FLEXFORUM

FLEXIBILITY PLAN 2.0

A plan to make flexibility easy and routine for households, businesses and communities

30 April 2025

Contents

FlexForum is an incorporated society with Members from across the electricity ecosystem committed to working together to make it easy for households, businesses and communities to maximise the value of flexibility and flexible resources.

The Flexibility Plan is a checklist of tasks and actions to maximise the value of flexibility developed drawing on the experiences and views of FlexForum Members. Each Member may have their own perspectives and positions about the tasks and actions outlined in the Plan.

Go to **www.flexforum.nz** or contact **info@flexforum.nz** to find out more.

Flexibility Plan 2.0

FlexForum is an incorporated society with Members[1] from across the electricity ecosystem committed to working together to make it easy for households, businesses and communities to say yes to flex and maximise the value of distributed, flexible resources.

The Flexibility Plan provides a checklist of the tasks and actions to support coordinated and collaborative action by the electricity ecosystem to enable people to easily and routinely make choices about and maximise the benefits of their flexible resources for themselves, the power system, and the economy.

Flexibility Plan 2.0 is an upgrade to version 1.0 published in August 2022. The upgrade has a more explicit focus on the actions and choices people have when considering and saying yes to flex, while including the flexibility lessons and experiences gained since 2022.

Delivering the Plan will underpin the evolution to a smart, flexible, and consumer-centric power system which supports affordable and reliable operation of the electricity market and power system through accelerated electrification by households and businesses as part of the transition in Aotearoa New Zealand to a zero emissions economy.

The Plan is Appendix A.

A flexible power system is a smart power system

Households, businesses and communities in Aotearoa New Zealand are shifting from fossil fuels to electricity for transport, cooking, heating and cooling, and for industrial, commercial and agricultural activity. An increasing number of people have electric vehicles (EV), solar and distributed generation, battery storage, electric space and water heating, electric motors and machines.

These electric machines and devices resources can – with the right settings and technical capability – flexibly modify their production or use of electricity in response to external signals. This flexibility is a feature of a smart power system.

The power system needs to be smarter and more flexible. Historically, it was built and operated based on predictable patterns of electricity use. However, these patterns are becoming less predictable with fundamental changes to how, when and where people use electricity, a shifting generation mix with more variable sources such as wind and solar, and more frequent extreme weather events. Flexibility is an extra tool to efficiently keep the lights, and everything else, on in an increasingly unpredictable environment.

A smart electricity system relies on providing people with incentives and motivation to say yes to flex supported by a set of multi-lateral technical and commercial interactions that make it simple and routine to realise the range of benefits from flexible energy usage.

> The smart electricity system of the future will need to be flexible, with an evolution in demand shifting and demand response from today's system. Flexibility will require new smart technologies to be developed and deployed across the electricity value chain, moving from the use of some technologies at scale to more dynamic responses from a broader range of technologies at a more targeted and granular level.
>
> BCG, **The future is electric**, October 2022, page 130

A flexible system is is a smart system that empowers households, businesses and communities that own and control growing levels of flexibility.

Flexibility promises more reliable, resilient and affordable electricity

Flexibility can deliver benefits to individuals, consumers and the economy by enabling a power system that is more sustainable, reliable, resilient and affordable.[2]

People can use flexibility to have greater agency and autonomy over their energy outcomes. It provides many opportunities to become more sustainable, have a more reliable and resilient power supply and minimise energy costs.

[1] FlexForum Members are listed at **https://flexforum.nz/about/**. Members span the electricity ecosystem and include electricity generators, retailers, metering services providers, EV charger manufacturers, energy management software firms, Transpower, distributors, advisory services firms, industry associations universities, and individuals.

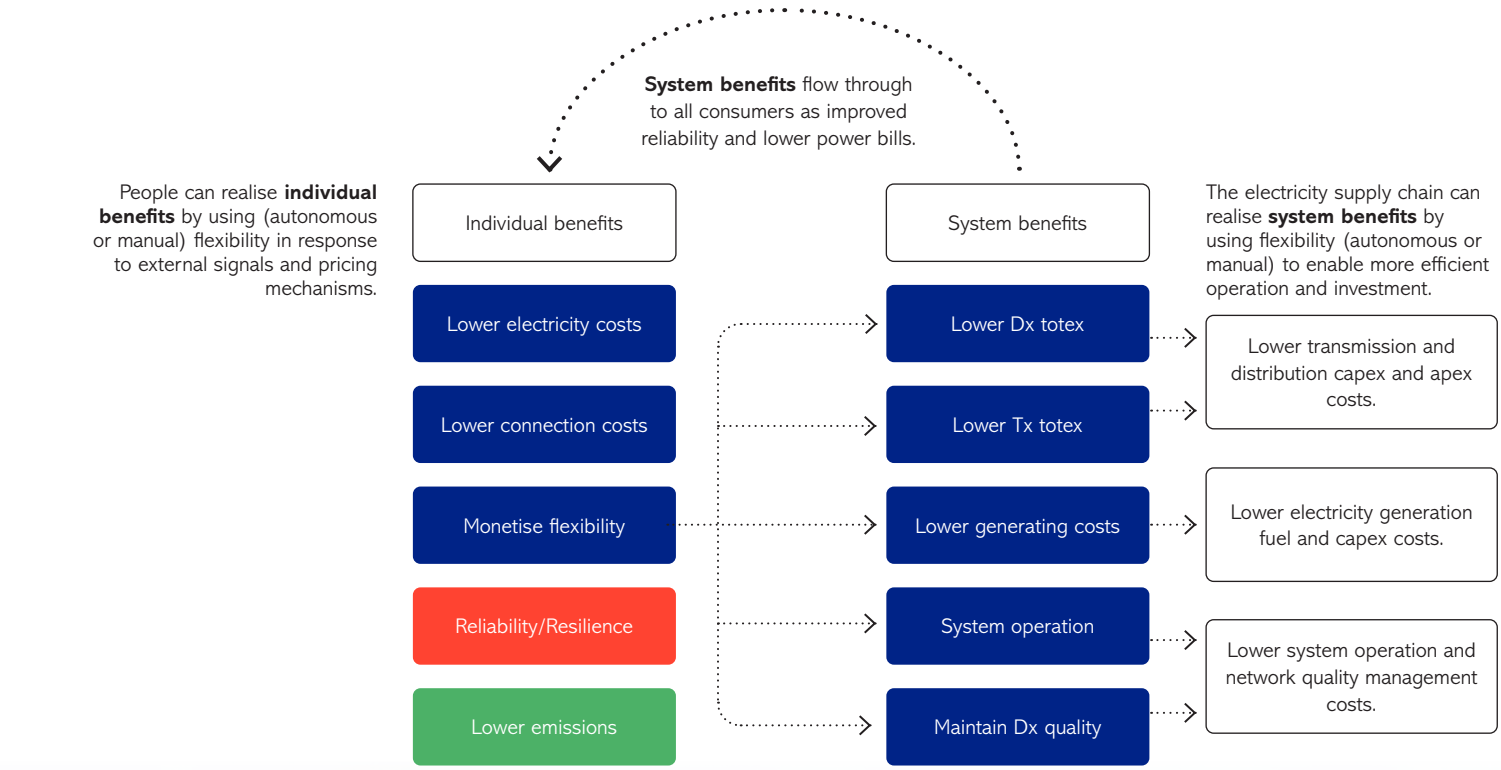
[2] The benefits of flexibility are described by a range of parties including **Transpower**, the **Market development advisory group**, and in the **BCG Climate change in New Zealand: the future is electric report**.

