it is useful for suppliers to know what things might look like to design their systems later because existing processes are working. 	The impact of the outcome is noticeable to material. <ul style="list-style-type: none"> more relevant to some approaches than others - use case specific useful to know what processes are to help develop software and systems - what does your architecture need to look like <p>The step is dependent on #6 and product definitions. The two tasks could be developed in parallel.</p> <p>This step is connected to the steps relating to trading of flexibility.</p>

