

FlexForum: session II

Pre-reading for 17 February 2022 session

Shared 11 February 2022

Session overview – topics and decisions

Three main topics

1. Discussion roadmap
 - a) Approve the first topic discussed will be DER potential
 - b) Decide who in the group/outside the group should speak to the potential of key types of DER
2. Stakeholder mapping, engagement approach and plan
 - a) Approve the engagement plan and activities
3. Administration – governance, budget and funding

Discussion roadmap – start with DER potential

The recommendation is to start with DER potential

DER potential involves

- recognising the primary use cases for key types of DER – the main reason the device is purchased and how it is used (typical load profile)
- identifying the capabilities of the DER, both individually and in aggregation, to provide a service within the electricity system by modifying generation and/or consumption patterns in reaction to an external signal (such as a change in price)
- identifying the implications for the network and electricity system of connecting and using the DER in significant numbers, without doing anything differently

The discussion on DER potential at the next session would focus on DERs that will be available in NZ and/or align with the winter peaking profile of NZ electricity system. This focus is consistent with delivering on Objective 2 and identifying the practical, scalable, no regrets steps to integrate and maximise the value of DER

DER roadmap – who should explain the potential of DER at the next session?

The recommendation is the group get explanations from members or outside experts on DER potential of the following types of DER:

1. Electric Vehicles and EV chargers
2. Solar systems and inverters
3. Battery storage (with/without solar)
4. Smart home/building/energy management systems

The explanation would provide a basis for discussion and building a common understanding of the technology capability and the unmanaged impacts on the electricity network and system (noting that there may be no impact)

High-level Table of DER Characteristics

Table 1
Different DER and their technical characteristics.

	DER	Flexibility direction	Flexibility characteristic (power vs energy)	Availability ratio	Predictability	Technical response time	Grid ^a
Electrical Consumption	Lighting loads (W)	Unidirectional (downward)	New LED systems: energy types older lightings: power types	$0.2 < a_r < 0.5$ during peak hours	Good	Second	DS
	Dispatchable, residential loads (washing machines, dishwasher)	Unidirectional (downward)	Power type $5\text{ s} < t_r < 5\text{ min}$	$a_r < 0.1$ low max power ratios t_r due to max off time	High	Second	DS
	Electrical heating/ Cooling (continuous loads)	Unidirectional (downward)	Power type $t_r \approx 15\text{ min}$	$0.4 < a_r < 1$	High	Second	DS
Bi-directional	Electrochemical Energy Storage (EES) (kW-MW)	Bidirectional	Power & Energy types $4\text{ s} < t_r < 10\text{ h}$	$a_r \approx 1$	Perfect	Second to Minute	DS or TS
	Electric Vehicle (kW)	Unidirectional or Bidirectional	Power & Energy types $30\text{ min} < t_r < 6\text{ h}$	$0.5 < a_r < 0.9$	High	Second	DS
Generation	PV Unit	Unidirectional (Upward)	Curtaileable	$0.25 < a_r < 0.4$	Good a few hours ahead	Minute	DS
	Micro-CHP unit (kW)	Unidirectional (production mode)	Energy type	$a_r \approx 1$	Perfect	Rather slow (5%/min)	DS

^a Where DS stands for distribution grid and TS for transmission grid.

Source: Managing electric flexibility from Distributed Energy Resources: A review of incentives for market design, *C. Eid et al. / Renewable and Sustainable Energy Reviews 64 (2016) 237–247*. Available at: <https://www.researchgate.net/publication/308768734>

DER roadmap – two examples of what the end of the journey might look like

The FlexForum is not travelling into unexplored territory. Others have started the journey:

