Dr Penelope Crossley
Lecturer in Energy and Resources Law, Sydney Law School

20 September 2016

Dear Energy Market Transformation Project Team,

Submission on the Energy Storage Registration Consultation Paper

Thank you for the opportunity to comment on the Energy Storage Registration Consultation Paper (‘the Consultation Paper’).

1. Expertise in this area
As an academic and a lawyer, my fields of research include the complex legal issues involving energy storage, renewable energy and electricity market governance. I am a recognised expert in this field both nationally and internationally. In 2014, I was one of only eight international experts, and the only Australian, who presented at the IRENA Expert Workshop on the Regulation of Energy Storage in Tokyo, Japan. My research on the regulation of energy storage has been cited by the International Renewable Energy Agency in their Energy Storage Roadmap (2015). Further, I was an invited keynote speaker for the Chinese National Energy Storage Alliance on the legal issues associated with the Australian energy storage market in October 2015. I am also the Senior Industry Advisor on Regulatory and Policy Issues to the Australian Energy Storage Alliance, as well as the Chair the Clean Energy Council’s Product Listing Review Panel. I have experience publishing in this area, including an article published in March 2016 entitled ‘Is it time to establish a national register for stationary energy storage?’ 34(1) Energy News Journal 18. I have attached a copy of this article to this submission in Annex 1 for your consideration.

I propose to deal with the issues that I have identified in the Consultation Paper in the order in which they are presented in that paper.
2. Scope of the Consultation Paper

The scope of the Consultation Paper that the paper fails to specify that it is only seeking to capture stationary energy storage applications. This means that it may (perhaps inadvertently) capture electric vehicles, which have been configured to be used as a mobile form of on-site energy storage. While in the longer term there may be some benefits to capturing this data within a national energy storage register if electric vehicles are being used as a substitute for stationary energy storage, I do not believe this is the intent of the EMTPT. Nor do I believe that such a move is practicable at this time. As a result, any policy formulated in this area would benefit from the adoption of a purposive definition of ‘energy storage device’ and an explicit statement that it only applies to stationary energy storage devices.

Recommendation 1: A purposive definition of ‘energy storage device’ should be adopted.

Recommendation 2: Any policy formulated in this area should include an explicit statement that it only applies to stationary energy storage devices.

Consideration also ought to be given to the issue of whether a de minimis threshold is required before energy storage devices are required to be registered. At present, I understand that the proposal is that all energy storage devices under 5MW may be required to be registered. This could potentially capture small USB powerbanks, for whom the gravity of the risks associated with their use is relatively minor, while the costs of their registration would arguably outweigh any benefits.

Recommendation 3: Consideration be given to whether a minimum stored energy capacity should also apply before an energy storage device has to be registered.
3. Do stakeholders agree an energy storage register is needed in Australia?

As I stated in my March 2016 article:

‘The growth of distributed generation coupled with energy storage will fundamentally change the National Electricity Market. However, for storage technologies that ‘have the potential to touch every point of the electricity sector,’1 remarkably little is known about the current state of the Australian energy storage market. While we have accurate statistics for the 2.2GW of pumped hydro storage,2 we only have estimates for the both installed grid-connected battery storage systems and the off-grid battery storage systems. These estimates vary widely by source; with some Australian industry experts estimating that there are currently three times more installed batteries than the Clean Energy Council estimates. The lack of accurate data within the sector is problematic. It affects a wide range of areas including market design, system reliability and planning, fire risk management, and product recalls. It is argued that a number of these risks could be better managed, if reliable data was publicly available, possibly through a regulated national register for stationary energy storage.’3

Thus for the reasons identified in my March 2016 article, as well as those identified in the CEC’s Battery Tracking Report4 and the Consultation Paper, I support the need for a national energy storage register.

**Recommendation 4: That a National Energy Storage Register be created in Australia.**

---

1Australian Energy Market Commission, ‘Integration of Energy Storage- Regulatory Implications’ (Discussion
3Penelope Crossley, ‘Is it time to establish a national register for stationary energy storage?’ (March 2016) 34(1) Energy News Journal 18
4. Are there any other reasons energy storage data should be collected?

