CONSULTATION SUMMARY PAPER
FEBRUARY 2017

Plug & Play

Facilitating grid connection of low emissions technologies

ClimateWorks AUSTRALIA

seed advisory

Plug and Play

Executive Summary

Harmonised requirements for connections to all electricity distribution networks are a key part of ensuring that the innovative technologies and business models required to meet climate targets and drive energy productivity can contribute to their full potential in providing our energy needs in the future.

Harmonised requirements should lead to less costly connection requirements, more responsive to the development of new technologies. Eliminating unnecessary costs to consumers and the wider economy should increase consumer uptake of new technologies. This includes new technologies that can reduce greenhouse gas emissions such as distributed electricity generation, storage, demand management equipment and electric vehicle charging infrastructure. Removing unnecessary costs from grid connections can create a virtuous circle – supporting Australia in meeting our policy objectives in energy productivity and emissions reduction. Removing unnecessary technical requirements from grid connections can also support product development and the uptake of innovation, as we move from smaller local to larger national markets for equipment and technology.

For Australia to play its fair share in the global effort against climate change we must ensure that the innovative technologies and business models required to meet climate targets and drive energy productivity can readily participate in the energy market.

The objective of the Plug and Play project is to identify and drive the implementation of institutional and policy solutions to make grid connections for existing and emerging technologies as straightforward and cost effective as possible for customers and proponents, while safeguarding electricity supply.

This paper outlines the findings from the first stage of the project where we have looked at the current connection requirements and processes and the barriers and unnecessary costs they impose on the connection of low emission technologies to the electricity network. The paper is informed by desktop research and initial consultations with stakeholders from the property sector, energy service providers, manufacturers and suppliers of equipment, and funders of renewable energy projects. It builds on previous work by ClimateWorks Australia and Seed Advisory in the area. We will be seeking further input from stakeholders in the second stage of the project proposed to finish in mid-2017.

During the second stage of the project, we will undertake further consultation to identify and test the proposed solutions with key stakeholders and refine these into a final report in mid-2017, setting out a solutions roadmap. It will identify the key actors and their roles in enacting the solution, as well as document international examples of solutions to the identified barriers. Subsequent phases will focus on implementation the agreed solutions.

About us

ClimateWorks Australia

ClimateWorks Australia is a leading independent organisation acting as a bridge between research and action to identify, model and enable end-to-end solutions to climate change.

Since our launch in 2009, ClimateWorks has made significant progress and earned a reputation as a genuine and impartial adviser to key decision makers from all sides of politics and business. Our collaborative approach to solutions that will deliver the greatest impact encompasses a thorough understanding of the constraints of governments and the practical needs of business.

We do this by looking for innovative opportunities to reduce greenhouse gas emissions, analysing their potential, resolving obstacles and helping to facilitate conditions for our transition to a prosperous, net zero emissions future by 2050.

ClimateWorks was co-founded by The Myer Foundation and Monash University and works within the Monash Sustainable Development Institute.

Seed Advisory

Seed Advisory is a commercial advisory firm specialising in the energy sector, with expertise in strategy, risk management, policy development and commercial management.

Since our launch in 2008 we have advised energy market participants – new and prospective – on the commercial and regulatory implications of their potential investments in conventional and renewable technologies. We have also advised national and state governments on the interaction of their energy-related policies and other areas of government policy, such as the relationship between smart metering and Australian Privacy law, or the impact on electric vehicle uptake of local regulation and distribution business practices affecting residential and commercial connection availability and cost.

Acknowledgment of Support

ClimateWorks Australia and Seed Advisory would like to thank those experts who have provided input to the consultations undertaken for this project.

We would also like to thank the Australian Energy Council (AEC) for its financial support of this project, and its members for their participation in the consultations undertaken. For a full list of those consulted please see Appendix 2.

Contents

1. About the project

ClimateWorks Australia and Seed Advisory commenced the Plug and Play project in September 2016. The overall objective of the project is to identify institutional and policy solutions which would make connection to the grid for existing and emerging new technologies as straightforward and cost effective as possible, while safeguarding the performance of the grid.

The project focuses on:

- identifying and addressing the source of barriers to installation and unnecessary costs
- describing the wider impacts of current requirements and processes for connection to the grid on uptake and energy productivity
- considering how standards and requirements in the electricity industry are set, interpreted and applied
- proposing solutions to create grid connection processes that will ensure that networked electricity is secure, affordable and low emission

This project will undertake a broad analysis of the impacts on the market of the current situation for connections of embedded generation and storage, on uptake of these technologies and on capacity to meet our energy productivity and emissions reduction objectives.

This project will not look at specific technical requirements of the electricity distribution network services providers (distributors). Issues about these technical requirements are well-documented. Distributors have been obliged to publish their own requirements since October 2014, and our previous work, and that of others, has analysed the differences. Our previous work found 'even within jurisdictions, distributors take materially different approaches to…connecting embedded generation to their network'. (ClimateWorks Australia (CWA), Property Council of Australia (PCA) and Seed Advisory 2015). Similarly, Energeia's work for the Clean Energy Council (CEC) found that 'Technical requirements are inconsistent across networks' (CEC 2016).

The Plug and Play project instead focuses on the costs that current differing requirements impose on connection proponents and the wider economy, and on alternative models that could reduce these costs while maintaining the safety and performance of the networks.

Our work to date has confirmed our initial thinking that variation in requirements and processes between different distributors is acting as a barrier to the adoption of new technologies and imposing additional costs. This discussion paper explains the issues arising from the current connection requirements and processes and other results arising from our initial consultations.

ClimateWorks Australia and Seed Advisory will be seeking further input from stakeholders to collaboratively develop institutional and policy solutions, before engaging with decision makers to assist those collaborating with us can advocate for reform.

2. Why focus on connection requirements?

The initial focus of the Plug and Play project will be on the impacts of connection requirements and processes; and their variation across Australia. The focus of the project stems from a number of issues:

- A major transformation in the structure of Australia's electricity sector is taking shape. This transformation is based on customers' interest in and ability to generate their own renewable energy and, looking forward, on the ability of customers to manage their interactions with the grid. In the future, customers are likely to collectively provide a range of services previously restricted to large specialised generation units. New technologies and services are being developed at a rapid rate with trials for innovative technologies underway.
- Federal and state policy to increase renewable generation and decrease emissions across the economy is combining with rapidly decreasing costs of low carbon technologies, and consumers' desire to achieve greater energy independence, to fuel this transformation. Such policy will result in further shifts in the number (and type) of connections.
- Australia's fifteen distributors have varied connection requirements for renewable energy generation and storage technologies. Our own work (CWA et al 2015), and work for the Future Proofing in Australia's Electricity Distribution Industry Project (CEC 2014) have extensively documented the extent of variation in these connection requirements and processes.
- The variation in requirements creates complexity and thus additional costs for customers, project proponents and distributors. In some cases it can lead to the abandonment of otherwise attractive projects. The recent All-Energy Conference identified delays in the customer decision making process and in the connection process as sources of increased installation costs.
- The variation in requirements may have a particular impact on the commercial sector. There is a high level of ambition within the sector to refurbish existing installations and/or install distributed renewable generation, as this has become more financially attractive. Installation at scale is potentially more cost-effective than small-scale installations. However, stakeholders have identified difficulties due to varying connection requirements and processes. Distributors across the National Electricity Market accept small inverter connected systems provided the inverter complies with AS 4777; no similar harmonised requirements exist for mid-size systems below 30 MW.
- Developments in behind the meter applications compete with services currently or potentially provided by distributors and/or generators. Realising the full potential of new technologies will require a shift from small, local network markets to a national market: platform economies are best realised at scale. New technologies and services can shift who benefits from the diversity of customer behaviour – the customer, the distributor or the market. Current connection processes which require individual distributors to manage the safety and performance of their networks may be a source of potential competitive disadvantage to new entrants and customers – even under the recently introduced ring-fencing guideline[1].
- Finally, stakeholder feedback suggests to us that our electricity markets currently lack support for innovation in technologies and services for both new market entrants and existing market participants.

