



13 June 2017

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**Consultation regarding the National Battery Storage Register Cost-Benefit Analysis -
Submission from *The Customer Advocate***

Dear Transformation Team,

Thank you for the opportunity to provide a submission regarding the National Battery Register Draft Cost-benefit Analysis report. Jacobs and the EMPTP are to be commended on the comprehensive and detailed report.

Please accept my apologies for the lateness of this response, and I trust it is still of value to the team.

The overall objective of gathering more detailed and complete information regarding Distributed Energy Generation is supported.

At the outset, the title of the work 'National Battery Storage Register' appears somewhat misleading. The underlying AEMO report 'Visibility of Distributed Energy Resources' and the many references in the consultation indicate that this work is intended to incorporate new solar PV installations, and preferably as much data as possible about the existing 1.9M solar PV installations in Australia. To this end, the scope of the work and associated CBA should clearly state the intention to include PV and rooftop generation, not just storage.

Secondly whilst the provision of a single DER database is important for market purposes, DNSPs and others also share responsibility for network performance, efficient capital investment and fair tariff allocations. The demand management functions of storage are of interest to retailers and aggregators. The establishment of database needs to clearly consider the realities and inherent cost implications of duplicated data repositories, parallel accountabilities and fragmented interests. Consideration of how data could be shared to avoid multiple collection and the inevitable discrepancies to lead to the efficient outcome of 'do it once, do it right'. It is very possible that the discounting of a data architecture that shares information across multiple sources and 'rolls up' to a summary level to meet AEMO needs may be premature

Finally, and most importantly, support for such a system must exist in the customer and installer arena, as these are the people who are responsible for providing the majority of the data, and who will ultimately be bearing the cost of the initiative. The CBA would benefit greatly by recognising energy consumers, owners of DER and installers of the systems as key stakeholders, and take their point of view in assessing many of the benefits.

The central theme of my response is to ensure that we embark on this work with an awareness of the realistic costs, consumer impacts and actual benefit of such a database, and proceed with a clear understanding of the practicalities and risks associated with such a significant undertaking. The central theme of an 'app' to collect the data is powerful, however related costs of ongoing data quality maintenance, the provision of the data to the many interested users, legal implications and the effort to enlist support of those required to supply data appear grossly underestimated.

My comments are based on experience in a large utility when establishing electronic application processes for renewable generator connections, the provision of data under the National Electricity Connection Framework, and as manager of an emerging Data Analytics capability.

Thank you once again for the opportunity to provide feedback. I am always happy to discuss these issues should that be useful.

Regards,

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General Comments on the CBA Report

- 1 Customers and the installer industry should be considered key stakeholders of this analysis, as they are critical in the acceptance of the scheme, the costs of which are ultimately borne by customers, and the primary source of timely and accurate data. The perspective of the customer as a significant and influential stakeholder and beneficiary is critical in managing the risks and costs of such an undertaking. The CBA would benefit significantly from being framed from the customer perspective.
- 2 The initial position of the CBA is that there will be one database to serve a range of largely disparate objectives. Some of the objectives, such as consumer safety and product liability may be better served by separate, more targeted and efficient actions, and as such should be considered in the CBA.
- 3 The CBA appears to significantly understate the cost and complexity of 'feeding' the database with timely, accurate and complete data; especially as the required data will come from multiple sources, not just installers. Most of those required to supply the data are unlikely to directly benefit from its existence and as such will see providing the data as an 'overhead'; and as such the quality and timeliness of the data provision will be questionable. This should be reflected in risk analysis in the CBA.
- 4 It is most likely that the application of such a database will expand, particularly as an enabler of the commercial interests of demand aggregation. The costs of data security, commercialization and access will quickly become of concern and should be considered.
- 5 Other than energy metering, this database is the first proposal to nationally aggregate significant data pertaining to customers' electrical equipment 'behind the meter'. This is uncharted territory in the proposed extent, detail and support from consumers. There are significant risks to be mitigated in the acceptance of such a database, which should be reflected in the CBA.
- 6 For data that is held at customer / NMI level, much of the data will be very dynamic, as network configurations change, customers will move house and use their DER differently, change tariffs and therefore usage behaviour will change, and equipment will be upgraded and replaced. The cost to maintain the appropriate data in a timely and accurate manner should not be underestimated.
- 7 The CBA is not clear as to highlighting the incremental costs and value of a national central repository of all storage (and PV?) systems against the background of existing arrangements where costs and benefits are already in place. The way the Jacobs proprietary forecasting models relate to the analysis is not clear.
- 8 Some of the benefits of the database may efficiently be achieved through the promulgation of effective equipment, performance and installation standards, without the need for central recording and data maintenance of many storage systems that are set up purely to manage the customer's exposure to the cost of peak energy. Such simpler, but perhaps less elegant, options should be considered in the CBA.
- 9 The CBA does not take into account a risk analysis on issues such as data quality, possible cost variations and the like.

