Energy Storage Registration Consultation Paper: Submission

ClimateWorks and Seed Advisory welcome the opportunity to contribute to the COAG's consultation process on Energy Storage Registration. This submission reflects previous work our organisations have undertaken, and initial planning and consultation for our recently launched Plug and Play project.

The Plug and Play project focusses on identifying and reducing the costs to consumers and the economy of the current processes for setting, interpreting and applying standards for grid connected generation and supporting technologies, such as battery storage. The objective of the project is to identify policy solutions that reduce costs to consumers and the economy to an efficient level, and provide a basis for product innovation and consumer uptake of future technological changes, while safeguarding the performance of the grid.

Any policy approach to these issues must consider the experiences and costs borne both by stakeholders seeking to enter the market with new technologies or business models who are dealing with these issues, and those customers set to benefit from the solutions. In addition, the opportunity costs to the economy from overly conservative regulation and the foregone benefits from lower emissions need to be taken into account when considering policy in the future. These perspectives have been under-represented in policy processes to date.

The Energy Storage Registration Consultation Paper

We consider that any action in this area should consider consumers' upfront and transaction costs, as well as implications for competitive neutrality within the Australian energy market. These principles should be used to test any proposals that COAG subsequently decides to pursue.

Looking at the Consultation Paper's wider discussion, we appreciate that equipment connected to the distribution grid may represent a risk to the safety of the network, line workers and the local community under certain conditions. We're concerned that in considering remedies to manage the risks, remedies should be appropriate and proportionate to the risks identified, and whatever remedy is proposed should not create an unnecessary cost burden to customers.

As we understand it, one of the outcomes of distribution businesses classifying small energy storage devices as embedded generation is that, just as small solar PV devices are required to meet the requirements of AS 4777 and its successors, small energy storage devices will be required to meet the same requirements. These requirements include inverter connection to the network, with the inverter set so as to terminate the operation of the device in certain defined network conditions, as well as terminating the operation of the device at the direction of the distribution network under the most recent version of AS 4777. If this is the case, and classifying small energy storage devices as embedded generators is thought to be appropriate for the management of the risks these devices may present, then any additional

requirements on small energy storage devices should be designed to address only those residual risks presented by the installation to the safety of the network, line workers and the local community.

The Consultation Paper's discussion raises a number of issues not addressed in the Consultation Questions. The Australian Energy Regulator (AER) is currently consulting on Ring Fencing Guidelines in relation to distribution businesses' participation in markets using customers' behind-the-meter equipment, including small energy storage devices. COAG should consider the implications of the scope of the register in the context of needing to maintain transparent competitive neutrality between regulated networks, networks' unregulated businesses and other market participants. The scope of the Australian Energy Market Operator's (AEMO) information requirements, and distribution businesses' requirements for information on installations, particularly their potential mode of operation (whether participating in a demand side participation contract, for example), should be tested to ensure the information required is strictly necessary for the safe operation of the network. Similarly, access by other unrelated third parties to any data register, if implemented, needs to be carefully tested against the principles underlying the Ring Fencing Guidelines.

Finally, AEMO's current Future Power System Security Program is investigating whether, under certain circumstances current requirements for the operation of small grid connected devices, including solar PV and small energy storage devices, could be ***inconsistent*** with the safe operation of the wider electricity system. This suggests to us, that in addition to concerns our work has given rise to about the current fragmented processes for the development of network connection and protection standards (see below), significantly better coordination in the development of requirements for standards for the connection and performance of these types of devices may be required across the National Electricity Market, between AEMO and all distribution businesses.

As an additional point, we noted the Consultation Paper's suggestion that "energy storage systems installed to date in Australia have generally not been recorded with local distribution businesses" (p. 12). However, our work with stakeholders, including some where batteries already provide back-up power to maintain their existing operations in the event of a failure of the electricity system, leads us to believe that existing storage systems connected to the distribution network are likely to be included in customers' Connection Agreements, and those Connection Agreements typically specify the mode of operation of customers' equipment, as well as governing the nature and size of grid exports, where these are allowed.[1] Connection Agreements typically exist for larger customers whether the customers are only load customers (no grid exports), or load *and* generation customers (exports to the grid allowed under the Connection Agreement).

[1] If the terms and conditions in individual Connection Agreements are not systematically recorded in some central register by individual distributors, then our observations and COAG's understanding could be both be consistent.

Distributed generation and grid connected equipment: customer empowerment, better energy productivity, and contribution to Australia's emissions reduction objective

ClimateWorks' *Pathways to Deep Decarbonisation* report outlined the technical potential for Australia to achieve zero net emissions by 2050 using existing technologies and without significant structural changes to the Australian economy.[2] Under the pathways modelled in ClimateWorks' report, electricity consumption increases substantially out to 2050 to facilitate electrification across the building, transport and industry sectors with gas and petrol replaced by low carbon electricity.

ASBEC and ClimateWorks Australia's recent *Low Carbon: High Performance* report on emission reduction potential in the Australian built environment sector found that installation of commercial and residential solar distributed generation alone could contribute 50Mt CO2e by 2030. This would deliver 18% of Australia's current 2030 emissions reduction target.[3]

However, this potential can only be reached if current barriers to installation and connection are addressed (and no further barriers are put in place).

For customer choice to be facilitated and to realise the emissions reduction potential of new technologies, policy should aim for the uptake of distributed generation, storage and demand management equipment to be as cost effective and straightforward as possible. With new technologies and business models emerging rapidly to support this transition, our electricity markets need to be able to support innovation and competition for new market entrants, as for existing market participants.

