Distribution Business Transformation

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Orion

Outline

- ***Considering perspectives on how energy sector transformation will impact the electricity industry, including technological change, demand growth and market operations with a higher level of renewable generation…***

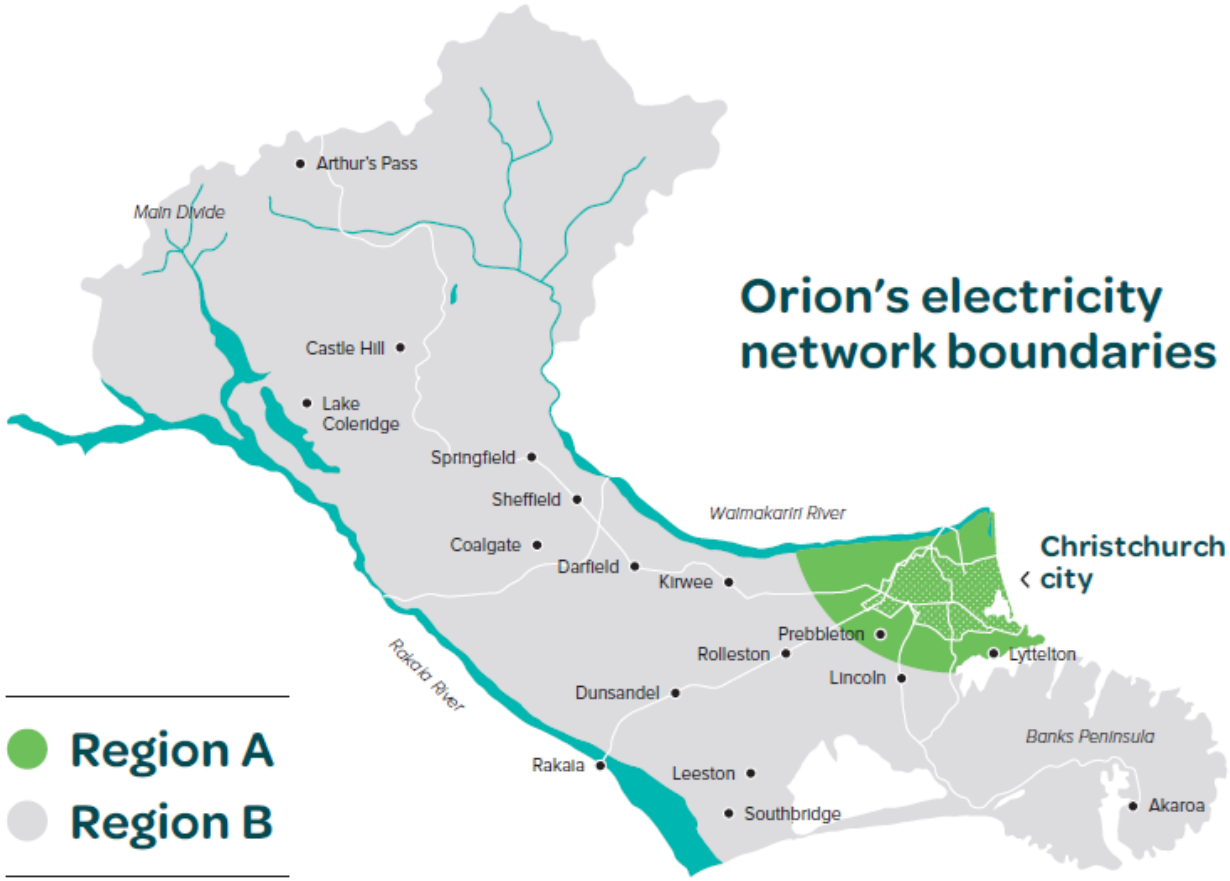
<u>Distribution Business Transformation</u>

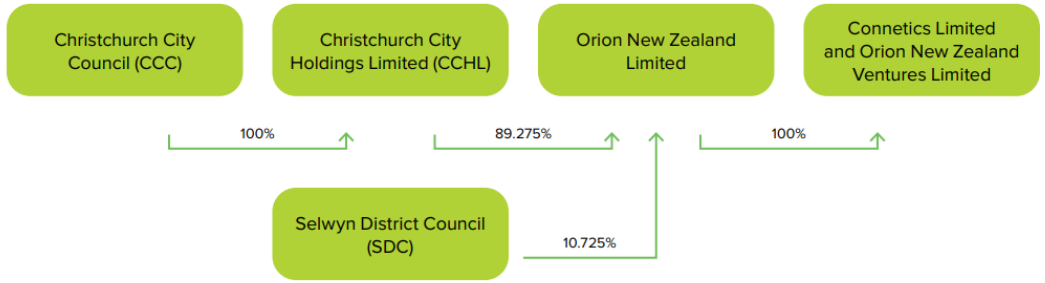
- **Orion**
- **Energy transition in mid-Canterbury**
- **EDB transformation - insights from the UK**