1. The Australian Electricity Regulator (AER) has introduced the ring-fencing guideline to ensure functional separation of the provision of direct control services by distributors from their provision of other services and to promote competition in the provision of electricity services.

Australia's variable connection requirements raise public policy questions about the costs imposed on all network connections; the costs of reducing competition in the equipment market by limiting available markets; and, the relationship between the distributor's decision in adopting its own requirements and the wider implications for competition between distributors and distributed energy providers. As it currently stands there's no oversight of the appropriateness of distributors' requirements. There is no mechanism to check whether the requirements strike the correct balance between reducing risks and the costs they impose on connections and the community as a whole.

Harmonising connection requirements and addressing the way in which those requirements are developed will make the transformation of our energy system easier, cheaper and more equitable. It could allow connection requirements to be more responsive to the rate of technical change.

2.1 Other barriers

We recognise the existence of a range of barriers to the uptake of embedded generation and the development of further market-based services envisaged as part of the wider energy market transformation. Our stakeholders have nominated the following key concerns:

- No existing platform or mechanism to effectively reward grid security/demand management services for services that are not readily included in current demand management programs.
- Current wholesale electricity prices present little incentive to sell into the grid, even for larger, more cost-effective installations.
- Distributors continue to impose significant barriers to exports from a connection, to the extent that connection proponents now routinely size their installations so as to remain within the envelope of the property's use, regardless of the potential scale benefits of larger installations. Aggregation mechanisms in the wholesale market are unsuitable for portfolios combining load and generation, and only a small number of retailers are prepared to aggregate a customers' supply and demand across the customer's portfolio.
- There are still no effective mechanisms to address the "last in, worst dressed" approach to the costs of upgrading a local network imposed on a connection proponent. Standard contracts, required by Chapter 5 of the National Electricity Rules, are silent on mechanisms to address this issue (CWA et al 2015).
- Islanding – that is, the ability of a property to continue to self-generate where the local network has failed – represents a significant potential benefit for properties where the property might require power in the event of a local network failure. Examples where this might be of benefit include: local emergency centres; other locations where significant numbers of people might be present at the time of a failure or might congregate after failure; etc. However, distributors currently are unwilling to consider islanding apart from some small, localised trials chiefly involving residential customers[2].

However, these issues are secondary to the importance of establishing a cost-effective connection process. In the absence of cost-effective connections, some installations will not go ahead, while others will be smaller than optimal, given site characteristics.

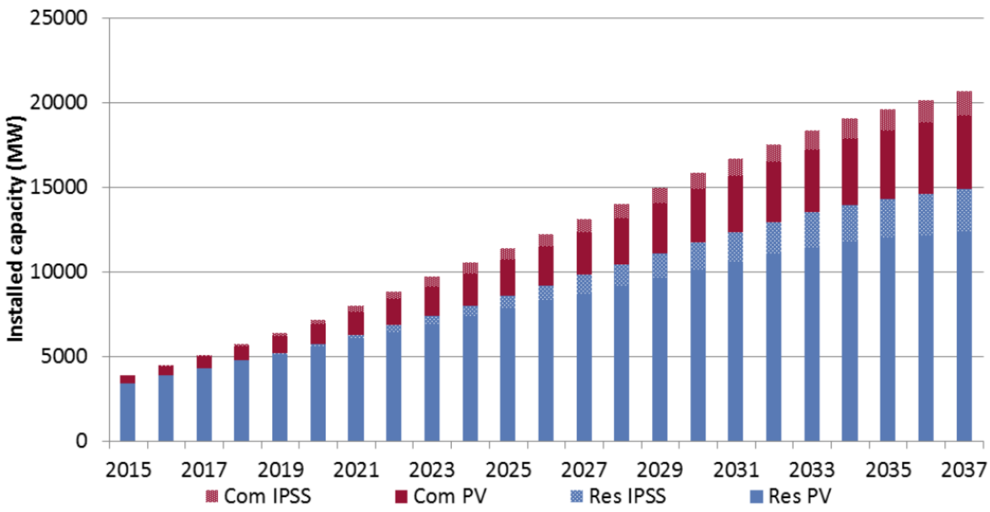
2. For example: http://www.ausnetservices.com.au/CA257D1D007678E1/All/41F5DC5437B4E7C2CA257F3A0020577041F5DC5437B4E7C2CA257F3A00205770/$file/160419%20Mooroolbark%20trial%20launch%20%20FINAL.pdf

3. The electricity system is changing

3.1 Customers are becoming active participants in the system

Mass adoption of distributed solar PV generation, especially in the residential sector, has driven a trend towards more active customer participation in the electricity system. The Energy Networks Australia (ENA) and CSIRO's Electricity Network Transformation Roadmap project focuses on the need to place consumers both residential and commercial at the centre of network planning to manage the transition from passive consumers of electricity, to generators and traders of electricity (ENA and CSIRO 2016).

Figure 1: Total installed capacity of rooftop PV and IPSS in the NEM (AEMO, 2016b)



In response, the electricity industry is shifting towards a more customer centric model where customers' choices and actions are increasingly important. Regulators and policy makers are undertaking a range of reforms in metering and information provision. The research and policy reform processes underway addressing a wide range of issues are summarised in Appendix 1.

Battery storage technologies now entering the Australian market are likely to follow a similar trend with a high level of initial consumer interest and consumer prices predicted to decrease rapidly (Morgan Stanley Research 2016). AEMO currently predicts that battery storage capacity will increase from almost zero now to 6.6 GWh over the next twenty years, while rooftop solar PV is projected to increase 350 per cent from 4.3 GW to 19 GW over the same period (2016b)[3]. These projections, which may be conservative given previous experience with the rate of solar PV uptake relative to initial projections, imply a high number of relatively small connections in the short to medium term. By the end of 2016, there were already 1.6 million small solar PV systems installed in Australia, most of which were connected in the NEM. (Clean Energy Regulator 2017).

3. This total 19 GW of solar PV includes 3.8 GW expected to be integrated with batteries.

3.2 The distributors' challenge

As the traditional static network of large-scale centralised generation evolves to respond to active consumers who generate their own electricity, distributors face significant challenges to their current operating model and to the management of the safety and performance of their networks. The distributors' requirements to manage this are discussed in Section 04.These challenges include a significant mismatch between consumption and the production profiles, requiring two-way flows to be facilitated in local network areas and across networks.

Rapid changes in net demand due to transitory weather conditions are more common, changing wholesale market dynamics. In some situations and weather conditions solar PV can reduce network peaks. However, the flows from embedded generation can be unpredictable, overall adding to the complexity of managing the network. Combining solar PV with batteries can mitigate the technical challenges presented by increased levels of distributed energy generation, for example, by allowing customers to reduce their exports into the network by storing their energy production for use at peak consumption periods.[4] However, network challenges are likely to remain.

If customers include management systems with their solar PV and battery system (integrated in the battery, or as a third party provider service), then customers can co-ordinate their demand and generation with the market. These management services seek to optimise when the customer exports electricity and when they import it – either for use or storage. This further increases the potential for their net demand to change from moment to moment.

