# Clean Energy Council submission to the

# Assessing DER integration expenditure

The Clean Energy Council (CEC) welcomes the opportunity to provide feedback on the Australian Energy Regulator (AER) Consultation Paper on Assessing DER integration expenditure.

The CEC is the peak body for the clean energy industry in Australia. We represent and work with hundreds of leading businesses operating in solar, wind, hydro, bioenergy, marine and geothermal energy, energy storage and energy efficiency along with more than 6,500 solar installers. We are committed to accelerating the transformation of Australia's energy system to one that is smarter and cleaner. We have a co-regulatory role, managing voluntary industry codes in conjunction with the Clean Energy Regulator (CER), the Australian Competition and Consumer Commission (ACCC) and various state and territory government agencies.

We welcome the AER's recognition that,

> "The offer of zero-export or significant augmentation do not represent a long-term sustainable solution to the continuing deployment of consumer DER"

However, we strongly suggest positively incentivising the network to integrate more DER on the grid through AER's capex and opex proposal.

The approach outlined in the consultation paper appears to be in its early stages, with some key decisions yet to be settled. For example, the proposed framework does not include a methodology for assessing the value of customer exports of electricity. This should be an important component of the cost benefit analysis. The CEC would recommend as a starting point, the Victorian Government's methodology for determining feed-in tariffs. It has the benefit of including a value for avoided greenhouse gas emissions, as well as the other benefits such as the value of electricity on wholesale markets and other avoided costs. It would be remarkable and extremely disappointing if the approach to cost benefit analysis of distributed energy resources (DER), which are primarily zero emissions energy sources, were to place no value on avoided greenhouse gas emissions. Industry places a shadow price on carbon emissions in its own risk assessments and cost benefit analyses for investment decision making. The AER should adopt the same approach. The CEC also like to recommend adopting Australian Energy Market Commission (AEMC)'s Electricity Network Economic Review Framework (ENERF) in AER's modelling and framework. The ENERF recognises existing gaps within the general regulatory framework and outline actions/ reforms need to fill these gaps.

Numerous reports have cited opportunities for innovation in network management and operation which integrates DER in a way to reduce future network and operating costs. However, current AER assessment approaches largely disallow innovation for the future grid while at the same time encourage traditional planning and renewal approaches as well as stable, benchmarked opex outcomes. We encourage setting guidelines and signalling network to invest in more DER expenditure. Positive incentives should be given to set expected targets of the network to invest in new technologies and innovations. Good examples would include encouraging projects such as South Australian Virtual Power Plant (**SA VPP**) comprises of installation of 1,000 energy storage systems installed behind-the-meter in homes and small businesses. Also, with increasing deployment of DER the DNSPs might have

to improve some aspects of their operation from transporting electricity in one direction to transporting electricity in multiple directions. This will increase efficiency access of DER and benefit the whole system. The AER should support and incentivise such improvements in the DER network.

We welcome the AER's support in the draft determination for the low voltage (LV) component of the SA Power Networks Regulatory Proposal. However, we are disappointed that the general approach to expenditure appears not to have kept up with the latest thinking. As outlined by the Australian Energy Market Commission (AEMC), the network regulatory framework currently imposes no consequences on distribution network service providers (DNSPs) for constraining off DER generation and similarly provides no benefits for increasing DER hosting capacity where this is in the long-term interest of consumers. The AER should be using its regulatory powers to hold accountable those DNSPs that have not demonstrated the steps they have taken toward improving network DER hosting capacity. There is an urgent need to develop metrics for measuring hosting capacity and frameworks for DNSPs to report on the steps they are taking to enhance hosting capacity and enabling exports of zero marginal cost DER generation.

The DNSPs act as natural monopolies, however AER could try to increase competition within the industry with the help of the private sector. The private sector could provide the same services e.g. improving hosting capacity which could increase competition and reduce cost. The regulation should be centred on outcomes that maximise benefits to all consumers and designed to promote innovation and competition and increase the efficiency of the whole energy system. DER integration expenditure decisions should also be reviewed more regularly than once every five years. This will help regulators to keep up to date with new policy and evolving technologies.

