



Flexibility at Orion: EDBs Role in Demand-Side Flexibility

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Structure

What is Demand Flexibility

The Current Use of Demand Flexibility

Our Collaborative Projects to Unlock Flexibility

How Distributors Can Enable Greater Flexibility

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What is Demand Flexibility

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“Demand response (Flexibility) refers to balancing the demand on power grids by encouraging customers to shift electricity demand to times when electricity is more plentiful or other demand is lower, typically through prices or monetary incentives”

International Energy Agency

The Energy Transition Requires Increased Flexibility

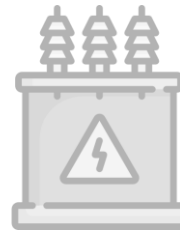
- Smart technologies and flexibility are essential to integrating low carbon power, heat and transport onto the system - *Ofgem*



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.

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A photograph of a modern, multi-story building at dusk. The building features large glass windows and balconies, some of which are illuminated from within. In the foreground, a wide set of concrete steps is lit up with small, recessed lights. The scene is framed by trees and a grassy area with wooden benches. The sky is a deep blue, and the overall atmosphere is warm and modern.

The Current Use of Demand Flexibility

How Orion Enables Flexibility Today

Ripple Control

Uses ripple control signals to turn hot water on and off

Examples:

- 52 MW of Peak Control
- 100k ICPs on Fixed Time Control

Contracted Flexibility

Secures flexibility through agreements, increasing certainty of response

Examples:

- Lincoln Flexibility Project
- Flexible Connection agreements

Pricing

Uses pricing signals to encourage flexibility based on network conditions

Examples:

- Control period demand for major customers
- Time of use tariffs
- Controlled tariffs

Emergency mode

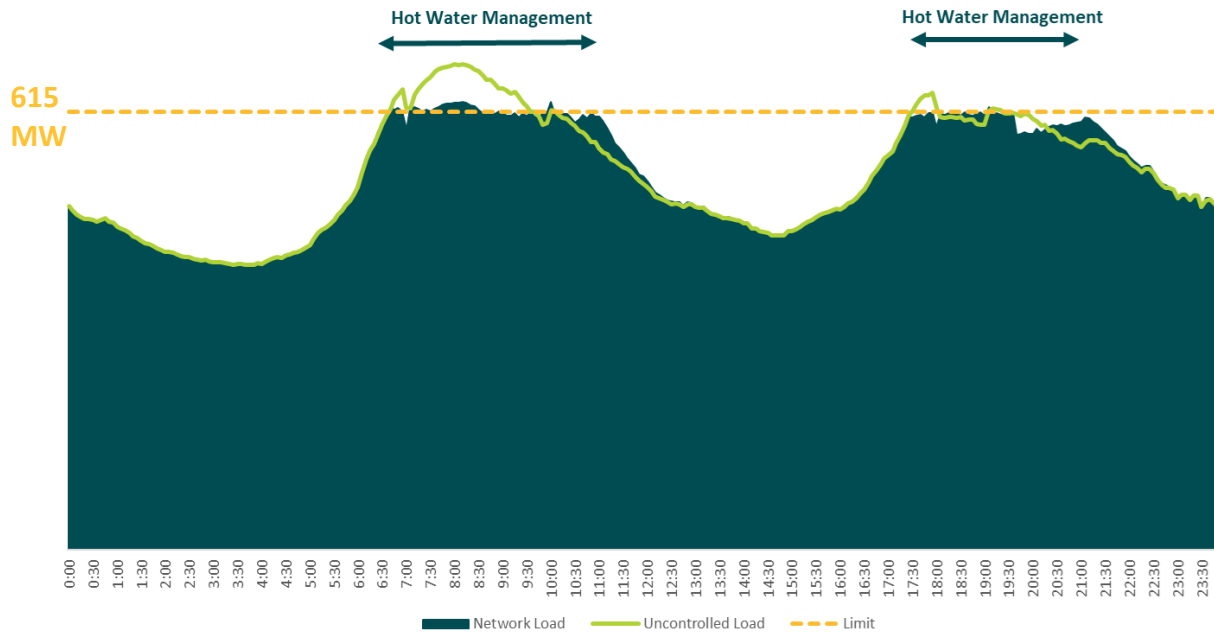
Mandatory response to avoid outages and protect the network in critical situations