All these dynamics can alter network investment requirements and wholesale energy demand. The combination of embedded generation, storage and management systems can compete with services currently or potentially provided by distributors and/or generators, which can change who benefits from the diversity of customer behaviour – the customer, the distributor or the market.

3.3 Meeting our energy productivity and emissions reduction objectives

Changes to our electricity system will be integral to making our use of energy more productive and reducing our emissions. The Council of Australian Governments (COAG) has committed to a goal of improving Australia's energy productivity by 40 per cent by 2030. The National Energy Productivity Plan outlines a series of initiatives to reach this goal in order to reduce costs to consumers, maintaining Australian business' competitiveness and reducing greenhouse gas emissions.[5]

Australia's ratification of the Paris Agreement on 9 November 2016 commits Australia to an emissions reduction pathway in line with constraining global warming to well under 2 degrees. Australia has also committed to be part of collective global action to reach net zero emissions. Analysis indicates that doing Australia's fair share requires achieving net zero emissions across the Australian economy by 2050.[6]

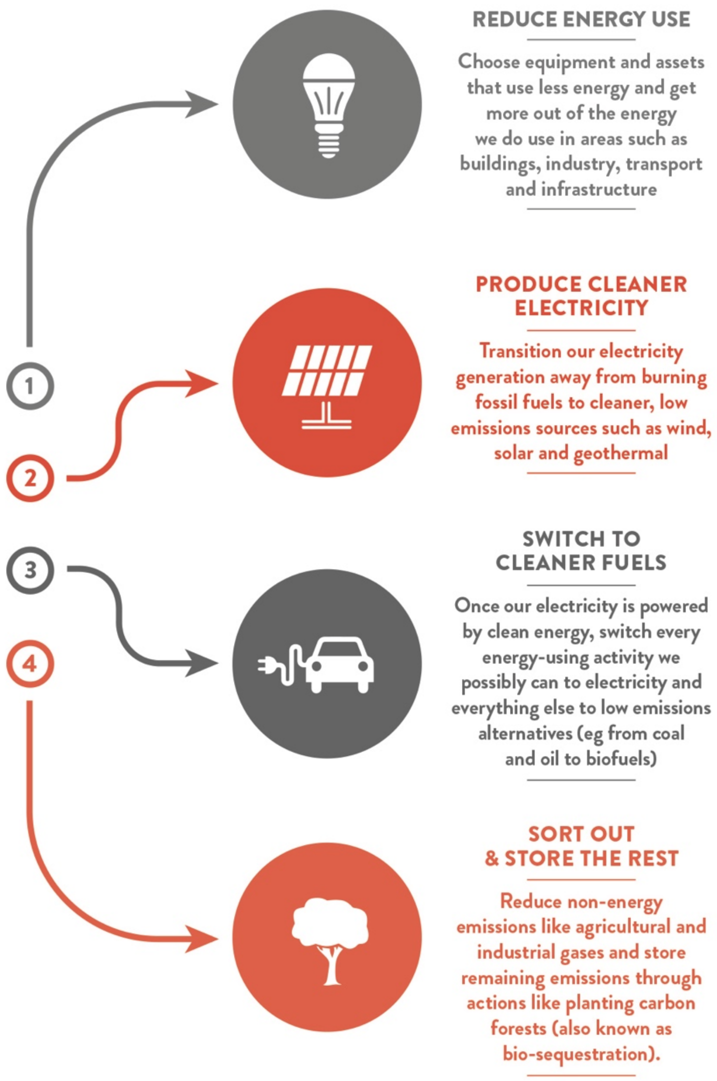
ClimateWorks Deep Decarbonisation Pathways report demonstrates how this goal can be achieved while maintaining economic growth through four pillars of decarbonisation.

4. The recent Energy Transformation Roadmap presentation (ENA and CSIRO 2016), for example, raised the possibility that, depending on the way in which tariffs are structured, and the management of customer diversity, peak network requirements could be shifted to time periods immediately before peak power rates cut in, or immediately after off-peak power rates commence.

5. COAG Energy Council, 2015

6. For example the long-term carbon budget proposed by the Climate Change Authority (CCA 2014, Chapter 8) will require net zero by 2050 given current emission rates.

Figure 2: The 4 pillars of Decarbonisation



Grid connected low carbon technologies play a central role in achieving a net zero economy. Distributed renewable generation contributes towards decarbonisation of the grid, while demand management equipment contributes to ambitious energy efficiency, and storage technologies support network stability with higher penetration of renewable generation. Electric vehicle charging infrastructure supports fuel switching from petroleum to low carbon electricity.

ASBEC and ClimateWorks Australia's recent report Low Carbon: High Performance, on emissions reduction potential in the Australian built environment sector found that installation of commercial and residential distributed solar generation could contribute a reduction of 50Mt CO2e by 2030. This would deliver 18 per cent of Australia's current 2030 emissions reduction target.[7]

7. ASBEC 2016, Low Carbon High Performance.

4. Current connection requirements

State legislation confers on distributors the responsibility for managing the safety and performance of the network within local jurisdictional guidelines, and the powers to control customer connections in line with these responsibilities. Some states impose symmetric rights and obligations on customers who use a network; in others, customers' responsibilities outweigh their rights when connecting to the network.

Distributors set technical connection requirements to allow them to meet their responsibilities to manage their network. The requirements fit within the National Electricity Rules which has three different connection processes for proposed installations that are the focus of this project. Installations under 30kW, which are covered by the Australian Standard AS 4777 (see breakout below), follow the process for a basic connection. Larger installations under 5 MW may follow a standard or negotiated connection process. Within the broad guidelines in the NER, each distributor employs their own processes for negotiating the connection of non-standard installations. Most installations above 30 MWs are covered by Chapter 5 of the NER.

Each distributor's requirements govern the type and performance of the equipment that can be connected, and the level of protection required for an installation to be approved in that distributor's franchise area. The requirements may be relevant Australian Standards, international standards, requirements specific to the distributor, or some combination of these. Connected equipment must be certified as compliant with the relevant requirement(s). Requirements vary from network to network. The differences between distributors' requirements and the issues they create are well documented[8].

Australian Standards aim to accept relevant international Standards, or accept with modifications where required for Australian conditions. Where the Australian market is ahead of development of international standards, a standard is developed independently. For example, Standards Australia is developing a standard for residential battery storage installations in the absence of a relevant international standard applicable to the Australian market. Once that standard is available, however, there's no guarantee that networks will allow installations consistent with the standard to proceed without other local requirements.

As it currently stands, there's no oversight of, or mechanism to review, the appropriateness of distributors' requirements and the costs they may impose on connections, or the community as a whole. Proponents have the ability to contest the distributor's decisions once made, but this review is only possible installation by installation.

In setting requirements for equipment that differ from those adopted by other distributors, or relevant Australian or international standards, the local distributor is asserting its judgement that unique requirements are needed to address conditions within its network. The distributor may have specific requirements in particular areas characterised by poorly performing, vulnerable or old infrastructure. However, stakeholders have raised concerns within our consultations that these judgements are not always appropriate[9].

8. ClimateWorks Australia, Property Council of Australia and Seed Advisory, Implementing the Connecting Embedded Generation Rule: Project Outcomes Report, May 2015
Energeia, Embedded Generation Grid Connection Standards Scoping Study: Task 3B.1, May 2016
9. In some instances, stakeholders have experienced responses from distributors where older versions of current technologies were mandated in preference to better performing, more recent versions.