Orion Group

Our Purpose is to power a cleaner and brighter future for our community

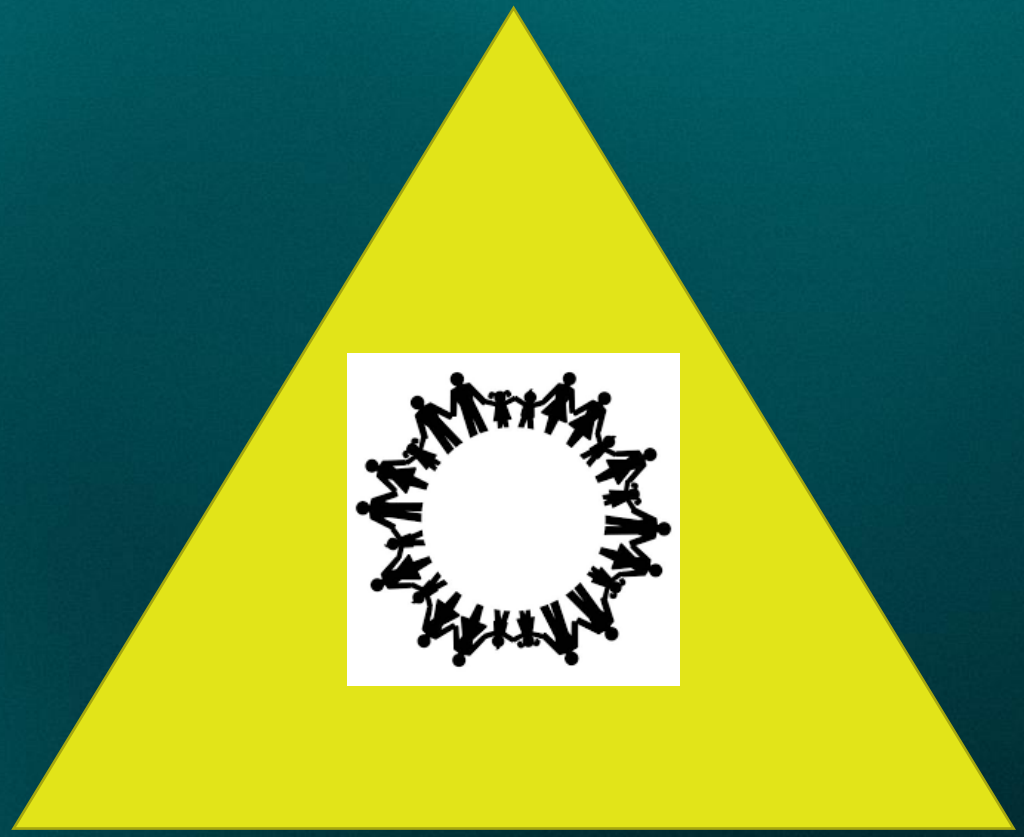
Orion's electricity network boundaries





The Energy Transition Challenges

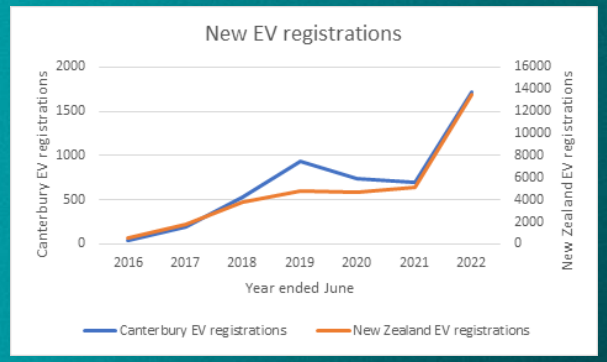
Decarbonisation

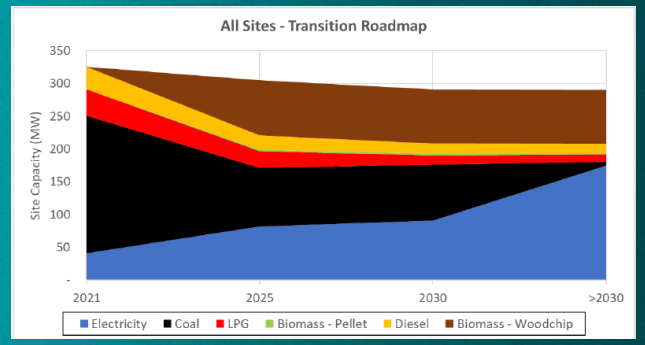


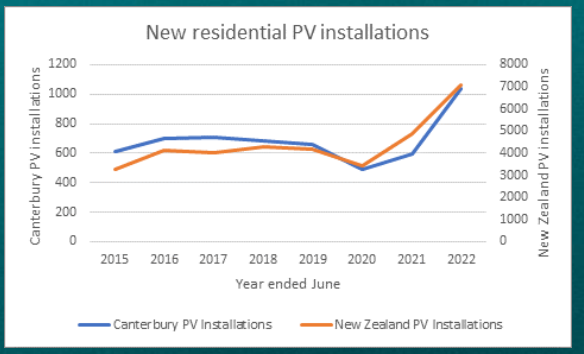
Energy Equity

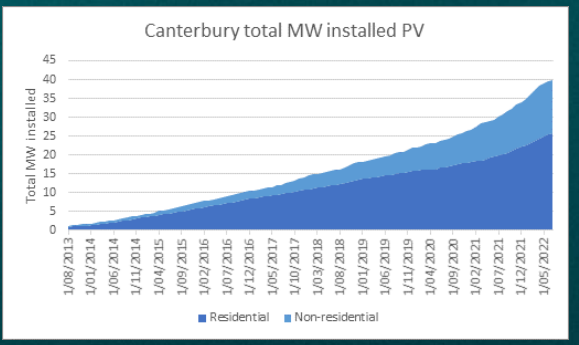
Energy Resilience

Decarbonisation







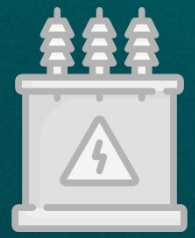


Flexibility

Smart technologies and flexibility are essential to integrating low carbon power, heat and transport onto the system - *Ofgem*

Historically, generation ramped up and down to meet demand, providing system flexibility

As generation becomes more intermittent, flexibility must come from storage and demand side response.



Significant adoption of DER as customers decarbonise heat, transport and energy.

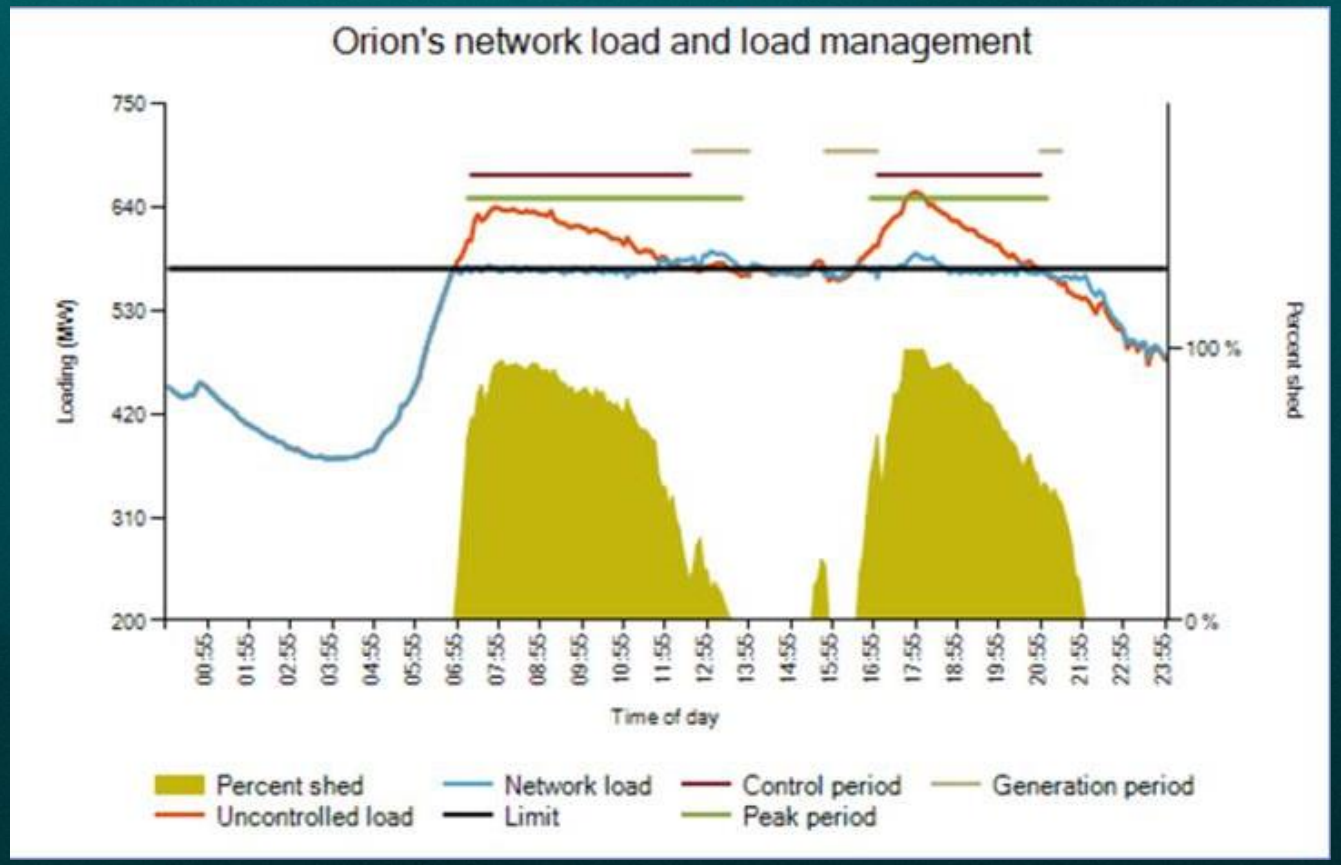
Flexibility can optimise the use of existing network capacity and reduce the cost/disruption of this transition.