4.1 End-user safety and product recalls

As I identified in my March 2016 article, there is an additional need for a national energy storage register to support compulsory product recalls and ensure end-user safety:

‘Batteries have been the subject of a number of international recalls in recent years, with problems including electrical malfunction, fire risk, the risk of electric shocks and battery leakage. Historically, product recalls in Australia have had limited effectiveness, with only 39% of products recalled by the ACCC being returned.\(^5\) However, where a product poses a risk of injury to a consumer, a quality that arguably many of the previous product recalls affecting batteries possess, the Minister has the power to order a compulsory recall.\(^6\) The effectiveness of compulsory recalls is dependent on the traceability of goods so that affected consumers may be contacted. Without a national register, affected consumers may not be aware of the existence of a recall, especially if their supplier or installer fails to keep proper records or goes out of business.\(^7\)

Energy storage devices (particularly in the form of lithium ion batteries) are not like other products that may be subject to a product recall. While the likelihood of a fire as a result of a battery may be relatively low, the risk of such an event is foreseeable, especially given the experience of other international jurisdictions such as Germany. Two years ago, I was advised by a German industry expert, Wilfried Schulz at the IRENA Expert Workshop on the Regulation of Energy Storage that he was aware of at least eight house fires caused by lithium ion energy storage devices in Germany.\(^8\) Further, we also had the fire caused by an energy storage device at a residential property in Victoria.


\(^6\) Ibid, 4.

\(^7\) See note 3, 19.

\(^8\) Discussion and follow up personal email.
in early 2016.\(^9\) The gravity of a fire event resulting from a malfunctioning battery on a residential household warrants that additional measures should be adopted to prevent the loss of life, personal injury and property damage.

**4.2 Safety of other personnel who may need to work on the device or the electrical wiring on a property (i.e. non-emergency responders)**

It is important that the EMTPT acknowledges that the risk posed by energy storage devices is not limited to emergency responders but may also pose a risk to certified installers, electricians, network employees etc. who may be required to work on the property housing the system. It would be more efficient for these employees to be able to access accurate data prior to their arrival at the property so that an appropriately trained/qualified person is sent to do the work.

**4.3 Benefits from improved modelling and system security**

As acknowledged in both the CEC Battery Tracking Report\(^{10}\) and in the Consultation Paper, accurate data on the volume of energy storage on the grid will also improve system security. For example, accurate data will enable better modelling of the amount of power required to “black start” the grid in the event of a catastrophic grid failure.

**4.4 Improve recycling rates at the end-of-life and discourage dumping of hazardous waste**

If an storage device is listed on a national energy storage register, the end user can be contacted towards the end of the expected lifespan of the product and provided with options for lithium ion/lead acid and other battery recycling schemes that are available depending on the battery chemistry.\(^{11}\) The knowledge that their energy storage device is also listed on a national energy storage register may also discourage people from dumping batteries at the end of life or inappropriately grouping lithium ion and lead acid batteries for crushing.


\(^{10}\) See note 4, 2.

\(^{11}\) This could possibly be facilitated or done in conjunction with the Australian Battery Recycling Initiative who are engaged in excellent work in this area.
4.5 Improved competition

A further benefit is that more accurate data on the scale of the uptake of storage and the development of the Australian market may also encourage new entrants to enter the market, thereby facilitating competition.

Recommendation 5: That in considering the costs and benefits of creating a National Energy Storage Register the EMTPT should also consider the benefits of such a register in respect of:

- end-user safety and product recalls;
- the safety of other personnel who may need to work on the device or on the electrical wiring of the property (i.e. non-emergency responders);
- system security;
- recycling at end-of-life and the discouragement of the dumping of hazardous waste; and
- improved competition.

5. Given large-scale energy storage systems are now required to be registered as a Generator under NER, should a register be established for distributed energy storage (less than 5 MW generating capacity)?