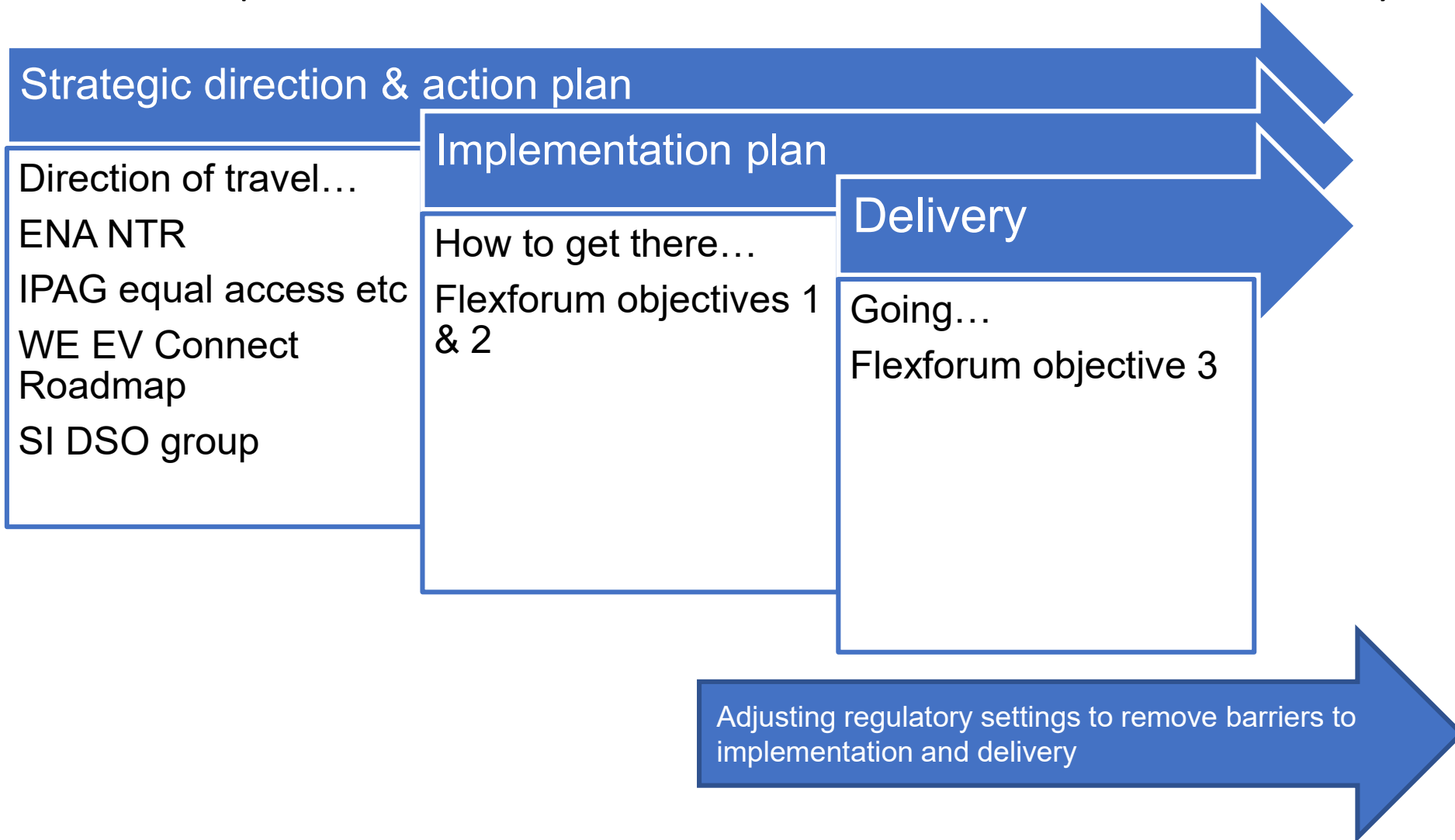
1. identify the minimum specifications of the services that DER can provide
2. identify the practical, scalable, and no regrets steps to use the services that DER can provide

Two examples are:

1. The United Kingdom Electricity Networks Association Open Networks Programme.
2. The Western Australian DER Roadmap.

These outputs of the UK and WA journeys are a reference point for what the FlexForum could produce after considering local circumstances and peculiarities