The main modelling technique uses historical data to forecast future outputs. Although past information is a good starting point to predict future outcomes, forecasts also need a forward-guidance factors incorporated into the model. The impact of climate change and bushfires demonstrates why we cannot assume the future will be like the past. Replacement capex scenario analysis and risk assessment of expenditure forecast / modelling should include scenarios under climate change that, until recently, have been outside all Australian experience. Risk modelling could improve the assessment of alternative options and take account of the high impact events of low but increasing probability, such as the extreme bushfire events Australia is experiencing now.

To gain positive outcomes in the energy sector requires cooperation and collaboration from all parts of the industry. We would be very happy to discuss these issues in further detail. We look forward to contributing further to this review.

## Responses to Questions raised in the Consultation Paper

## Question i

*Are our assessment techniques outlined in our Expenditure Forecast Assessment Guideline (the EFA Guideline) sufficient to assess DER integration expenditure?*

The CEC considers that the AER's Expenditure Forecast Assessment guideline is insufficient to assess DER integration expenditure.

We suggest direct incorporation of Electricity Network Economic Review Framework (ENERF) into EFA guidelines, which seems to recognise serious gaps that exist withing regulatory framework of the electricity Network. We also suggest that EFA guidelines should be revised to directly incorporates guidelines on DER integration rather than treating DER integration guidelines separately.

There is gap in model framework due to the absence of guidance on the methodology for valuing exports into the grid. As a starting point we suggest the adoption of Victorian Feed-in tariff (FiT) methodology.

The AER notes that when a DNSP's total capex or opex forecast is greater than what the AER estimates, it may reject the DNSP's estimate and "substitute our own estimate that does reasonably reflect the expenditure criteria". The AER relies on internal benchmarking and modelling processes to create estimates. However, given the relative novelty of DER integration expenditure, it is unclear how the AER will develop benchmarks and the data on which it will draw. We therefore urge continued industry consultation as the methodology for benchmarking DER integration expenditure is developed.

The AER's modelling and benchmarking approach will be made more difficult by the lack of good baseline data on DER integration. The consultation paper notes, for example, that the AER models and benchmarks capex productivity changes. This benchmarking technique is efficient in comparing new values to a base year, but it might not be accurate to predict future capex changes just based on past expenditure outcomes (especially pre-2015 expenditures with low DER) as this will bias DER integration expenditure forecasts.

Historical trends for replacement capex may be a very inaccurate basis for predicting future asset replacement, especially in the face of climate change and the increased risk of extreme bushfires. Replacement capex models should include consideration of the risk of extreme, high impact natural disasters.

The EFA Guidelines use revealed (past actual) costs as the starting point for assessing and determining efficient forecasts. It assumes "actual past expenditure should be a good indicator of the efficient expenditure the NSP requires in the future". However, this approach is questionable given the newness and rapidly changing nature of DER. A forward-looking guidance / policy target component should also be incorporated into the modelling and forecasts.

The EFA Guidelines states the AER will, "Assess the efficiency of base year expenditures using our techniques, beginning with economic benchmarking and category analysis, to determine if it is appropriate for us to rely on a DNSP's revealed costs". Although economic benchmarking and category analysis has its benefits it still has some weaknesses. For example, how to determine which year to be the base year in the first place. If the based year values are unreasonable then the whole future forecast of DER integration expenditure will be inaccurate.

## Question ii

*What form of guidance should we include to clarify how our assessment techniques apply to DER integration expenditure? For example, should we update the EFA Guideline to be more prescriptive, or only include principles to allow for greater flexibility in our assessment and information requirements as DER integration matures?*

The EFA guidelines with respect to DER integration will need be flexible or capable of being updated regularly to account for changes in costs and technology. The DER expenditure model should not be based on extrapolation of past trends. Incorporating ENERF into EFA guidelines will provide a solution to these problems as it recognised importance of fast evolving technologies and cost changes within the DER network.

Guidance should be given on the value of customer energy exports, for use in the cost benefit analysis.

## Question 1 – Information provision

*What information is reasonable and necessary in identifying and evidencing the impact of DER on the demand for standard control services and hence on maintaining the quality, reliability or security of supply of standard control services?*

EFA guidelines for assessing demand forecasts point to the use of "raw (historical) peak demand, weather corrected peak demand at different probabilities of exceedance, coincident peak demand, non-coincident peak demand, power factors, coincidence factors, economic indicators and forecasts, temperature measures and forecasts". In addition to these factors, data and information on localised demand and geographical factors might also help improve these analyses.