To only require large-scale energy storage systems to be registered under the NER, would arguably undermine much of the potential value of having a national register. To exclude both distributed energy storage and off-grid storage from registration would not appropriately mitigate the risks posed to emergency services nor would it foster the full benefits that could be achieved from better market planning. An integrated register containing both the large-scale storage systems and distributed energy storage and off-grid systems should be created to ensure that there is consistency in the information contained in the register and that it provides an accurate picture of the size and nature of energy storage deployment in Australia.

Recommendation 6: An integrated register should be established to capture the data of all energy storage devices operating in the Australian market.
6. Do stakeholders agree the Victorian Case Study is an effective framework for storage emergency response?

While the Victorian Case Study provides some strategies for dealing with storage emergency response, it does not provide a complete or an effective framework. In particular, I believe that the Victorian Case Study fails to recognise that the emergency responders in rural and remote areas may be the Rural Fire Service or volunteer Community Fire Units (or their other interstate equivalents), which may not adopt the same protocols as are used in urban areas. As I stated in my March 2016 article:

‘Fire risk management

The chemical make-up of lithium ion batteries means that when placed under conditions of extreme heat and/or high pressure, they are likely to combust, release hazardous fumes, and possibly also explode. This presents a real risk in both bushfire and house fire scenarios, with emergency responders requiring specialised equipment such as breathing apparatus and different extinguishers, such as CO2, dry powder or foam, depending on the battery chemistry. Unfortunately, the lack of a national register means that when emergency responders are approaching a property, they often do not know if a stationary energy storage system is present.

Further, due to the classification of batteries as hazardous materials, once a battery has been identified on a property the protocol is that the fire cannot be dealt with by the Rural Fire Service (RFS) or Community Fire Unit (CFU) volunteers but rather must be dealt with by Fire and Rescue NSW. To put this in context, if you live in Tibooburra in NSW, the closest Fire and Rescue NSW Station is Broken Hill, some 335km away. This could create serious issues if there is a significant uptake in storage in rural, remote and islanded communities. Especially as battery storage systems are already an economically viable alternative to diesel

storage and generation systems in many of these communities. Indeed, in some of these communities there is evidence that individual households are choosing to install storage to provide them with a source of power for their water pumps in the event that the networks will switch off grid electricity during a bushfire. If there is a high uptake in rural and remote communities, decisions will have to be made about whether RFS or CFU volunteers receive training and the specialised equipment needed to extinguish such fires. However, without knowing the location of battery storage systems, not only are individual firefighters being placed at unnecessary risk, but proper regional risk assessment and appropriate resource allocation and training are unable to occur.13

In a bushfire emergency, the emergency responders may not call 000 for each and every property that they are approaching. In these circumstances, the known presence of batteries in multiple properties will likely fundamentally change the risk evaluation. Bushfire management would benefit from the development of a simple ‘Google Maps’ style app that could be used by first responders on the ground to evaluate the risks posed by a number of properties in an area.

**Recommendation 7:** That consideration be given to the needs of first responders (including the Rural Fire Service and volunteer Community Fire Units) in the context of bushfires within the Victorian Case Study.

Further, the Victorian Case Study also does not appear to acknowledge that some battery chemistries are ‘hazardous materials,’ and thus require specialised emergency response teams, equipment and training.

**Recommendation 8:** That the Victorian Case Study be amended to reflect that some battery chemistries are declared ‘hazardous materials,’ and thus require specialised emergency response teams, equipment and training.

---

13 See note 3, 18-19.
While I agree that the development of Best Practice Guidelines and Standards for signage is an admirable (and much needed) endeavour, it is difficult to evaluate their potential efficacy given the present lack of both Guidelines and Standards for signage. In the event that Standards for signage are developed, signage should be required both on the exterior of an energy storage device, and in bushfire prone areas, possibly also identified somewhere on the exterior of the property or street front.

*Recommendation 9: That COAG Energy Council support the expedited development of Best Practice Guidelines and the Safety Standards for Batteries (including those around signage) as a matter of priority.*

7. Data and access

7.1 Given the needs of AEMO, emergency response and other potential users, what is the “must have” data which should be collected?