For example, **Rewiring Aotearoa** states: *'Every home is different but, on average, homes currently using gas appliances and petrol vehicles could save around $1,500 per year (and around $4,500 per year if they can get a low interest loan) if they choose electric equivalents and get their electricity from a combination of rooftop solar, home battery and New Zealand's highly renewable grid.'*

The savings identified by Rewiring Aotearoa rely on flexibility giving the household the ability to pick and mix electricity from their solar, battery (perhaps one on wheels in the garage) and the grid.

People will also benefit from a smart, flexible power system. A smart power system is central to the transition pathway which achieves sustainability and reliability goals with the lowest system cost and lowest energy bills. Estimates indicate about 2 gigawatts (GW) of flexible resources are needed by 2030 and 5.8 GW by 2050 to save about $10 billion on a net present value basis by avoiding or deferring generation and network investments.[3] These system benefits – which would flow through to lower power bills – rely on using the growing stock of flexibility in the hands of households and businesses.

The two sets of benefits – individual and system – are complementary and should largely be additive, noting that the timing and size of the benefits depend on a range of factors, including the incentives and costs of being flexible and people being motivated to say yes to flex.



[3] BCG, **The future is electric**, October 2022. Spreading the $10 billion over 25 years gives an annual saving of $400 million.

Individual benefits of flexibility	System benefits of flexibility
Lower energy and electricity costs. People can flexibly respond to cash signals to reduce their day-to-day costs by choosing the cheapest sources of electricity across the day from their solar or other distributed generation, battery (perhaps one on wheels in the garage) and the power system.	**Lower distribution total expenditure.** Flexibility enables higher asset utilisation. Distributors can manage demand for capacity with relatively less infrastructure, over time avoiding or deferring expenditure on long-lived infrastructure that gets used sparingly, e.g. the few hours a year of network congestion.
Lower network connection costs. People can use flexibility to right size their network connection and reduce connection and downstream network expansion costs.	**Lower transmission total expenditure.** Flexibility enables higher asset utilisation. Transpower can manage demand for capacity with relatively less infrastructure, over time avoiding or deferring expenditure on long-lived infrastructure that gets used sparingly, e.g. the few hours a year of network congestion.
Financial benefits from monetising flexible resources. People can receive direct financial benefits by contracting with supply chain participants to offer their flexibility to realise the system benefits available from lowering network expenditure, lowering generating costs and lowering quality management costs.	**Lower generating costs.** Flexibility enables electricity retailers to lower their average electricity generation costs by modifying generation and usage, particularly when there is a supply shortfall. This will lower fuel costs by burning less coal, gas and diesel, and over time avoid or defer investment in generation that is used sparingly, eg, the few hours a year of peak electricity demand or supply shortfall.
Better reliability and resilience. People can use flexible resources to keep their lights on and the wheels of commerce turning during system outages caused by severe weather and similar unpredictable events. Increased resilience will contribute to increased household and economic output, and may over time, contribute to lower distribution and transmission expenditure by enabling microgrids that enhance local resilience. Research indicates that system resilience is most efficiently achieved using distributed flexible resources.	**Lower system operation costs.** Flexibility enables the System Operator to procure lower cost ancillary services costs due to access to a wider and deeper pool of resources.
Lower greenhouse emissions. People can use flexibility to improve the business case and bring forward their emissions reduction investments. For example, flexibility gives people the option to choose the cheapest source of energy to fuel their car (electricity) and to choose the cheapest sources of electricity across the day.	**Lower distribution quality management costs.** Flexibility enables network operators to more effectively and efficiently manage network quality, eg, voltage, harmonics etc due to access to a wider and deeper pool of resources.

Putting people first. The benefits rely on flexibility being easy and routine

Flexible resources will increasingly enable everyday electricity choices regarding when and how to use energy. However, realising the benefits of flexibility depends on people finding it easy and routine to embrace their flexibility journey and say 'yes to flex'.

A smart, flexible system is not a foregone conclusion. Most flexible resources will be owned and controlled by households and businesses, and in many cases the potential benefits of flexibility will be secondary to having a hot shower, a warm house, being able to drive to the beach and keeping the wheels of commerce turning.

Flexibility gives people more options to get sustainable, reliable and affordable power

People want electricity to be sustainable, reliable (and resilient) and affordable. The Flexibility Plan recognises this by starting from the perspective of people – with flexible resources either now or in the future – making choices about their options[4] to maximise the value and benefits of electricity for themselves, their community and for the wider economy.

There are five flexibility options for people to realise their sustainability, reliability and resilience and affordability outcomes. These options are the starting point for a flexibility journey.

Outcomes	Flexibility options
Affordability	**Minimise day-to-day energy costs** and lower everyday household and business costs. Flexible resources allow people to shift their electricity use across time in response to external cash signals. **Minimise network connection costs** and lower the infrastructure costs of gaining access to the electricity network and system. Flexibility allows people to minimise or manage their network capacity to get the lowest cost network connection and network expansion (capital contribution) costs. **Monetise flexible resources** by supplying services to the electricity sector participants. Flexible resources allow people to earn revenue from: selling electricity generated using solar or other distributed generation; selling flexibility to support network operation; and selling flexibility to support system operation (ancillary services).
Reliability and resilience	**Manage the reliability and resilience of their electricity supply** to minimise the costs and impacts of network and system outages. Flexible resources allow people to have power independently of network and system conditions.
Sustainability	**Reduce greenhouse emissions.** Aotearoa New Zealand has committed to reducing and removing greenhouse gases from the economy. Flexible resources allow people to produce or prefer renewable, zero-emission electricity, ie, make their own power from the sun, or modify their electricity use to reduce their emissions intensity (eg, shifting their use to times when electricity is more renewable).