Examples

- Grid Emergency Notice procedures with Transpower
- Shedding feeders etc

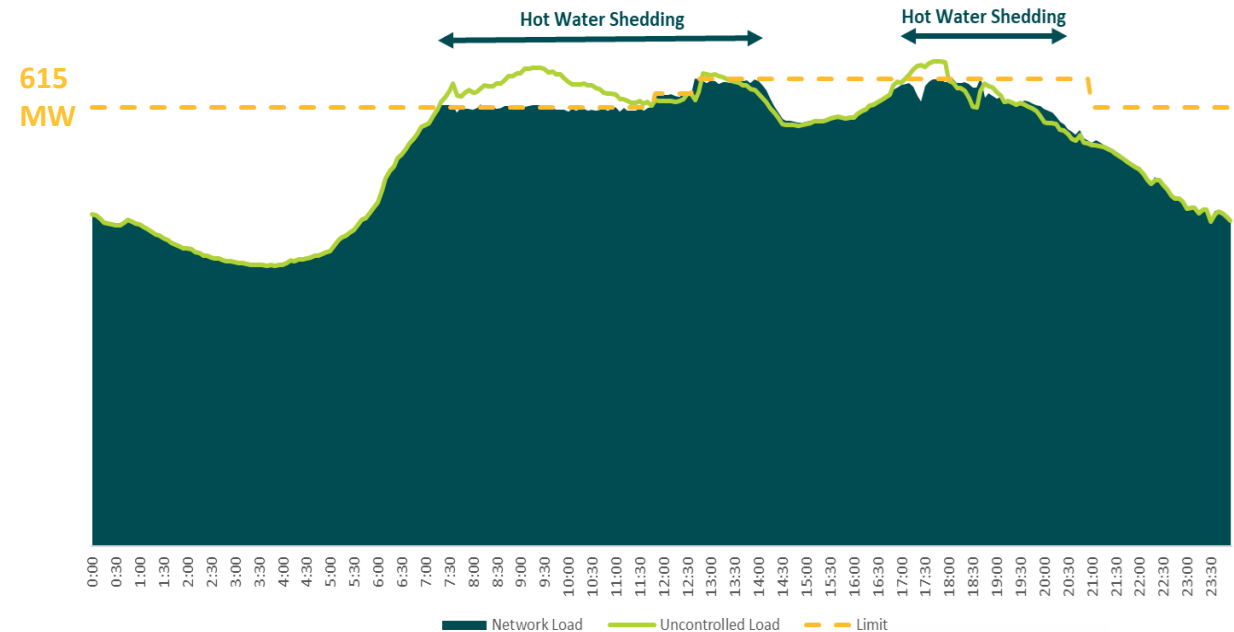
The Result of Demand Response

Days where both morning and evening peaks are managed occur around 20 days a year



Source: 9 August 2023 - <https://online.oriongroup.co.nz/LoadManagement/>

Our load factor is around 0.84. This is roughly what Transpower assume nationally we will get to in 2035



Source: 11 July 2022 - <https://online.oriongroup.co.nz/LoadManagement/>



Our Collaborative Projects to Develop Flexibility

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What we are doing with our partners



Hot water flexibility trials

- Partner with Retailers to test shared control of hot water.
- Unlock the use of hot water control to provide more value to customers.



Lincoln Flexibility Service

- Address local network constraints in Lincoln by procuring demand flexibility.
- Build capability to communicate to aggregators.
- Working with Ecotricity who have partnered with us to deliver the project.