As customers adopt DER, their energy consumption and maximum demand could increase.

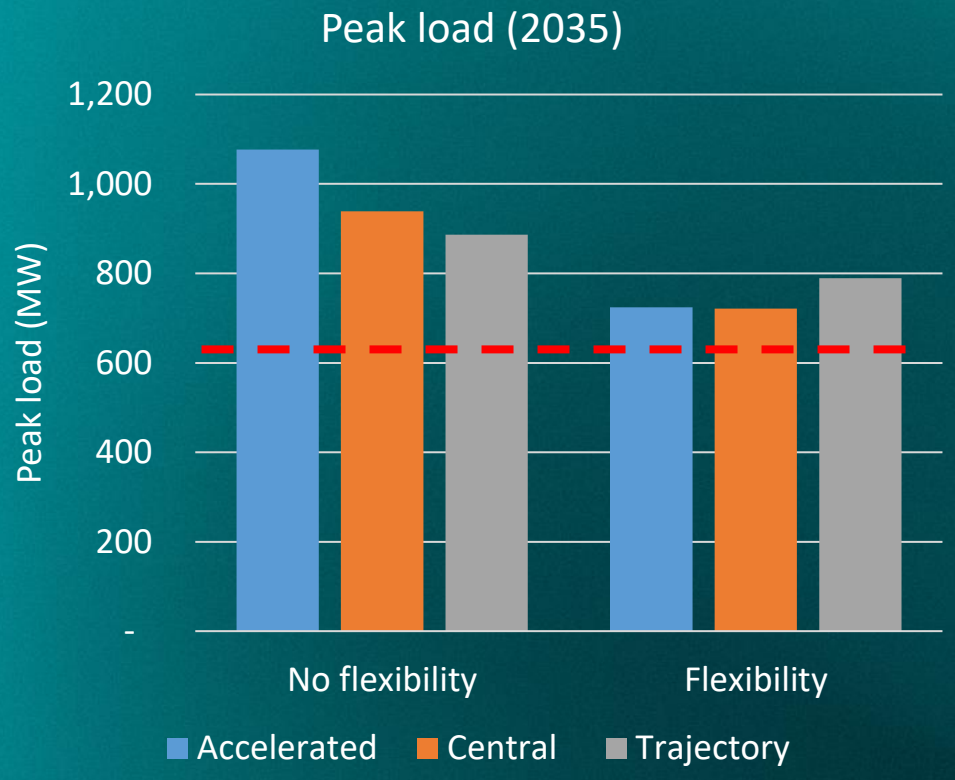
This will increase the need to manage their electricity use in a flexible way, to keep cost down and use energy when it is cleanest.

Building on existing capability

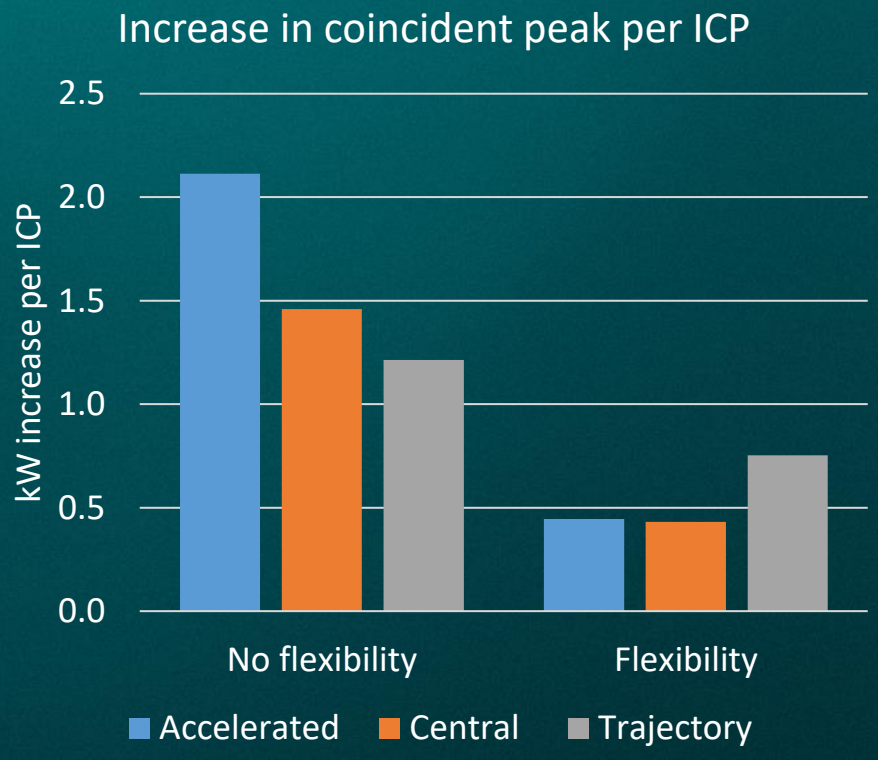
- Excellent track record of managing demand across the network through hot water ripple control.
- However access to this control is reducing, and as the energy system transitions Orion will need more flexibility, and in more specific locations.
- Market-led solutions are needed to incentivise this flexibility, while enabling access to other value streams.