I have had the benefit of reading the CEC’s Report on Battery Tracking. Page 4 of that Report suggests that the following data be collected:

‘CUSTOMER DETAILS

• Customer Name
• Site Address
• Customer Phone Number
• Customer Email

CEC INSTALLERS DETAILS

• Accreditation Number
• Installation Date
• Battery System Location (Eg. Shed, etc)
BATTERY DETAILS

- Manufacturer Name
- Model Number
- Cell Serial Numbers
- Battery type (SLA, gel, li-ion, etc)
- Total Battery Capacity (C10 rating)
- Cell Voltage
- Module Voltage (for li-on)
- Number of cells on site
- Battery Bank Voltage

ENCLOSURE / ROOM

- Batteries are enclosed in enclosure or room
- Building Classification/ Type under NCC
- Enclosure/ room meets Australian requirements for housing of batteries
- Ventilation has been installed to manufacturer’s instructions and relevant standards
- Main Battery Isolator is installed
- Emergency Shutdown Procedure signage is present

OTHER

- Owner has been instructed on Emergency Shutdown Procedure
- “Batteries On site” signage has been secured to prominent exterior location
- Maintenance Interval (auto send reminder to customer e-mail).

I strongly endorse this list of the data required. I would also add to the list the following requirement:

- History of any safety incidents/product recalls involving the device.

Recommendation 10: That the suggested data from page 4 of the CEC’s Battery Tracking Report be adopted as the “must have” data to be collected, along with the addition of the history of any safety incidents/product recalls involving the device.
7.2 What are the likely costs of this data and do the impacts outweigh benefits?

A thorough cost benefit analysis is required prior to the creation of a national energy storage register. However, if the data being collected is already largely required to be able to import the energy storage devices into Australia (battery chemistry, size, etc.) then it is really a question of the cost to either expand the data available in the CER database or build a new database from scratch. I understand that the CEC have priced the latter activity at approximately $300,000 upfront plus ongoing maintenance costs.

Arguably, it would not be arduous to enter the data into the database, particularly if an app was made available to certified installers to facilitate this process. In these circumstances, it is then a matter of pricing the installers time:

Installers costs approx. $110 per hour (incl. GST).

Time required to enter the data into the database (estimated at approximately 15 mins)

$110/60 x 15 = $27.50 per energy storage device (incl. GST)

Given the wide range of benefits a National Energy Storage Register would provide, the estimated additional cost of $27.50 in the context of the current cost of a residential energy storage device (ranging from approx. $4000 to $16,500 incl. GST) seems a small price to pay.

Recommendation 11: A thorough cost benefit analysis needs to be conducted to assess whether the costs outweigh the benefits of implementing a National Energy Storage Register.
7.3 What is the “nice to have” data, and does the cost of this additional data collection merit its collection?

Industry stakeholders have been heard to argue for the inclusion of the residential phone number, property owner’s mobile phone number and email address. If these details are incorporated an argument could also be made that if the property is rented, and the renter bears the onus to maintain the energy storage device, that their details should also be recorded, though this may be difficult to maintain and is likely to be uneconomic at present.

There may be an economic argument made for the inclusion of any access issues associated with the location of the energy storage device. This data would be particularly valuable for the emergency services or others such as electricians and network personnel who made need to access the energy storage device.

Recommendation 12: Consideration should be given to identifying any access issues associated with the location of the energy storage device on the register.

7.4 How would data be collected and provided to a central register?

The data should be collected by certified installers\(^{15}\) and added to the database by them. In the absence of a certified installer, such as where the homeowner self-installs (which should obviously be discouraged due to the safety implications), the homeowner could bear the onus of collecting the data and adding it to the central register. Placing this onus on the homeowner may undermine the accuracy and integrity of the register, particularly where homeowners come from educationally disadvantaged or non-English speaking backgrounds. In these circumstances, the onus should

\(^{15}\) By certified installer, I am adopting the definition used by the Clean Energy Council meaning that the installer should be subjected to an accreditation program which meets the following requirements:

- ‘Competency in nationally accredited training modules’
- Continuous professional development
- The requirement to submit a case study
- Compliance procedures e.g. Demerit points, suspension and cancellation
- Sharing of best practice procedures.’
arguably be placed on the Australian supplier of the energy storage device to ensure that the device is appropriately registered. Suppliers will have greater economies of scale and would be easier to educate about the need to register energy storage devices.