4.1 What happens during a connection application?

The diagram on the following page (Figure 3) is a stylised representation of the connection process (other than for very small applications covered by AS 4777) for a connection application in a distribution network. A typical description of the connection process will outline the various steps. This diagram, in contrast, focusses on the decision points in a connection application arising from the distributor's technical requirements:

- **Self-assessment:** The proponent's self-assessment that the application complies with the distributor's specific requirements.
- **The distributor's assessment** of the application against its own mandated requirements.
- **Safe in this location?** The distributor's assessment of the application in relation to the network characteristics of the location for which the installation is proposed
- **Meeting additional requirements of the location:** If necessary, the distributor's requirements for remediation of or augmentation to the local network to enable the installation to proceed.

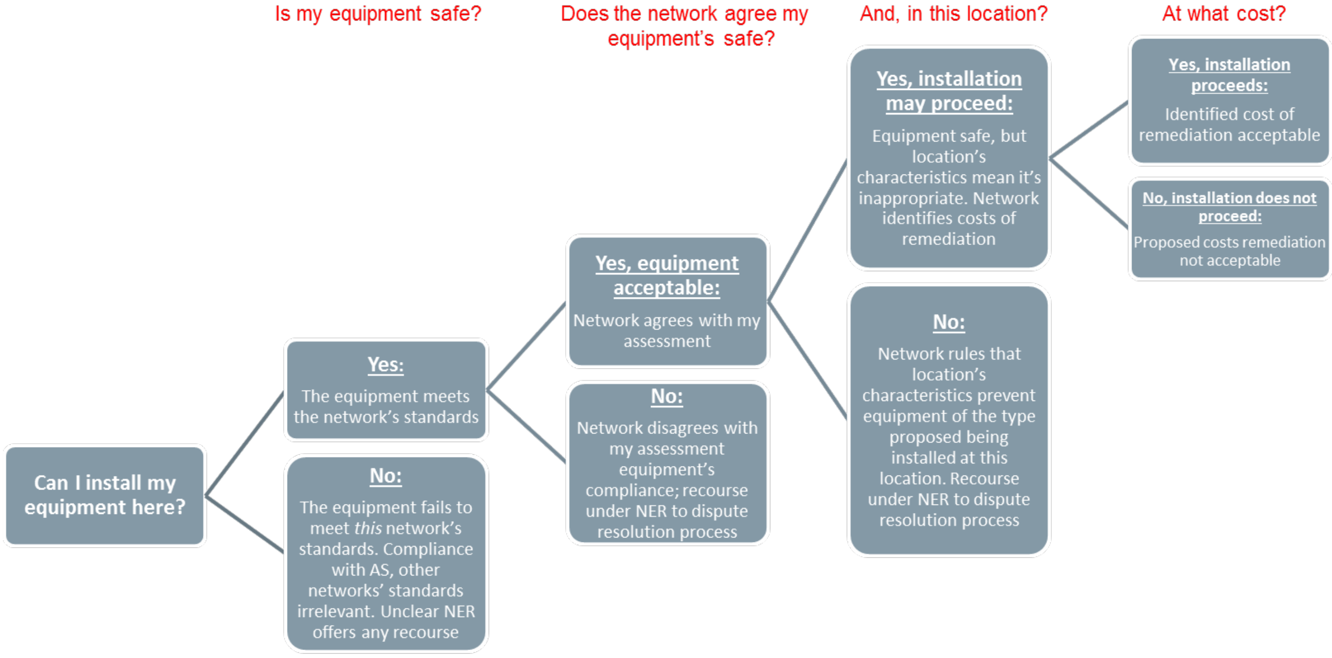
The diagram also describes, at a very high level, the proponent's avenues for clarifying or disputing a distributor's decision, where these exist. This diagram has been used in our initial consultations with stakeholders to assist us in identifying and classifying proponents' experiences.

Standardised requirements for small-scale PV

COAG adopted the Australian Standard AS 4777 (and its successors) as the primary technical requirement for a basic connection for small scale PV. AS 4777 mandates inverter connection for all complying solar PV installations. In its more recent versions it has added additional functionality relating to the management of the network. This use of a harmonised standard has facilitated the widespread installation of small scale solar PV penetration in Eastern Australia.

However, some distributors add additional requirements for connections covered by AS 4777, for instance if their network has a high penetration of solar generation. Distributors who wish to reduce exports into the network from a high presence solar generation have responded in a number of ways. The distributor may limit the size of the system to a set size or a size less than that customer's consumption envelope; they may require that batteries are installed as part of the system or they may not permit further solar PV installations in specific areas in their network. Others include an additional assessment step before a small-scale application is formally processed; or longer waiting periods than for a basic connection application as part of the assessment period.

Figure 3 Stylised representation of the connection process for a connection application in a distribution network



Self-assessment

First, a proponent assesses whether the proposed connection is safe and compliant with the distributors' requirements, based on the distributor's published materials, before making an application.

The proponent may have difficulty deciding if the proposed installation is compliant due to lack of clarity in the distributor's information about their requirements. For example, if a distributor's requirements refer to a wide group of standards with additional requirements the proponent may have to make a judgement between apparently differing requirements, and may not be confident that their judgement on which applies will be acceptable to the distributor. This is discussed in our earlier work (CWA et al 2015) and the Energeia study for the CEC (2016).

The equipment configuration proposed may have been acceptable and successfully installed elsewhere, but the local distributor may have different requirements. There's no recourse to another authority in the event that a distributor's requirements rule out equipment consistent with other distributors' requirements, Australian standards or comparable international standards.

The distributor's assessment

Second, in making an application, the proponent is asking the distributor whether it agrees that the connection application meets its requirements. If the distributor refuses an application on these grounds, a connection proponent has recourse to the NER's dispute resolution procedures, should the proponent choose to pursue a dispute. The distributor to which the connection application is being made is the only authority on requirements for its network.

Some of the stakeholders we have interviewed have argued that ambiguities in distributor's published materials make this step as difficult for the distributor as it is for proponents. In the absence of clear requirements, the default position can be a rejection of a compliant application, rather than the exercise of judgement in the interpretation of vague or ambiguous requirements.

Typically, this step in the process is not differentiated from a decision on whether the proposed installation is safe at a given location. We have distinguished between the two because the outcomes of failing each of these are different. If a distributor decides the connection does not meet its requirements it may reject the connection application, require an amendment to the proposed configuration or equipment or require further studies.

If network characteristics require significant additional protection equipment, or an investment in network augmentation, the distributor must specify the requirements, and, in the case of network augmentation works, provide an estimate of the costs of the works required.

Safe in this location?

All locations in any network cannot support all connection applications: network characteristics differ by location and over time. A distributor's intimate knowledge of prevailing conditions in the local network, and more advanced connection applications relating to the same location mean the distributor is the obvious arbiter of the safety of an application in relation to any given location.

As we understand the requirements of the NER, if an installation would not be safe because of the local conditions, a distributor should impose specific requirements on the connection application or require the connection proponent to fund downstream works in the distribution network. In the first case, those requirements are intended to bring into compliance the proposed connection and the distributor's site specific requirements. In practice, connection proponents continue to point to occasions where a ban on all exports into the network has been imposed, rather than the requirements for exports to be acceptable in the relevant section of the network being specified. A connection proponent can use the NER's dispute resolution procedures to dispute the additional requirements, or to contest a distributor's refusal to contemplate the application at the proposed location.