Indicative Value of Flexibility to Orion

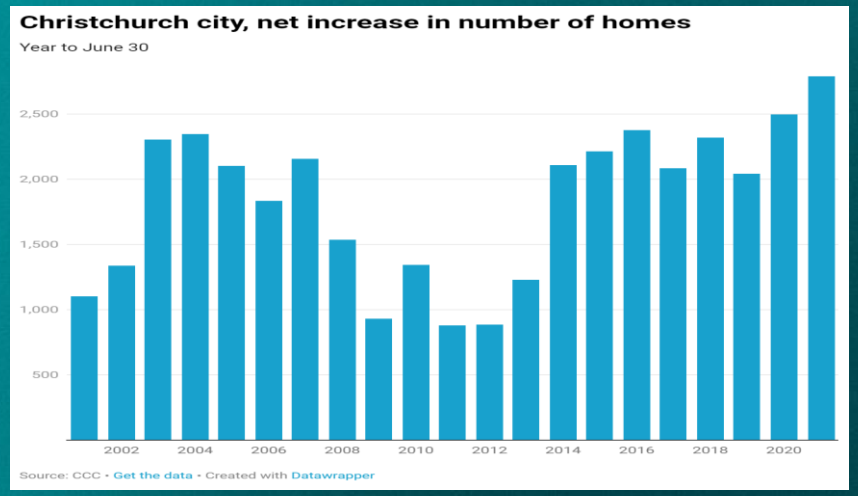


Increases in peak capacity caused by DER and decarbonisation could be accommodated through traditional network reinforcement, or flexibility to improve network utilisation.



Without flexibility, coincident peak demand could increase by 1.2-2.1kW per ICP. Flexibility could reduce this to an increase of 0.4-0.8kW per ICP (benefit of 0.5-1.7kW).

Urban Development: Intensification & Greenfield



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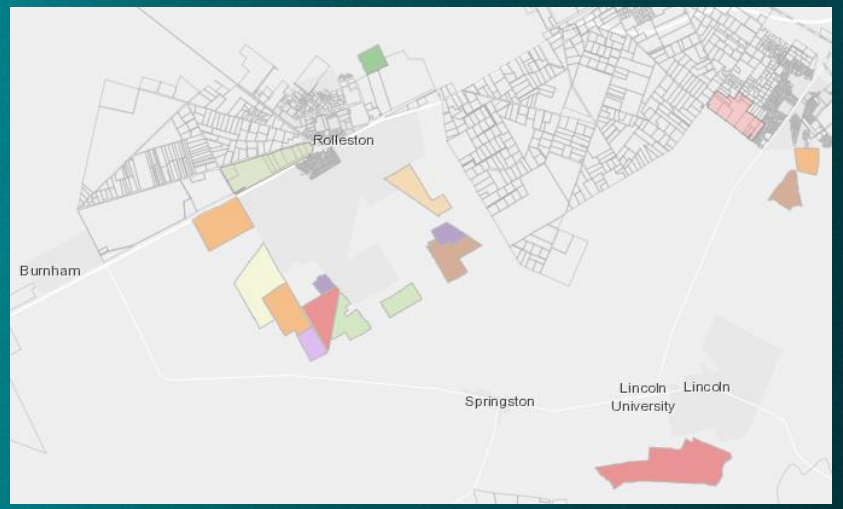

IMAGE: SELWYN DISTRICT COUNCIL

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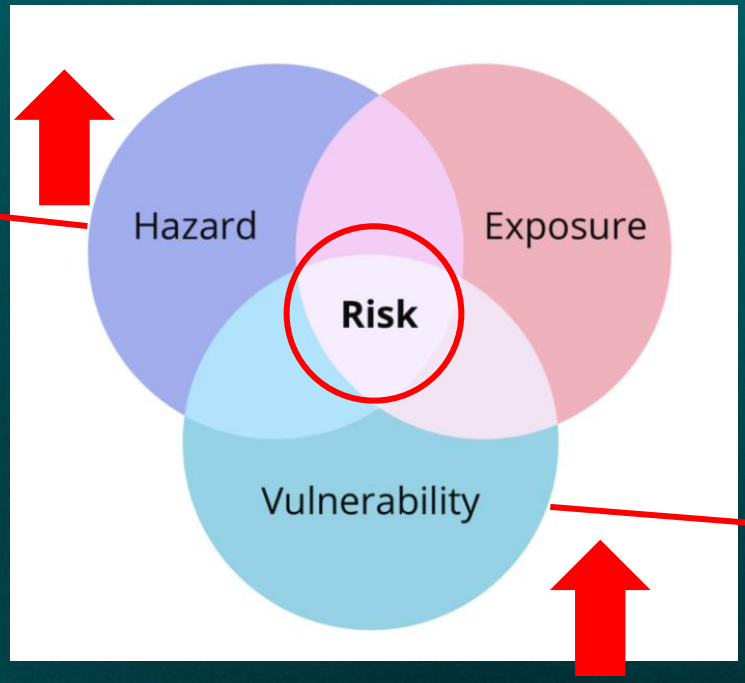
Resource Management (Enabling Housing Supply and Other Matters) Amendment Act 2021

Public Act 2021 No 59
Date of assent 20 December 2021
Commencement see section 2

IMAGE: CHRISTCHURCH CITY COUNCIL

Community Energy Resilience

AF8
ALPINE FAULT MAGNITUDE 8



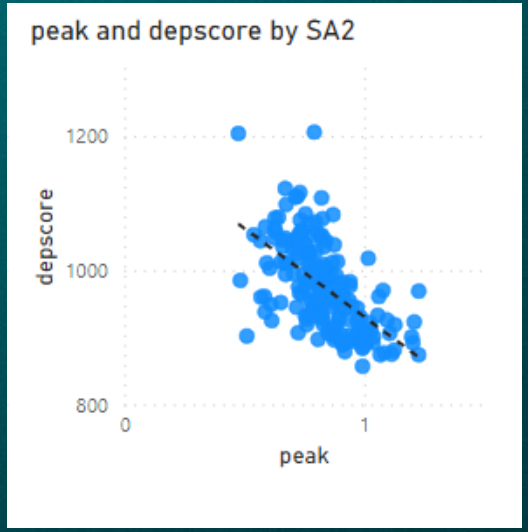
Equity (Access & Affordability)

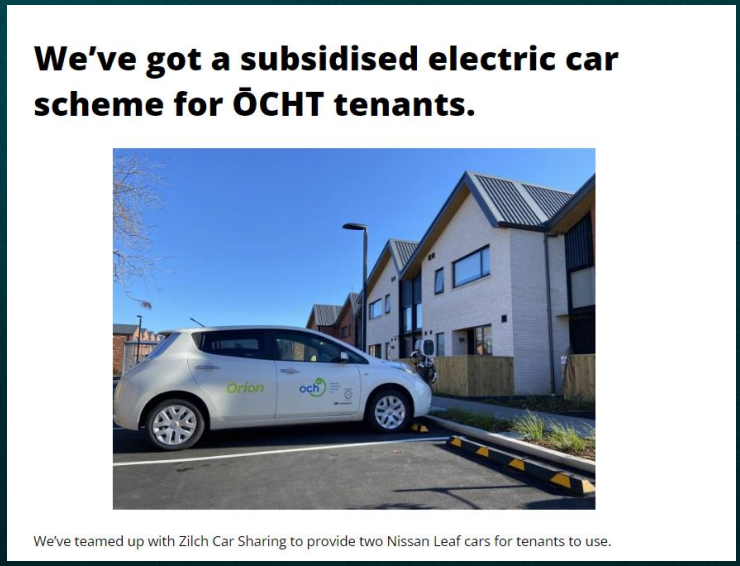
Affordability:

- Ensuring electricity remains an affordable and attractive solution for our customers and communities.

