DOES DER STACK UP IN NEW ZEALAND?

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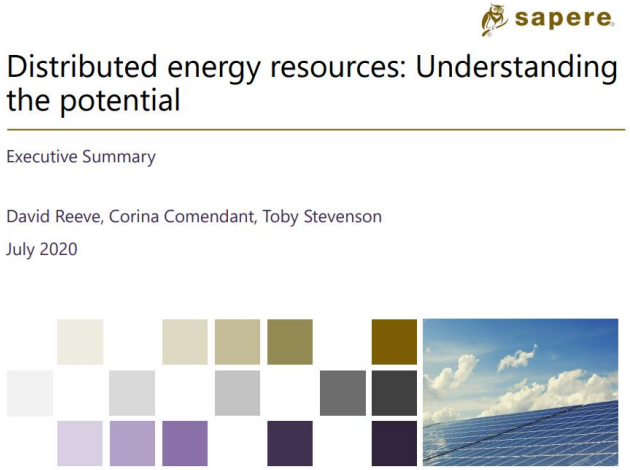
POWERING NEW ZEALAND TODAY + TOMORROW

Yes

HOW DO WE KNOW?

In our role as system operator, we commissioned an independent consultant to assess the following:

- The potential value of DER to the New Zealand power system
- Uses for DER in New Zealand which could be encouraged with the right pricing
- Impacts of barriers to deployment and transaction costs in New Zealand



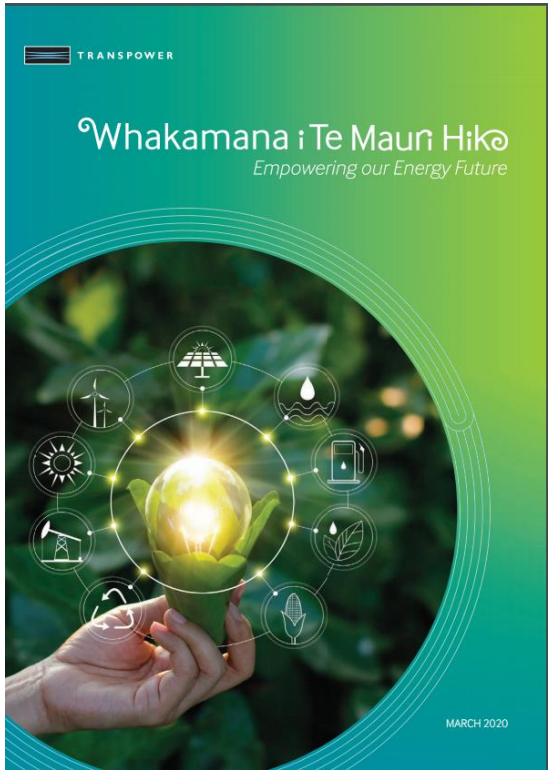
DER report link

WHY DID WE ASK?

To verify our belief DER has an important role to play in New Zealand's energy future.

DER will play a role in a transition to a Smart Grid which uses renewable electricity to meet all our energy needs

[Transpower's strategy documents]




AUTHOR'S
FINDINGS

DER DEFINITION USED

The report's authors included the following sources of DER in their study.

- Distributed generation
- Battery energy storage systems
- Demand response
- Electric vehicles
- DER related ancillary equipment

POTENTIAL VALUE STREAMS

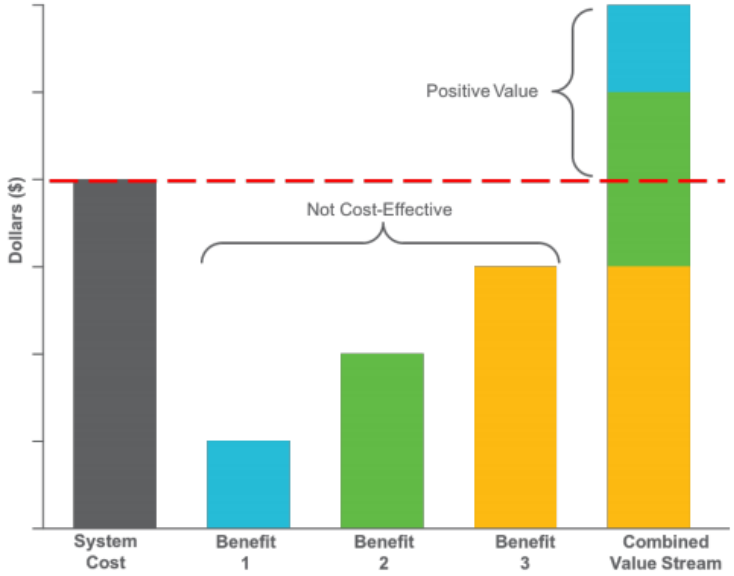
The report shows how DER providers in New Zealand could earn revenue by participating in the activities and services listed below.