Recommendation 13: The data should be collected and added to the register by the certified installer who installs the device. In the absence of a certified installer, the onus to ensure that the data is collected and accurately added to the register should be placed on the Australian supplier of the device.

7.5 What arrangements and requirements should be put in place to ensure data is collected and supplied in a timely manner?

Accurate data collection and the timely entry of that data onto the register should be made a condition on the ongoing certification of the installer. This requirement should feature prominently in the installer’s initial training and their continuing professional development. If an energy storage device is not added into the register within one to three months of installation, in the first instance the installer should receive a written warning. Where more than two breaches have occurred within the period of certification of the installer, the installer should have their certification suspended until they have gone through appropriate CPD about the need to register devices, the registration process and got all of their un-registered installations registered. In the event of a further breach following one suspension, they could be removed from the list of certified installers.

A further incentive to register an energy storage device in a timely manner may be to make a failure to do so a criminal offence, in a manner similar to that found in Parts 15 and 15A of the Renewable Energy (Electricity) Act 2000 (Cth) (the ‘Act’). These Parts of the Act provide penalties including fines and in severe cases up to six months imprisonment.

Recommendation 14: Accurate data collection and the timely entry of that data onto the register should be made a condition on the ongoing certification of the installer. This requirement should feature prominently in the installer’s initial training and their continuing professional development.
Recommendation 15: In the event that a certified installer fails to register an energy storage device in a timely manner, there should be a system of warnings, suspension of certification and possible exclusion from the certified installer list developed.

Recommendation 16: Consideration also ought to be given as to whether a failure to register a device ought to be classified as a criminal offence and subject to penalties such as fines, or in severe cases imprisonment in a manner similar to those found in Parts 15 and 15A of the Renewable Energy (Electricity) Act 2000 (Cth).

7.6 Could a national register be linked to other databases e.g. data collected by distribution businesses?

The national register should not be linked to other databases to ensure that all of the data entered into the database is accurate and meets the standards required for the national energy storage register. However, the data collected by the distribution businesses could be used to cross-reference the data contained in the national energy storage register for audit purposes. However, for this to occur it would require the distribution businesses to be willing to share that information. From my discussions with the networks, I understand that they hold significant proprietary information which they believe is commercially valuable and thus they may not be willing to share the information contained in their databases.

Recommendation 17: The database should not be linked it other databases but the data contained in those other databases could be used to cross-reference the data contained in the national energy storage register for audit purposes, providing the information holders are willing to share that data.
7.7 Beyond AEMO and emergency response providers, what other parties should be able to access the data register and on what grounds?

A range of parties should be able to access the data register, with different levels of data provided depending on their reason for access the database. This may help to allay the privacy concerns of some consumers.

**Highest level access – provided access to all information contained in the register**
- Emergency services
- Property owners (but only with respect of their own data held by the register)
- State electricity safety regulators
- Certified installers

**Medium-level access – provided access to the agreed relevant information in the register**
- AEMO
- AER
- State based energy departments
- Distribution businesses
- Electricians
- State planning departments
- Energy storage device manufacturers and suppliers
- Worksafe (and other occupational health and safety agencies)

**Low-level access – provided access to high-level aggregated and non-identifiable data**
- Researchers/policy-makers
- Consumer advocates
- Industry associations
- Insurance companies
- Retailers
Recommendation 18: That in order to allay privacy concerns and to prevent market abuse, appropriate levels of access be given to the range of users who may seek to access the data contained within the National Energy Storage Register.

7.8 Are there particular conditions which should apply to these users?

Consumers /householders should be able to access their own data on the register without needing to submit a Freedom of Information request, which may otherwise be rejected on the grounds of commercial interest or national security. This would be particularly useful for subsequent purchasers of the property who may not be given complete information when they purchase the property.

Recommendation 19: Consumers (and subsequent purchasers of the property containing the energy storage device) ought to be able to access their own data as a matter of course and without being required to file a Freedom of Information request.