Access:

- Ensuring the economic, health, and social benefits of participation extend to all levels of society, regardless of ability, race, or socioeconomic status.





Our Overarching Challenge:

Investment to enable the transition, ensure resilience, and maintain service reliability…
in the face of growing complexity & uncertainty…
without gold plating.

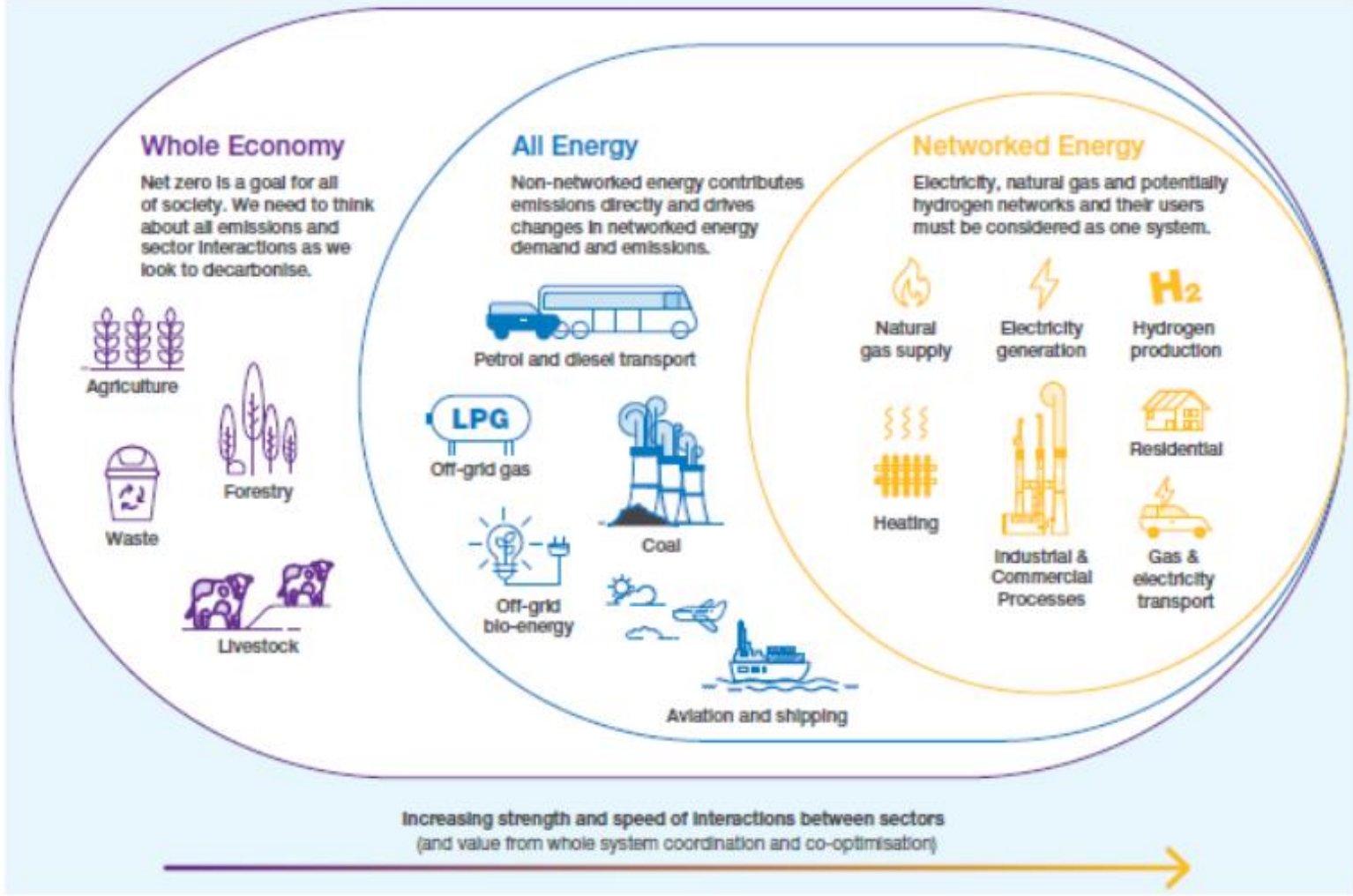
Right place, right time, right solution

EDB Transformation:
some insights from the UK...

- From Electricity to Energy System Lens
- Benefits of local / place-based system design
- Collaborative innovation
- Regulation & Policy Enablers

From Electricity to Energy System

Fig. 1. Whole system interactions captured in FES

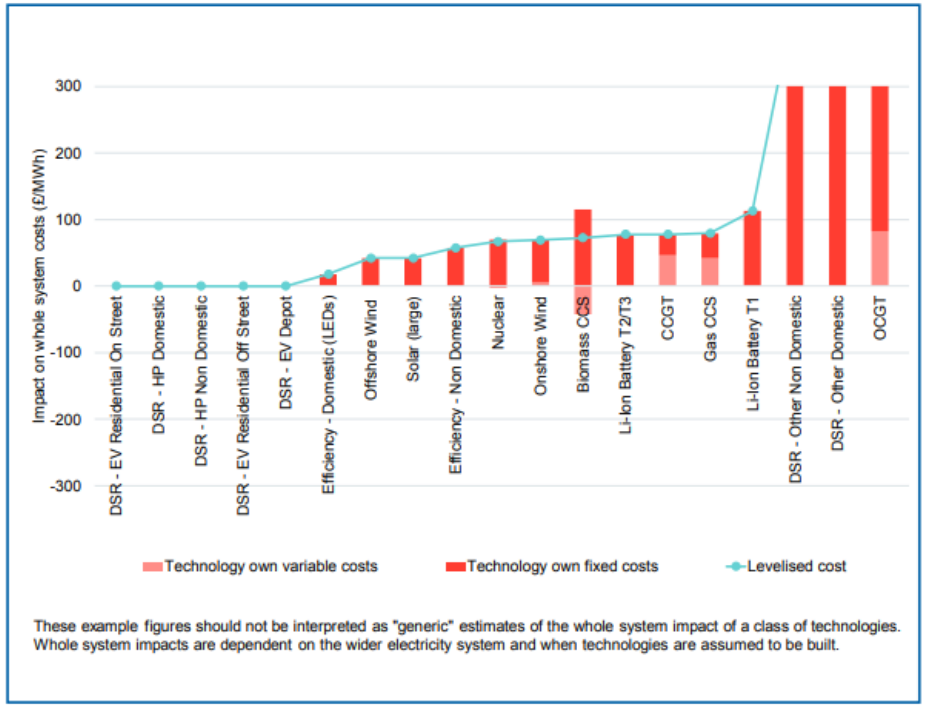


https://www.energynetworks.org/industry-hub/resource-library/on22-ws1b-p2-fes-and-dfes-purpose-of-energy-scenarios-(30-may-2022).pdf