Specific feedback on the CBA Report

1. Customers must be considered as the ultimate stakeholders of the database.

- a) The establishment of the database must clearly consider the customer position, and identify and articulate the value and cost of the initiative to the customer.

Without the support and 'buy-in' from customers and the installation industry, the cost to obtain, maintain and support accurate data will be significant, and will place the CBA analysis in question.

As the data will reflect consumer installations 'behind the meter', the purpose, benefit, supportability and cost of such a database facility will be very dependent on the level of understanding and support from energy consumers, in an environment where trust in the industry is not high.

The CBA would benefit greatly by taking a consumer point-of-view, or, at least, consider consumers as key stakeholders (Table 1).

- b) The CBA risk analysis should reflect the experience from rooftop PV, where data accuracy, timeliness and auditing is dependent on installers and the incentives to 'do the right thing'.

As the database is intended to reflect largely behind-the-meter data, the support from customers and the local supply and installation industries will have a major influence on the availability, accuracy and timeliness of the information.

- c) The cost and benefits identified in the analysis should be relevant to the consumers who will ultimately be paying for the service.

In this environment of energy prices and trust in the energy industry, the cost and ultimate success of the proposal hinges on framing the proposal and CBA in the terms of benefit to all energy consumers.

2. The CBA should consider the cost and feasibility of using existing alternative mechanisms for non-AEMO functions

Product liability, one of the three key objectives of the data collection, is already a well-understood and proven commercial and customer mechanism; for example, vehicles, telephones and household appliances such as washing machines. The supplier has a vital legal and reputational interests in monitoring and maintaining their product reputation, and has the greatest to lose in the case of failure.

In addition, the forthcoming AS 5139 Installation Standard will complement the product liability and whole-of-life responsibility of suppliers of energy storage.

The CBA should consider whether the objective of product safety obligations, liability and recall could be delivered more cheaply and effectively through the enhancement of existing product warranty and liability obligations.

The comment in table 1 '*Presently manufacturers do not have a means to undertake product recalls*' suggests clearly that a wider and more significant consumer protection issue is to be addressed.

3. The emergence of high-value demand aggregation functions should be considered in the CBA

Most recently highlighted in the Finkel workgroup recommendations and in comments by AEMO, demand aggregation and wider DM services will become prominent in the market landscape. It is likely that private market entrants will see the data held in the proposed database as being of very high commercial value.

It is acknowledged that the CBA does touch on this issue, however matters of data privacy, access, possible misuse and realisation of commercial value will need to be considered more thoroughly.

4. Detailed comments on the CBA report itself

In the interest of a supportable and accurate document, the following comments are offered.

2.1 Primary Objectives

- The statement 'protect the safety of consumers, line workers and installers' is hard to justify, especially in how the database would enhance existing product and installation safety obligations. Also, network staff have no exposure to 'behind the meter' equipment, and as such will not benefit from the data in the area of safety. The key issue for network safety is the inverter, which is already recorded under distributor connection obligations, and inverter isolation requirements which are already well-expressed in connection standards. The role of the database in enhancing the safety of installers is also unclear, especially in light of existing obligations for training, product familiarization and installation standards.
- The discussion regarding the difficulties to ensure accurate and timely data collection are supported by harsh experience. As incentives to 'register' fell away under PV, especially as feed-in tariffs were removed, the quality of data and information fell as well. This highlights the difficulty of requiring registration through legislative requirements alone, and should be reflected in the CBA. Such difficulties in maintaining quality data will be highlighted as rule changes push metering away from distributors and into a more commercial arena.
- The box 'impact on study' understates the complexity and buy-in needed from installers and customers to ensure accurate and timely information collection. If there is nothing in it for the installer, then it will always be a 'grudge purchase.' The suggestion of a standardised national process for the registration of storage is commendable, but experience in every state suggests significant costs in training, compliance and support will be needed.
- Figure 1 (p19) – note that 'Form A' is largely peculiar to Ergon Energy and SAPN. The more generic term in the industry is Electrical Work Request (EWR). The data captured varies widely across states, as does the process and who is involved. For instance, installations under 5KW capacity in most states are not subject to assessment. Victoria includes inspection and issue of a 'Certificate of Electrical Safety' (CES). BY the end of the year, in most states, the meter replacement will not be always undertaken by a distributor's representative, and the voltage and defect check is not guaranteed. In essence, the responsibility for much of the data collection to the extent required in the draft proposal for the database will fall on the equipment installer.
- (p19) The likelihood of a battery storage installation being undertaken without the involvement of a licensed electrical contractor is very low. All storage installations that produce mains voltage require an inverter, which is mains voltage equipment. One exception may be the

installation of storage to an existing hybrid inverter, where the only connection to be made may be at low voltage in some cases.