Meeting additional requirements of the location

Where the network requires additional investment to make the installation safe in that location, in some states the connection proponent may choose its own contractor to undertake the works, or require the distributor to seek competitive quotes for the works required. The proponent can choose not to proceed with the application if the costs are too high, or may choose to dispute the distributor's requirements under the NER dispute resolution procedures. If the proponent goes ahead with the work they have a right to collect from future connections contributions to shared infrastructure investments, but, in the absence of co-operation from the distributor, that right is unenforceable (CWA et al 2015)[10].

A connection proponent has only a limited ability to predict the distributor's specification of its downstream requirements, except to the extent that the distributor's Distribution Annual Planning Report provides some current insight into local conditions. Distributors have argued that local conditions can change so rapidly that the task of keeping publicly available materials on local status up-to-date is an onerous task.

10. None of the model contracts required to be published by the distributors and reviewed in the report made any reference to the potential for the recovery of expenditures on network augmentation from future connections.

5. Impact of the current connection process

Customers connecting new technologies under current processes bear unnecessary costs – whether measured in the time to connect, or direct costs of connection, or both.

Varying requirements from distributors fragment the Australian market into state and local network areas. This fragmented market directly increases the costs of equipment. The further costs it imposes on standardisation and learning by doing are a drag on energy and national productivity and innovation.

Further, these costs represent a reduction in customer welfare. The status quo also hinders businesses – the distributors and all those involved with offering technologies and services. These costs reduce the uptake of new technologies and, by extension, limit the achievement of Australia's emissions reduction and energy productivity goals. In the following sections, we've summarised observations around the current connection process from our analysis and consultations to date.

5.1 Costs to business and consumers

Inconsistent and non-transparent requirements for the connection of technologies to the grid impose costs and reduce the benefits available from harmonisation. Ambiguity or the absence of a written description of distributor's requirements increases the difficulty of an installation. Restricting the equipment approved for use decreases competition in the equipment market and hence, may increase costs to customers.

Given projected customer uptake of renewable energy over the short to medium term, any reduction in transaction costs associated with more consistent, transparent and balanced connection requirements is likely to deliver significant aggregated cost savings. For example, AEMO's projections for the NEFR suggest commercial and industrial customers will install around 25,000 solar PV systems over the next 10 years, adding around 1 GW to total solar PV installed in the NEM.

Direct cost reductions from harmonising connection requirements are expected to be substantial. The reduction in consumers' installations costs – from the first 10 years of a nationally consistent set of technical requirements for grid connections for small to medium (30kW to 5MW) embedded generators - could be worth at least $140 m ($2016), according to estimates prepared by Energeia for the Future-Proofing in Australia's Electricity Distribution Industry Project (FPDI) (CEC 2016). AEMO's projected uptake of solar PV by commercial and industrial customers in the 2016 National Electricity Forecasting Report is around 20 per cent higher than the estimate Energeia's uses in its benefit calculation: on a like-for-like basis, savings would be 20 per cent higher (Seed Advisory calculation based on AEMO 2016b).[11]

Whichever of these estimates are used, the benefits from changes to the requirements for grid connections are understated, because they only consider current levels of installation. Broadening nationally consistent requirements to larger and smaller connections would increase direct benefits, and lower costs would be likely to increase the number of installations of embedded generators of all sizes. Reducing the cost of installations can have equity implications – some customers currently excluded from installing their own renewable energy could afford to do so and save money across the life of the system.

11. The estimate has been calculated based on AEMO's projections for additions to solar PV installed by Commercial and Industrial customers, assuming the same average size installation and similar costs per installation as used by Energeia. AEMO's and Energeia's projections have different initial trajectories, but over a 10 year period, the number of installations assumed to underlie AEMO's calculations is around 20 per cent higher than Energeia's projection for the same period.

5.2 Impact on uptake

Increasing the number of installations and reducing the costs could create a range of further economy-wide benefits, improving energy productivity, increasing the uptake of renewable energy and contributing to national objectives for reduced emissions. Lower costs to customers increase demand: the progress of residential solar PV installations shows us just how potent this effect can be. If, for example, we take AEMO's assumptions that customers' responsiveness to price changes is 0.1 per cent for every percentage change, then for every 10 per cent reduction in installation costs achieved, the number of installations increases by 1 per cent (calculations based on AEMO 2016b). Over a 10 year period customers will install around an extra 2,100 systems, or around 86 MW of further solar PV, if using Energeia's estimate for annual installations (CEC 2016). The increase is larger using AEMO's projections, by around 10 MW[12].

Conversely, delays and costs in achieving installations reduce demand. For larger potential installations, this takes a number of forms. The connection proponent could reduce their ambition, reducing the scale of the project proposed either to address potential network issues, or in response to direct distributor feedback on an application. Or, the project may be abandoned; in the commercial property sector, project timelines and connection application timelines are still inconsistent, despite recent reforms to connection application processes. The costs of delaying a project typically far outweigh the benefits of embedded generation: time consuming connection processes directly reduce proponents' interest.

Stakeholders have also mentioned distributor requirements that directly limit embedded distribution, without taking into account the individual installation. An example is distributors' use of an absolute, undiversified capacity limit, where the total combined installed capacity of solar PV, battery and inverter installations is restricted to below a defined limit, regardless of the likely pattern of consumption and production on the customer's premise.

Informed by their experiences in other markets, customers expect behind-the-meter installations to follow rapidly after the purchase decision. Stakeholders have reported to us the difficulties confronting retailers simultaneously managing customer expectations for close-to-immediate installation and distributor processes, in some cases requiring 60 business days processing time. Managing these processes imposes additional costs on retailers and, ultimately, all customers; and the delays may reduce the potential size and growth of a currently immature market, if customers' experiences are negative in the early stages of the market.

5.3 Inefficiencies when installing in multiple locations

The current situation has obvious implications for proponents aiming at state-wide or national roll-out. The differences from one distributor to the next mean that each project will be to a greater or lesser extent unique. Designs, procurement and installation costs will all be more expensive than would otherwise be the case. Larger solar PV installations are subject to significantly longer delays than small residential installations. The delays introduce significant lags into installers' businesses relative to the pipeline for small residential solar PV installations.

Alternatively, a proponent could invest time and cost up-front to seek distributors' agreement to a common design. There is, however, a risk that the most onerous distributor requirements (or the distributor the least willing to negotiate) set the bar for all installations. This would impose unnecessary expense on the total project, and, for some projects, reduce the likelihood of the project proceeding.

---

12. In calculating the impacts, we've assumed AEMO's projections are based on current connection processes and timelines.

In the commercial property sector, high transaction costs resulting from inconsistent requirements from distributor to distributor, non-transparent and complex connection requirements and processes all remain significant barriers. This is particularly true for businesses with sites spread across different distributors. Consequently, despite high levels of ambition in the sector, commercial solar PV installations in Australia are progressing at a slower than desired rate. Projects are approached on an individual basis, even when the property owner or manager recognises the potential benefits of approaching projects as part of a wider program of work. Installation rates are slow even though rooftop solar should be a cost-effective investment for many building owners, especially those with large unutilised roof spaces such as large retail and industrial assets.

The inability to achieve economies of scale is not limited to the connection proponent. Banks and fund managers with the goal of increasing their lending to renewable energy projects see harmonisation as part of a process that shifts project financing from the current, high cost, bespoke model to a simple replicable model with a project pipeline to support efficient funding approaches. In contrast with the current model, a replicable model for project development would simplify project documentation, due diligence and securitisation, decrease financing costs and increase finance availability.

