Consumer
Challenge
Panel

Incentivising and measuring export service performance for distributed energy resources

Response to the AER Consultation Paper, August 2022

AER Consumer Challenge Panel – DER workgroup

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Acknowledgement of country

We recognise the traditional owners of the lands on which the Australian Energy Regulator (AER) operates, as well as those where this report is being prepared. We respect the elders of these nations, past and present along with their emerging leaders.

Confidentiality

We advise that to the best of our knowledge this Advice neither presents any confidential material nor relies on confidential information.

About the Consumer Challenge Panel sub-panel

The AER established the Consumer Challenge Panel (CCP) in July 2013 as part of its Better Regulation reforms. These reforms aim to deliver an improved regulatory framework focused on the long-term interests of consumers. The CCP assists the AER to make better regulatory determinations by providing input on issues of importance to consumers.

The expert members of the CCP bring consumer perspectives to the AER to contribute to the range of views considered as part of the AER's decisions.

The Distributed Energy Resources (DER) CCP is a sub-panel of the AER's Consumer Challenge Panel. The AER established the sub-panel to focus specifically on the AER's considerations related to the Distribution Network Service Providers' DER investment proposals and the development of networks to meet the future energy landscape.

1. Initial comments

The AER Distributed Energy Resources Consumer Challenge Panel (DER-CCP) is pleased to contribute to this next stage of work to support the development of Distributed Energy Resources (DER) in the community. This advice is in response to the AER document '*Incentivising and measuring export services performance – August 2022'* (the **consultation paper**).[1]

The consultation paper seeks views on three issues:

1. Whether incentive arrangements for export services are fit for purpose, including whether there is merit in updating the service target performance incentive scheme (STPIS) to cover exports.
2. The development of performance metrics to include in the first annual DNSP export service performance report.
3. How best to incorporate export services into the AER's annual benchmarking report.

DER OR CER?
To recognise the central role of consumers in Australia's energy transition, in this advice we have adopted the terminology used recently by the Australian Energy Market Commission (AEMC) and Energy Consumers Australia (ECA). '*Consumer Energy Resources'* (CER) refers to behind-the-meter energy resources owned and operated by households capable of generating energy or actively controlling energy usage. Examples of these devices include solar PV, battery energy storage systems, and electric vehicles.

This approach is consistent with Energy Consumers Australia's recent terminology change noted in their paper *Death to DER? Why we need to change the language we use for the energy transition*, May 2022.

1.1 Intent of the consultation

On 12 August 2021, the AEMC made a final determination on updates to the National Electricity Rules (NER) and National Energy Retail Rules (NERR) to integrate distributed energy resources (DER) such as small-scale solar and batteries more efficiently into the electricity grid.[2] This determination has at its centre the intent for DNSPs to provide export services as efficiently as possible, and that consumers will benefit from the application of incentive arrangements to export services. Providing DNSPs with rewards or penalties based on their export service performance would facilitate greater levels of DER exports in a least cost way, and the delivery of a better-quality export service to consumers that use the network to export.

The determination notes concerns that without appropriate incentives, DNSPs may tend to underinvest in the network capacity and systems needed to support increasing levels of CER.

a) Existing efficiency schemes could incentivise DNSPs to reduce or defer the expenditure needed to provide an effective export service (clause 47), and

b) There are no performance parameters for export service quality, or the capacity that is available for consumers to export (clause 48).

[1] For more information on the AER project, see Incentivising and measuring export services performance | Australian Energy Regulator (aer.gov.au)
[2] AEMC, Access, pricing and incentive arrangements for distributed energy resources, Rule determination, 12 August 2021 – available at https://www.aemc.gov.au/rule-changes/access-pricing-and-incentive-arrangements-distributed-energy-resources

1.2 The consumer demand for export services

We agree with the many forecasts that consumers will continue to invest heavily in embedded CER, and the number and capacity of rooftop generators will increase over the next few years. The high likelihood of rises in energy bills for consumers will increase the desire for consumers to invest in more CER, including generation and storage, to replace grid supply to the premises as much as possible. Networks will need to continue to invest to maintain power quality and network capacity, to ensure that the system operates safely and with acceptable quality. Investment will be required particularly in voltage management as the power flow swings from periods of high demand to periods of high export.