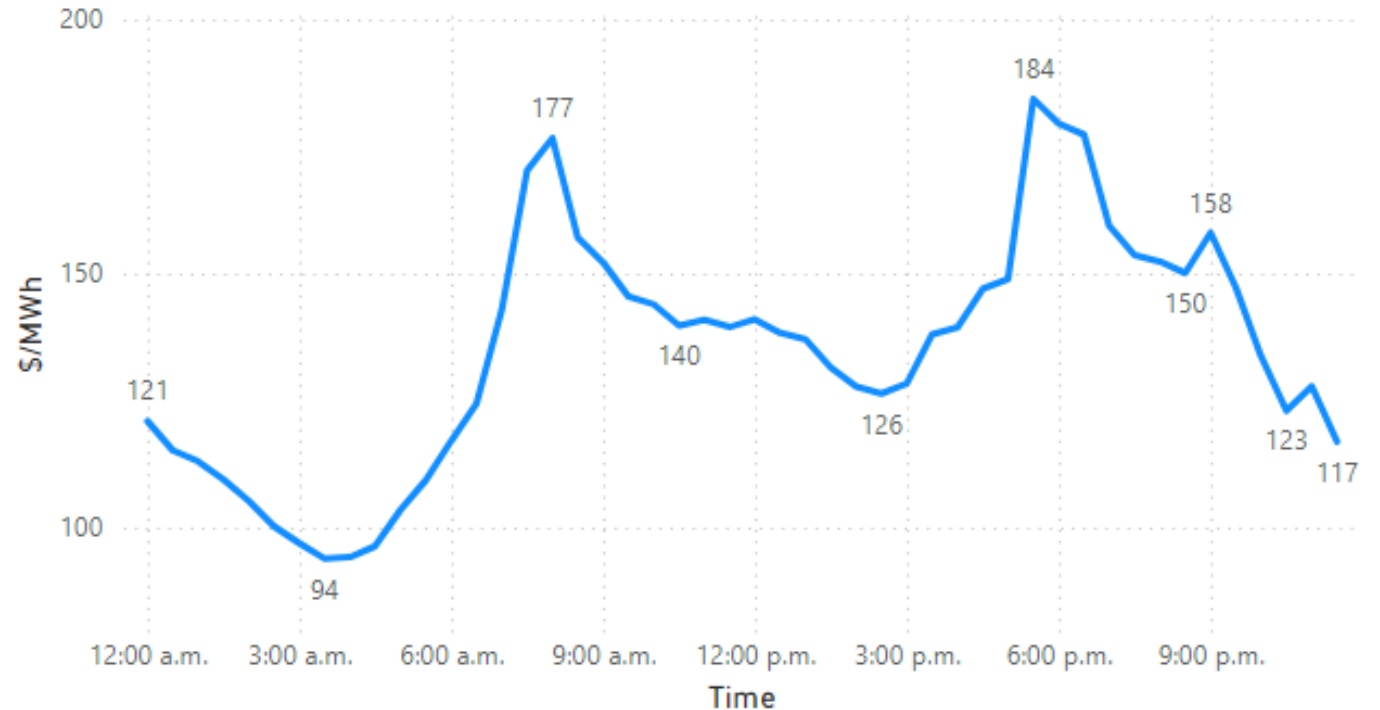
Resi-Flex

- Incentivise flexibility from residential consumers.
- Explore commercial mechanisms in partnership with Wellington Electricity and Retailers.

Retailer Hot Water Control

- Currently, hot water load is controlled by distributors
- We are working with retailers to test how we can share control of hot water
- Retailers can provide value (potential over \$200 a year) for customers with hot water control

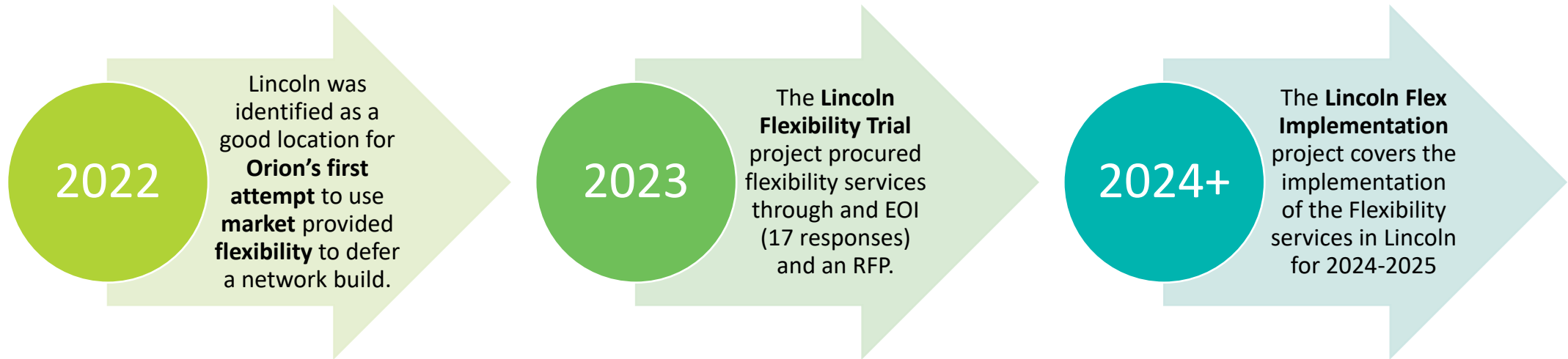
Average daily spot price between 2021 and 2023