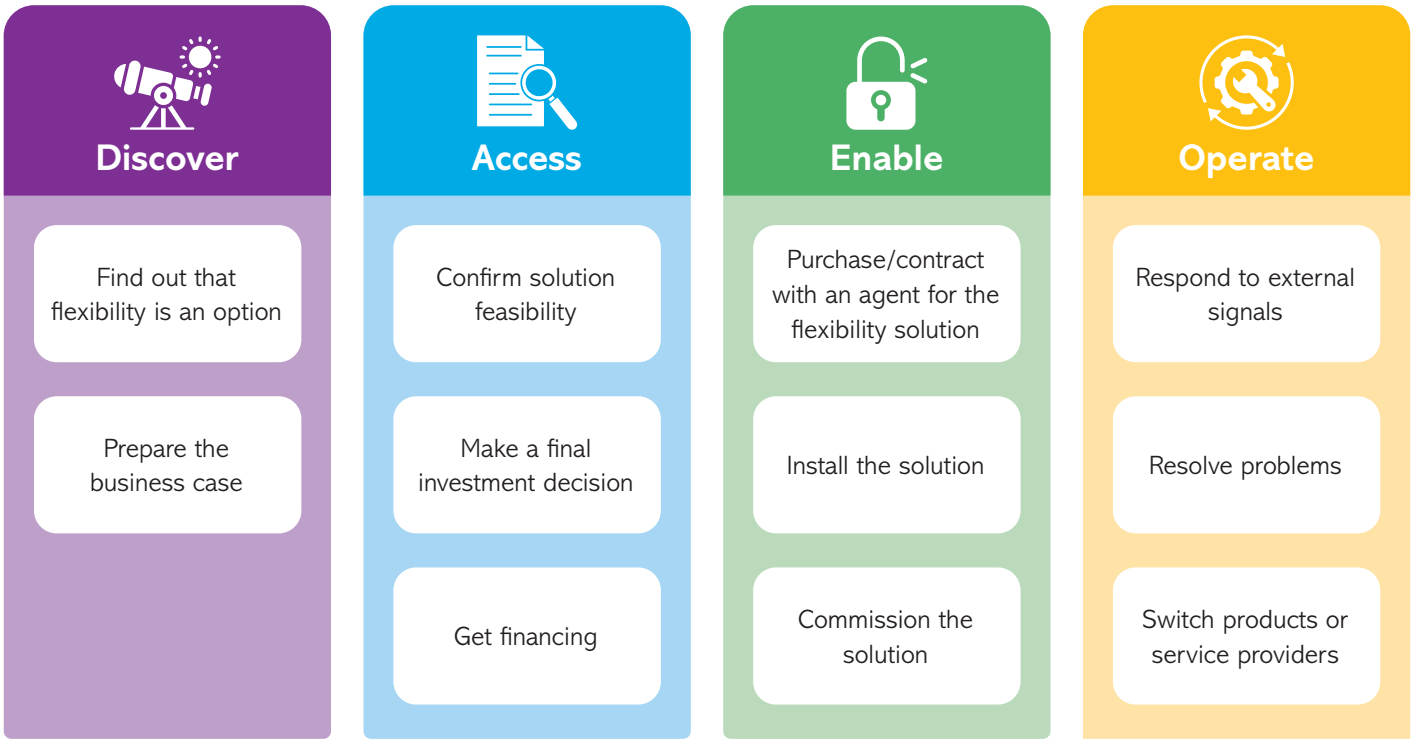
[4] The five options were defined through a series of FlexForum workshops between April and August 2022. You can check out the discussions at **https://flexforum.nz/session-notes/**. Starting with outcomes was a deliberate effort to ensure the Flexibility Plan reflects the perspective of a household, business or community – who may have flexible resources either now or in the future – making choices about flexibility and wanting to maximise the value of their resources for themselves, their community and for the wider economy.

The flexibility journey needs to be easy and routine

The flexibility journey is a four stage process. People will explicitly or implicitly work through a series of actions and choices to Discover, Assess, Enable and Operate a flexibility solution which gives them what they want given their circumstances and preferences.

Discover	Assess	Enable	Operate
…involves a person learning about the flexibility solutions which could provide the electricity outcomes they want.	… involves a person understanding which specific flexibility solutions could deliver the outcomes they want and making a final investment decision.	… involves a person implementing their flexibility solutions by working through the purchase, installation and commissioning processes required to achieve the desired outcomes.	… involves a person operating and receiving the benefits of their flexibility solutions.

The Flexibility Plan follows the choices and actions a person, or their agent, make through their flexibility. The flexibility journey includes these key choices and actions…



Flexibility options are not an easy or routine

The flexibility journey is not currently easy or routine. Easy means the action or choice is quick and straightforward. Routine means the action or choice is possible anywhere and anytime it is practicable.

Mapping the journey highlights a series of potholes and roadblocks which prevent or delay people throughout their journey from discovering to operating flexibility. The difficulties that people face at each stage of the flexibility journey place limits on their flexibility options and raise barriers to realising the full sustainability, reliability, resilience and affordability benefits of flexible resources.

Flexibility options	Is the option easy and routine for households, businesses and communities today?
Minimise day-to-day energy costs	**Not easy or routine** • choosing the retail electricity product which maximises benefits requires considerable effort. Powerswitch is a manual process lacking full usage and price information. Expert advisers struggle to get data to provide prompt personalised flexibility advice • holes in the value stack, largely due to a lack of cash signals designed to motivate a dependable flexible response to unpredictable network and market conditions, prevent the development of flexible products • choosing and installing flexibility solutions to optimise sources and time of use of electricity to maximise value by responding to price signals requires considerable effort and expertise
Minimise connection costs	**Not easy or routine** • variable capacity and connection size may be available to individual businesses, but not routinely or at all for households • network information needed to inform assessment of flexibility solutions investment choices is difficult to get • doing things differently requires 'extra' project management and coordination. Most building contractors do not have the necessary expertise, experience, or capability
Monetise flexibility	**Not easy or routine** • able to sell electricity only via the retailer providing supply. This prevents revenue maximisation due to trade-offs between the buy/sell package unless spot exposed on import and export • opportunities to sell flexibility are not widely accessible (eg, must be signed to a specific flexibility coordinator), and some services are not monetised (eg, no kvar service)
Manage reliability and resilience	**Not easy or routine** • flexibility solutions are not yet a seamless substitution, requiring considerable effort and expertise to assess options, a potentially material upfront financial outlay and case-by-case installation and commissioning
Reduce emissions	**Routine, but not easy** • flexibility solutions to reduce emissions can require considerable effort and expertise to assess options, a potentially material upfront financial outlay and bespoke installation and commissioning.

Using the plan

The Flexibility Plan is a checklist of tasks and actions that lead to the flexibility journey being easy and routine for households, businesses and communities. The checklist is a guide for building a smart, flexible consumer-centric power system and is a robust foundation for:

- **Coordination.** Aligning efforts across the electricity ecosystem with a comprehensive list of tasks and actions.
- **Collaboration.** Connecting tasks to the broader flexibility vision for system-wide collaboration.
- **Accountability.** Measuring progress effectively to support the flexibility journey.

Each step in the Plan involves a task(s) intended to enable people to more easily and routinely discover, assess, enable and use flexibility in a way that reflects their circumstances and preferences. In most cases, a task involves the electricity ecosystem developing capabilities, processes or practices to integrate flexible resources and maximise their value in the market and system.

Tasks are scoped using a double diamond design thinking approach to clarify the issue, the desired outcomes and possible solutions.[5] Task timeframes are based on the current state and the practical, scalable action which can be taken to achieve the desired outcome. Some tasks involve implementing a known solution. Some tasks involve understanding the problem. Some tasks involve learning-by-doing to explore options and refine solutions.