Standards for grid connected generation and supporting technologies: barriers to grid connection

Currently, every proposed connection that involves some element of distributed generation is non-standard, and evaluated as if it was unique and without precedent. The exception to this is small scale residential solar, where the treatment of small scale installations consistent with the relevant Australian Standard has been standardised across the National Electricity Market. Australia has the highest penetration of residential solar in the world.[4]

Networks, even in the same state and with the same jurisdictional coverage, have different standards for distributed (or embedded) generation connections to their networks, and for the protection equipment required to ensure the safe performance of the installed equipment as part of that network.[5] A business looking to improve its energy efficiency and reduce its

---

[2] ClimateWorks Australia and Australian National University (ANU) 2014, Pathways to Deep Decarbonisation in 2050: How Australia can Prosper in a Low Carbon World, Melbourne.
[3] ASBEC 2016, Low Carbon High Performance, Melbourne.
[4] http://newsroom.unsw.edu.au/news/science-tech/fact-check-australia-world-leader-household-solar-power
[5] ClimateWorks Australia, Property Council of Australia and Seed Advisory, 2015, Implementing the Connecting Generation Rule: Project Outcomes Report, Melbourne.

carbon emissions by installing its own generation (or a business offering these services and products to others), or installing a battery to better manage its own generation, will find its installations need to be individually assessed in every location it investigates, with no guarantee that a system accepted on one distributor's network will be accepted on its neighbour's system. The basis for the rejection on one network could be a differing view to the neighbouring network's about the safe performance of the required equipment, or different performance or protection requirements for equipment on that network, or a lack of familiarity with the equipment proposed.[6]

Networks' requirements differ across states and distribution networks within states, imposing costs on customers[7] and delaying customers' uptake of new technologies. These processes and requirements ignore Australia's status as a small technology importer, and fragment the Australian market into state and local network areas. The fragmented market, and the costs it imposes on standardisation and learning by doing, are a drag on energy and national productivity and innovation.

In the commercial sector and particularly in businesses aiming for a national footprint, transaction costs resulting from inconsistent, non-transparent and complex connection standards and processes remain a significant barrier to improved energy efficiency and lower emissions. Consequently, despite high levels of interest in the sector, commercial installation in Australia is progressing at a slow rate. The stakeholders we engage with continue to report that their efforts to progress projects are delayed, or abandoned due to:

- Lack of clear and transparent technical requirements for larger scale and non-standard connections;
- Inability to achieve efficiencies of scale (for example, across property portfolios) due to differing requirements imposed by different DNSPs;
- Inconsistency in protection equipment requirements for the same installation, and unreasonable costs due to overly conservative and variable assessments of risk;
- Inconsistent application of network standards, with standards applied differentially between network supported projects, and projects by non-network proponents; and
- Delays in processing applications for connection increasing project costs.

Equipment manufacturers and importers have suggested that Australia's current standards regime limits product availability in Australian (or state) markets due to lack of clarity in technical standards, inconsistency across DNSPs, divergence from relevant international standards and the size of the total domestic market. As one stakeholder expressed it, if a state adopts significantly different requirements from other states, and that state is, say, "15 percent of not a lot", the manufacturing process is not going to be altered to meet the differing requirements. Rather, the manufacturer will choose not to compete in that market, reducing consumer choice and market competition.

---

[6] In some instances, our clients have experienced responses from DNSPs where older versions of current technologies were mandated in preference to better performing, more recent versions, presumably because the earlier equipment was better known.

[7] Clean Energy Council, 2016, Embedded Generation Grid Connection Standards Scoping Study, Melbourne.

Given the potential scale of customer uptake over the short to medium term, driven by customer demand, decreasing equipment costs and emissions reduction activity, any reduction in transaction costs associated with more consistent, transparent and balanced connection standards is likely to deliver significant aggregate cost savings.

Priorities in addressing these barriers

Our project is in its early stages and possible policy solutions are yet to be identified or fully explored.

However, we have been exploring desirable characteristics of potential solutions, and what they may mean for the direction of future policy. Our current perspectives on those priorities, and their implications, include:

***Minimising up front and transaction costs of installation as far as practical for all installations*.**

Aiming for lower costs implies moving towards consistent, clear and transparent national access arrangements for grid connection is key to any solution.

Ensuring that costs to consumers and the economy are adequately considered in any solution.

Standardising at customers' expense is unlikely to be the optimal solution. Setting requirements excessive for the network conditions characterising most customers' networks in order to achieve a level of consensus represents some improvement relative to a position where there is no standardisation, but it's a minor improvement relative to the status quo. Similarly, standardising, but not recognising and addressing the issues which the speed of technical change present for the current Standards development process would be a backward step.

Finally, proposals for the networks to collectively develop equipment, connection and protection standards need to be carefully scrutinised both for the mechanisms that ensure their outcomes are customer centric, and to ensure that, in reaching a consensus networks with the most onerous standards are not inappropriately driving the outcome.

Whatever the future process for setting standards, the process needs to provide transparent competitive neutrality between regulated networks, networks' unregulated businesses and other market participants.

The current allocation of responsibility to an individual network to decide *whether a particular (type of) installation is safe,* the conditions that apply to the installation of the proposed equipment in the proposed location, and consequently the cost of its connection arguably falls short of providing the necessary transparent competitive neutrality in a market where distribution businesses are increasingly seeking to deliver behind the meter services.

Whatever the future process for setting standards, the process needs to be able to adjust to rapidly changing technology.

We may need to rethink the model for the development and adoption of standards to allow for more rapid turnaround times, or, alternatively to establish processes with *minimum requirements*, not *mandatory requirements*, allowing customers to take advantage of future technological developments. In addition, we need to think about whether the current processes, centred as they are on individual networks and their capacity to assess technologies and the implications for their networks, are appropriate and cost efficient for the ongoing management of this process during a period of rapid technological change.