

## **Submission – EA consultation on Code Changes for Real Time Pricing**

solarZero

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### **Summary**

solarZero strongly supports moving to a real time pricing system including dispatch notification (dispatch lite) and dispatchable demand. We make three main points in this submission:

- Data aspects - enabling the option of using data from devices being managed (as compared to ICP meter data). We are confident that using inverter (or similar) data is feasible, practical and straight forward for distributed energy providers.
- Enabling distributed aggregated generation, such as household batteries and vehicle to grid (V2G). The key issue here is the point of measurement. If the point of measurement is at the GXP then distributed aggregated generation can be considered a form of demand, because it reduces demand at the GXP level.
- The preparation of a vision document or roadmap that sets out the intent of these and other Code changes. The Code will never be perfect and being clear on the intent is very important to assist with interpreting the Code. A vision/roadmap document will help with interpreting the Code during this period of significant change in the electricity sector.

The Code needs to be enabling. The power system is going through a major change. A prescriptive Code and literal interpretation will constrain the opportunities associated with new technologies. Changes to the Code from this point on need to be enabling of a range of technologies and futures.

solarZero bases its views in this submission on the experience we have gained with thousands of distributed household batteries:

- Participating in the Transpower pilot demand response programme.
- Preparing for participation in the reserves market.

### **Multiple aggregators operating on the same meter**

The house or business of the future may have the following electricity arrangements as an example:

- An EV charger that is managed by an EV charging company in terms of dispatchable demand and potentially supplying power to the grid at times (V2G).
- The hot water cylinder controlled by a hot water load aggregator company.
- Heat Pumps controlled by a heat pump load aggregator company.
- A solar and battery system controlled by a different aggregator company to the above.
- A retailer providing the home with electricity.
- Etc.

This is not an implausible future. solarZero will soon have 10,000 solar and battery systems in market. Companies specialising in EV charging are being established. In parts of the PJM Interconnection Grid load aggregators are working across parts of the system at the household level and we could expect to see similar initiatives here in time.

Unpicking which aggregator has performed what function at what time based on a single “at the gate” half hour meter will be very difficult. The option should therefore be created that enables demand to be measured using a meter on the device, e.g. the inverter, the EV charger or a device on the heat pump. The aggregator will need to provide the data in an aggregated form at the required scale, both time and space.

### **Key principle: Measure as close to the device being managed as possible**

The ICP is no longer the most accurate location to measure activity in the power system. The ICP will rapidly become an amalgamation of different controllable devices, such as a solar-battery system, hotwater heating, heat pumps, EV charging, vehicle to grid and so on. All these devices may in the future be managed by different companies.

The key principle for the power system of the future is that measurement should be at the device that is being managed.

Many controllable devices have a metering function built in, for example, controllable EV chargers. It is relatively easy to make the data available for verifying activities in the market. We should not be limited to ICP data - that will not enable innovation and the kinds of advances in power system management that the real-time pricing project is seeking to achieve.

The Code changes need to enable this flexibility of multiple providers doing different things at the same time. We fully acknowledge the technical requirements of the System Operator. Data is pivotal to understanding who did what and when and therefore who should get paid for their actions. In short, ICP meter data will not be adequate and the Code should enable different metering methods that meet the technical requirements of the System Operator.

### **Metering, data and changes to the Code**

Metering and data are critical to enabling this kind of multiple aggregators future. The Code needs to enable data to be used and aggregated from inverters, EV chargers, hot water cylinders, heat pumps and the like. As per the principle above, the Code needs to enable and support measurement at the device level, not just the ICP level. This needs to be a key principle that the Code enables.

We are not in a position nor have the experience to propose detailed Code changes to allow multiple aggregators on an ICP. It is likely that a different category of metering is needed similar to the different categories of “dispatch” and “dispatch notification (lite)”, i.e. “metering lite”.

We suggest the following points need to be taken into account for Code amendments for “metering lite”:

- Requirements and testing regime: The testing regime the device needs to go through, assuming that “type” testing suffices, i.e. not every single device needs to be tested.
- Volume of data and time step is unlikely to be an issue. Inverters and other types of meters can provide granular data (e.g. 5 minutes) and the transmission via internet/cellular is generally not an issue.
- Aggregation of data is best done by the aggregator themselves. We assume that the data will need to be aggregated at a GXP level. Having a clear framework for aggregators is important.

- Holding data. We would expect there to be requirements to hold data for a certain time period.
- Checks/audits: We would expect some kind of checking/assessment system around the accuracy of the data the aggregator is providing.

In essence the Code needs to reflect the realities of modern solid-state on-device measurement systems as well as aggregated data systems.

A key element that we think is missing in the proposed Code changes is the principle of measurement at the device that is providing the service to the power system or interacting in some managed way with the power system. As outlined above, we are not providing suggested drafts of parts of the Code as we do not have expertise in that area.

### **Case study: Our experience participating in the Transpower pilot demand response programme**

solarZero participated in the Transpower DR programme. The technical aspects are relevant to metering and reporting for dispatchable demand. Key learnings from that programme include:

- The ICP meter did not provide enough resolution and detail to understand how our battery systems and control of hot water had operated during a demand response event.
- The ICP meter data does not capture the effect of behind the meter batteries since other factors also impact the grid readings, e.g. a large load in the home such as an oven.
- solarZero needed to aggregate the data from the hundreds of devices we had enrolled at the GXP level for the Transpower DR programme.
- A new methodology for measuring demand response needed to be developed to take account of solar variability (i.e methodology was based on historical daily patterns but solar generation distorts this)

We would be happy to brief the Electricity Authority on our learnings around metering and measurement for distributed energy resources.