Further, the amount of data available to insurance companies and retailers who may seek to use specific information to set particular pricing or tariff structures should be limited to prevent abuse.

8. How the register should be set up?

The register should be a national energy storage register. Jurisdictional state based registers, even when working towards a national standard for the information to be collected, invariably do things slightly differently, collect data or report data in different ways, have different rules about who can access the data and how. These differences act as informal market barriers and are likely to reduce the level of transparency, and usefulness of the data collected. It will also make planning in the NEM more difficult as AEMO will be forced to try and collate large volumes of data from numerous state registers. A further issue is that state based registers have the disadvantage of duplication of activities and resources but if they were to work using a national energy storage data collection standard, there is also no guarantee that all of the jurisdictions would cooperate and implement it. (See the issues with the NECF as a case in point).
Recommendation 20: The register should be set up as a single national register rather than multiple state-based energy storage registers.

Given that the vast majority of energy storage systems are likely to be attached to existing or new solar installations, it would make sense to take advantage of the economies of scale and simply expand the existing CER solar database. One of the challenges from such an undertaking is whether sufficient incentive exists to encourage people to register their energy storage devices in the absence of subsidies or other financial incentives such as those that exist in Germany.\textsuperscript{16} However, this challenge could be easily overcome by placing the onus on certified installers who have both the knowledge and experience to simply implement the registration of energy storage devices, with sanctions applicable when they fail to meet this requirement in a timely manner.

Recommendation 21: The most logical “home” for the register is to expand the CER’s existing STC register to take advantage of the synergies between solar and storage and the economies of scale.

I further note that the Consultation Paper raises the possibility of the Renewable Energy (Electricity Act (Cth) 2000 needing to be amended in order to enable the Clean Energy Regulator to fulfill the role of housing a national energy storage register. I have carefully reviewed this law with a view to understanding the amendments that may be required in order to provide the CER with this power.

The objects of this Act as it presently stands are to:

‘4. The objects of this Act are:

(a) to encourage the additional generation of electricity from renewable sources; and

(b) to reduce emissions of greenhouse gases in the electricity sector; and

(c) to ensure that renewable energy sources are ecologically sustainable.’\textsuperscript{17}


\textsuperscript{17} Renewable Energy (Electricity Act (Cth) 2000, s.4
It is arguable that if one of the purposes of a national energy storage register is to facilitate the use of storage to enable additional generation of electricity from renewable sources then these amendments could be made without amending the objects of the Act. Further, the other amendments to create the national energy storage register could simply be made by introducing a new Division 6 “The register of energy storage devices” into Part 13 “Registers” of the Act.

Recommendation 22: That a new Division 6 “The register of energy storage devices” be inserted into Part 13 “Registers” of the Renewable Energy (Electricity Act (Cth) 2000 to provide the CER with the power to create and manage the National Energy Storage Register.

9. Other registration requirements

9.1 Should relevant jurisdictional licensing frameworks be reviewed and amended to require registration of energy storage devices?

Yes - this would be an area in which the laws and jurisdictional licensing frameworks should be harmonised to remove the imposition of state-based market barriers.

9.2 It is understood that off-grid distributed generation, including energy storage, is not currently captured under both national and state/territory registration frameworks. Should consideration be given to registration of off-grid storage systems for emergency purposes or other uses?

Off-grid storage systems present many of the same risks as on-grid storage systems particularly in relation to the emergency services, end-user safety and recycling at end of life. Equally, many of the benefits associated with registering storage such as facilitating product recalls, better market planning, and improving competition in the market are the same for on-grid and off-grid systems. Given the relatively low cost per storage device associated with establishing a national energy storage register compared to the potential gravity of the harm posed to an unsuspecting emergency services worker or volunteer in a fire situation, it seems unconscionable to exclude off-grid systems from such a register.
Conclusion

In short, I strongly endorse the creation of a National Energy Storage Register and would be happy to assist in the further development of the register and any associated changes to the existing law and policy in this area. Should you wish to discuss any of these issues further with me, I may be contacted either on (02) 9351 0388 or alternatively, via email at penelope.crossley@sydney.edu.au.

Yours sincerely

Dr Penelope Crossley