Lincoln Flexibility Service

Purpose: To use procured demand flexibility to address a local network constraint in Lincoln.

Objectives: Build capability to dispatch via a service provide, inform service development and operational technology requirements.



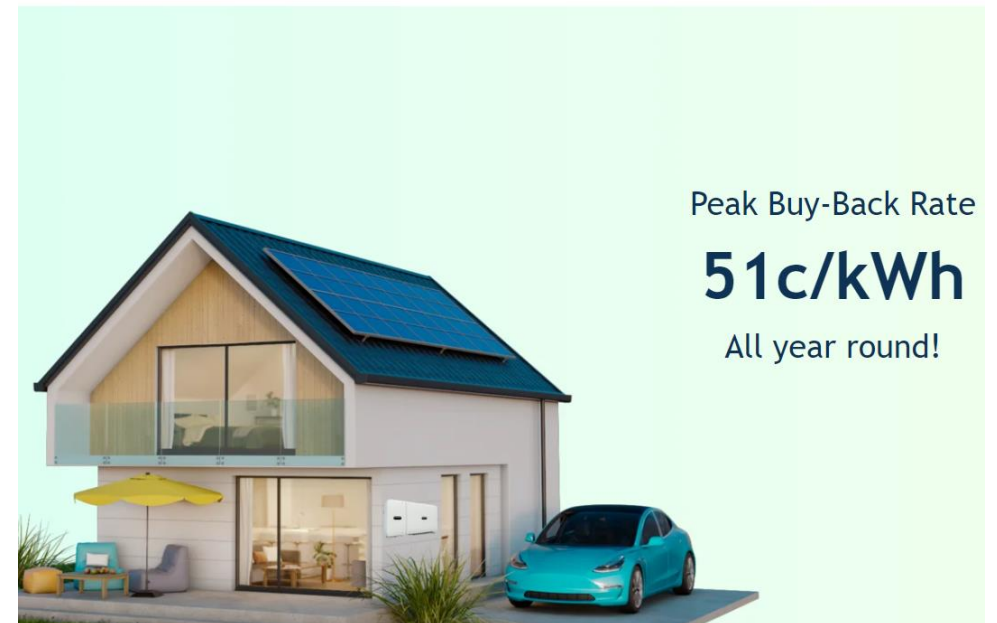
What we've learnt from Lincoln

Customer participation

- Challenging to accelerate adoption of solar and batteries
- Some interested customers not in zone to participate

Flexibility provider

- Ecotricity has provided competitive offerings and formed partnerships to encourage the adoption of flexibility
- The 5kW export limit reduced the ability for the flexibility provider to respond



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Resi-Flex – Results so far

- 13 response to EOI
- Over 400 customers participating currently
- Working with four retailers
- Two commercial mechanisms are being tested, with more in development