Flexibility Plan		
Step	**Responsible party**	**Timeframe for action**
Each step describes a task which is expected to help make it easier and more routine for someone to take the associated action on the flexibility journey	The responsible party is the entity that is best placed to take action which makes progress with delivering the step.	Each task is framed to be deliverable in the next 12-24 months.

A reference point for working towards a smart, flexible consumer-centric power system

Predicting what the electricity system and market look like in 2040 or other arbitrary future date is an exercise of quickly diminishing returns. Some things will be similar to now. Others will be very different. All we can be sure of is the future state will not have the same actors, actions and interactions that we know and love today, but will have households, businesses and communities.[6]

Not being able to predict the future does not mean a plan is unnecessary. The Plan provides a practically focused reference point for decisions about the features and design of the electricity system and market that maximise the benefits of flexibility.

The Flexibility Plan exists to enable a smart power system by identifying the steps and actions required for people to have the autonomy, information, incentives and ability to maximise the value and benefits of their flexible resources for themselves, the power system and the economy.[7]

[5] The approach was used to describe the evolution of flexibility in the United Kingdom. See Ofgem, The future of distributed flexibility. Call for input, 1 March 2023, at **https://www.ofgem.gov.uk/sites/default/files/2023-03/Ofgem** Call for Input on the Future of Distributed Flexibility2023.pdf.

[6] The laws of physics will probably also remain constant.

[7] With the qualification that the decisions people can make will take account of incentives and minimum physical operating parameters of the power system, and the coordination of resources may be exercised by someone choosing to make their flexibility available to an intermediary.

The fundamental assumption underpinning the Flexibility Plan is that the **owners of flexible resources are best placed to decide how, when and why their flexibility is used**. This assumption and core design principle:

- is consistent with the central design principle of the existing wholesale electricity market and choice of electricity retailer
- respects property rights, eg, 'I decide when and where to 'fuel' (charge) my (electric) car…', 'I decide how warm my house is…' and 'I decide when the factory is operating…'
- recognises that energy and flexibility is a means to an end wanted by a human, eg, comfort, convenience
- promotes efficiency, particularly by maximising supply and demand-side utility and preferences.

Coordination of a complex and inter-related set of tasks

The Flexibility Plan provides a reference point for coordinating a complex and inter-related set of tasks and actions, and is intended to make delivering a smart, flexible and consumer-centric power system easier, faster and more affordable by supporting more effective coordination and prioritisation of scarce resources through identifying tasks, dependencies, gaps in effort and opportunities.[8]

The Plan lists 41 steps, each involving a task which is intended to deliver an output – a capability, process or practice – to make it easier and more routine for people to undertake their flexibility journey.

Each step identifies a responsible party which is considered most able to progress the step based on its interests and role. FlexForum is ambivalent about who delivers steps and has no ability – other than reporting on progress – to get anyone to deliver a step. This is not meant as a free pass to others across the electricity ecosystem because delivering the Plan requires a collective effort.

Coordination is critical to the pace of delivery. Several steps – particularly those relating to technical standards, communications interoperability, and market development – depend on multi-party collaboration within and across separate steps and tasks. The Plan supports coordination by focusing efforts on practical outputs while at the same time making it easier to coordinate efforts to address issues which are common to several steps.

Collaboration across siloes

The multi-lateral nature of flexibility requires an increased focus on engaging widely across the electricity sector and beyond. Very few steps can be effectively delivered within silos. Many steps require learning-by-doing involving multiple parts of the supply chain. Collaboration is essential.

The Plan expects collaboration. Each step identifies a party which is best placed to make progress. However, FlexForum expects each task will be delivered with interested parties who are involved in the problem definition, options design, solution testing and implementation. The extent and nature of involvement will considered as part of the regular progress assessment.

FlexForum will endeavour to collate and share experience and insights. Sharing learning-by-doing will inform the development of capability, practices and processes, and the development of appropriate regulatory settings. Failures provide important experience and should be embraced as a critical part of advancing the Flexibility Plan.

Collaboration is also required to develop an environment which encourages people to say yes to flex. Three areas stand out.

- **Customer agency.** The Plan describes steps to enable people to discover and assess their flexibility options, however, a broader effort will be required to earn social license, build trust and encourage people to say yes to flex.

[8] Michaelis et al, Consumer-centric electricity markets: Six design principles (see **https://doi.org/10.1016/j.rser.2023.113817**) describe the goal of a consumer centric market design is to integrate distributed and renewable energy resources to enable a decarbonised and just energy system. Also see the work of Joskow and others, for example, Joskow, P., 2019, Challenges for Wholesale Electricity Markets for Intermittent Renewable Generation at Scale, Working Paper CEEPR WP 2019-001, MIT Center for Energy and Environmental Policy Research and "Introduction to Electricity Sector Liberalization: Lessons Learned from Cross-Country Studies," in Sioshansi, F. and W. Pfaffenberger. Electricity Market Reform: An International Perspective, 1-32.

- I**nstaller training and accreditation.** A significant enabler of successful flexibility deployment is a trained workforce of installers. The Plan describes steps to provide advice and information for installers, however, a broader effort will be required to establish training and accreditation pathways which support successful flexibility installation and commissioning processes.

- **Connectivity and interoperability.** Integrating flexible resources into the market and system depends on common, open and interoperable communication protocols to provide a robust platform for exchanging messages and signals between devices and counterparties. The Plan describes steps relating to technical and communication standards and protocols, however, a broader effort will be required as the increase in real-time device integration and data exchange increases risks relating to system security and personal data protection.

Accountability for progress

FlexForum is committed to regularly reviewing progress with delivering the Plan and updating the Plan as learning identifies new tasks and tasks are ticked off. This iterative approach allows course correction and adaptation to changing circumstances.

FlexForum will check in on progress with the Plan with the responsible parties and with the wider ecosystem. FlexForum will regularly check in with the responsible party about progress with the step and task as part of the progress monitoring and assessment. The responsible parties have been identified because they have a critical role in the output, eg, via a decision-making or implementation role.

