



Ms Daniela Moraes

Project Leader

Consultation on a Rule Change to Establish a Distributed Energy Resources Register
Australian Energy Market Commission

30 April 2018

Dear Ms Moraes

Thank you for the opportunity for Deakin University to provide input to the consultation on a Rule Change to Establish a Distributed Energy Resources Register.

Introduction of a well-designed Register that enables capture of accurate, dynamic data, and analysis and interpretation of that data for safety, network and consumer applications, will deliver broad benefits. A Rule Change is timely, given the rate of technology and business model development. Delays will result in an increasing number of distributed energy systems entering the network with insufficient visibility to network operators and emergency personnel.

Deakin University is particularly well placed to provide input and assist the Australian Energy Market Commission and the Australian Energy Market Operator during the consultation and implementation phases. Our research capabilities in battery technology, virtual reality training, data interpretation, renewable energy systems and energy law are recognised globally.

Furthermore, we have commenced development of a microgrid on the University's Waurn Ponds Campus, which includes over 7MW of solar generation and over 1MW/MWh of battery storage systems. As recommended by the Finkel Review, a model system such as our microgrid with over fifty separate systems, would add enormous value to the development and implementation of a Register. I invite discussion of microgrid applications and broader opportunities to assist the Commission in its work.

Yours sincerely

A handwritten signature in blue ink that reads 'Jane den Hollander'.

Professor Jane den Hollander AO
Vice-Chancellor



Attachment 1 Stakeholder feedback template

The template below has been developed to enable stakeholders to provide their feedback on the questions posed in this paper and any other issues that they would like to provide feedback on. The AEMC encourages stakeholders to use this template to assist it to consider the views expressed by stakeholders on each issue. Stakeholders should not feel obliged to answer each question, but rather address those issues of particular interest or concern. Further context for the questions can be found in the consultation paper.

Organisation: Deakin University

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Questions		Feedback
Chapter 4 – Assessment framework		
1.	Is the assessment framework appropriate for considering the proposed rule changes?	<p>In discussion of safety aspects of DER, reference is made to the safety of third parties, such as emergency workers. Restricting the assessment framework to consideration with respect to the NEO/NERO does not directly address this aspect of safety.</p> <p>Other aspects of the proposed rule change are within the assessment framework.</p>
2.	Are there other relevant considerations that should be included in the assessing the proposed rule changes?	<p>With storage systems and applications evolving rapidly, the assessment framework may be insufficiently precise (the same technology may be used for a variety of purposes therefore simply recording its presence is of limited benefit) and, in a related issue, the use of DER may change rapidly or over some time in response to commercial or technical drivers. Again, assessment against a framework that doesn't account for the dynamic, granular nature of DER will restrict benefits.</p>

Questions		Feedback
Chapter 5 – Section 5.1.1 – Benefits of a register		
3.	What are the likely uses of a distributed energy resources register?	There are too many variables associated with the range of DER available currently, let alone under development, to describe likely uses. A matrix of applications and potential usage profiles against potential use is worthy of development as this will assist in prioritising
4.	How, and to what extent, could the static information provided by a DER register meet the objectives outlined by the COAG Energy Council, namely:	
	a) more accurate load forecasting?	Further sector and technology development must occur before a clear understanding of the uses to which DER is put emerges. For example, battery storage systems can operate in many modes. Whether a battery is charging or discharging, the state of charge, the initial and aged charge rate and the customer's decisions as to how the battery is operating at any given time will all impact on how accurately load can be forecast. A static register may therefore only have narrow, limited value.
	b) improving AEMO's ability to manage power system security during credible contingency, protected and non-credible contingency events?	Not all customers nor technologies will be willing or able to participate in response to AEMO requests, even if the static register indicates that the particular technology has appropriate capability. This may be due to commercial considerations or technical. For example, although a battery system has a nominal storage/discharge capacity, the availability of this capacity cannot be determined at any point in time. Once penetration becomes greater, sophisticated data analysis of technical and customer preferences will assist in identifying confidence levels of the match between nominal parameters and actual availability.

