**SolarZero Submission to "The future operation of New Zealand's power system"**

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**Introduction**

The Electricity industry is going through the first major change it has ever been through. That change is driven by technology and will occur at the grid edge. The fact it is occurring ***at the edge*** is hugely significant because the electricity system exists to supply the ***edge***. In other words, the very nature of the electricity system is going to change, because if you change the grid edge (where electricity is consumed) you change the whole power system. That fact does not seem well recognised at present.

The change is so large that much of the existing rules, regulations and policies will not be fit for purpose. The Electricity Code, which is backward looking and is essentially a standard operating procedure, will need a complete overhaul. To support the change and to enable innovation, granting exemptions to the Code must become common place. It is beyond absurd that an exemption takes over six months to enable something that technology easily allows/enables.

Given the large magnitude of the changes coming, (i.e. the first ever change the electricity sector has been through), a coordinating agency or interagency working group is needed to overview the changes. That group will need to come up with a new set of rules, policies and operating arrangements for the electricity sector.

Currently we see differences and disagreements between some of the key players in the electricity sector. The Transmission Pricing Methodology (conflict between EA and Transpower) is a case in point and it is not clear whether the Commerce Commission and Electricity Authority are aligned on distribution pricing policy and its implications for capital spend. If the large change in the electricity sector is to be orderly and efficient the key agencies must be aligned in order to provide certainty for investors and the wider industry.

With lower certainty capital becomes more expensive and the consumer pays more. And if the uncertainty reaches a sufficient level, political intervention may occur. Thus, some kind of coordinating mechanism is needed to overview the change and ensure it is as orderly as possible.

*Q1. Do you consider section 3 to be an accurate summary of the existing arrangements for power system operation in New Zealand? Please give reasons if you do not agree.*
Yes

*Q2. Do you agree that we have captured the key drivers of change in New Zealand's power system operation? Please give reasons if you do not agree.*
Not quite. A missing driver is the need for integration. The large change is going to occur **at the grid edge**, i.e. where power is consumed. If you change the **edge** you change conditions on the distribution transformer, on the feeder, at the zone substation, on the sub-transmission, at the GXP and on the transmission system. System operation will also be changed. The sense about how the power system will change ***as a whole*** is missing in the document.

*Q3. Do you have any feedback on our description of each key driver?*
The integration of the drivers is not adequately covered, as discussed above.

Why is an integrated approach important? Changing the grid edge can significantly alter the power system, meaning that different actions are needed at each level. A likely outcome is much less investment is needed through the change if the grid edge can be better managed. Which is what the change is all about: technology now enables the grid edge to be much better managed. Two examples:

- Upgrades of distribution transformers, feeders, zone substations and so on may not be needed as the economy is electrified due to the technology now arriving at the grid edge.
- A further example is that "spinning reserve" can be changed to actually providing generation, which is what was designed to do priori to be "hacked" to provide reserves. In the future much of the "reserves" will be provided at the grid edge, by vehicle to grid, household batteries, smart control of loads and the likes.

*Q4. What do you consider will be most helpful to increase coordination in system operation? Please provide reasons for your answer.*
As discussed in the introduction section, a coordinating mechanism is needed. The tone of the document is that the Electricity Authority will be the preeminent agency. It should not be. A group is needed that reports to a Minister who in turn is required to report to Cabinet.

For example, in paragraph 5.6 the Authority states: *"The impediments to greater visibility must be addressed – such as the need for common standards and/or protocols, to facilitate interoperability. The Authority's work programme on updating the regulatory settings for distribution networks is tackling these issues."* This statement is deeply troubling. In our view, the Authority is barely scratching the surface of what is needed. Clearly, the Authority does not understand the scale of the challenge ahead, which is very concerning.

For example: The entire standards system needs revamping. Training is needed. New approaches are needed for developing lines company asset management plans, to identify just a few issues. None of these are under the purview of the Electricity Authority. Hence an overview group is needed to coordinate actions across the whole sector.

*Q5. Looking at overseas jurisdictions, what developments in future system operation are relevant and useful for New Zealand? Please provide reasons for your answer.*

Funding for innovation is critical. The Australian ARENA model needs to be looked at.

The UK provides a really useful model for how "flex" has become a part of power system management.

Some kind of system architect role is needed, be it a working group or a new agency. New Zealand, being small, probably best suits a working group with an independent chair and secretariat to overview the change to the electricity sector.

*Q6. Do you consider existing power system obligations are compatible with the uptake of DER and IBR-based generation? Please provide reasons for your answer.*

Absolutely not and reviewing the Code is the wrong approach, that will take enormous resources and deliver a suboptimal outcome.

The Electricity Code was developed as a backward looking document – in effect as a standard operation procedure. We need to recreate the environment before there was an Electricity Code. We need to innovate. If something can work technically it should be allowed, irrespective of what the Code says. The Electricity Authority should have a KPI of granting a Code exemption in **ONE DAY** providing a set of technical requirements are met that is signed off by the relevant agencies.