However, the need for export services will not increase at the same rate as the growth in CER. For those consumers who choose to invest in CER, our assessment is that maximising the level of self-consumption of generated energy will continue to provide the best economic return. The likely trends in tariffs and energy cost will encourage consumers to self-consume increasingly greater proportions of energy generated at their premises, and there will be less reliance on exported energy to provide economic returns.

More impetus for consumers to become self-reliant and to consume their own solar generation will come from the move to time-varying tariffs and prosumer tariffs, a rising focus on demand response, and falling feed-in tariffs (FiTs) for most owners of CER. These cost pressures represent a strong signal for consumers to take measures to avert bill shock. In the absence of significant demand for increased export services, the benefits of incentivising export service performance for CER will be marginal.

Despite this, many consumers with CER continue to see their exported energy as valuable, and they express concern at the concept of restricting the export of the remaining balance of the generated energy. Our observation is that there are several reasons for this. Some value the commercial return, regardless of its relatively low per-unit value. It is likely that this demand for export services is a function of the FiTs observed across different regions.[3]

Others may see solar export as an important contribution to a low carbon economy and assisting the overall share of renewable energy available to all consumers. In our work with consumers and through recent engagement, there is clear support by many consumers – with and without renewable generation or other CER – for DNSPs to prepare for a network that supports high levels of CER. The community commitment to a low-carbon economy is unquestioned. New energy services will also continue to gain traction.[4]

Whatever the incentive, it is important for the AER to draw out the underlying objectives of consumer investment in CER, to ensure that any new incentive scheme is fit for purpose and is optimised to meet the long-term interests of consumers.

1.3 CER owners as investors and consumers

We encourage the AER to recognise explicitly that incentives differ in the way they relate to the long-term interest across various cohorts of consumers. Consumers who have or will invest in CER have a different approach and sensitivity to network capability than those who do not.

Prosumers now include a group of prosumers, colloquially titled 'gensumers', being those who place a particularly high value – economically, socially or environmentally – on the ability to export a proportion of their generated energy beyond the value of exporting generation not needed at the site at the time.

[3] This ultimately represents a violation of the assumption of exogenous preferences, as the demand for export services is influenced by policy settings at the state level. Steps to meet existing demand for export services cannot thus be assumed to be welfare-improving.

[4] The new energy services we have in mind might include energy market participation, programmed energy export in response to price incentives (such as are being proposed for the early evening), and engaging in network services such as a Virtual Power Plant (VPP).

Gensumers seek all or a combination of:

a) Maximising their economic return for their investment through optimum timing and quantum of exported energy, including accessing the benefit of export tariffs that incentivise export at particular times;

b) Supporting a commitment to a low carbon network through the best operation of their local renewable generator, to the value of exporting 'spare' energy for use by others; and

c) Participation in energy sharing or grid support schemes such as VPPs or aggregation.

Efforts to meet the needs of prosumers and particularly gensumers raise serious concerns about cross subsidisation that effectively generate a wealth transfer from consumers to prosumers.[5] As recently noted by Energy Consumers Australia:

> *The opportunities and challenges of smart technology uptake will likely be disproportionally spread across Australian consumers. Without access to energy efficient housing and appliances, rooftop solar PV or home battery storage, a significant proportion of households and small businesses could face the burden of disproportionately higher energy bills.*[6]

The central premise of the AEMC Rule Determination of 12 August 2021 is to take actions that result in the provision of export services that are in the long-term interests of consumers. The challenge is that 'consumers' in this context is a more complex definition now as against when the concept of consumers was initially developed.

The cohort of consumers continues to polarise into those who have or will invest in CER, and those who cannot or will not. While recent consumer engagement by many DNSPs tends to support a strong view of the importance of a low carbon economy, each group has a somewhat different view of what 'long-term interest' means, and therefore how export capacity is valued. Given that prosumers and particularly gensumers are likely to reap a relatively larger share of the benefits of any new incentive scheme, it is worth considering how the cost of a new incentive scheme is appropriately allocated across the two different segments – CER consumers (prosumers / gensumers) and non-CER consumers.

It is also imperative not to forget that most energy consumers cannot or will not have access to significant levels of CER. In this case, objectives must maintain a focus on affordability with fair and equitable allocation of any costs that may be incurred in increasing the level of CER in the network.