Questions		Feedback
		As there is currently no regulatory requirement to utilise specific technologies for storage, it isn't possible for AEMO or DNSPs to remotely measure nor dictate operational requirements of individual systems.
	c) improving AEMO's ability to set the bounds of the technical envelope at an efficient level?	The size of most DER installations in domestic and medium scale commercial environments is significantly smaller than generation and storage resources within the purview of AEMO currently. Furthermore, as described above, DER will exhibit differing characteristics individually and in aggregate according to owners requirements. Setting bounds will be problematic and potentially avoidable unless a concurrent regime of technical and commercial regulation of DER is introduced.
	d) improving efficient market and network investment?	Purchase and installation of DER is generally at the discretion of individual customers in response to actual or perceived needs. In order for AEMO to improve market efficiency and network investment, customers would need to be incentive to install and operate DER with specific characteristics. A register of systems installed without this incentive is unlikely to improve either parameter.
5.	Are there any other ways that a distributed energy resources register could benefit the National Electricity Market?	A register of small to medium solar generation with accurate geolocation could benefit the NEM by improving confidence levels in forecasts. Extensive further data gathering and analysis is required to determine penetration levels before
6.	What features does a register need to have in order to meet the objectives outlined by the COAG Energy Council?	The COAG objectives seek to improve power system and network security and operation as well as the safety of third parties. To achieve these objectives, the register needs to be dynamic, accurate with respect to geolocation, technology capabilities, and historical usage data. This latter feature will allow development of a data-based determination of probable operational parameters as an input to system forecasting.

Questions		Feedback
Chapter 5 – Section 5.1.2 – Expected costs		
7.	What costs do you believe would likely be involved in the collection of useful data about DER?	Costs will depend on the data interface to DER. Manual data collection and entry will be expensive, difficult to quality check and static but is likely to be used initial installation. Ongoing costs would be minimised if standards for network interfacing were set. Privacy and cybersecurity issues will add complexity and therefore potentially cost to dynamic data collection initially until standardisation of equipment is achieved.
8.	Do you agree with the costs identified by Jacobs for different stakeholders? If not, why?	
9.	Are stakeholders able to provide data or case studies that would support further quantification (in monetary terms) of any of costs likely to manifest?	
10.	How might the nature and magnitude of these potential costs change over time?	Improvements in the data interface will reduce costs and improve accuracy. More complete, insightful interpretation of data will allow minimisation of the data set whilst meeting register objectives.
Chapter 5 – Section 5.2 – Governance		
11.	Please comment on the suitability of the following:	
	a) Should 'small scale' systems be limited to generation systems below 5 MW? Should any further limitations be imposed (e.g. a minimum capacity or a threshold in MWh for energy storage)?	<p>In most situations, 5 MW will be appropriate for residential households. Even with reducing system prices, few residential roof spaces accommodate larger systems. Battery capacity is far less certain, with current limitations set by price. It would be appropriate to review this definition on a regular basis.</p> <p>Small business are increasingly considering solar systems larger than 5MW. From a network perspective, average systems are still considered “small” but a 5MW threshold would exclude them. It would be more appropriate to define any BTM DER to be within the scope of the register.</p>

Questions		Feedback
	<p>b) Is the NER definition of 'connection point' an appropriate spatial demarcation for 'behind the meter' DER? If not, what is an appropriate spatial demarcation for 'behind the meter' DER?</p>	<p>For individual systems, from the perspective of network management, the connection point definition is adequate.</p> <p>An increasing number of systems, such as will be installed in Deakin University's microgrid (http://invenio.deakin.edu.au/30-million-microgrid-research-platform-announced-at-deakin/) will be in the multiple MW scale in aggregate but consist of a large NEM-registered generator and approximately 50 sub-5MW installations. Battery storage will also consist of utility scale and residential scale units. All of this infrastructure is BTM. Deakin University proposes that its microgrid be used as a test case for development and operation of the register for these types of installations.</p>
	<p>c) Is a 'distributed energy resource' "<i>an integrated system of energy equipment co-located with consumer load</i>"? If not, what else could it be characterised as?</p>	<p>At the current cost of DER, most systems are installed to offset load. This will not remain the case as the economics of such systems allow standalone installations, not associated directly with a customer's load. The definition should be reviewed regularly.</p>
12.	Regarding the management of a DER register:	
	<p>a) To what extent should the types and capacity of DER eligible for inclusion in the register be defined in the NER or in an AEMO guideline?</p>	<p>A broad definition should be included to capture the evolving range of DER entering the Australian market.</p>
	<p>b) Should the nature of the information being collected and recorded in the register and any other requirements, such as how often parties need to report the data, be determined in an AEMO guideline?</p>	<p>If the register consists of static, manually entered data then regular updates would add value. The period requires further consideration. However, if DER systems are automatically reporting then the frequency of reporting should be determined by further study based on data volumes and granularity required for accurate interpretation.</p> <p>Manual data collection, regardless of any realistic period, will only serve the purpose of identifying whether a DER is present</p>