Saving Sessions

June - September 2024

$\frac{1}{3}$ customers nationwide signed up

$\frac{2}{3}$ customers saved

8 Saving session

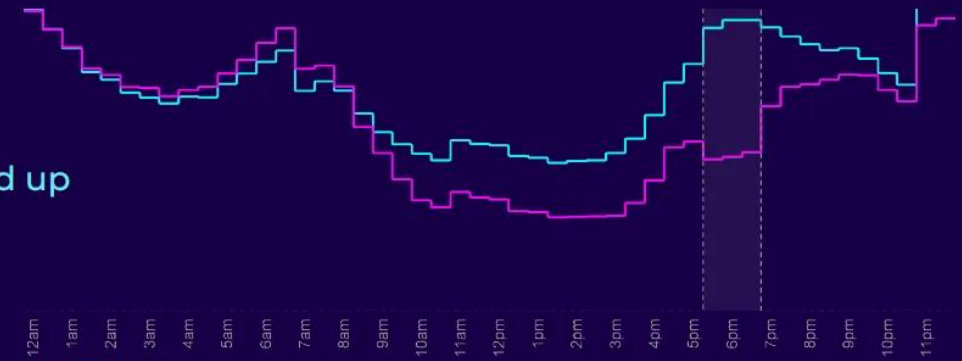
1 - 1.5 hours in length

Morning and evening sessions

Average reduction from **1.4kW** to **0.7kW**

50% reduction in load!

$0.7\text{kW} \times 2\text{M homes} \times 20\% = \mathbf{280\text{ MW}}$



\$2 / kWh

\$1 / kWh

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How Distributors Can Enable Greater Flexibility

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Pricing and Procurement



- The right price signals need to be sent. Time-of-use pricing may have limitations in the future
- EDBs can also play a large role in stimulating the market:
 - Vector – Bus Charging
 - Aurora – Clutha Solar Zero partnership
 - PowerCo – Coromandel Solar Zero partnership
 - Orion – Lincoln Ecotricity partnership
 - More?