The impact of DER on the demand for standard control services should take account of changes in technology. For example, an inverter installed after the introduction of AS 4777.2:2015 can provide grid services such as Volt-Watt and Volt-var response. Impacts of DER should be able to be segregated into different time periods based on the capability of inverter technology and at what point that capability was mandated by DNSPs as a condition of grid connection.

We also support Victoria Essential Service Commission (ESC) proposal for publication of voltage on network. This proposal will increase the quality and reliability of the DER network by improving transparency to consumers.

AEMO/ ENA Open Energy Network project (OpEN) has recently published a required capabilities and recommended actions report which presents key functions required by Australian electricity system to improve safety and reliability which benefits all customers.

## Question 2 – Options analysis

*What range of options should DNSPs consider for DER related investments? Does the Regulatory Investment Test – Distribution provide the appropriate starting point for this analysis*

Most of the options and cost benefit analysis for DER related investment is based on quantitative analysis/ net economic benefits. However, it is important to account for the net non-economic benefits of each options. For example, the net social benefits of each option and if the net economics and net social benefits outweigh the net economics and social costs of each option.

For risk assessments using repex models, sensitivity analysis and augmentation analysis, incorporating models such as Monte Carlo simulations to assess risk of each option could be a good starting point.

might also be options not included in the Regulatory Investment Test, such as the changes to voltage standards proposed in the current review of the Victorian Electricity Distribution Code. Systemic

changes such as this should be considered in the assessment, even if they are decisions beyond the power of the DNSP to make.

The ENERF framework together with Regulatory Investment Test could be considered for DER related investment. The hosting capacities need to be improved competitively which could increase the efficiency of the DER network and benefits customers in the long run.

Benchmarking against DNSPS outside of NEM could be an option to compare relative DER investment.

## Question 3 – Sampling and modelling

*Electricity networks have utilised sampling and modelling techniques to forecast energy demand and consumption for decades. These processes have proven affective for large cohorts of consumers where diversified behaviours can be predicted with sufficient accuracy. Is it reasonable to assume that sampling and modelling techniques will play a part in developing dynamic models of the electricity networks?*

Sampling and modelling techniques will be necessary where direct measurement is not practical or is prohibitively expensive. In states with very high levels of smart meter penetration it should be possible to use direct measurement approaches rather than sampling and modelling. The approach to DNSP reporting being considered in the current review of the Victorian Electricity Distribution Code could be useful as a 'real' benchmark against which modelled results elsewhere can be compared.

Sampling and modelling require a sufficiently large sample size to accurately represent the population. There is always a risk of bias analysis if the sample is not representative. For example, behaviour of large numbers of consumers for demand and solar generations is reasonably predictable but battery behaviour will be more influenced by algorithms and pricing in the future.

The CEC also recognised that there is a large risk of using sampling and modelling to recognise network constraints. We suggest the use of more dynamic operating models which includes the development of operating envelopes.

## Question 4 – Non-network options

*Distributed energy resources are, by definition, located at the end of the electricity network. Typically, networks have less visibility of this part of the network. What approaches or information is reasonable to assess whether DNSPs have considered purchasing the necessary information from metering or DER data providers rather than building their own assets and systems?*

The AER's Consultation Paper misses the point. It focusses on where the data should be purchase from but has ignored the issue of what level of funding is necessary to incentivise networks to acquire and use data in the first place.

Numerous market bodies have highlighted the lack of network visibility is a key impediment to increasing hosting capacity and integrating DER. Networks outside of Victoria have little access to energy data at low voltage and lack the capability to analyse and use data in a way that would increase low voltage hosting capacity. They also have little positive incentive to improve low voltage visibility in a way that would increase hosting capacity, resulting in partial or full restriction of export in any areas of Australia.

The AER needs to consider funding arrangements which improve data collection, analysis and DER integration. Funding arrangements should focus on incentivising lowest cost information provision which in many cases may not be a smart meter. This is particularly the case in areas where smart meters are not prevalent or cannot provide the necessary data. A positive incentive to acquire data through funding arrangement would create a low-cost competitive market for data acquisition and result in network investment being the last resort option if competitive options are not available or too expensive. Under such an arrangement If DNSPs proposed to install their own measuring equipment

they should explain why a superior or cheaper result could not be achieved by purchasing from data providers or paying customers.