DER roadmap – interaction between the Flexforum and other work underway



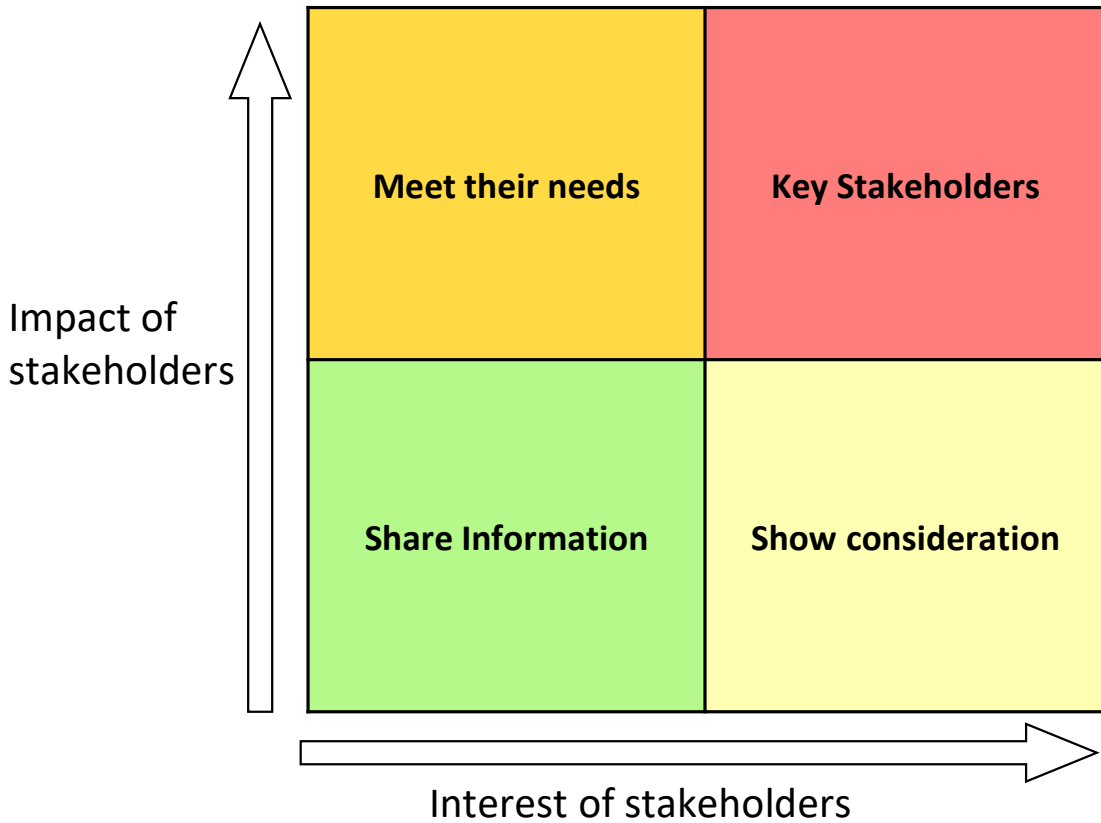
Stakeholder mapping

Your responses to this survey will be used during the discussion on stakeholder mapping to decide:

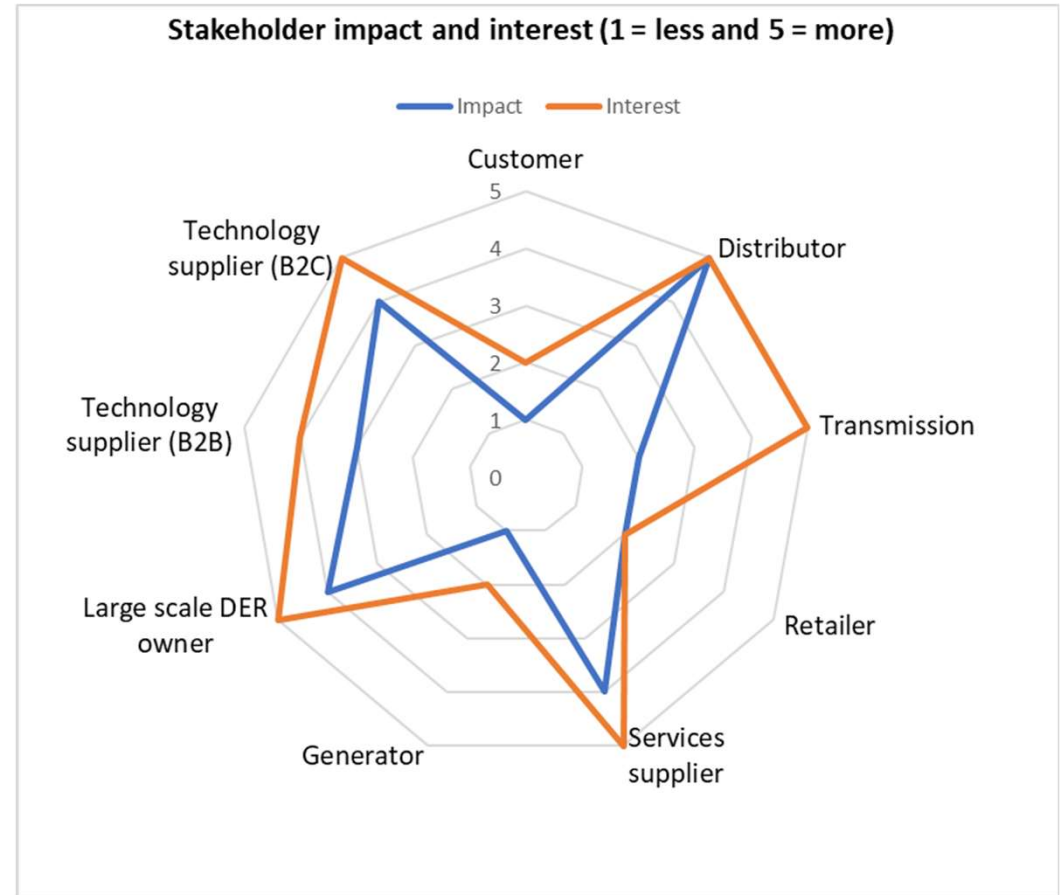
- if any new members should be added to the group
- the scope and nature of engagement with key stakeholders and the wider electricity sector
 - noting the engagement approach can be calibrated through delivering the engagement plan

Persona	Description
Customer	Household, commercial & industrial. May own DER
Distribution network	South Island/North Island; large/small; urban/rural
System operator	Transpower
Retailer	On-sells electricity: large/small customer base
Services supplier	Business to customer focus: customer experience, electricity-related services eg, peer-to-peer, load aggregation
Generator	Grid connected generation
Large scale DER owner	Owns/operates multiple distributed generation and flexible load sites
Technology supplier	Business to business technology focus: SCADA platforms; communications; metering equipment
Equipment supplier	Business to customer focus: Electric vehicles/EV charging; PV; battery storage; inverters; intelligent devices
Quasi-government agencies	Government officials, Regulators, Agencies (EECA, Ara Ake, Worksafe, Standards NZ etc)

Stakeholder quadrant and indicative mapping of interest and impact of personas/stakeholders [to be updated with survey results]



www.stakeholdermap.com



Illustrative mapping of impact and interest: placeholder for results of stakeholder mapping survey

Proposed engagement plan

The recommendation is to approve the engagement plan and activities – the minimum immediate need is a website/page to host materials and provide the starting point for stakeholder engagement. The engagement plan is budgeted for

Announcement

- write to key stakeholders informing them of the process, purpose and expected outcome, and how they can participate and contribute

Use a FlexForum micro-website/page to host workshop materials – pre-reading, on-the-day presentations, session notes – for people to follow along on the journey

- provide regular updates (eg, after each session) on progress to a mailing list (created by asking people to signup for updates) and on a FlexForum website/page
- materials would be published asap (ie, 2-3 days) following each session to provide transparency and immediacy

Request input on the challenges and questions being discussed by the group

- invite practitioners and experts to share their perspective on issues and questions being discussed
- use surveys of interested parties to obtain wider perspectives on specific issues and questions
- provide a comments function (or email to the secretariat) on the FlexForum webpage for people to share their perspective on the views outlined in the session notes