FUNCTION / SERVICE	INCOME SOURCE
Energy arbitrage	Energy trading
Resource adequacy	Paid service
Instantaneous Reserve	Paid service
Frequency keeping	Paid service
Voltage	Paid service
Simulated inertia	Paid service
Black start	Paid service
Harmonics	Paid service

VALUE STACKING

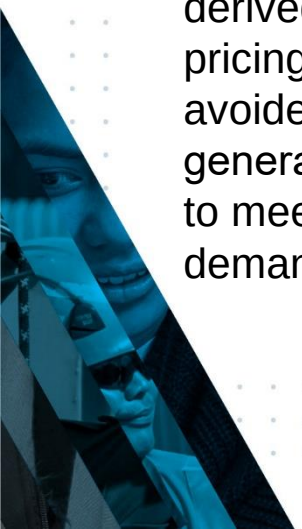
The nature of DER and some of the services it can provide are able to be ‘stacked’. In this way, a single DER can provide, and receive revenue, from providing multiple services.

- Physical double-dipping is not OK
- Financial double-dipping may be OK



VALUE STACK ASSESSMENT RESULTS

The report's authors assessed the 'size of the pie' which DER providers may be able to access. These values were derived from current market pricing, including the assumed avoided costs of new grid generation and 'poles-and-wires' to meet the expected growth in demand from decarbonisation.



Value stream (million) p.a.	2020	2035	2050	Additive
Energy Arbitrage (small-scale DER)	$3	$21	$70	Yes
Resource Adequacy	$24	$588	$861	Yes
- *Transmission*	*$7*	*$166*	*$230*	
- *Distribution*	*$10*	*$234*	*$324*	
- *Generation*	*$7*	*$187*	*$306*	
Instantaneous Reserve	$0	$20	$20	Yes
Frequency Keeping	$0	$1	$0	Yes
Voltage	$0	$10	$14	**No**
Harmonics	$0	-$1	-$7	Yes
Simulated Inertia	$0	$21	$85	Yes
Black Start	$0	$0	$0	Yes
Total	**$27**	**$650**	**$1,029**	

ASSESSING THE SERVICE VALUE STREAMS

Service values are accessed by being cheaper than the alternative. Therefore the values are **MAXIMUM** potential values.

As an example DER at 2035 could potentially access $588m p.a. by shifting 2,400MW of peak load.

$78k/MW p.a.

$69k/MW p.a.

$98k/MW p.a.

ADDITIONAL KEY FINDINGS

- Electricity will become simpler for consumers but more complex for those operating the power system.
- Between 2.5 and 3GW of DER could be installed by 2035 if the pricing for DER services reflects all the value it can deliver, and a further 1 to 1.5GW by 2050.
- DER will be comprised of multiple technologies. For DER to be best integrated into markets and operating policies the focus should be on the capabilities required to provide each service not the technologies themselves – technology agnostic integration.
- The integration of DER to markets and operating policies is somewhat of a ‘chicken-and-egg’ proposition. Should DER be integrated into the market design to incentivise accelerated DER uptake, or should DER integration follow DER uptake?

KEY QUESTIONS FOR INDUSTRY

The Report's authors pose a number of important questions for industry to consider.

"Where does the industry leadership come from for DER integration into the current system and arrangements, where the problem is economically and technically complex, and the solution could be a world first?"

"Is there broad enough support for a difficult transition and, if not, how can that be secured?"

"What is the process to engage a diverse set of stakeholders, which needs to include innovators, aggregators, technology developers and market participants?"

QUESTIONS

Please contact Murray Henderson for any questions or ongoing interactions.

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