5.4 Variations in requirements reduces competition in equipment markets

The Australian market for connection equipment is not large; if local distributors adopt different requirements, the market for the affected equipment is reduced to fragmented local markets. We have heard from equipment manufacturers who choose not to compete in the Australian market, because of the costs of participation[13].The status quo affects not only the availability of products in the Australian market but also the depth of product and service offering, particularly where distributors have unique requirements. Lower product availability results in less competition, and in turn, higher costs. We have also heard from a stakeholder where Australian installations in an international roll-out of identical facilities have the unenviable position of dominating the list of "10 most expensive installs" internationally. The stakeholder stated this was largely owing to differences in cost of equipment, driven by a lack of competition in the market place in Australia for certified equipment, and reinforced by the high cost of certification[14].

Limited competition in the Australian market, combined with the high cost of certifying equipment for Australian requirements, resulted in a single available certified model in the Australian market of a specific transformer. That transformer cost more than four times the cost of the same equipment in the Japanese market. Given a limited number of expected installations the costs of certification specifically for the Australian market means there would be no payback for the customer in importing and certifying an alternative transformer for her own use. And the fragmentation of the Australian market reduces the incentive for other manufacturers to compete with the existing certified model.

In summary, installation technologies in Australia can be significantly more expensive than in other similar countries, because the choice of equipment certified to Australian Standards is limited, as a result of a combination of the small size of the Australian market, the extensive differences in networks' requirements and the costs of certification.

13. The same could be said where, for example, Standards Australia adopts materially different standards from the prevailing international standards: customers bear costs from a reduction in suppliers to the Australian marketplace, while different standards may provide no commensurate benefit to customers or the community more broadly.
14. This information was provided during stakeholder consultations.

5.5 Impact on innovation and technical change

Local technical standard setting for connection of equipment limits the ability of new models or new technologies - including those demonstrating superior performance and safety - to enter the market. Issues identified during our consultations include:

- Existing Australian Standards are slow to adapt to technical change. For example, as inverter designs change, the requirement that all small solar PV installations comply with AS 4777 shuts newer designs out of the market until that standard is updated to recognise the changes to designs.
- We are aware of businesses with more advanced model inverters who have been advised that the best and most productive route to market is through international certification, followed by Australian market entry, rather than entering the Australian market directly.
- International equipment manufacturers' decisions to participate in the Australian market are informed by the scale of the available market and the cost of compliance to specific Australian requirements. Stakeholders representing Australian technology developers have stated that the status quo restricts market entry.
- The cost of certification in Australia is high (particularly when considering the size of the market), and stakeholders mentioned instances of some distributors accepting Australian Standards as the only acceptable certification regardless of certification in other markets.
- New business models face difficulties in getting established, especially for state wide or national business offerings crossing multiple distribution businesses.

5.6 Risk of unfair market advantage

Stakeholders have also expressed concerns that as a result of the requirements adopted by individual distributors, innovation in products and services may be limited to the distribution businesses themselves - providing an unfair market advantage. We've also been told of distributors requiring extensive and competitively sensitive information about the software being installed with solar PV/battery bundles, as well as distributor requirements that seek to restrict small residential customers from exporting from the equipment installed. Similarly, we've heard concerns from businesses that there may be the selective application of distributor requirements – one rule for the distributor's own businesses, and one for connection applications by unrelated businesses.

A key question relates to whether the status quo is consistent with competition in network services provided behind the meter. In the absence of any oversight of distributors' individual requirements, it is not clear whether it is. Current state legislation provides no oversight mechanism for distributors' requirements, or the balance of safety, performance and competitive access achieved in the application of those requirements. Aside from future rule changes extending the coverage of the NER to networks' requirements, the only mechanism currently available under the NER is a dispute between a connection proponent and the network on a specific application.

Clarity on the relationship between distributors' requirements and the competitive landscape is unlikely to result from connection disputes, because customers' ability to dispute the requirements is limited; the dispute resolution processes under the NER are available only on a case-by-case basis and in relation to specific connection applications; and dispute resolution processes are only available once a connection application has been made. Projects that don't proceed to the application stage because the proponent's assessment of the network's requirements is unfavourable to the project proceeding, have no recourse to adjudication of any sort.

---

15. Some of these efforts appear poorly designed: customer undertakings not to export are difficult to enforce if the customer at the premise changes, while requirements on retailers to enter into undertakings a customer does not export are unlikely to survive a customer's change of retailer. But, more relevantly, limitations of this sort appear to be inconsistent with the treatment of small customers under the NER, and raise material questions about competitive neutrality. In prohibiting a customer exporting through their retailer or a third party, is the network effectively positioning itself as the only possible provider of this value stream to the customer?

6. Characteristics of preferred solutions

In order to minimise costs and maximise uptake of low carbon grid connected technologies, we believe that new institutional solutions are required to replace the current network-by-network process. These solutions should ideally minimise delay and reduce up front and transaction costs of installation as far as is practical, while maintaining safety and security of the network. This would be a substantial public benefit – installing embedded generation and storage can help Australia transform our energy system and reduce emissions. Harmonised requirements will make this easier, cheaper and more equitable.

We have identified some characteristics of an approach which can deliver on these objectives more so than the status quo, and we've had an early look at alternative institutional models as a guide to what this might be. In the next stage of this project, our objective is to develop alternative institutional models in line with our preferred characteristics, to develop a preferred alternative to the status quo with stakeholders.

Considering standards as providing a minimum acceptable solution or a performance based specification, rather than defining the only acceptable solution, could be a solution in times of rapid technological change.

6.1 Consistent national standard: rare exceptions

A consistent, clear and transparent national connection standard would reduce the cost and market impacts of the current arrangements, provide benefits to customers and the economy, and unblock uptake of new technologies. State-based solutions, like the proposal by Ergon Energy, Energex and the Queensland government (2016) potentially offer easier steps forward, but this proposal and other government proposals of which we are aware, do not fully address the issue - especially for businesses with a national footprint, and in relation to competition in the equipment market.

National standards must explicitly balance risks to safety and network performance, costs and wider policy objectives: There is a cost to both inappropriately high and inappropriately low standards, and the process used to develop network standards needs to recognise these costs[16]. The performance of the electricity system as a whole needs to be considered, in addition to local distributor requirements, according to AEMO's recent work on inverter settings (2016a) and its Future Power System Security Program (2016c). AEMO's initial work suggested that under certain specific circumstances current local distributor requirements may be inconsistent with system-wide requirements: for example, distributors' requirements for inverters to respond to under-frequency events by disconnecting could contribute to the worsening of system-wide performance.

The distributor may have specific requirements in particular areas characterised by poorly performing, vulnerable or old infrastructure: in our view, these characteristics should be addressed at a local level, not through a distributor-wide standard.

It's also important that network standards reflect conditions in the networks where there are a large number of connections and where the major economic activity is, that is, in highly meshed urban networks, high performing by international standards. Setting network standards based on the performance of the least well performing areas of the network would result in network requirements 'levelling up' to meet the most onerous current requirements. Our view is that the opposite should be the case: national network standards should be set at the minimum consistent with the safety and performance of networks, and areas where exceptions to those standards are appropriate should either be explicitly excised (for a period) from the coverage of the standards, or dealt with on an exceptions basis. This is the appropriate use of the test as to whether an application is safe at the proposed location, the third of the tests in our diagram in Section 4.