We recommend than any developments in this consultation should be considered in the context of these 'good outcome' indicators.

1.4 Non-CER consumers must feature strongly in the consideration

As described above, there are different consumer segments – those who act solely as consumers, and those who also act as investors. Provision of electricity for consumption is an essential service; provision of export services is not an essential service if other economic sources of generation are available that do not require the same amount of additional network investment.

The most vulnerable consumers are the least likely to be prosumers or gensumers. The AER should prioritise the interests of consumers as consumers rather than as investors. Providing export rights for prosumers should have a lower priority than maintaining reliable affordable supply for consumers of electricity.

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[5] Picciariello, Angela, et al. *Electricity distribution tariffs and distributed generation: Quantifying cross-subsidies from consumers to prosumers*, Utilities Policy 37 (2015): 23-33.

[6] Energy Consumers Australia, Written Evidence (ONZ0044) submitted to Ofgem's role in the transition to net zero. https://committees.parliament.uk/writtenevidence/38419/pdf

1.5 What is an efficient level of export service?

Recent work in considering the Customer Energy Curtailment Value (CECV)[7] clearly provides a guide to valuing the export service. At times when the CECV is at or near zero, there is little if any value in incentivising the provision of (more) export capacity when the value of exported energy (as viewed through CECV) is low.

This tends to suggest that an efficient level is, like CECV, time varying based on the needs of the network at any point in time.

In addition, networks provide a basic level of export service already as a natural feature of an electricity network. For instance, in their tariff reformation work, Ausgrid has suggested a basic export level of 3 kilowatts peak and a corresponding energy feed-in of approximately 600 kilowatt hours per quarter peak exists.

The efficiency of a network export service must consider the energy export capability, whereas most focus tends to be on the instantaneous peak export level in kilowatts. Benchmarking could consider energy as a key product of export capability, suggesting network availability to accept exported energy - removing the focus from instantaneous exports which can be limited for short periods of time to avoid network augmentation.

1.6 The need for a focus on improving utilisation of network assets

This review is an opportunity to consider how utilisation of assets is measured and reported. A focus on the efficient use of existing assets is timely and extremely necessary.

1.7 Energy flow as an efficiency indicator

We suggest consideration of an energy 'net flow' indicator. Much is made of net-zero as an environmental goal. A similar parameter is used by consumers to gauge the effectiveness of their CER investment – that is, how much of their energy is 'consumed locally' and supports peak demand reduction or a greater proportion of renewable energy being consumed

This is not a strong technical parameter, as net power flow is not a key measure of networks. However, in the consumer psyche, being 'self-sufficient' or having a certain level of locally produced renewable energy is seen as positive. The AER should be encouraging local consumption – not just on-site but also off-site but still geographically local, because that does not require much if any network investment. This position is reinforced by many recent instances of engagement as part of the imminent regulatory resets.

This concept needs refining and more thinking, but the idea of 'supporting net zero' could be developed as a reputational incentive.

1.8 What does a good outcome look like?

With so many variables, options and influences, we believe it is important throughout this work to refer continually to the vision of a useful and efficient outcome. Throughout consideration of the AER's consultation paper and subsequent decision-making, we recommend periodical questioning of the following:

a) To what extent will the decision lead to better utilisation of existing network assets?

b) Will the decision drive significantly lower bills for all consumers, with or without access to renewable generation or other CER?

[7] See https://www.aer.gov.au/networks-pipelines/guidelines-schemes-models-reviews/customer-export-curtailment-value-methodology

c) To what extent will the decision stimulate a wealth transfer from consumers to prosumers, which may not be desirable?

d) Is the risk of curtailment shared equitably between the DNSP and the consumer-investors?

e) Is there effective communication that assists the consumers to understand the costs associated with energy export, and how that can be avoided?

f) To what extent does the analysis underpinning the decision consider potential rebound effects, i.e. increased demand for export services that is stimulated by improvements in export capacity that then leads to demands for further improvements in export capacity, etc.?

What is a customer's right to access export services?

