Rewiring Aotearoa submission on *Our Future is Digital - Discussion Paper*

About Rewiring Aotearoa

Rewiring Aotearoa is an independent non-partisan non-profit funded by New Zealand philanthropy. It is a registered charity working on energy, climate, and electrification research, advocacy, and supporting communities through the energy transition. The team consists of New Zealand energy, policy, and community outreach experts who have demonstrated experience both locally and internationally. We're always fighting for the New Zealanders who use the energy system, and our goal is to help build a low cost, low emissions, high resilience electrified economy for Aotearoa NZ.

Key messages

The key messages shared via this submission are:

- Successful digitalisation should allow customers to maximise benefits from their provision of demand flexibility and solar and battery exports, without third parties (aggregators or VPPs) routinely taking a cut of the value.
- Retail tariffs that include time of use prices and export tariffs that fairly reflect the value of export especially during peaks will be key enablers of successful digitalisation of the electricity system. Prices can likely deliver the majority of value from customer flexibility through incentivising efficient investment in DER and predictably shaping demand and exports.

Response to Questions

Question 1: What could stop or slow digitalisation of the electricity system? What would make it successful? How far should digitalisation go?

Digitisation of the electricity system should take a first-principles approach to designing how participants of the system engage. It should aim to maximise value to consumers - the New Zealand people - not to energy companies (whether those energy companies be gentailers, retailers, networks, or aggregators).

With a first principles approach, it should quickly be realised that much of the industry-driven opinion on functionality of the system comes from inherent bias from actors within a system which benefits themselves at the expense of the people. All digitisation design, modelling, and impact assessments should be done from the perspective of electricity customers bills. Anything less than that is an incorrect and inherently biased viewpoint on the outcomes that will be created.

Successful digitalisation should allow customers to maximise benefits from their demand flexibility, and solar and battery exports in response to prices and export tariffs, without third parties (aggregators or VPPs) routinely taking an unnecessary cut of the value. New Zealand's digitalised system design should not lock-in unnecessary third party players that will further increase the cost of energy to consumers by embedding another profit layer.

While the function of these systems (enabling flexibility) will help lower system costs, investigating this function from a first principles approach is likely to demonstrate that most if not all of it can be automated to save consumers money (for example, pricing can likely provide most of the value of flexibility, and there is no reason there can't be "NZ Inc" VPPs that pass benefits back to consumers rather than adding another profit seeking layer. The design of digitisation should operate from the ground up to minimise energy system costs to consumers as its fundamental priority. It must also be acknowledged that lowering system costs does not necessarily lower consumer bills, the cost of generating electricity has fallen dramatically over the past decade, and yet the cost of buying electricity for homes and businesses has continued to rise faster than inflation. Third parties in the middle have a profit incentive to extract as much value from the New Zealand people as they can, and as such it is vital to understand the impacts from the consumer bill perspective, not just the "system" perspective.

In a future digitalised electricity system customers should have the option to rely on algorithms in their DER (like batteries, solar panels and smart EV chargers or smart hot water heaters) or home energy management system (HEMS) to manage their consumption, charging and/or exports to minimise household bills including optimising value from export in response to their chosen retail pricing plan and export tariffs. From working with experts across the industry, it is clear that the algorithms needed to provide the majority of this value are simple in nature, openly available, and do not need a third party in the middle to provide most of the value.

Retail offerings that include time of use prices and fair export tariffs will be key enablers of successful digitalisation of the electricity system. Customers need a fair deal through their electricity prices and export tariffs. This means the customers need to have the option to choose from a range of retail tariffs that include time of use prices, fair export tariffs (that reflect the value in the wholesale market) and symmetrical export tariffs from distributors.

Visibility of consumer DER will be important both to the System Operator and distributors to manage the national grid and distribution network. For example, the System Operator will need visibility of what to expect from DER connected within distribution networks and behind the meter, especially when balancing the system gets tight. However, it is important not to underestimate the ability of the System Operators load forecasting, which can learn to predict the response from increasing uptake of DER in homes and businesses and contribute to successful system management.

Distributors also need the ability to manage their networks including avoiding local congestions. This will involve improving visibility of their low voltage networks and DER.