16. In the course of the debate surrounding the changes to connection processes in Chapter 5 of the NER, a stakeholder representative claimed it was a matter of some pride that the automatic connection threshold in the NER Schedules was as onerous as it is. To an economist, of course, a standard set so high it can never profitably be implemented is ineffective and expensive regulation, not a desirable outcome.

Technical standards in the telecommunications industry

There are alternative models available that better address questions of competitive advantage. For example, at the beginning of the telecommunication industry's transformation, the incumbent Australian network operator was the arbiter of all equipment that could be connected to its network[17]. In the telecommunications sector, the incumbent was national, which meant that economic costs imposed by its restrictions were lower relative to those currently resulting from the differing requirements among electricity distribution networks. The companies locked out of the market – equipment manufacturers in particular – were large, international businesses and the customers were represented initially by large international businesses, like Optus and Vodafone. The question – when was the incumbent appropriately safeguarding its network's performance and safety, and when were there anti-competitive implications from the incumbent's decisions – was resolved by moving the development of technical standards to an independent regulatory authority.

The Australian Communications and Media Authority (ACMA) has legislative responsibility for, among other things, licensing and regulating telecommunications carriers, certain standards for telecommunications equipment and cabling, and elements of network performance (interference, for example). ACMA's required approach to the technical standards is that the standards are the lowest level consistent with the safe performance of the network, and its enforcement program adopts a risk-based approach to its priorities.

ACMA has an accredited radio communications compliance laboratory that carries out compliance testing of radio communications devices. Its main purpose is to support industry compliance with regulatory arrangements such as the radio communications standards compliance and labelling arrangements. The laboratory is accredited by the National Association of Testing Authorities (NATA) for assessing compliance with compliance levels two and three for the full range of ACMA standards and equivalent international standards.

6.2 Minimum performance standards, set independently

Consistent technical standards for equipment would be best supported, as in other industries, by common standards supported by independent and cost effective testing and certification accepted across Australia. Standards Australia acknowledges that in relation to the representation on its Committees developing standards for the electricity industry, the representation of organisations directly representing customers' interests has dwindled over time, leaving the Committees' membership dominated by distributor representatives.

We have identified models for setting harmonised requirements supported by appropriate testing and certification. These cover the regulated solution represented by the Australian Communications and Media Authority (ACMA); the coordinated approach adopted by Australian gas networks which rely on Standards Australia's standards as the basis for industry standards[18]; and the aviation sector approach which relies on international standards and modifies them only where strictly necessary for Australian conditions.

Telecommunications and transport are regulated by the federal government, but the gas industry's approach suggests that state regulated industries can arrive at a national approach, if industry (and the local regulators) have the will to do so.

---

17. Early in the process of opening telecommunications to competition, the incumbent operator insisted on restricting connected equipment to equipment it manufactured.
18. In other markets, competition extends to the development of standards themselves, with competent organisations competing for the right to develop standards on behalf of industry organisations and regulators.

In some cases, the regulatory authority has its own testing facilities, although testing is not restricted to those facilities. In other cases, the industry body owns a testing facility, operated as a for-profit business in competition with other test facilities.

Equipment standards in the Australian gas industry

Australian gas networks share equipment standards across Australia. The current process for qualifying equipment for connection to an Australian gas network is based on Standards Australia's development of relevant standards (although there are concerns about the speed of Standards Australia's current processes, and the representativeness of Standards Australia's committee memberships). Equipment subject to a specific standard is tested and certified by one of a number of competing accredited facilities. The Australian Gas Association operates an accredited facility. Accredited facilities are audited regularly, typically by the state-based technical regulator, to ensure test procedures are appropriate. Certified equipment can be connected to any gas network in Australia.

Gas networks' safety and performance, like electricity distribution networks, is a state responsibility. However, co-ordination efforts by the technical regulators have resulted in technical regulation converging to a national model, even though state legislation differs in the powers and processes applied from state to state by the designated technical regulator.

In some states, additional certification processes have been introduced where the equipment for which certification is being sought is not expected to be installed in significant volumes. This additional certification category is a possible model for new technologies in the early stages of development, or where there are only a small number of certified products available in the Australian market.

6.3 Responsiveness to technological change

The development, adoption and revision of standards in the electricity sector would benefit from being revised to allow for more rapid turnaround times. Alternatively, the process could focus on establishing minimum requirements or performance-based requirements, rather than mandatory requirements. This would allow customers to benefit from innovative technological developments.

Discussions about work on an installation standard for small scale battery installations at a Standards Australia workshop in August 2016 highlighted the challenges of the current standards process, the pace of technological development and the potential costs to consumers (and manufacturers). One of the Committee members discussed the claims by some battery models to have technical safeguards against common risks to a household from a battery malfunction or other incidents. In the absence of a performance standard, however, the models making these claims could not be tested; and, as a result, the installation requirements for small batteries could not differentiate between equipment with or without the claimed safeguards. As a result, installation requirements are likely to be based on the least safe models. This would mean the distributor may require additional measures for all installations; for those offering superior performance, those requirements are likely to be overly onerous.

Some, but not all, batteries offer additional safety features that reduce the risk of fire to acceptable levels, for example. If the standard or a distributor does not differentiate between those with and those without these features, all batteries may be required to be installed externally in a metal fireproof cabinet. This requirement creates extra costs for all batteries installed, and stops batteries with the additional features benefitting from those features. Stakeholders' experience of amending Australian standards in response to technical developments suggests that amendment to capture industry developments will be difficult and time consuming.

There is also a need to consider the current processes for setting individual networks' requirements, which rely on individual distributors and their capacity to assess technologies and the implications for their networks. The next stage of the project will consider further whether the status quo is appropriate and cost efficient during a period of rapid technological change. This will include whether individual distributors have the capacity to keep up with the developments in the market place, and if it is cost effective for individual distributors to duplicate such activity.

6.4 Competitive neutrality

Distributors are increasingly seeking to deliver behind-the-meter services to manage demand and investment in their network as well as for commercial benefit. The risk to competitive neutrality from distributors' control of their own connection requirements and the absence of any effective oversight of those requirements, or their application, has the potential to become a significant issue.

Currently, a distributor decides whether a particular installation or type of installation is safe, subject to the local jurisdictional framework. The distributor also determines the conditions under which the proposed connection can be made, and consequently the direct cost of the connection. This allocation of responsibility may create conflicts for competitive neutrality between the distributor's regulated business, its unregulated business and its potential competitors. Given there is little oversight of distributors' technical requirements or their decision making, the current process offers few avenues to effectively contest distributor decisions. This will tend to decrease the provider's confidence that there will be competitive neutrality for potential products and services behind the meter.

The Energeia report (CEC 2016) includes a comment from one respondent to their stakeholder survey that the Ring-Fencing Guideline will ensure competitive neutrality in distributors' requirements. However, the Guideline does not discuss the potential conflict of interest from the distributors acting as gatekeepers to their networks for services with the potential to compete with their own services.

7. What next?

Gathering further evidence of impact

We will work with a coalition of stakeholders to build further evidence about the impact of identified barriers. This will particularly focus on the cost and uptake impacts, of the status quo on connection requirements. We will develop workable solutions that can be rapidly implemented to unblock barriers.

Articulating the solution

We will develop institutional and policy solutions to the issues identified through a collaborative process with stakeholders across a range of sectors.

We aim to undertake further consultation which will allow the proposed solutions to be tested with key stakeholders and refined.

We will finalise a report including a solutions roadmap in mid-2017. It will identify the key actors and their roles in enacting the solution, as well as document international examples of solutions to the identified barriers.