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Regulation and Partnership

- Regulation to:
 - Ensure the incentive scheme rewards demand flexibility as much as building new assets
 - Clarify the roles and functions of different industry players
 - Support communication with EDBs, The System Operator, Retailers and Aggregators
- Partnership with:
 - Customers
 - Retailers and Aggregators
 - The System Operator and Grid Owner

What we are looking at next



- What medium size customers require to participate in demand flexibility
- Providing more options for customers to get value from flexibility at peak network times
- Continuing to partner and enable other participants in the sector to provide value to customers for flexibility
- How to encourage flexibility in a system with a large uptake of residential solar

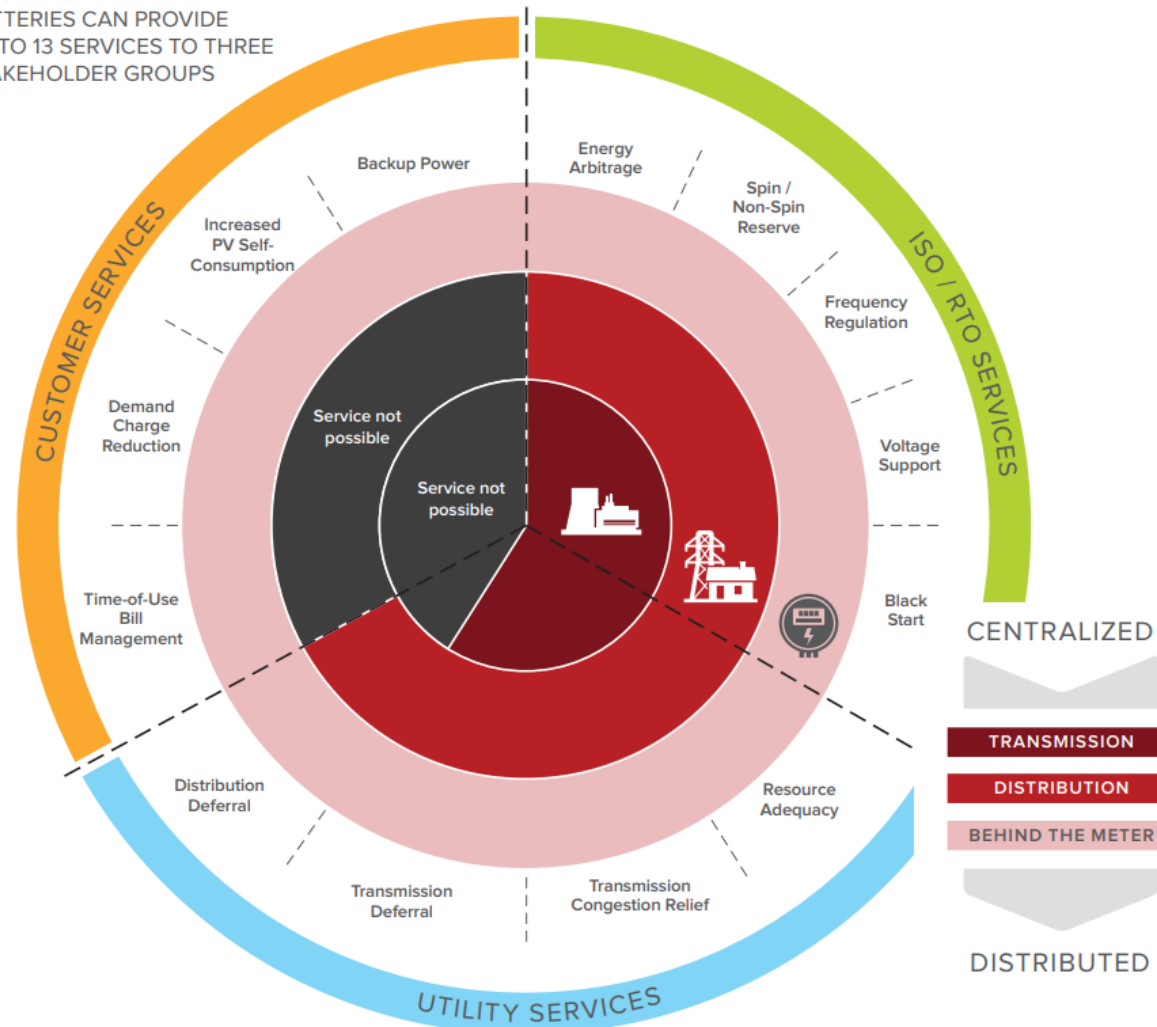
<https://comcom.govt.nz/regulated-industries/electricity-lines/electricity-distributor-map>