Questions		Feedback
		in a particular location but have very limited value for network management purposes.
	c) What types of principles, factors or other criteria should AEMO be required to consider when developing guidelines on the collection and recording of information on DER?	The current provisions for accuracy, privacy and cybersecurity under which AEMO operates for other data collection are likely adequate. Dependant on the final structure of the register and agreed use, further consideration of these factors is required.
Chapter 5 – Section 5.3 – Data collection and compliance		
13.	How often does the data need to be collected and updated to achieve the objectives of a DER register?	General comment on Section 5.3 – a workshop which includes industry, NSOs, regulators and data specialists is worthy of conduct to establish initial settings for a register. Deakin University offers to convene such a workshop and apply its substantial data analysis capability.
14.	Do you agree that there is a need for consistency across network regions in what data should be collected?	
15.	If DNSPs' connection application processes are considered a good method of collecting data, what changes are needed to existing processes?	
16.	Should obligations on parties other than DNSPs be considered to support data collection? If yes, which parties are best placed to collect and report this data?	
17.	How would an obligation on the parties identified above best be applied and enforced? Please provide details.	
18.	Will a register be beneficial if the levels of compliance in relation to providing information are similar to the low levels of compliance with the DNSP connection application processes? What levels of compliance are needed?	
19.	How else can compliance levels be improved?	

Questions		Feedback
20.	How can compliance best be maintained over time as technology changes?	
Chapter 5 – Section 5.4 – Transparency and confidentiality		
21.	Given the nature of information that may be required to be provided by registered participants under the proposed rule change, are existing regulatory arrangements (such as the protected information provisions under the NEL and Privacy Act 1988) regarding the collection and disclosure of information adequate to protect market participants and consumers whose DER systems are included in the register?	Deakin University's work in electricity data analysis has identified novel uses that are made possible by new technology. A simple, static register that only lists minimal information about the DER is likely to be both compliant and manageable within current provisions. A dynamic, complex register will need further consideration.
22.	If not:	
	a) What are the likely nature, and magnitude, of potential consequences of insufficient protection of such information?	
	b) Should the NER limit, on the basis of confidentiality concerns, the information that registered participants or others would be required to provide to AEMO under the DER Register Guidelines? If yes, how?	
	c) Should the NER limit, on the basis of confidentiality concerns, how AEMO may use or disclose information provided to it under the DER Register Guidelines? If yes, how?	
23.	Are there any competition concerns raised by the establishment of the register?	
Chapter 5 – Section 5.5 – Safety issues and emergency response		
24.	Would the sharing of data collected under a DER register be useful to emergency services, and if so, how?	<ul style="list-style-type: none"> General comment on safety aspects – the range of DER technologies and installations results in problematic training of emergency workers. Deakin University has experienced significant customer response to its commercialised virtual reality firefighting simulator, the FLAIM Trainer (http://flaimtrainer.com) It is suggested that a training

Questions		Feedback
		environment is developed, based on information in a register, to ensure that information to emergency workers is meaningful and applicable in extreme situations.
25.	Are there existing mechanisms currently in place (e.g. requisite IT systems) that could facilitate the practical sharing of data with emergency responders on a real time basis?	
26.	Is the proposed DER register the most practical mechanism to provide emergency services with the required information?	
27.	What important features does a register need to have in order to meet the needs of emergency services?	
28.	To what extent is energy related information already shared between relevant bodies (e.g. AEMO/CER) to emergency services for safety reasons?	
Other comments on the rule change request or consultation paper		
29.	Do you have any other comments on the rule change request or the consultation paper?	Reliance on the register for emergency response and for network decisions requires accurate, current information. If this is not the case, inappropriate actions may be taken. It will be essential to consider legal and safety consequences arising from an inaccurate register.