Lone Wolf Enterprises Limited

Working together to ensure our electricity system meets the future needs of all New Zealanders

I welcome the opportunity to comment on the Electricity Authority's (the Authority) green paper: 'Working together to ensure our electricity system meets the future needs of all New Zealanders'. I am the principal of Lone Wolf Enterprises, a business providing consultancy services to the New Zealand energy industry. A key focus is helping companies develop capability in a changing sector.

I am also Chair of Waipa Networks, a Director of Network Waitaki, a Director of Counties Energy, a Director of Horizon Energy, an advisor to Energy Trusts of New Zealand (ETNZ) and former independent Chair of Electricity Networks Aotearoa's Smart Technology Working Group. The views expressed in this submission are my own and do not represent the views of those organisations.

Decentralisation is incorrectly defined

The paper sets out a description of decentralisation which unfortunately is incorrect. What is described in the paper could be best described as dispersed or distributed in the context of energy systems. Confusingly there is also reference to democratisation.

Decentralisation is an important facet of the future electricity system, but it needs to be viewed as a control philosophy/operating model. The electricity system can be currently characterised as a centralised control system – a relatively small number of large participants with well-defined operational interfaces and centralised decision making. This model will not work in a system with thousands of distributed generators and a more dynamic demandside. Decentralisation is about ceding control of the system to the system.

As I have noted in previous submissions we will be hampered by our current centralised mindset, hence why it is vital the Authority correctly defines what decentralisation is and identifies the associated problems transitioning to a more decentralised system.

This problem is not unique to New Zealand. Everywhere I go I see jurisdictions grappling with this challenge. In part it is because those trying to make the change have a centralised mindset. In part it is because to architect the future system requires a centralised process of data extraction and algorithm development before intelligence can be embedded back into the system.

The Authority must look to others outside the energy industry to help enlighten it – the use of decentralised (distributed) control systems is widespread in many other industries and is not new.

Current Context

To solve a problem or challenge it is important to define the context in which we are operating.

Historically the electricity system has provided a high level of reliability and ease of use which has shaped customers' perceptions. We are all accustomed to being able to turn the lights on, or plug in and operate appliances as we see fit. As the Authority has identified this is changing, though perhaps not as rapidly as the Authority believe.

The current system has evolved to supply a relatively stable and predictable demandside. As the Authority is aware large parts of the system are operated 'blind' in that there is no visibility of what is happening in these parts of the system. That is simply a function of the historic high cost of obtaining this information relative to the need. This has not yet proven to be an issue as the system has been well designed as proven by its operational reliability.

The system has also been operated conservatively, largely because of the consequences to customers of failure on a large scale. Again this isn't unusual – airlines and oil refineries can point to the same underlying operational risk aversion for very good reasons. Networks also have a responsibility to look after all their customers – if the actions of a customer threaten supply to all then action is taken to protect the rest of the customers.

What we have today is looming change in terms of new applications (solar PV and EV charging) and a desire to 'flex' load for the benefit of the system. There is currently considerable ambiguity around how this will present itself. We have high customer expectations that things should work like they always have, even if they are new things. We have a lack of visibility of understanding of parts of the system. We have an underlying conservatism driven by a need to not break the system and to look after existing customers. This is creating visible frustration and growing tension as the Authority can attest to. Things need to change but in a considered way.

Decentralisation risks

The green paper fails to clearly note the most significant risk. That is by enabling new applications and business models we create situations that break the system. Addressing this needs to be the priority. I wholeheartedly agree that it is important to empower customers and communities to experiment with new business models. That is how we will find out what works for customers and what doesn't. However these must be enabled in a way that doesn't threaten the integrity of the whole system. That is why enabling decentralisation is so important.

The green paper notes the shift will likely make governance more complex and that systems operation will become more complex. Both statements are incorrect, and are good examples of centralised thinking. Decentralised systems are largely self-governing. Responding to complexity with more complexity only increases the risk and consequence of failure.

What is needed?

The outcome of the current situation is non-optimal use of the current system and a perceived lack of urgency to enable some forms of connections. It is permission based and feeds the dangerous notion of capacity rights, i.e. ownership, rather than co-operative sharing.

In contrast here is how a decentralised system could work. Parties who wish to connect can do so on the condition they operate within well-defined limits. These limits are pre-set by network operators who, as a result, are less heavily involved in the connection process. As is the case currently those wishing to connect (or to add new loads) will likely seek their own technical advice.

If a connected party strays outside these limits then action is taken to bring it back within those limits. This could be disconnection, curtailment or some other means. As the limits will relate to things we can easily measure on the system, e.g. voltage, it is relatively easy to automate large parts of the system and have the system self-manage itself.

Sometimes the collective impact of parties will cause situations that lead to system overload or collapse. For example multiple customers may react to price signals by shifting load and creating unintended peaks. The system must be designed to fail safely at an appropriate scale. Having parties consider this and publish what is an acceptable level of failure is the first step in this transition.

A decentralised system allows greater flexibility of use with the acceptance that all connected customers need to act responsibly. The price of connection is acceptance that we are part of a shared collective system.

Think 'and'

In transitioning to a more decentralised system it is useful to think in 'and' mode. We are migrating to a system that is both centralised and decentralised. We are doing this to enable new and different uses of electricity and support existing uses. We are doing this to enable easier connection of new customers and protect existing customers from any undesired impacts of this.

Finally and of lesser importance, it is unhelpful for the Authority to assign arbitrary targets like 2040. As I have noted in previous submissions transitioning faster is the value creating pathway for New Zealand. To achieve this the Authority needs to focus the key actions that transition us to a decentralised system. Many could be considered mundane, but they are about introducing minimum standards for equipment capability, information protocols to enable widespread sharing of information and leveraging work done by small groups across the wider sector rather than imposing burden on everyone.

There are many examples today of people fixing problems created by people trying to fix problems. We must try and avoid this for the future electricity system.

Thank you again for the opportunity to comment on the green paper. I would like to engage further with the Authority on this matter. Please feel free to contact me on [redacted]

Yours sincerely

Jonathan Kay
Director Lone Wolf Enterprises