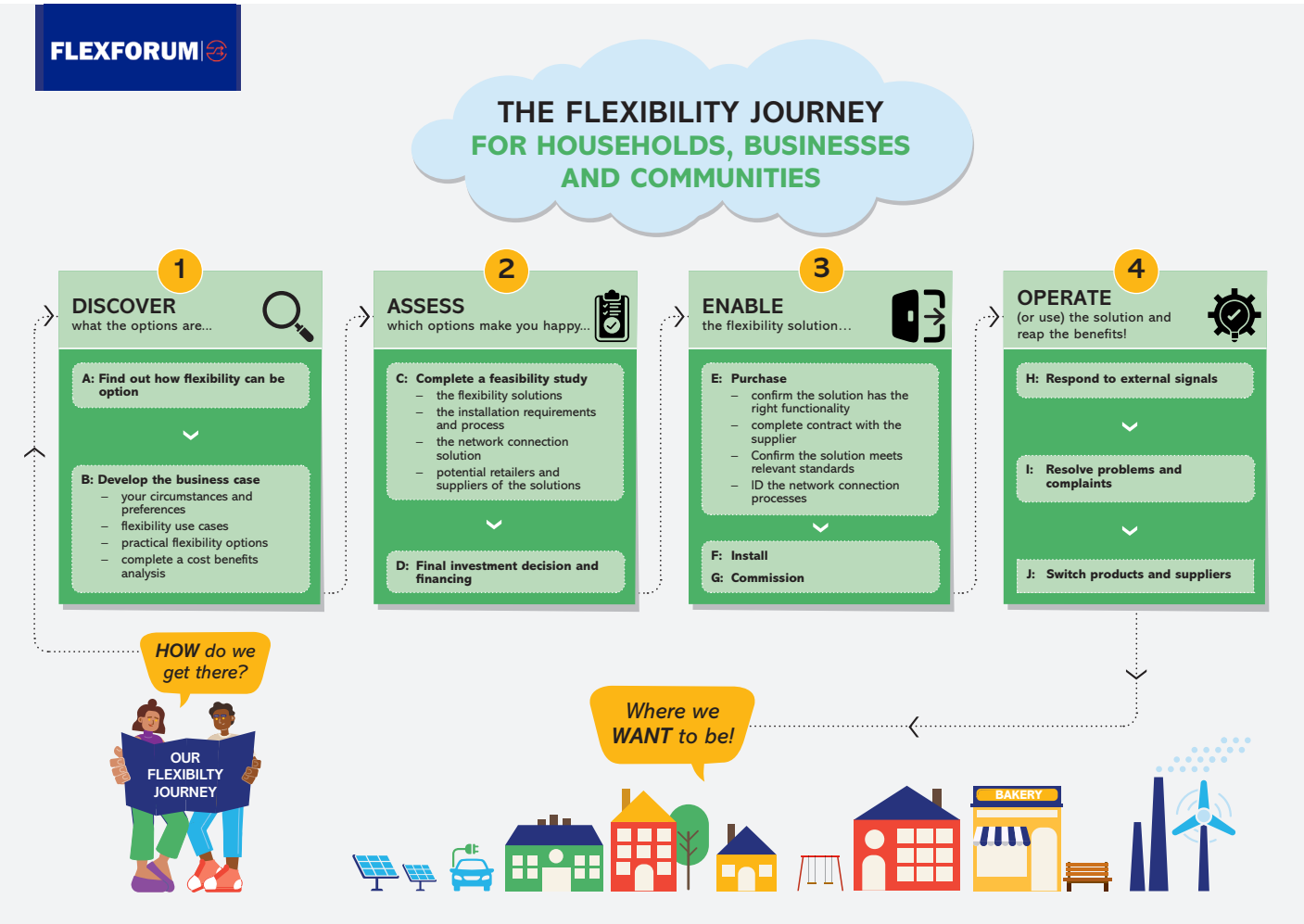
Monitoring progress is intended to highlight the outcomes of learning-by-doing, assist course corrections, identify tasks which can be checked off, adjusted or added, and also highlight gaps in effort and steps which deserve more priority. Measuring progress will help people, the electricity sector, regulators and government to have confidence that tangible efforts are being made to realise tangible benefits for flexible resources.

Appendix A. Flexibility Plan 2.0

The steps in Flexibility Plan 2.0 are organised based on the actions a representative human would take through the discover, assess, enable and operate stages of a flexibility journey.

Each step in the Flexibility Plan is intended to make the flexibility journey easier and more routine.

This is a summary of the actions and choices people have during their flexibility journey.



Each Step describes a task which can be delivered over 12-18 months to make Action by the human easier and more routine. A Responsible party is identified for each step.

References to the equivalent step in Flexibility Plan 1.0 are shown as eg, [FP1.0 #1].

#	Step	Action by the human	Responsible party
	DISCOVER		
	The discover stage involves a person finding the flexibility solutions which could provide the electricity outcomes they want. Discovering a short list of flexibility solutions involves a person **finding out how flexibility can be an option** and **completing a flexibility business case**. The business case requires people to get information and data to: **specify their preferences; identify the potential flexibility use cases/purpose; identify potential flexibility options;** and **complete a cost/benefit analysis**.		
1.	Develop and distribute information on the electricity outcomes available to households, businesses and communities from using flexibility, the nature of the potential benefits, and potential solutions for each outcome [FP 1.0 #1]	**Find out how flexibility can be an option.** Awareness of flexibility options – what, when, where, how and why – is not widespread and flexibility is not routinely considered. People need to know the option exists… Research indicates people want affordable, reliable, low emissions energy (eg, see **Consumer Advocacy Council research**). But awareness of flexibility options is not widespread and flexibility is not routinely considered except for specific use cases, eg, EV charging and energy intensive businesses.	Energy Efficiency and Conservation Authority, supported by input from the electricity ecosystem. This task is consistent with existing EECA activities and partnerships, eg, with the **Master Electricians**.
2.	Determine if people can easily get information about their existing electricity retail rates and charges.	**Establish personal preferences.** These are informed by experience and circumstances and are defined by factors including existing retail rates and charges. Retail prices are available on power bills, but key terms may not be easily found.	Electricity Authority, supported by input from the electricity ecosystem. This task aligns with the EA functions, eg, to promote the benefits of comparing and switching retailers.
3.	Determine what network capacity information people need for decision-making, what data is available, what data is needed, and how the missing data will be obtained. [FP1.0 #12, 16]	**Preferences** are informed by network capacity information. Information is increasingly available but is not routinely available for the low voltage (LV) network layer.	Electricity Networks Aotearoa, supported by input from network users. This task aligns with the ENA purpose to support coordinated efforts across distributors.
4.	Determine the options to report historical and current network reliability and quality information (eg, voltage) for the LV layer. [FP1.0 #3, 14, 15]	**Preferences** are informed by network reliability and quality information. Granular, local information is not available because reliability and quality data is not routinely collected for the LV layer.	ENA, supported by input from network users and data services providers. This task aligns with the ENA purpose to support coordinated efforts across distributors.
5.	Determine the options to provide people information about network resilience for their location, eg, similar to **flood zone information**.	**Preferences** are informed by network resilience information. Granular, local information on network resilience is not routinely available.	ENA, supported by input from the electricity ecosystem, local government and emergency management bodies.
6.	Determine the options to provide people with granular emissions intensity data for their location. [FP1.0#4]	**Preferences** are informed by emissions intensity information. Emissions data is available from **Energy Market Services** and **WattTime**, but is reported at the transmission level. Granular, local information is not available.	Transpower as owner of EMS, supported by input from the electricity ecosystem.
7.	Develop an initial common description of the use cases for each electricity outcome a. network use cases (distribution and transmission) [FP1.0 #6] b. electricity use cases (individual, retail and wholesale) c. ancillary (system) service use cases This step depends on #19 (use case minimum functionality) and complements step #1 (outcomes, benefits and possible solutions).	**Identifying the flexibility use case/ purpose which delivers the desired outcome** will be easier if the use cases are clearly and consistently described. There is no common answer to these critical questions: • what services can a human provide using flexibility (ie, to monetise their flexibility)? • what services can a human obtain using flexibility (for their own benefit)?	FlexForum. This task requires coordination to achieve a whole-of-system outcome for: • network use cases • retail use cases • ancillary services use cases