6.1.3 Enhancing existing systems

There are a number of statements here that do not reflect a fair and open-minded approach to the costs and benefits of a consolidated database. For instance:

- DNSPs do, and will continue to, maintain their own registers of embedded generator connections. Even with a separate AEMO database, it will be important that the DB databases are consistent and aligned with the central one.
- Over time, it will be important for distributors to also capture some battery data not only for connection approval purposes but also for tariff analysis and low and medium voltage network planning in a manner very similar to the network capacity planning undertaken by AEMO. The question then is, will DBs duplicate the data capture processes and augment their own data connection systems, or defer the data capture process to AEMO ?
- The advantages and disadvantages (table 5) should reflect the disadvantages and costs of multiple data entry by installers and the issues associated maintain multiple independent databases with similar information.
- The same regulatory mechanisms and incentives proposed in the draft CBA would enhance the quality of the distributor's data.

Just for clarification, it is useful to note in this section of the Draft CBA report:

- I do not believe there are any customers on an 'extra low voltage systems' that is other than a single, off-grid installation, where capturing battery data is of very limited value.
- The statement that installations below 2.5KW may not require a licensed electrician is incorrect.
- The disincentive to notify of augmented DER due to the loss of FiT applies in all circumstances, not just under s 6.1.3.

6.3 Choice of database host.

The selection of AEMO as the most appropriate agency to host a register is supported. The challenges highlighted in Table 1 are by no means trivial, as noted elsewhere in this response. Some of the advantages also need to be considered critically, such as:

- Not being subject to government funding opens the question 'who pays, and how ?'
- The fact that AEMO requires all the data at such granularity is debatable. None of AEMO's planning and operation functions require visibility of individual customer installations, and to collect customer data regarding 'behind the meter' installations is unprecedented.
- The parallels between AEMO's management of meter data and the information inherent in the proposed application present obvious advantages, however it is important to note that AEMO does not use individual meter data for any market-level system planning or operational purposes.

2.3 Information Requirements

The consultants have quite rightly highlighted the need for a wider form of data collection.

The use of a mobile application is attractive technically, however establishment of a data collection 'app' will quickly lead to the issue that installers are already required to handle installation data multiple times –including for the REC allocation and again for connection approval. As noted in s5.4 of the CBA report, the issue of the cost and loss of efficiency and risk to accuracy in asking installers to provide data for the database 'another time' will need to be addressed.

Duplication of data will need to be considered, where the three key data repositories – DBs, the CER and this database, arguably hold the same data. Keeping these sources 'in sync' will be challenging and will come at a cost.

Looking at the data required, it is very unlikely that an app would satisfy all data needs. Should the data collection by 'app' be pursued, it must be noted that:

- The installer may not be aware of the customer NMI
- The installer will most likely not be aware of any export agreement the customer may have.
- The way the battery is used by the customer, and hence its impact on the network, will not be evident at the time of installation.
- The customer contact details provided by the installer may not be consistent or in the same format as that with that held in other market systems such as MSATS or retailer data. Which is correct ?
- The data maintenance for the drop-down options may be significant as new equipment is added and removed.

Installers (or most of them, anyway) are already familiar with this process and recognise it as a necessary step in installing a system. In most DNSPs this process of application is automated, and presently collects as a minimum:

- NMI, address, installation date, inverter capacity and make details (from CEC database).
- Inverter protection settings and approved export limit are available as part of the connection agreement conditions. (refer NECF Ch 5A and other MEG connection requirements)

Decommissioning data would be very unreliable, just for the fact that telling a regulator that you turned it off and sent the battery to scrap will be the last thing on the list for the customer.

It could be realistic that the DNSPs could enhance the data collection facility to collect the following:

- capacity (is that of the inverter, or the battery, or the PV, or export rating ?)
- information regarding the battery (make, model, capacity, location).

In fact, I would expect that most DBs are planning such enhancements to fulfil their own obligations of network planning and operation. In the option analysis, the cost of such enhancement should be considered as 'draw-forward' rather than a stand-alone cost.

The existence of aggregated control and DMS contract arrangements will need to come from either the customer or the DSM agent, as neither the installer nor the DB will be privy to that information.

Linking NMI to contact details is tricky. Distributors are reliant on retailers, who hold the customer relationship, to provide details such as name, phone number and email to link to the NMI. Often, this information, which is provided through AEMO's MSATS, is incomplete.