Building support for action

We will engage with stakeholders to present the proposed solutions and garner support for action. This will also include broader engagement with key policy makers, regulators and industry players, plus a focused media campaign. We will identify stakeholders who wish to form a coalition active role in implementing the solutions. We will run a series of forums so that coalition members can engage directly with key decision makers and clearly voice their support for reform.

Implementation and monitoring of reform

We have learnt from our previous efforts in driving change in the energy market that it takes time and effort to see things through. Once support is built, we will continue to engage with decision makers to observe implementation of the desired outcomes and monitor action on the ground to ensure that change is embedded into practice.

Project funding

ClimateWorks and Seed Advisory currently seek funding for this project, from a variety of sources and are keen to discuss this with interested parties.

8. References

Australian Energy Market Operator (AEMO) 2016a, Response of Existing PV Inverters to Frequency Disturbances, April 2016
https://www.aemo.com.au/-/media/Files/PDF/Response-of-Existing-PV-Inverters-to-Frequency-Disturbances-V20.pdf

AEMO 2016b, National Electricity Forecasting Report, National Energy Market.
https://www.aemo.com.au/-/media/Files/Electricity/NEM/Planning_and_Forecasting/NEFR/2 0 16/2016-National-Electricity-Forecasting-Report-NEFR.pdf

AEMO 2016c, Future Power System Security Roadshow presentations, 2016
https://aemo.com.au/-/media/Files/Electricity/NEM/Security_and_Reliability/Reports/2016-FPSS-Roadshow-presentation-1.pdf

Australian Sustainable Built Environment Council and ClimateWorks Australia, 2016, Low Carbon, High Performance, Sydney.
http://www.asbec.asn.au/wordpress/wp-content/uploads/2016/05/160509-ASBEC-Low-Carbon-High-Performance-Full-Report.pdf

Clean Energy Council (CEC), 2014, 2013-14 Grid Connection Experiences Survey Results, Melbourne. Task 4C.1 by CEC, 2014
http://fpdi.cleanenergycouncil.org.au/dam/cec/policy-and-advocacy/ARENA/FPDI/Grid-Connection-Experiences-Survey-Results-Report.pdf

CEC, 2016, Embedded Generation Grid Connected Standards Scoping Study, Melbourne. Task 3B.1 by Energeia, May 2016
http://fpdi.cleanenergycouncil.org.au/dam/fpdi/reports/embedded-generation-study-report.pdf

Clean Energy Regulator, 2017, Postcode data for small-scale installations. Viewed 17 January 2017
http://www.cleanenergyregulator.gov.au/RET/Forms-and-resources/Postcode-data-for-small-scale-installations#Summary-of-postcode-data

Climate Change Authority, 2014 *Reducing Australia's Greenhouse Gas emissions – Targets and Progress Review Final Report*, Melbourne

ClimateWorks Australia, Property Council of Australia and Seed Advisory, May 2015, Implementing the Connecting Generation Rule: Project Outcomes Report, Melbourne.
http://climateworks.com.au/sites/default/files/documents/publications/implementing_the_connectin_embedded_generation_rule_report_20150507.pdf

COAG Energy Council 2015, National Energy Productivity Plan 2015-2030: Boosting Competitiveness, Managing Costs and Reducing Emissions, Canberra.
https://scer.govspace.gov.au/files/2015/12/National-Energy-Productivity-Plan-release-versio n-FINAL.pdf

Energy Networks Association (ENA) and Commonwealth Scientific and Industrial Research Organisation, 2015, Electricity Network Transport Roadmap: Interim Program Report, Sydney. Viewed October 2016.
http://www.energynetworks.com.au/electricity-network-transformation-roadmap

Ergon Energy, Energy Queensland and Energex (2016) Above 30 kW to 5 MW Embedded Generating System Connection Standard for Queensland – Consultation Paper
https://www.ergon.com.au/__data/assets/pdf_file/0005/383144/Above-30kW-and-up-to-5MW-EG-Connection-Standard-Consultation-Paper.pdf

Morgan Stanley Research, 2016, Australia Utilities Asia Insight: Solar & Batteries.

Appendix 1: Summary of energy market reform processes

Who	Process	Timeline
AER	Ring-fencing Guidelines	Final guidelines published end November 2016: http://www.aer.gov.au/system/files/AER%20Ring-fencing%20Guideline%20-%2030%20November%202016.pdf.
COAG	Energy Storage Registration Consultation	Consultation paper released in 2016: http://coagenergycouncil.gov.au/sites/prod.energycouncil/files/publications/documents/EMTPT%20-%202016%20Forward%20Work%20Program_2.pdf
COAG	Stand Alone Energy Systems in the Electricity Market Consultation	Consultation paper released in 2016: http://coagenergycouncil.gov.au/sites/prod.energycouncil/files/publications/documents/EMTPT%20-%202016%20Forward%20Work%20Program_2.pdf
COAG	Finkel Review	Report to COAG December 2016 with final report early 2017: http://coagenergycouncil.gov.au/independent-review-reliability-and-stability-national-electricity-market.
Standards Australia	Energy storage installation standards	Discussion paper released for comment July 2016: http://www.standards.org.au/OurOrganisation/News/Documents/Second%20Standards%20Australia%20Energy%20Storage%20Standards%20Discussion%20Paper%202016.pdf
Standards Australia	Distributed Generation Roadmap	Discussion paper released for comment July 2016: http://www.standards.org.au/OurOrganisation/News/Documents/Standards%20Australia%20and%20the%20Future%20of%20Distributed%20Electricity%20Discussion%20Paper%2011%20July.pdf

In addition to this list, the Competition in Metering reforms are expected to commence in 2017 and the AEMC is considering a wide range of Rule Change proposals.

Appendix 2: Stakeholder engagement

Seed Advisory and ClimateWorks consulted the following organisations during this project:

ABB
AGL
AECOM
AEC members and associate members
AMP Capital
ANZ
Brookfield
Charter Hall
Clean Energy Council
Dexus
Frasers Property
Goodman
The GPT Group
ISPT
Investa
JetCharge
Lendlease
Mirvac
OakleyGreenwood
Property Council of Australia
Pro-utility
Red Energy
Scentre Group
Simply Energy
Stockland
Tesla
Vicinity Centres

During the consultations, Seed Advisory and ClimateWorks raised the following issues relating to the lack of harmonised requirements that had been brought up in previous consultations:

- Increased costs to businesses and consumers
- Downscaling of ambition
- Abandonment of projects
- Difficulties accessing project finance
- Reduced market availability of products
- Difficulties in rolling out new business models and technologies
- Limiting innovation and poor responsiveness to new technology

Organisations could either raise their own issues or were prompted with the following questions:

- Has your business experienced any of these impacts?
- What is the cost impact of current standards and processes on your business?
- What are the impacts in terms of update of distributed generation and new technologies?
- Are there additional impacts we have not discussed?

Contact us

For further information about this project, contact ClimateWorks Australia:

ClimateWorks Australia
16/41 Exhibition St
Melbourne Victoria 3000
PHONE +61 3 9902 0741
EMAIL: info@climateworksaustralia.org

Published by ClimateWorks Australia
Melbourne, Victoria,
February 2017

This report may be downloaded at www.climateworksaustralia.org

MONASH University | MONASH SUSTAINABLE DEVELOPMENT INSTITUTE

THE MYER FOUNDATION

ClimateWorks Australia is a leading, independent research and advisory organisation helping Australia transition to net zero emissions by 2050. Founded through a partnership between Monash University and the Myer Foundation and hosted by the Monash Sustainable Development Institute.