The AEMC has indicated that it will review progress with the smart meter rollout in 2020. Decisions arising from that review have the potential to improve the disappointing uptake of smart meters.

## Question 5 – Policy and standards

*The optimisation of DER can be improved through many different approaches. Factors such as tariff reform, connection standards, technical standards, energy efficiency standards, etc. can greatly impact the way that DER operates on the network and impact on network performance. How should these options be integrated with the development of network DER proposals?*

Scenario analysis could be carried out by introducing above approaches separately and together to investigate impact on the network performances. After review, if the benefits of adding such factors outweigh the costs, it can be added into recommendations for policy. A review process of such options should be carried out in reasonable intervals to increase the efficiency of network performance. A process to audit and benchmark DNSP actions to improve hosting capacity which will likely to increase the efficiency of the energy sector.

## Question 6 - Cost benefit analysis

*Project justifications will require detailed analysis on the costs and benefits of each option. Many of these benefits may be external to the DNSP's cost base and may accrue directly to DER users. What level of analysis is required?*

Detailed cost benefit analysis for each alternative using NPV calculations are usually not sufficient, and non-monetary cost benefit analysis should be incorporated to account for social and environmental impacts. For example, future impacts on $CO_2$ emissions, health, poverty and inequality are other factors that could be integrated into these NPV calculations.

## Question 7 – Customer Benefit

*With DER being able to provide services across the electricity supply chain, how should DNSPs identify and value customer benefits? These benefits can include reliability outcomes, increased export potential, greater access to energy markets, access to network support services, etc. Should a common approach to valuing consumer exported electricity be established?*

AER/DNSPs can carry out surveys to find out opinions of customers based on a representative randomised trial. This will give a clear idea of customers opinion which will help improve client services.

A common approach to value export electricity will be a good methodology to improve accuracy and equity in the system. It will also make national comparison of outputs and customer benefits simpler. However, it is important that the common approach to be flexible for different factors such as geographical location.

## Question 8 – Options value

*Noting the technological rate of change and the typical asset life of 65 years of many network assets, it is important to test whether current research could provide a more efficient option in the near future. Should an assessment of emerging alternative approaches be a requirement for DER forecast expenditure? Should there be an 'options value' placed on this?*

It is essential to account for technological growth in DER forecasts. It is also important to note that these new technologies might develop at different rates, therefore it is important consider such changes in the DER forecast expenditure (at least, new technologies anticipated within the next ten years).

Non-network costs need to be incorporated into option values which will also improve the DER forecast expenditure.

## Question 9 – Shared learning and systems

*The development of common platforms, communication standards and shared systems may reduce the overall cost and complexity of facilitating DER. Should DNSPs need to show how they have considered options that leverage shared learning, common standards and common systems to provide efficient solutions, and that they have consulted and implemented learnings from prior works and trials across the NEM?*

It is common knowledge that there is significant reduction in cost due to share learning and systems in any technological processes. The DNSPs are natural monopolies. It is reasonable to require them to demonstrate they have considered options to leverage shared learning. Shared learning should not just be between one DNSP and other. Requirements for transparency of data assist with shared learning across stakeholder groups. The proposed change to the Victorian Electricity Distribution Code, requiring DNSPs to publish voltage management data and accounts of how they use data smart meters, is a good example of how to drive shared learning across the sector and not just between DNSPs.

## Question 10 – Rail gauge outcomes

*As a corollary to the above question, it will be increasingly important for the industry to work together to provide customer outcomes that are consistent across the NEM (or with international standards if applicable). What approaches or information is reasonable to show that any DNSP-specific communication protocols, interfaces, connection standards, etc. will not lead to increased cost and complexity for consumers and industry providers?*

The CEC strongly supports the use of national standards that are consistent with international standards, wherever possible. The default assumption should be that all communication protocols, interfaces, connection standards etc will be nationally uniform. DNSPs should be required to apply to the AER for variation away from the national standard.

To determine whether DNSP-specific all communication protocols, interfaces, connection standards would add cost and complexity for industry providers, we suggest the AER talks advice from industry providers. This could include an expectation to demonstrate any claims of increased costs created by DNSPs making their own unique or unusual rules.