The Code is not some kind of holy grail, which seems the default approach of some in the electricity industry. As outlined above, it is backwards looking and a standard operating procedure. There should be no attempt to update the Code because as soon as it is updated, the update will be out of date, such is the pace of change that is occurring in the electricity system.

An example is batteries: The Code was proposed to be amended to enable BIG batteries. But really it needed amending to enable all batteries. Why was the original proposal for big batteries only? Because no one had thought of distributed batteries. Fortunately, the change to the Code ended up being worded generically for batteries, both large and distributed, but it could easily only have been for big batteries. If that had happened the Code would have then had to be amended again for distributed batteries.

SolarZero has unparalleled experience in bringing innovative solutions to market. We have found that the Code is a major barrier and has actually prevented us from providing optimal outcomes. Trying to develop Code changes, at pace, to enable the once-ever change in the power system is the wrong approach. Exemptions must become the norm, followed some distance down the track by Code amendments.

*Q7. Do you consider we need an increased level of coordination of network planning, investment and operations across the New Zealand power system? Please provide reasons for your answer.*

Absolutely. The grid edge is going to change dramatically. The electricity system exists to supply the grid edge – that is where electricity is consumed. Therefore, the entire electricity system is going to change. That point does not yet seem to be fully understood in the electricity industry.

A big change has to occur at the network planning level. A much more integrated approach is needed. The entirety of the planning framework for networks needs to be revised. The asset management planning framework, that seem to focus on single isolated issues, needs a comprehensive refresh to enable a much more integrated approach to be taken.

The largest change is going to occur in the low voltage network which is the part of the power system where there is the least information. Lines companies need to be innovative and identify new ways to gather information on the low voltage network including working in partnership with others.

Getting much better at planning and managing networks requires an unparalleled set of coordination, training and change management. Central is the Commerce Commission and the Electricity Authority. The level of coordination and cooperation between these two agencies is no where near good enough. Both need to step up and learn how to effectively work together for the benefit of the New Zealand power system.

*Q8. Do you think there are significant conflicts of interests for industry participants with concurrent roles in network ownership, network operation and network planning? Please provide reasons for your answer.*

As the electricity system goes through the first ever change it has gone through, many things need to be done differently. Conflicts of interest are a secondary issue. The primary issue is enabling, supporting and encouraging the key actors to do things differently. Most people in the electricity industry are time poor. Learning new ways of doing things takes time. Training, funds for innovation and so on are needed to enable the industry to move faster up the curve.

Change in the electricity industry is enabled and driven by the policy and regulatory settings. It is critical to ensure that the policy and regulatory settings support the change in the

electricity industry. For example, the Code is a significant barrier and will not be fit for purpose until a new normal in the electricity industry is achieved.

A conflict of interest is in the functions of the various agencies together with underlaps and overlaps. The conflict of interest and misalignment between the Electricity Authority, Transpower and the Commerce Commission needs to be actively managed, for example, another transmission pricing methodology process fiasco would not be helpful. The agency angst around actually addressing winter peak, as compared to asking the industry to hold hands and hope, shows that major institutional change is urgently needed. Further, the misalignment between the Authority and the Commerce Commission is unhelpful. We ask is that the representatives of the key agencies genuinely work for the collective good of the industry rather than their own narrow agency perspective.

An overview agency or working group is needed to identify the changes that are needed and the sequencing of these. Agencies need an unprecedented level of coordination and cooperation to develop the new policy settings to guide the electricity industry through this once-ever step change. Left alone the agencies will not achieve the needed level of coordination and cooperation.

The following actions are needed:

- Develop an overview group or temporary agency that coordinates all the changes in the policy/regulatory space. A key focus should be conflicts of interest between the key agencies together with identifying and addressing the overlaps and underlaps.
- Develop a clear vision for the power system that all players can buy into.
- Grant Code exemptions rapidly. The KPI should be **ONE DAY** if a set of technical pre-conditions are met and signed off by relevant agencies.
- Carefully, but with confidence and speed, adjust the policy and regulatory settings to reflect the new vision for the power system.
- Organise training and learning.
- Support innovation and pilots.

*Q9. Do you have any further views on whether this is a good time for the Authority to assess future system operation in New Zealand, and whether there are other challenges or opportunities that we have not covered adequately in this paper? Please provide reasons for your answer.*

It cannot and must not be the Authority's job to assess the future of power system operation in New Zealand. We do not want another Transmission Pricing Methodology process fiasco. We do not want another year or two of non-action, but endless consultation, on winter peak. The Electricity Authority is simply not the right agency to lead this work. Its poor track record to date on these two areas (TPM and winter peak) speaks loudly to this point.

The role of all the agencies involved in electricity system governance needs to be reviewed. The actions of the agencies need an unprecedented level of coordination. Hence, an overview group or even a temporary agency is needed that can draw on the expertise across the whole industry, plot a new course for the whole industry and get the key agencies to work together in ways they have not managed to achieve to date.