



The future operation of New Zealand's power system

"We cannot solve our problems with the same level of thinking that created them".

Albert Einstein

I welcome the opportunity to comment on the Electricity Authority's (the Authority) consultation paper: 'The future operation of New Zealand's power system (15 Feb 2024)'. I am the principal of Lone Wolf Enterprises, a business providing consultancy services to the New Zealand energy industry. A key focus is on helping companies develop new 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 these organisations.

INTRODUCTION

NZ has a stated goal of net-zero emissions by 2050. To achieve this we will need to replace fossil fuels with renewable electricity to the fullest extent possible. As we transition towards a low carbon economy we face considerable uncertainty. This uncertainty extends beyond the take up of electric vehicles (EVs) and solar PV systems to how customers will use them and ultimately what customer behaviours will emerge and to what degree these behaviours can be influenced.

The discussion paper outlines the journey the New Zealand electricity system has been through to arrive at where we are today. We are at the start of the next phase of that journey and it is a journey that will take decades.

The role of the Authority is to provide impartial guidance and to ensure it acts appropriately given the current uncertainty and our current context. It must be careful it does not commit the electricity industry to pathways that constrain us or unnecessarily waste resource as we begin this journey. Sadly the consultation paper makes a number of assumptions that threaten to do just that.

ENERGY LENS

Throughout the paper are numerous references to lowest or least cost from an electricity context. This is not only shortsighted, but it is shortchanging NZ consumers. We are in an energy transition,

and it is one where the total energy cost to consumers will be billions of dollars per year cheaper once we have transitioned. From an energy perspective we are heading to lower costs not higher costs. Our challenge is how to get there faster and to look after all consumers as we do so.

The Authority continues to be guilty of taking a myopic electricity-centric view when a whole of energy lens is required. If it is unable to do this because of its statutory role then it should urgently look to revise this. Failing to do so will condemn NZ households and businesses to higher costs.

Recommendation 1

The Authority must find ways to look at how it can consider the total cost of energy to consumers in its decision making.

AN EVIDENCE BASED APPROACH IS NEEDED

As noted we are currently in a period of extreme uncertainty. We are also at low penetration levels of EVs and solar PV. It is very dangerous to extrapolate from this position to form views based upon this as can be seen from the following example.

The paper cites analysis by Concept Consulting showing there could be one million EVs by 2030. As at the end of 2023 there were 73,000 EVs in the NZ light vehicle fleet. New light vehicle registrations (new and imported used cars) are currently running at 225,000 p.a. To achieve one million EVs by 2030 will require 70% of all new registrations to be EVs each and every year until 2030 remembering that historically over 20% over these registrations have been for utes and SUVs - areas of the car market not well served by EVs. Put another way if EV sales continue on their current growth trajectory then by April 2026 EV sales would need to be 100% of new registrations!

Forecasts and scenarios are useful for helping us envision possible futures, but they must be treated with caution. The Authority has a duty of care to ensure it makes plans off a sound evidence base.

AN OPEN MINDSET

It is also important the Authority keep an open mind at this formative stage of development. The paper makes multiple references to increased complexity. There is no doubt the energy transition will be challenging but if we think it will be complex we are in danger of building a complex solution. Complex systems are surprisingly fragile and often fail in catastrophic ways. When they fail the results can be catastrophic. There are simple models that will suffice for the initial period of the transition and perhaps even for the long-term, yet none appear to be contemplated.

The electricity system has dealt admirably with many problems in the past. We are now facing new problems and there is a tendency to overestimate the impact of such problems until we have encountered and dealt with them. For example, bi-directional flows are frequently cited as a looming and complex issue. I am aware of an electricity network that has a subdivision that has 100% solar PV penetration (courtesy of a mandate by the developer). The network did not alter its design standards, nor make significant changes to its operating system to accommodate this development and has not encountered any material issues with it to date.

DECENTRALISATION

The paper seeks feedback on key drivers of change facing the electricity system. A glaring omission is decentralisation. The operation of the current system is highly centralised, and we have carried that paradigm into our thinking for the future. To paraphrase Einstein we are guilty of drawing on those who have gotten us to where we are today to take us to a new future. Just as we shouldn't judge a fish by its ability to climb a tree nor should we invite those used to a centralised system to design a decentralized one.

In a similar vein the Authority makes reference to work being done in other jurisdictions such as Australia and the UK. We would be better served looking beyond the electricity sector to other examples of decentralised systems to open our eyes to potential solutions. There are many examples including the telecommunications industry, the shift to personal computing, advanced manufacturing plants and in nature.

Recommendation 2

The Authority must expand its horizons and look to other industries and examples of decentralised systems.

KEEP FOCUSED ON THE ISSUE AT HAND

The final section of the consultation paper is titled 'Possible challenges and opportunities in power system operation during New Zealand's transition to net zero emissions.' Sadly it fails to focus on this important issue. Instead it traverses a broad range of topics including network planning, responses to market signals, and more effective DER connection amongst others that do not relate to the topic at hand.

It is also highly assumptive, not least when it comes to consumers. Consumers are all different. The advent of new technology and operating paradigms will enable those that wish to be more engaged to be so, but equally there will still be many consumers who choose to not be engaged. Our challenge is to cater for all consumers and to do so in a way that enables them all without disadvantaging some.

System operation is about keeping the system 'up' and keeping the lights, Wi-Fi, cars, solar PV, and everything else consumers rely upon 'on'. With a more responsive demandside there will be times in the future when market signals create situations that are potentially detrimental to many consumers. In these situations some customer's behaviours will be limited to protect the greater good.

The Authority needs to sharpen its focus to this matter and not be distracted. To assist it in this regard a way forward would be outline some real or looming situations and facilitate debate and discussion around solutions. Much is made around constraint management but being specific around where and when would help uncover a range of solutions many of which are simple and cost-effective. Doing so would help inform us all of where the current priorities should lie.

QUICK WINS

There are some quick wins the Authority should progress to best prepare the electricity industry for the future. These are,

- DER Standards- Regulators need to ensure DER standards are suitably futureproofed. There has been little to no progress on changes to inverter and EV charger standards to ensure the required future capability is being deployed now well ahead of when it is needed.
- Voltage Standards- The current voltage standards are in need of urgent review. Modern equipment and appliances have much greater tolerances for voltage fluctuations. Moving into a world with more active voltage management without reviewing and amending the current standards will only result in higher costs to consumers.
- Information Access- The Authority has recognised the need for participants to have improved access to smart meter information. Investing in and developing the capability to manage and analyse data takes time. What is needed urgently is information on EV charging patterns – to understand what they are and as importantly to understand if, and how, they can be influenced. The better the level of information we collectively have the better our modelling will be. There are some participants who are in a privileged position to be able to provide these insights. The Authority should find ways to work closely with these parties and find ways to share information without comprising privacy issues.
- Capability- The Authority has previously recognised that new capability will be required for the future electricity system, yet it has failed to clearly articulate what capabilities are required. The time to facilitate a discussion on this is overdue. Rather than a debate focused on models and structures we should be investing our time in understanding what capability is required and when. If this is clearer it will provide clarity around which participants should fulfil future roles. Form follows function.

Recommendation 3

The Authority should implement the above quick wins with urgency.

The next few years are pivotal as we plan for how we will respond to the challenge of decarbonisation in an uncertain environment. Keeping an open mind is critical.

Thank you again for the opportunity to submit on the consultation paper. I am available and willing to meet with the Authority to discuss any of the points raised in my submission. Please feel free to contact me on 021 306 877.

Yours sincerely

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