#	Step	Action by the human	Responsible party
		DISCOVER	
8.	Develop and distribute information for people and expert advisers about flexibility options and potential solutions with the input and support of relevant industry and professional associations, eg, Master Electricians, SEANZ, Master Builders, Green Building Council etc. Complements step #1 (outcomes, benefits and possible solutions).	**Identifying the flexibility options** for each flexibility use case requires information about preferences, circumstances, use cases, and the capability and features of flexibility solutions. People need to do their own research or pay for bespoke expert advice because no tool effectively connects flexibility options to electricity outcomes or provides a package of options.	EECA, supported by input from the electricity ecosystem. This task is consistent with existing EECA information and guidance-related activities.
9.	Introduce rules to require data holders (eg, retailers) to instantaneously respond to requests by a person or their agent for usage data from the data holder. [FP1.0 #2]	**Completing a CBA requires usage data** to provide the Q in the PxQ benefit calculations. The action will be easier if usage data is available instantaneously. It is not.	EA, supported by input from the electricity ecosystem. This task supports the EA objective to protect the interests of consumers and it has the regulatory powers to deliver the step.
10.	Develop and deliver a plan to provide cash signals which are accurate (as possible), give easy access to benefits, and motivate efficient responses. [FP1.0 #7, 8]	**Completing a CBA requires price information** to provide the P in the PxQ benefit calculations. Across the value stack, pricing mechanisms do not provide an accurate cash signal, access to benefits is not easy or the signal does not motivate an efficient response.	EA, supported by input from the electricity ecosystem. The EA is responsible for pricing mechanisms and has the regulatory powers to deliver the step.
11.	Identify the causes and impact of transaction costs for discovering retail and electricity pricing information, and find options to reduce those transaction costs. [FP1.0 #7] Complements step #10."	**Completing a CBA requires retail and electricity price information** to provide the P in the PxQ benefit calculations. Specific retail and electricity pricing information is not generally disclosed or is not easy to find.	EA, supported by input from the electricity ecosystem. This task supports the EA objective to protect the interests of consumers and it has the regulatory powers to deliver the step.
12.	Determine the options to make it easy for people to compare their connection options and costs with and without flexibility. • identify and provide the network information people need to assess their connection options with and without flexibility. Complements steps #3 (network capacity information), #4 (granular network data) and #5 (network resilience information). [FP1.0 #3, 14] • develop initial with-flexibility physical or contractual connection options, eg, connection agreements with dynamic operating envelopes [FP1.0 #11] or lower capacity connections • provide people with incremental price information for common plausible connection scenarios.	**Completing a CBA may require network connection options and costs.** People cannot easily or routinely compare their connection options and costs with and without flexibility. Practices differ across distributors, however, household connections do not routinely include with and without flexibility options. Larger connections typically involve the distributor quoting on a single connection option without offering with/without flexibility options for comparison.	ENA, supported with input from the wider electricity ecosystem. This task aligns with the ENA purpose to support coordinated efforts across distributors.

#	Step	Action by the human	Responsible party
	ASSESS		
	The assess stage involves a person **completing a feasibility study** to assess which specific flexibility solutions could deliver the outcomes they want and **making a final investment decision**. The feasibility study involves **selecting the right flexible devices, identifying the installation requirements and process, identifying the network connection solution** (if any is required), and **identifying the potential market interface agents**.		
13.	Develop and establish a common lexicon for the electricity ecosystem to describe the functional requirements and performance of flexible resources and flexibility use cases for people to easily see if a thing will provide the flexibility use case. The step depends on steps #7 (flexibility use cases) and #19 (use case minimum functionality).	**Selecting the right flexible device** may require assessing the features of unfamiliar products. People need to do their own research or pay for bespoke expert advice. For people to be confident they are spending (potentially a lot) on the right thing they should be able to easily find and compare the flexibility functional requirements for each use case with the technical functionality and performance of the various device/equipment options, ie, will this thing do what I need it to do.	EECA, supported by input from the electricity ecosystem. This task is consistent with existing EECA information and guidance-related activities.
14.	Understand device features which may frustrate people from maximising value. Understanding may identify frustrations that require some response. This step depends on steps #7 (flexibility use cases), #10 (filling holes in the value stack) and #19 (use case minimum functionality). Complements steps #1 (outcomes, benefits and possible solutions) and #8 (flexibility option information).	**Selecting the right flexible device** will be easier if people can easily find features of device/equipment options which might prevent them from maximising value over time, eg, proprietary software solutions which preclude interoperability. People currently need to do their own research or pay for bespoke expert advice.	EECA, supported by input from the electricity ecosystem. This task is consistent with existing EECA information and guidance-related activities.
15.	Develop guides providing a checklist of potential installation requirements and process for typical installation scenarios.	**Identifying the device installation requirements and process provides** clarity about things like site specific requirements (eg, is there room in the garage to fit the EV charger), timeframes and whether electrical, building or other trade assistance is required. People need to do their own research or pay for bespoke expert advice.	EECA, supported by input from the electricity ecosystem. This task is consistent with existing EECA information and guidance-related activities.
16.	Develop guides descibing the network connection implications and requirements of typical flexibility solutions. Complements step #12 (compare connection options). Depends on step #22 (connection processes).	**Identifying whether a network connection solution** or alternative connection arrangements are needed for a flexibility solution requires information about the solution and the situation. Identifying potential changes to connection requirements and arrangements is not always easy.	The EA, Electricity Enginneers Association and ENA are collaborating on a **Streamlining connections programme** • EA – **developing fit-for-purpose application processes and standards** • EEA – **developing technical guidelines for connection** • ENA – **mapping connection process pain points and improvement options**.
17.	Introduce rules to allow people to easily contract with separate market interface agents (ie, retailers, flexibility coordinators). [FP1.0 #5]	**Identifying the retailers and/or flexibility coordinators which provide the desired products/services** may be needed if the flexibility solution involves market participation. People cannot access a full range of options because regulatory settings require people to contract with a single party for all market interactions. This means people are not able to pick and choose products/services to maximise the value of their flexibility and their preferences.	EA, supported by input from **Ara Ake** and wider the electricity ecosystem. The EA is responsible for market systems and it has the regulatory powers to deliver the step.
18.	Develop and deliver a range of financing arrangements and options for people in all circumstances.	**Make the final investment decision, and payment arrangements**, to say yes to flex. People may need financing to pay for their flexibility solutions. A range of financing options are available, but not to everyone, eg, renters.	Rewiring Aotearoa and EECA, with input from the banking sector and wider electricity ecosystem. Rewiring is working on increasing financing options. EECA has a mandate to enable uptake of flexible options.