Again we think price signals and export tariffs can provide a lot of value to avoid network investment by shaping load to reduce network congestion over the long term.

There will be some use cases where direct signals to request responses from customer's DER will add value, for example in grid emergencies, to respond to infrequent local network congestion and to provide short response time reserves. Rewiring is working on demonstrating this with the local network in Queenstown through the Queenstown Electrification Accelerator (QEA.nz) and exploring the types of open signals Aurora could provide and how customer batteries can respond to emergency signals automatically. This project will test a base level of operation where batteries can sit on automatic mode behaving in expected ways, and still be available when needed for emergencies without needing unnecessary value extraction away from consumers who are the ones that paid for the batteries in the first place. This is currently done by CPD (ripple control) and text message, which could be improved a lot.

Finally, designing our digitalised electricity system to rely on third party innovators also goes against principles of market design (cost reflective pricing first), when in practice VPPs are being used as a gatekeeping device to only let some consumers/devices engage, even when the control algorithms are simple and already on devices. We saw this play out with the 150kWh battery at Forest Lodge Orchard, which was not "allowed" to join SolarZero's VPP, yet his neighbour's very small battery was allowed. When they both pushed out at peak, only one got paid to do so. This means it will never unlock all of the underlying opportunities if we have this sort of gatekeeping of system value, not to mention much of that value is unlikely to reach customers.

Question 2. Do you agree with how we have defined 'data' and 'information', especially in the context of making data more visible?

Yes. Appropriate standardised formats for data sharing should be considered.

This is again an area where it is necessary to think from the consumer upwards. If data is "open" but access to it is still difficult (e.g. see Australia's open energy data), then it is not really "open" to customers. There is no reason energy data should not be as easy to grant access to as a document or photo. For example, a customer could enter in the email of their electrician and select "share access to meter data", enabling that electrician to look at ways to help the home save money. It should not require back and forth emails, forms, and lengthy delays by retailers. Data access must be thought of from the consumer's perspective.

Question 3. What data do you think needs to be more visible?

We have focused on data the consumer could directly benefit from. This includes:
- Own consumption data provided within seconds, in a standardised format customers can easily share with chosen third parties.
- Transparent and regular public reporting of all retail tariff offerings by retailers.

- Better visibility of network congestion and spare capacity, for customers looking to connect or upgrade a connection or invest in DER.
- Easy and automatic access by flexibility devices to the retail tariffs that a customer is using. For example their HEMS should be able to access their retail plan and optimise for it without needing the consumer to enter in their peak/offpeak price. This could be the same sharing access to ICP mentioned above, that ICP page could show consumption and plan data, and be password protected but shareable by consumers so their devices (smart charger, water heater etc) can access and automatically respond to pricing for the consumer.

Data that will be utilised by electricity customers should consider customer needs, to define the nature of the data and how it is provided. When providing own customer consumption data:

- Customers should be able to download their historic half hourly electricity consumption data, near instantaneously and freely give access to this data to any party they choose.

- Regulation should not limit consumers' ability to share data due to unnecessary levels of security requirements or accreditation process. Small firms who cannot resource the staff and systems to meet these requirements should not be excluded from historical electricity data access at a consumer's request.

- Data sharing security requirements can be lower for historical electricity data than banking data, because the data is less sensitive and risks are lower.

For example if a consumer is getting quotes for solar PV, data sharing could be as simple as the customer providing emails for suppliers it would like to receive its electricity data and the data provider emailing data files to these suppliers. This process would need to be quick and take less than a few minutes.

Question 4. What challenges do you think we might face trying to improve visibility? What considerations need to be given to data privacy or cybersecurity? How could increasing visibility create more opportunities for consumers, participants and innovators?

Today

Distributors do not have full visibility of consumers' distributed energy resources (DERs).[2] Consumers can be flexible with their consumption, or use their DER in response to time-of-use pricing, but receive no specific signal to respond to network constraints.

In the future

Retailers and distributors could be able to instantly access specific consumer data. This means retailers and distributors can send automated requests to consumers, or their agents, to use their flexibility or DER. The consumer will get paid if they agree to these requests.