### **The importance of enabling “metering lite” and metering of specific devices for aggregators**

As is outlined in the case study above, to enable aggregators to operate at the household it is very important to have a “metering lite” and the ability to meter and provide data for the devices being managed. Increasing competition, providing greater consumer choice and creating increased benefits for consumers will only be achieved via:

- Dispatch notification (“dispatch lite”) and
- Metering “lite”.

It is vital to have both these elements together and to ensure that the Code enables “metering lite” as a partner to dispatch notification. Ironically, “metering lite” data may have much greater granularity than normal half hour metering data. So this is not about less data - it is about data from a range of devices.

### **Dispatch notification for aggregated discharge, not just demand**

Aggregators may wish to discharge devices such as household batteries and in the future vehicle to

grid (V2G) enabled systems. The implication in the consultation document is that dispatch notification applies only to dispatchable demand. That may be too limiting. On the other hand if dispatchable demand means at the GXP level then the definitions work because residential batteries including V2G would be considered as dispatchable demand. Clarity on this point is needed, with a view to explicitly enabling aggregated injection of energy into networks.

**The Code will never be perfect - the need for an overarching document to assist with interpreting the Code**

RTP is a major change to the electricity market in NZ. Even bigger is the technological driven change - the development of controllable distributed energy resources (C-DER). The Code will not be 100% correct and always runs the risk of not enabling new technology if a literal interpretation of the Code is applied. As with all regulations there is room for interpretation.

We suggest that a vision/roadmap document is prepared that sets out the Authority's view on how the power system should operate under RTP and with increasing amounts of C-DER. The vision/roadmap document would help guide conversations about the interpretation of the Code. It could help shift conversations away from literal interpretation of specific sections of the Code in isolation and provide context for the interpretation of the various relevant sections of the Code.

The vision/roadmap document should not just be high level. It should contain practical examples as well as hypothetical ones from New Zealand and from other jurisdictions. The document should explain how the EA expects the electricity system to work and what it expects the Code to enable.

It is our direct and real experience that a literal interpretation of the Code will constrain innovation and the development of newer, better and more efficient solutions. These solutions will benefit consumers in both the long and short run. A vision/roadmap document that enables conversations about intent and direction would help in debates about the meanings of specific sections of the Code and how they relate to other sections of the Code.

**Responses to question - please note that we have only responded to questions that are relevant to solarZero**

***Q11. Do you agree with the proposal to exclude approved dispatch notification generators from the definition for intermittent generating station? If not, why?***

It is not clear as to the rationale for the 30MW limit for dispatch notification and where it applies. Does it apply at a generating station, GXP, an island or nationally. It is likely that aggregators will reach the 30MW amount reasonably quickly (within a few years), e.g. battery and solar, EV chargers or widespread hot water heating. 30MW for an aggregated fleet is low and we would suggest raising it significantly given the projected growth in distributed energy resources projected in documents such as the FSR Roadmap and Whakamana i Te Mauri Hiko.

We agree that variable generation should not be considered part of dispatch notification. Batteries (controlling charge/discharge) and the ability to control load are the critical elements for dispatch notification. Dispatch notification should apply to C-DER (controllable DER).

**Q14. Do you agree with the proposal to co-optimize interruptible load and dispatchable load? If not, why?**

We do agree that it is important to co-optimize interruptible load and dispatchable load to ensure there are sufficient reserves.

**Q15. Do you agree with the proposal to reinstate clauses related to information flow between generators, the grid operator and the clearing manager? If not, why?**

The consultation document and the proposed Code changes do not address a key issue - how to handle data from multiple sites, e.g. EV chargers in homes, vehicle to grid, or hot water control, or solar/battery systems, or combinations of all of these. We suggest, as outlined above, that a “metering lite” concept is developed and the Code updated to reflect this concept. “Metering lite” would sit alongside dispatch notification (“dispatch lite”).

The “metering lite” concept would be around the testing required for metering. It would not be around the volume or frequency of data, for example, many measuring devices collect data far more frequently than half hourly.

**Q18. Do you agree with the proposal to update the definition of dispatch notification purchaser to include load aggregators and virtual powerplants? If not, why?**

Yes, absolutely. VPP will become an increasingly important part of the NZ power system moving forward. It is critical that the regulations enable VPP technology.

Dispatch notification should not be limited to dispatchable demand and should be extended to dispatchable distributed generation. For example, an aggregator may wish to bid generation from household batteries, including vehicle-to-grid enabled generation. If that is considered “demand” at the GXP level, the level the System Operator works to, then that is fine and can probably work technically. But we do encourage the EA to consider whether both changes in demand and generation from distributed resources should be better catered for in the Code.

**Q19. Do you agree with the proposed method for handling dispatch notification loads under a non-dispatch flag? If not, why?**

That should work.

**Q22. Do you agree with the proposed drafting of the Code amendment? Any concerns or feedback?**

As outlined earlier in this submission, the Code will never be perfect and will be open to interpretation. We suggest that the EA prepare a high level vision/roadmap document that outlines its vision for the power system of the future. That vision/roadmap can be used by all users of the Code to help them with their interpretation of the Code. The vision/roadmap would not be statutory, but we suggest should be signed off by the Electricity Authority Board to give the document “standing”.

There are a range of documents that the EA could draw upon, such as a number of EA documents, IPAG reports, Whakamana i Te Mauri Hiko and the like. The vision/roadmap would be more about drawing those documents together and framing the vision/roadmap in terms of how to go about

applying the Code as New Zealand works its way through the largest change since the wholesale market was enacted and the most the significant technology-driven change since the electricity system was developed - the rise of distributed resources and smart control.