#	Step	Action by the human	Responsible party
	ENABLE		
	The enable stage involves a person implementing their flexibility solutions by working through what is involved to confidently **purchase, install and commission** a physical or services flexibility solution.		
19.	Develop a common minimum functionality for each flexibility use case so the same device can provide the same services across the country. [FP1.0 #25] Complements #7 (initial common use case descriptions) and #13 (common flexibility lexicon).	**Purchasing a physical solution involves checking a device has the required minimum functionality** for the use case. However, limited information exists on what functionality is required for something to be flexible.	EECA and the Ministry of Business, Innovation and Employment, with input from the EEA and wider electricity ecosystem. MBIE is coordinating amendments to the Energy Efficiency and Conservation Act to give EECA powers to set minimum standards for demand flexibility-capable products. The specific standards should be informed by practical learning-by-doing, eg, via FlexTalk
20.	Ensure technical standards establishing minimum functionality for flexible devices remain up to date [FP1.0#26]. Complements #7 (initial common use case descriptions) and (common lexicon for functional requirements and performance).	**Checking a device has the required minimum functionality** for the use case may be complicated if changes to technical standards do not always flow through.	EEA and EECA, with input from the electricity ecosystem. Updates to technical standards should be informed by practical learning-by-doing, eg, via **FlexTalk**. EECA will have regulatory powers to keep standards up to date.
21.	Develop a common technical standard for devices, including but not limited to flexible resources, connected to a network which can individually affect network performance or safety. [FP1.0#9]	**Purchasing a physical solution involves checking a device meets all relevant technical/connection standards.** Technical standards are set out in distributor connection policies and other instruments. Policies are not standard across the country.	EEA, with input from the EA, ENA and the electricity ecosystem. EEA is working on technical connection guidelines and standards development (eg, AS/NZ EL-052). Distributors will have an implementation role. The EA may have a regulatory role.
22.	Develop network connection application and delivery processes which make it easy for people and distributors to connect flexible resources as quickly as possible. [FP1.0 #27] Complements step #12 (compare connection options).	**Purchasing a physical solution may involve navigating the network connection application and delivery process.** Existing connection processes assume small numbers of connection requests from both small and larger-scale flexible resources.	The EA, EEA and ENA are collaborating on a **Streamlining connections programme** • EA – **developing fit-for-purpose application processes and standards** • EEA – **developing technical guidelines for connection** • ENA – **mapping connection process pain points and improvement options**
23.	Develop participation requirements that enable specialist flexibility coordinators to interface with and integrate their activities into the market and system. [ref FP1.0 #30] The initial focus can be to understand the upgrades to market systems and processes, including switching, reconciliation and settlement, needed to integrate flexible resources. [FP1.0 #28] Complements step #17 (choice of suppliers).	**Contracting a service solution involves contracting with the agent/flexibility coordinator** offering the value maximising service. This is not always possible because only **participants** can offer people contracts for services which require a market or system interface, eg, retail supply service is via a trader. Existing participant categories do not necessarily align with flexibility coordination activities, thus requiring parties to meet unnecessary obligations.	EA and MBIE, with input from the electricity ecosystem. Industry participants are specified in the **Electricity Industry Act** or by regulation. MBIE is responsible for amending legislation. The EA is responsible for market administration, including participation.
24.	Identify and develop mechanisms for exchanging flexibility for each use case which are low cost, support liquidity and participation and make it easy for people to maximise the benefits of their flexibility. [FP1.0 #32, #33]	The agent/flexibility coordinator must be able to easily and routinely establish business to business counterparty relationships with other participants, eg, with a distributor, System Operator or a retailer. Business to business relations may not be easy due to high transaction costs of buying/selling flexibility.	FlexForum. This task requires coordination to achieve a whole-of-system outcome for: • network use cases • retail use cases • ancillary services use cases
25.	Develop consistent terms of trade for transactions for all flexibility use cases. [FP1.0#34]	Business to business relations may not be easy due to high contracting transaction costs.	FlexForum. This task requires coordination to achieve a whole-of-system outcome for: • network use cases • retail use cases • ancillary services use cases

#	Step	Action by the human	Responsible party
		ENABLE	
26.	Develop product disclosure information and practices sufficient to help people make informed decisions a flexibility-related contract is structured for their circumstances. [FP1.0#29]	**Contracting a service solution involves seeing and understanding the impact of contract terms**, including risk allocation, obligations, costs and prices. People could benefit from information about the implications of unfamiliar services and obligations, focusing on the **three primary risks people face**: 'identifying a contract appropriately structured for their circumstances (ie, risk profile and management capability), then acting in a manner that is rewarded (not penalised) by the contract, then avoiding falling prey to a loyalty penalty.'	FlexForum. This task requires coordination to achieve a whole-of-system outcome for: • network use cases • retail use cases • ancillary services use cases
27.	Develop a process to collate, document and share good installation practices for common flexibility resources. Complements step #15 (installation guides).	**Installing the physical and/or service solutions** involves people finding an experienced supplier/installer, and/or getting installation information, and/or having clear instructions or the option to contact a helpdesk. This information is not routinely available.	EECA, supported by input from the EEA and wider electricity ecosystem. This task is consistent with existing EECA information and guidance-related activities. EEA is delivering the **FlexTalk** project including developing installer-facing guidance.
28.	Make changes to the registry to make flexible resources visible to the market and system. [FP1.0#28]	**Commissioning processes will be specific to the physical and/or service solutions and the use cases.** Some solutions may require the flexible resource to be visible to the market and system through the **registry**. Upgrades to the registry are needed to include information about the full range of flexible resources, eg, heat pumps, hot water cylinders, refrigeration, plus to establish processes making it easy to input that information.	EA, supported by input from the electricity ecosystem. The EA is responsible for market systems and it has the regulatory powers to deliver the step.
29.	Develop technical qualification methods for each flexibility use case which are low cost and scalable. [FP1.0#24] Complements step #7 (flexibility use cases), #8 (flexibility option information) and #15 (installation guides).	Some solutions may require flexible resources to meet technical qualification criteria for a flexibility use case. Technical qualification methods and processes do not exist for each use case because the use case has not been 'formalised', or are bespoke with the qualification and testing requirements set out in the contract with the flexibility coordinator, or are designed assuming the service comes from a small number of large suppliers.	FlexForum. This task requires coordination to achieve a whole-of-system outcome for: • network use cases • retail use cases • ancillary services use cases