Instead of jumping to develop a digitalised system that relies heavily on automated requests to consumers or agents in the future as set out in the infographic above, we think network pricing and export tariffs should be used initially as the primary way to signal to customers to change their load shape or export to reduce network constraints. This will demonstrate how effectively time of use pricing and fair export tariffs can deliver value to the system from customer flexibility. See Rewiring Aotearoa's paper on Symmetrical Export Tariffs[1], and Rewiring Aotearoa's Cross submission on the Competition Taskforce consultation 2A[2].

Data access should not be limited to retailers and distributors, or system participants in any way. It should be open to whoever the customer wants to share their energy data with - it is their data after all. To demonstrate true open fairness in data access, it should be just as easy for a consumer to share energy data with their mum as it is to share it with a flexibility provider.

Automated signals to customers requesting use of their flexibility could be useful in emergency situations, in a small handful of periods to address network congestion or to access reserve services that can require fast response times. See our answer to question 1 above for more details.

Question 5. What work are you planning or doing to increase visibility within the electricity system? Are you aware of any work that contributes to this goal?

Queenstown Electrification Accelerator. [3]

Question 6. What challenges do you think we might face in increasing interoperability? What other opportunities do you think greater interoperability will bring?

Greater interoperability will bring with it plenty of benefits to the electricity system. One challenge will be ensuring distributors keep pace with the pace of technological progress, which is demonstrably not the case today. For example if Vehicle to Grid has great interoperability in one network, but not in another neighbouring network, it will cause customer confusion and possible network constraints through lack of coordination.

Question 7. What work are you planning or doing to increase interoperability within the electricity system? Are you aware of any work or research that contributes to this goal?

We are working on the Queenstown Electrification Accelerator[4] which will be working on interoperability. We encourage the authority to look to Australia, not a nonchalant glance, but in detail, to recognise it is already solving (or has years ago) many of the interoperability questions being raised in New Zealand and concerns being raised by networks. For example, EDBs in New Zealand often talk about the "difficulty" for them of more solar coming into the network, yet in New Zealand we have 3% solar adoption, Australia has 40% with

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[1] https://www.rewiring.nz/symmetrical-export-tariffs
[2] https://www.ea.govt.nz/documents/7096/Rewiring_Aotearoa_2A_X-submission_2025.pdf
[3] https://www.qea.nz/
[4] https://www.qea.nz/

some communities over 75% solar adoption. Australia is handling this high level of solar already, going beyond 3% for EDBs should not be of any concern if they are willing to be open to technological progress.

Retailers should be required through regulation to publish all their retail offers for each network, and update this as soon as any offers change.

The Electricity Authority should ensure that a well designed easy to use energy bills tool is available for customers to help them make choices about their energy use and options. The tool should have two functions:
- To help customers find the lowest electricity bills based on existing use
- To help customers explore options to lower their total energy bills (including transport energy costs), through behaviour (demand shifting - eg: always charging EVs overnight) and investment in DER (solar, batteries, smart hot water management and smart EV chargers) and electrification of vehicles and other household appliances.

Retailers should not be able to opt out of inclusion of tariffs in the tool and should not have to pay to have their retail tariffs to be included in the tool. The Energy bills tool would simply pull in all the published retail tariffs and update these on a daily basis.

The tool should be designed to leverage future improvements in customers ability to access their historic consumption data within seconds, and be able to consider changes to load profiles for behaviour demand shifting, and investment in DER and electrification. It could then assess all retail plans on this basis. Functionality should be maintained and updated to capture changes such as the proposed multiple trading relationships, whereby customers can buy power from multiple providers and sell exports to others and allow information about potential future peer to peer community trading platforms the customer is part of.

Not all customers will use a tool like this. To support all customers to benefit from a more digitalised energy system (and opportunities from DER, electrification and behavioural demand response) regulators and policy makers should develop and fund education to support customers that work for them. This could include information provided via community groups, provided in different languages and in other formats that best meet customer needs.

Customer bills are clearly confusing, and work could be done to standardise and improve electricity bill understanding. For example, a bill should look closer to an infographic, and testing should be done to make sure any bill is easy to understand in seconds by the majority of the population. We expect this is not the case today.

Question 9. What work are you planning or doing to increase simplification within the electricity system? Are you aware of any work that contributes to this goal?

Queenstown Electrification Accelerator.[5]

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[5] https://www.qea.nz/