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Again: Flexibility Enables Whole of System Value

FIGURE ES2

BATTERIES CAN PROVIDE UP TO 13 SERVICES TO THREE STAKEHOLDER GROUPS

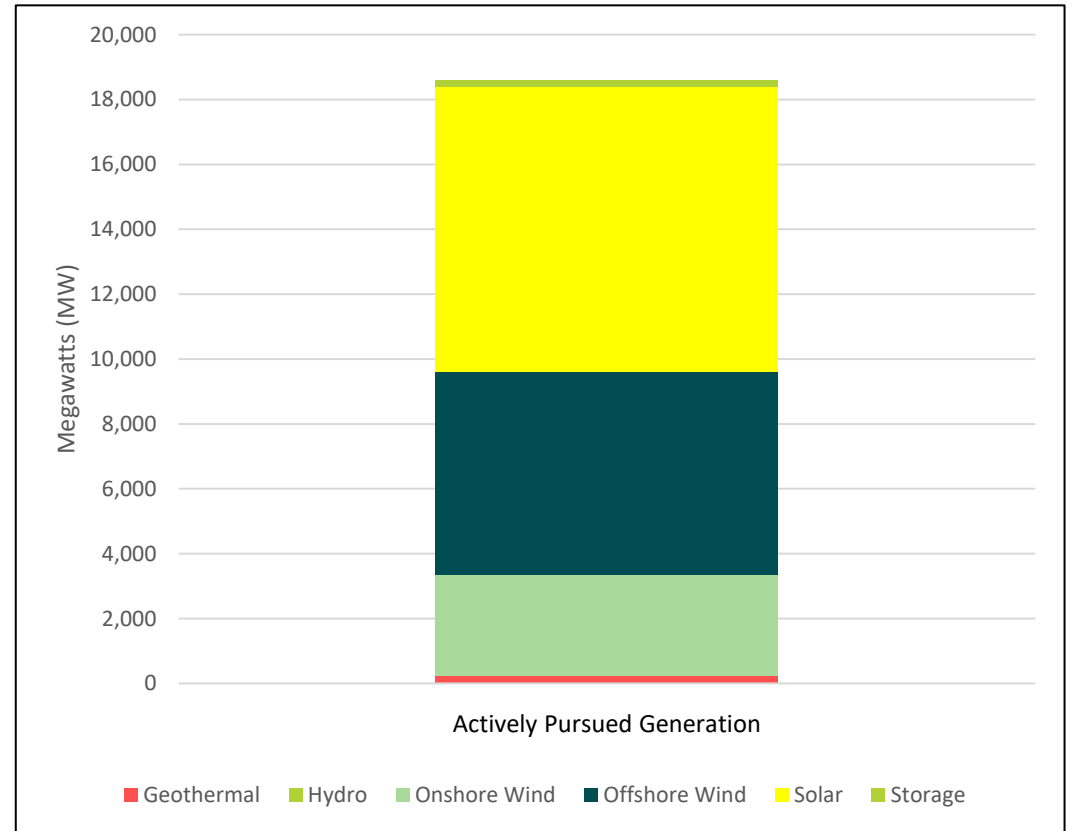
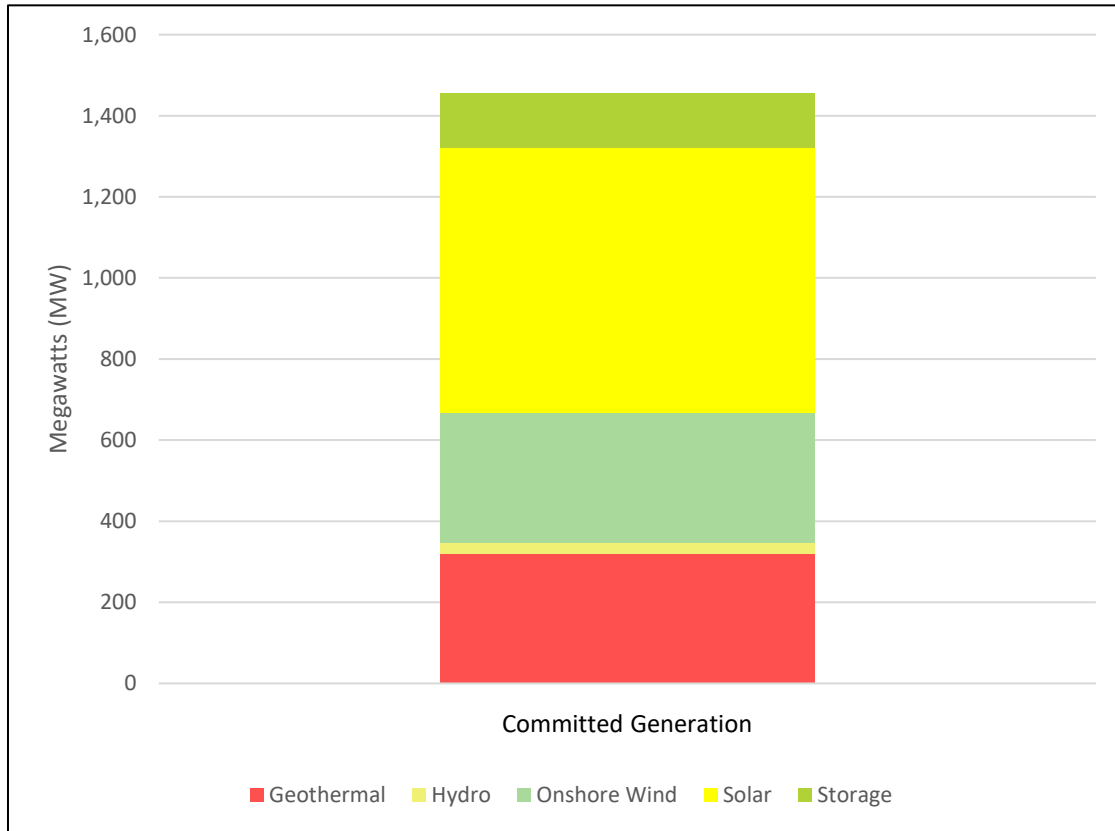


<https://rmi.org/insight/economics-battery-energy-storage/>

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More Generation is Needed



<https://public.tableau.com/app/profile/electricity.authority/viz/Investmentpipeline/Investmentpipeline>



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graph LR; A[More Demand] --> B[More Generation]; B --> C[More Poles and Wires]; C --> D[Higher cost]
```

More
Demand

More
Generation

More Poles
and Wires

Higher cost