The outcome is that the data will have to come from a range of sources, and its collection will be very expensive to facilitate. Recommendations are:

- critically review and minimise the dataset for absolute necessity
- try to source data from the existing DNSP connection approval process wherever possible
- Use data matching, such as determining chemical composition from make / model data
- Beware a regulatory approach to require reporting. Such an action will then require consideration of compliance auditing, penalties, training. Most states require a separate efficiency test as part of regulation change, such as the Qld Office of Best practice Regulation – an important yet long and arduous process.
- Consider any options that may exist under the NER CH5A MEG connection process to enhance data collection. Again, costs to DBs will be significant.
- Look for ‘carrots’ for the reporting, where the installers and other data providers receive some form of benefit for providing the data, such as the offer of standardised connection and approval processes, fast track assessments or more generous export benefits.

3.2 General Assumptions

The CBA assumes 100% capture of new PV and batteries, which experience shows is unlikely, as supported by anecdotal evidence from Queensland.

The assumption that 80% of new batteries will be installed at the same time as PV should be clarified.

As many customers are receiving feed-in benefits less than consumption tariffs, and should tariff reform proceed as expected, the majority of battery installations are likely to proceed at premises with existing solar PV. Some customers will choose hybrid inverter systems, others will opt for AC coupling. Each has quite different performance characteristics in respect to network impact. The type of coupling – AC, hybrid or UPS – is important to collect as part of analyzing the network impact of the battery.

Note that most distributors set an export limit around 5 kilowatts for embedded generators, whether they be PV, battery or hybrid.

In relation to data audits, it’s not just the cost of the audit, it’s the rework for any errors that are found that costs.

4.1 Data collection costs

For this information, it would be most appropriate to get the views of a sample installers as to the time taken, the processes and ease of access of the required data. It’s hard to imagine that utilities have a clear line of sight as to how installers do their work.

The forecast volume of these activities is not clear in arriving at the total costs. I presume that is where the complex forecasting processes noted in the appendices are incorporated, but the actual numbers used in the calculation are not evident.

4.3 Total Costs

Providing a database for national capability, developing data collection tools, testing, commissioning for around \$1M seems very low, based on experience for other systems such as automated connection applications. Validating these costs is critical.

The cost estimate has little detail about the capacity, performance, operational expectation and access to the database, so it's hard to comment; rather to say that the estimated cost of a system that could potentially store data about 2M customer sites and potentially the same number of storage systems, that can be easily updated as information about customers, installations, new equipment and network connectivity changes seems incredibly low, especially if it contains training for the country's installers.

For credibility, that estimate needs to be supported by more data as to what the system does now, how it needs to be changed and how that cost was arrived at. Industry has many, many examples of underestimating the cost of IT systems, and for this proposal to be supported this cost must be clarified with more rigour.

Similar data is required for the issues of data O&M, system hosting, data validation and data alignment.

The cost of \$6.97M for data collection will be carried by installers and passed onto customers. What is that cost per installation ?

4.3 Quantitative benefits

The way the benefits have been arrived at is not clear.

The nature of the benefits, particularly in the wholesale market, do not reinforce the requirement for individual, NMI based, near-real time data as proposed. It appears that the capital infrastructure costs could be realised with better forecasting of the uptake of DER, not with the register, and data aggregated by region or node.

The network benefits are an incentive for the networks themselves to improve their data collection, with benefits reflected in EBSS and CESS. The approach to storage as a DM function for contingencies, planning and investment through mechanisms such as tariff design, DM incentives and local DM agreements are related to this benefit, and it is hard to see just where the 11.6M comes from as a result of the register alone.

Do the 'without register' benefits assume no knowledge of DER implementation ? If so, then the results are questionable, because we do actually know a fair bit about the DER, perhaps not to the level of accuracy and precision suggested in this project, but a fair bit about where, how much and how it performs all the same.

4.3 Qualitative benefits

See above about the costs to implement, enforce and support regulatory change. It takes a long time, it's expensive and is certainly no guarantee of success.

Again, the benefit of market operation does not support the detailed, granular database. The benefits to AEMO arise from data that is at least regional, perhaps postcode in granularity, and the CBA should try to justify the proposed data architecture, volume and application. The way it reads, the needs could be satisfied by weekly downloads of .csv files from the distributors, most of whom could do pretty cheaply.

Safety –it is very hard to put a benefit on this. The database being held by AEMO immediately puts a level of onus on AEMO to use best endeavours (is that enough, given the stakes ?) to maintain the quality and accessibility of the database. Is AEMO prepared to take that responsibility ? At what risk ? Have we a legal opinion on this ?

Similarly for recall – should the solution be to put the onus on the manufacture, as in so many other industries ?

Low benefit regarding safety of line workers – agreed.

8. Conclusion

The CBA should recognise the cost to use the app as a means of populating the DB databases, however the issue is that the DBs seek the data largely as an approval process before installation proceeds. The proposal should show how the data capture would practically align with the field process. Again, installers should be consulted as part of the CBA.