Whole of System Cost:Benefit

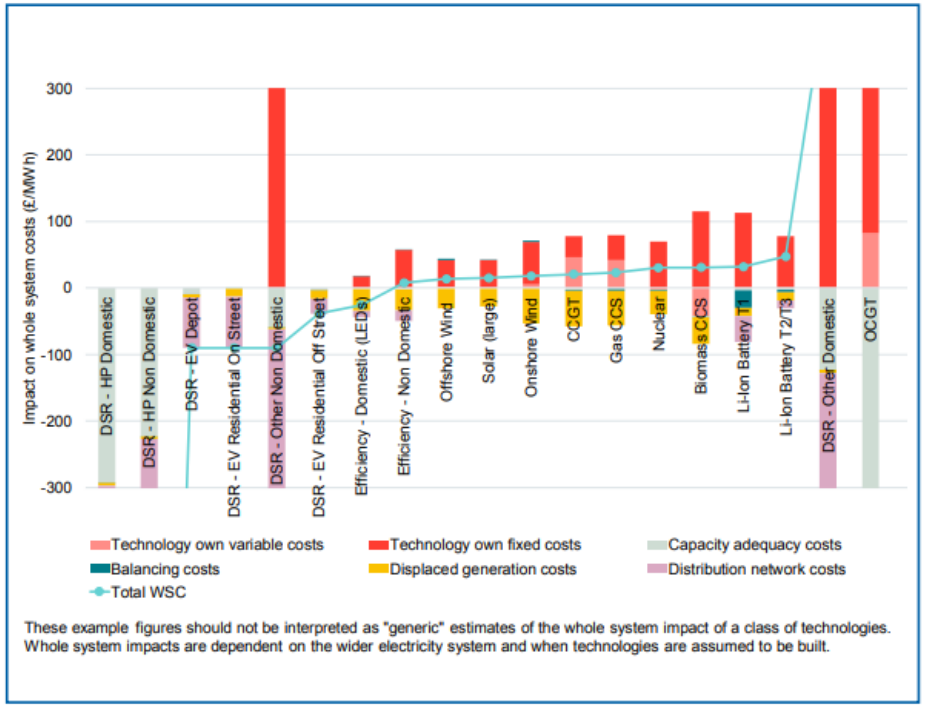
Source: @Challenging Ideas: ReCosting Energy

TODAY: LEVELISED COST



These example figures should not be interpreted as "generic" estimates of the whole system impact of a class of technologies. Whole system impacts are dependent on the wider electricity system and when technologies are assumed to be built.

TOMORROW: WHOLE SYSTEM COSTS



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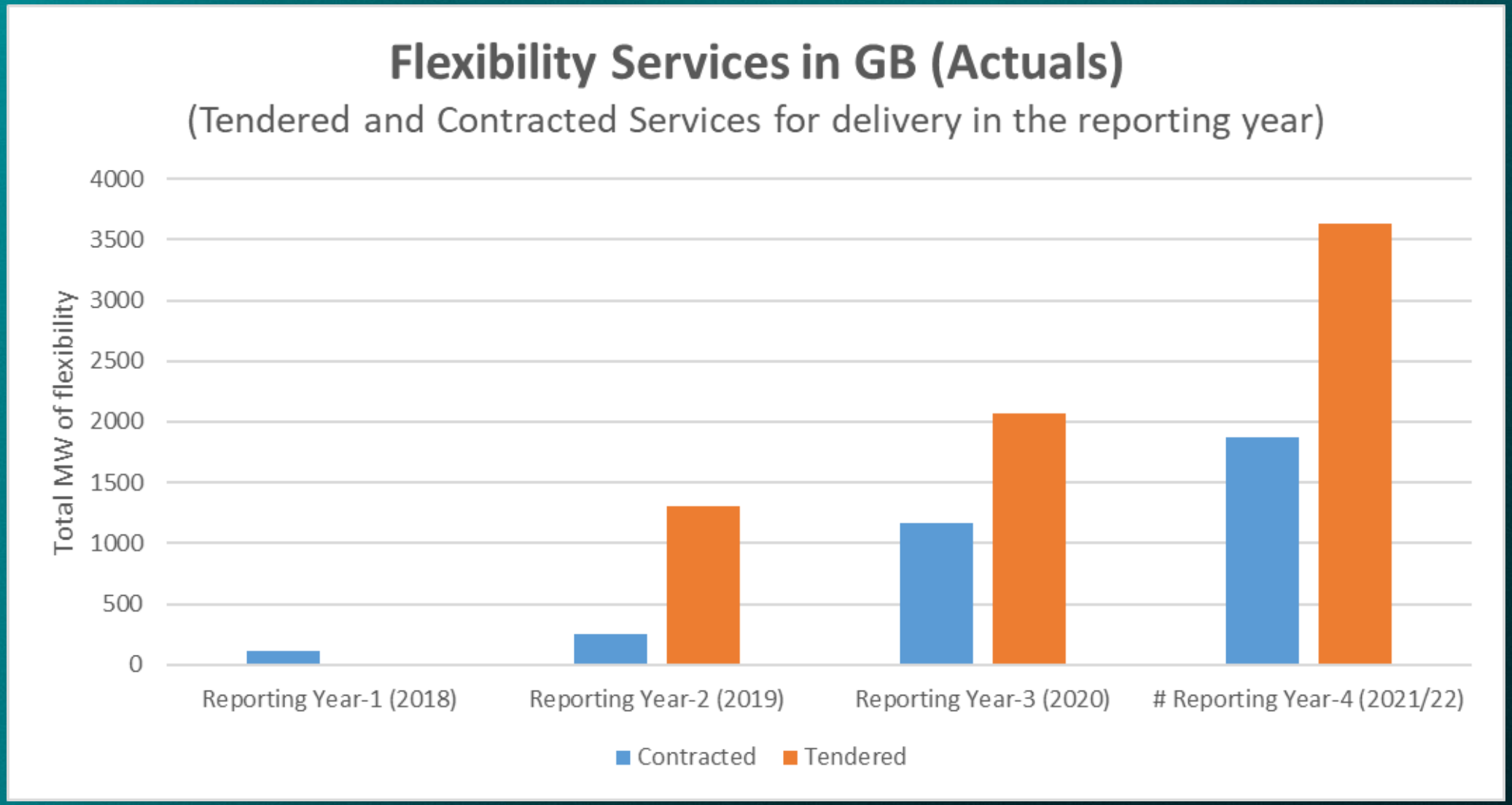
Revealing different outcomes for all forms of demand and flexibility assets and generation assets, showing LCOE is not able to reflect the overall value or cost to the system