#	Step	Action by the human	Responsible party
	OPERATE		
	The operate stage involves a person using their flexibility solutions by **responding to external signals** and sometimes **asking the service(s) provider how to resolve a problem**, or **switching products or providers** to reflect changed circumstances, preferences or opportunities. Each of these actions rely on backoffice processes. Responding to an external signal relies on the signaler being able to create and send the signal. Resolving a problem relies on the supplier having resolution processes. Switching providers relies on simple, low cost switching processes.		
30.	Develop a minimum set of operational visibility requirements and capability to support integration of flexible resources into distribution networks and the system. [FP1.0 #13]	Creating signals requires operational visibility of power flows across the system and networks. Operational visibility exists for transmission, high and medium voltage networks. It is being developed for the low voltage network layer as distributors get capability to measure network conditions to get asset utilisation, asset health and quality of supply data. Challenges to getting low voltage operational visibility include: the scope of new capabilities needed, opex funding thresholds and spending priorities.	ENA, supported with input from the wider electricity ecosystem. This task aligns with the ENA purpose to support coordinated efforts across distributors.
31.	Develop a minimum set of forecasting requirements and capability to support integration of flexible resources into distribution networks and the system. [FP1.0 #13]	Creating signals may require power system analysis and forecasting capability. This capability exists for transmission, high and medium voltage networks. It is being developed for the low voltage layer as distributors work out how to get and use granular usage and operational data. Challenges to getting the data inputs include: the scope of new capabilities needed, opex funding thresholds and spending priorities, and transaction costs of contracting data services.	ENA, supported with input from the wider electricity ecosystem. This task aligns with the ENA purpose to support coordinated efforts across distributors.
32.	Collate the experience with procuring, deploying and using flexible resources which is needed for decision makers to confidently invest in flexibility. [FP1.0 steps #17, #18 and #19] Depends on steps #7 (flexibility use cases), #13 (common lexicon), #19 (use case minimum functionality), #21 (network technical standards), #23 (participation requirements), #24 (flexibility exchanges) and #25 (terms of trade).	Creating signals requires planning and investment practices to include flexibility as a business as usual operational tool, with the buyer and signaler planning to routinely buy flexibility via a cash signal and associated external signal. Buyers across the value chain are building experience in how to procure, deploy and use flexible resources. Networks in particular want to better understand what flexibility can be offered by which people, when it is wanted, and how to most easily and routinely secure the resource.	FlexForum. This task requires coordination to achieve a whole-of-system outcome for: • network use cases • retail use cases • ancillary services use cases
33.	Identify the financial and non-financial barriers which reduce the motivation of potential flexibility users to invest in developing and scaling flexibility. Learning by doing, eg, by delivering step #32 (collate experience), is a good start.	Creating signals requires potential buyers to invest to build experience with procuring, deploying and using flexible resources. There is a chicken-and-egg situation. Sellers often need buyers to commit to buying before investing in integration. Buyers appear to want sellers to show the resource is integrated before buying.	FlexForum. This task requires coordination to achieve a whole-of-system outcome for: • network use cases • retail use cases • ancillary services use cases.
34.	Check the regulatory settings enable the System Operator to buy and use all sorts of flexibility for ancillary services. [FP1.0 #22]	Creating signals requires potential buyers to have flexibility on the menu. Regulatory settings may not make it easy for some buyers to use some flexible resources flexibility easy, eg, for some ancillary services.	System Operator, with input from the EA and wider electricity ecosystem. The System Operator is responsible for procuring and managing ancillary services.

#	Step	Action by the human	Responsible party
		OPERATE	
35.	Develop a consistent approach to the design of flexibility-enabling operating practices such as operating envelopes so people and flexible resources have an equivalent experience where ever they are. [FP1.0 #11 and #21] Complements step #12 (compare connection options).	Creating signals requires buyers to have transparent and predictable rules and arrangements underpinning the contractual and counterparty relationships for how and when they will use flexibility. These rules are developing, eg, flexible connection agreements or dynamic operating envelopes. Flexibility-enabling operating practices rely on things like defined performance expectations, communication and connectivity, and cash signals. Consistency across these things will make it easier for people to take advantage of the opportunities.	ENA, with input from the EEA and wider electricity ecosystem. This task aligns with the ENA purpose to support coordinated efforts across distributors.
36.	Develop a common approach to connectivity which easily integrates and maximises the value of flexible resources. [FP1.0 #31] Complements steps #19 (use case minimum functionality) and #15 (installation guides).	Sending signals relies on connectivity and communication flows between resources, sellers and buyers to send and respond to external signals. Connectivity is a necessary condition for integrating flexibility resources into the market. There is not a common approach to connectivity.	FlexForum. This task requires coordination to achieve a whole-of-system outcome for: • network use cases • retail use cases • ancillary services use cases.
37.	Develop a common approach for deploying flexibility with consistent use case triggers and messaging structures.	Sending signals relies on the dispatch practices for deploying flexibility when and where it is needed, including messaging options and structures. Deployment and dispatch practices are developing. Challenges include standardising the use case triggers and messaging structures.	FlexForum. This task requires coordination to achieve a whole-of-system outcome for: • network use cases • retail use cases • ancillary services use cases
38.	Develop common methods and the associated capability sets for measuring, validating and settling flexibility transactions across the use cases. [FP1.0 #31 and #36]	Sending signals relies on measurement, validation and settlement processes to accurately calculate the nature and benefit of a response. There is not a common approach. Exchanging flexibility will be easier with common methods and capability for measuring the response, eg, amount, duration; method and capability for validating the response and method and capability for settlement of accounts payable.	FlexForum. This task requires coordination to achieve a whole-of-system outcome for: • network use cases • retail use cases • ancillary services use cases.
39.	Identify the functions, capability and roles required to coordinate a power system with multi-directional power flows and flexibility. [FP1.0 #36]	Sending signals will require more coordination across the system to manage the potential for external signals created by participants across the supply chain to pull in different directions. The potential for conflict has been observed with distribution and spot market signals. Multi-directional power flows and flexibility require coordination across the system – the system operator, grid owner, distributors and network users will need processes and capability to maintain a secure, reliable power supply that maximises benefits to system users.	FlexForum. This task requires coordination to achieve a whole-of-system outcome for: • network use cases • retail use cases • ancillary services use cases.

#	Step	Action by the human	Responsible party
40.	Develop a problem resolution process which makes it easy for people to know who to call when electricity and flexibility outcomes depend on integrating and coordinating a bundle of devices, products and services potentially involving multiple providers. Complements step #23 (participation requirements).	**People will encounter problems** with their devices and services. A future where outcomes are obtained using a bundle of flexible devices, products and services could make it difficult for people to know who to call, particularly if blurred responsibilities lead to buck passing.	Utilities Disputes, with input from the electricity ecosystem. UDL is the complaints management service for the electricity sector.
41.	Develop and implement a plan to update market systems to make switching flexibility products and services as easy as switching retailer. Complements step #23 (participation requirements) and #28 (registry).	**People will want to switch products or service providers.** Switching flexibility products and services is a necessary condition for maximising the value and benefits of flexible resources. Market systems are designed to support switching the supplier of the retail electricity retail service. Switching flexibility products and services is not contemplated.	EA, with input from the electricity ecosystem. The EA is responsible for market systems and it has the regulatory powers to deliver the step.