Hold open forums at stage gates to check in and get wider input

- conclude with a Pitch day to launch the conclusions and describe the next steps

Appendix A: A starting point for the list of discussion topics

What	When	Where	How	How much
DER potential	Buyer visibility of conditions & need	Buyer visibility of conditions & need	Deployment & dispatch requirements	Negotiated or administered pricing
Network design & operation/conditions	Seller visibility of place of need	Seller visibility of time of need	Procurement approaches	
Connection requirements			Terms of trade	
Network planning & investment				
System & market operation/conditions				

To **who** is a function of the product specifications (ie, the what), current or forecast network, system and market conditions (ie, when & where), the ability to procure the service (ie, how), and the options available (ie, how much)

Appendix B: revised goal, purpose and objectives

The FlexForum goal is to create a set of actions to integrate DER into the electricity system and markets to maximise the benefits for Aotearoa New Zealand

The FlexForum purpose is to:

- deliver three objectives – the things it will do – to integrate and maximise the value of DER
 - identify the minimum specifications of the services that DER can provide, to who, when, where, how and for how much
 - identify the practical, scalable, and no regrets steps to use the services that DER can provide
 - support ongoing learning and collaboration across the electricity sector on real world deployment of solutions to realise the benefits of DER, including identifying and resolving barriers
- build a broad consensus across the electricity sector and other interests for the set of actions to integrate DER
- build capacity and capability to implement the set of actions to integrate DER.

Elaborating on the goal

The FlexForum goal is to create a set of actions to integrate DER into the electricity system and markets to maximise the benefits for Aotearoa New Zealand

...*a set of actions* is about identifying the specific choices and actions which need to be taken now in a coordinated way to integrate and maximise the value of DER

...*integrate DER* means considering the commercial (products and markets), service provider/customer (transactional) and network (technical and network access) dimensions of using DER for the primary purpose and any electricity supply chain purpose

...*the electricity system and markets* are the distribution networks and transmission network and the range of markets for electricity services, eg, energy, ancillary services etc. The electricity system and markets will be increasingly critical as decarbonisation results in electricity replacing other fuels

...*maximise the benefits for Aotearoa New Zealand* means the benefits of DER are available to households and businesses, individually and in aggregate, network operators and across the electricity supply chain by supporting electrification and decarbonisation

...*the benefits* are expected to include greater customer choice to connect and use DER, lower electricity costs and prices, better quality and more reliable and resilient electricity supply, and faster decarbonisation.

Elaborating on the purpose

The FlexForum purpose is to:

- deliver three objectives – the things it will do – to integrate and maximise the value of DER
- build a broad consensus across the electricity sector and other interests for the set of actions to integrate DER
- build capacity and capability to implement the set of actions to integrate DER.

...the three objectives will be described separately (see next page)

...*build a broad consensus* means the FlexForum process needs to be inclusive, robust and for the common good, not immediate commercial interest of those directly involved, to achieve wide-spread acceptance of the things delivered

...*build capacity and capability* means the Flexforum will look past delivering the immediate objectives and consider the tools and skills required for implementation

Elaborating on the objectives

The FlexForum objectives – the things it will do – are:

1. identify the minimum specifications of the services that DER can provide, to who, when, where, how and for how much
2. identify the practical, scalable, and least regrets steps to integrate DER and use the services that DER can provide
3. support ongoing learning and collaboration across the electricity sector on real world deployment of solutions to realise the benefits of DER, including identifying and resolving barriers

...the minimum specifications involves identifying a standard specification for each electricity-related service available from DER given the requirements of participants across the supply chain, the electricity system and market and identifying standard processes for DER owners, distributors, flexibility suppliers and other electricity market participants to use (or transact) DER services

...the practical, scalable, and least regrets steps means identifying the specific changes to operating practices and the investments in equipment and capability needed to provide options and the flexibility to adapt to changing circumstances

...support ongoing learning and collaboration is a forward-looking objective dependent on delivering objectives 1 and 2, and parties implementing the practical, scalable and least regrets steps for integrating DER and using the services available from DER