Demand-side optimisation

Balancing

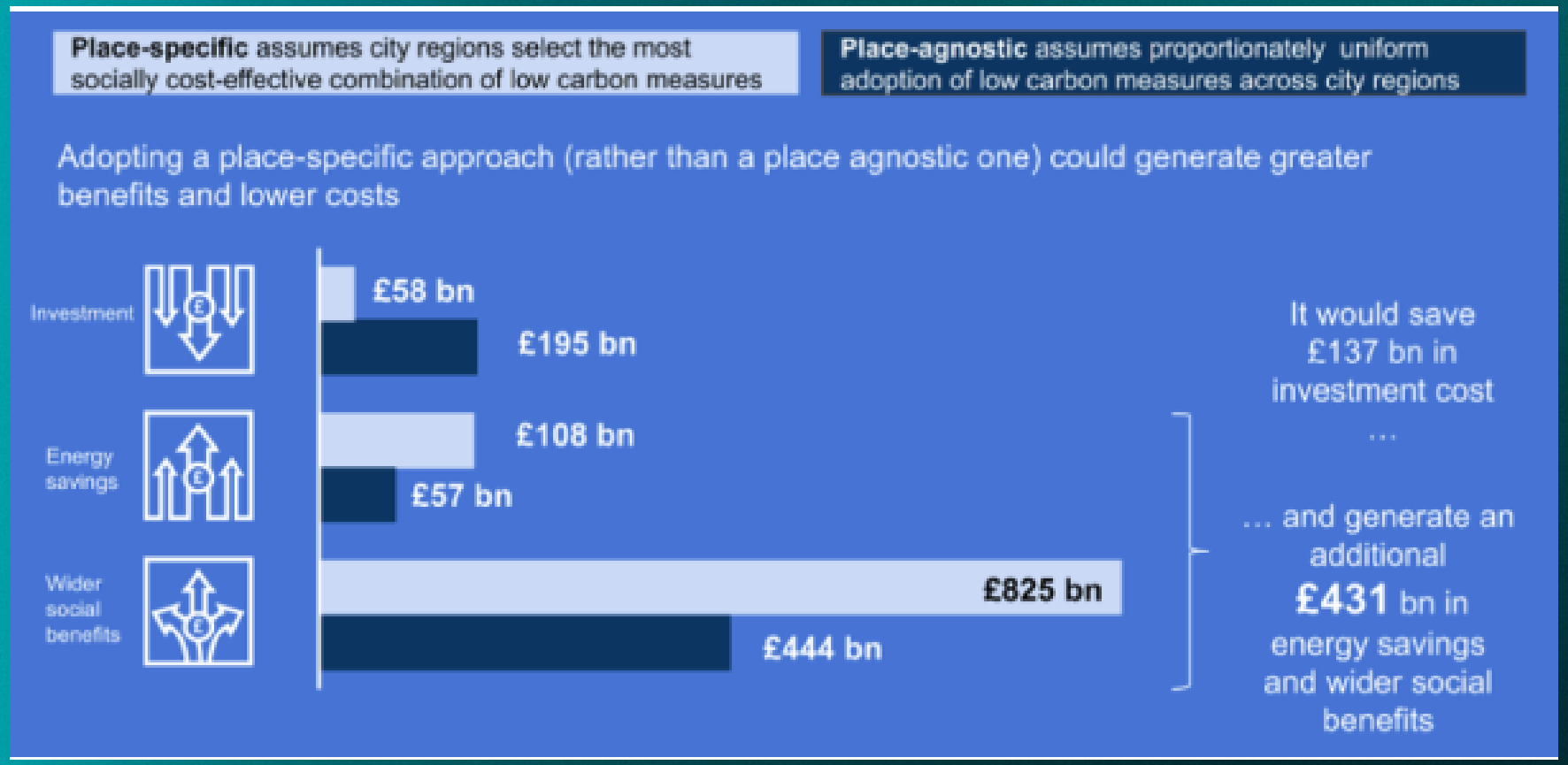
Supply-side

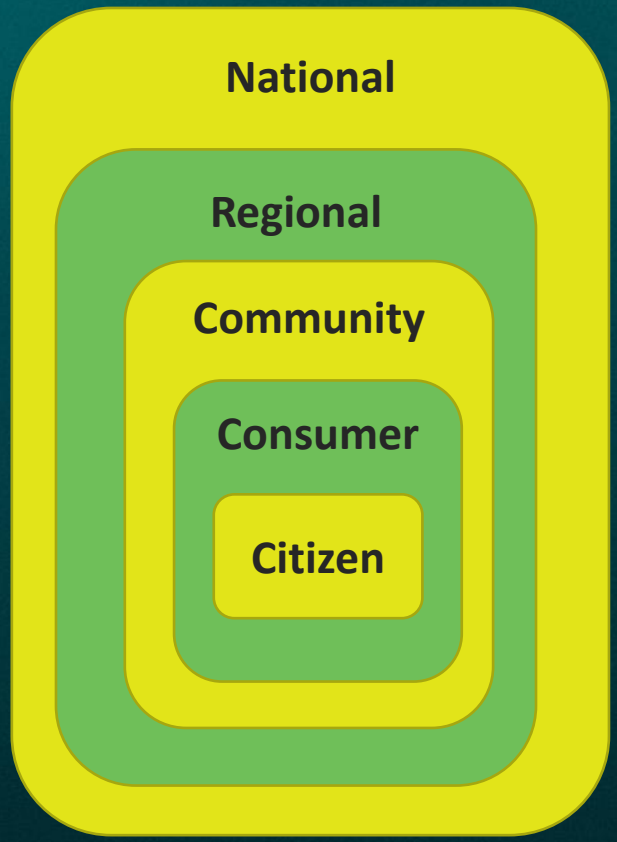
Flexibility Market Development



https://www.energynetworks.org/industry-hub/resource-library/?search=ON22-WS1A-P0+Flexibility+Figures+2022%2F23&id=267

Benefit of Place-based Energy Systems



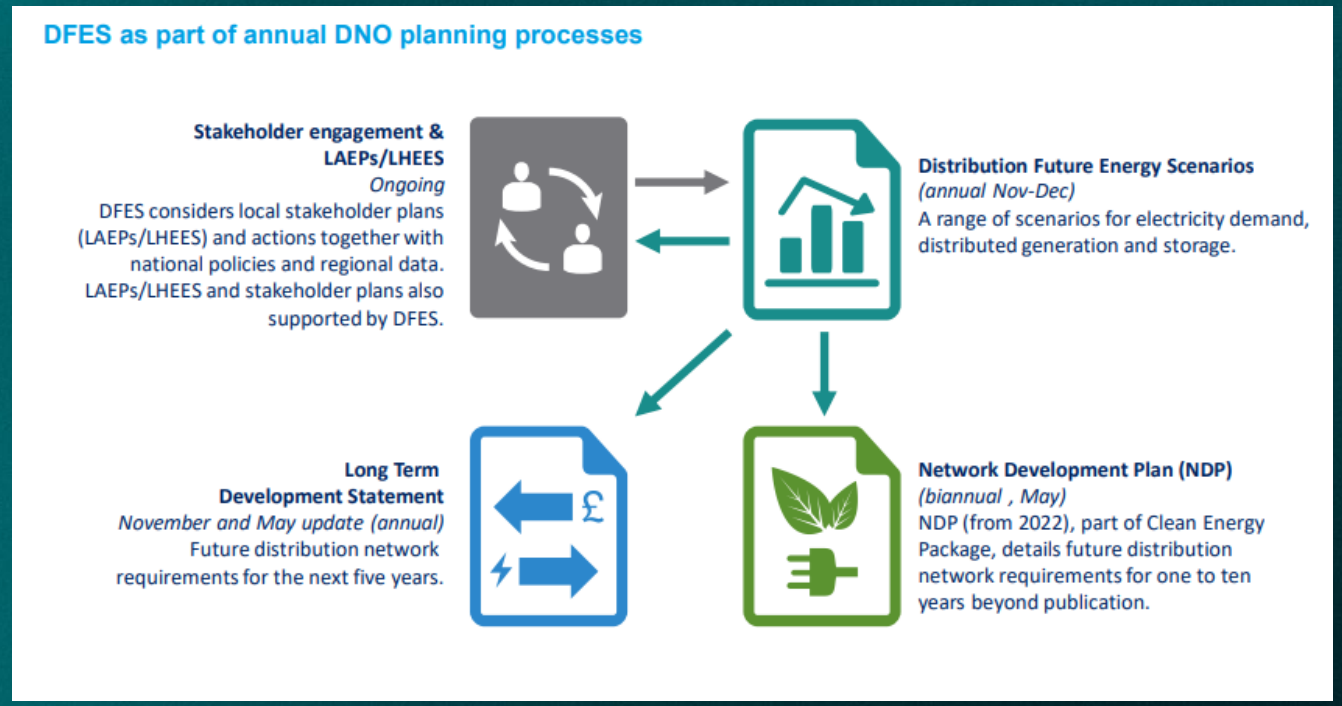


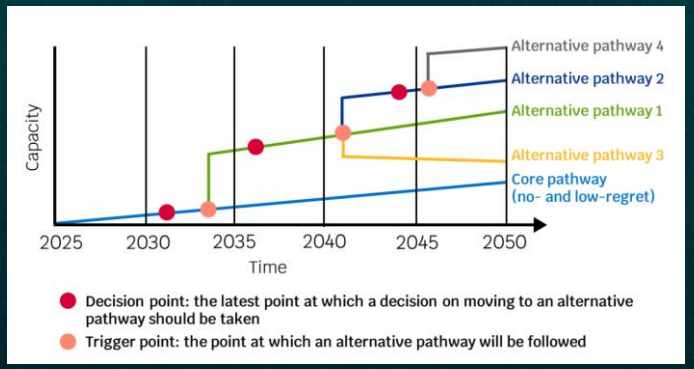
https://netzeroweek.com/local-energy-systems-an-answer-on-our-doorstep/#/

Integrated & Adaptive Energy Planning

https://es.catapult.org.uk/tools-and-labs/our-place-based-net-zero-toolkit/local-area-energy-planning/

https://www.nationalgrideso.com/future-energy/future-energy-scenarios





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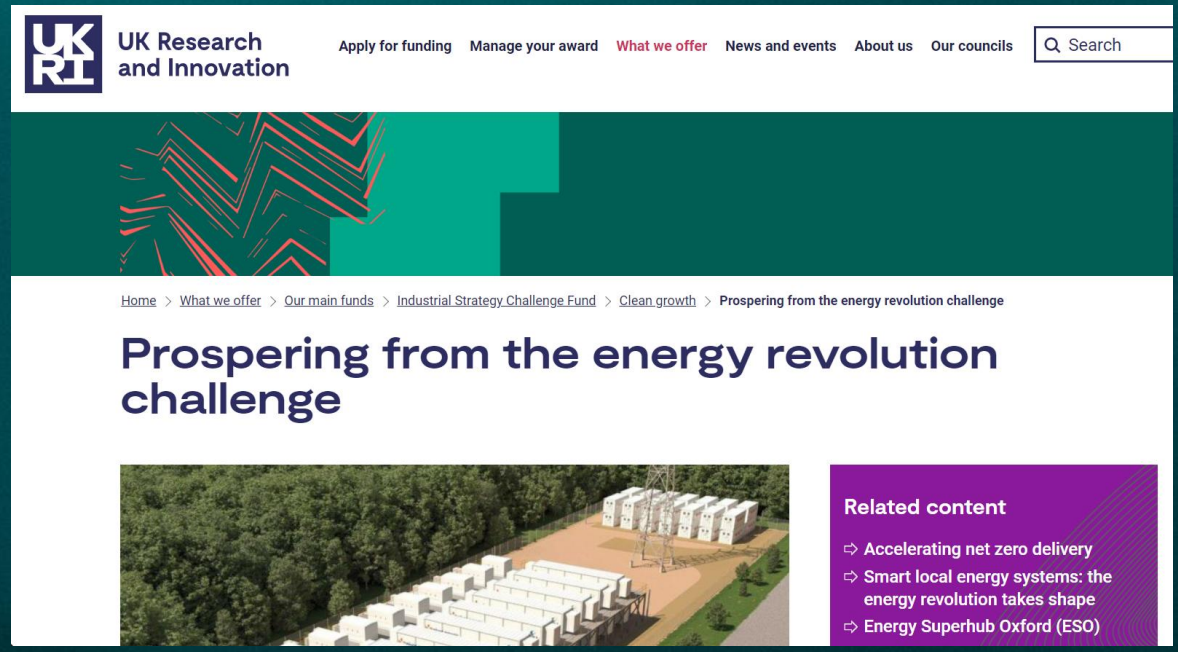
Enabling ‘Energy Communities’

Energy Local
making energy work for you

Collaborative Innovation

https://www.energynetworks.org/creating-tomorrows-networks/open-networks/



https://www.ukri.org/what-we-offer/our-main-funds/industrial-strategy-challenge-fund/clean-growth/prospering-from-the-energy-revolution-challenge/

Regulatory & Policy Enablers

- Stronger focus on customer *in a meaningful way*
  - Better and deeper engagement with customers – evidence-based
- Strong focus on impacts on energy equity
- Forward looking approach to expenditure
  - (cf extrapolation of historic expenditure)
- Totex funding
- Collaborative innovation mechanisms

Summary

- Challenges:
  - Electrification, urban development, resilience, equity
  - Growing complexity & uncertainty
- Opportunities:
  - Energy system lens, whole of system cost/benefit, ‘flexibility first’
  - Place-based, integrated and adaptive planning, energy communities
  - Collaborative innovation
  - Regulatory & Policy enablers