The AEMC Rule considers that export services are part of the core services to be provided by DNSPs,[8] and is clear that DNSPs are to be discouraged from denying a customer access to export services. In many ways, this is a parallel with the obligation to connect a load customer, within the framework of implicit and explicit connection agreements through Chapter 5A or the NER and elsewhere.

While a CER consumer's right to access export services is inherent in the connection guidelines in all state regulations, the level of access for exported energy has been treated differently over the past 10 years, including blanket 5kW / 30kW (three phase) generation capacity with no export limit to zero export limits (all energy must be self-consumed at the premises). Complex voltage calculations were frequently applied in assigning export rights.

Now, the application of Dynamic Operating Envelopes is likely to influence the approved connection capacity or export service level.

Essentially, the customer's right to access export services to date has been variable and uncertain.

1.9 DNSPs have a role in encouraging non-asset solutions

Fundamental to the measurement of export service performance is the question 'what level of export performance is either needed or economically efficient?'

Informing and encouraging consumers to make good decisions regarding their CER investment and usage can make a large difference to the level of export services that is appropriate. Consumer information programmes and the development of innovative consumer-focused products can influence the inputs to calculation of how much energy is being curtailed to:

- Reduce the need for investment in long-term network assets, and
- Encourage solutions that are more targeted to optimise network utilisation and better outcomes for consumers beyond the generic promise of lower wholesale prices.

The AEMC ruling also noted that there are relatively low-cost steps that a DNSP can use to improve its network's capacity to connect more CER before investing in network expansion. Some of these options include gaining a better understanding of the DNSP's low voltage networks, phase balancing, and implementation of dynamic export connections. The design of new incentive arrangements to support export service performance should encourage DNSPs to prioritise these options ahead of investing in expanding network assets.

[8] AEMC, Access, pricing and incentive arrangements for distributed energy resources, Rule determination, 12 August 2021, summary paragraph 8

1.10 Summary

We support the establishment of a bespoke framework of incentives and reporting measures for export service performance, as it has the potential of encouraging a fair level of export capability with a greater level of transparency than inclusion in regulatory investment proposals. Providing a more 'closed loop' process with performance feedback is a good outcome. However, we do not wish to underestimate the magnitude of the task in presenting meaningful and targeted information that drives appropriate network investment or reflects the variability in consumer requirements.

We believe that the following process steps are critical in meeting consumer needs:

a) Constantly refer to the objective of encouraging equitable and fair prices for all consumers,

b) Encourage improved utilisation of network assets, and

c) Support investment that reduces the inherent risk margin that exists in a DNSP's approach to CER.

d) A focus on energy (kWh) fed-in as a key product of export capability, suggesting network availability to accept exported energy - removing the focus from instantaneous exports which can be limited for short periods of time to avoid network augmentation.

In addition, this initiative is an ideal opportunity to reconsider the benchmarking and reporting of network utilisation (including a new definition of throughput to reflect two-way flows) and provide strong incentives for networks to get the most out of existing network assets by encouraging investment to improve load factors and increase network utilisation.

Parameters for an incentive scheme could include network utilisation, progress towards net-zero targets, and the take-up of flexible export schemes by consumers.

2 Response to questions

Q1 Do stakeholders consider further incentive measures are required to ensure DNSPs provide efficient levels of export services?

Incentives can be a useful way of encouraging utilities to efficiently provide appropriate levels of export capability. Through the application of effective and robust incentives, the more open-ended claims for capital and operating costs in the regulatory process could be replaced with a more 'closed-loop' process to encourage effective investment.

Key to this issue is how an efficient service is defined, and the extent to which the service is efficient at the moment.

To assist in answering this question, it is useful to try to determine how much export curtailment is a problem? We could look to the information provided under the DER investment case where the amount of energy curtailed needs to be estimated.

As a first step, it would be prudent for the AER to collect data from DNSPs on curtailment ratios, and the volume of curtailment across peak and off-peak periods. We strongly support the AER's proposal for DNSPs to report export volume curtailment due to network constraint / connection limitation.

We do not accept the argument that this information is "not available / too challenging", as described by the DNSPs. The information is critical to understand the quantum of the problem, and for the AER to track the success of any changes to the incentive scheme. Without having this information, it is difficult for the AER to assess whether any implemented changes to the incentive scheme are effective in reducing curtailment volumes.

As noted in the presentation by the AER to the stakeholder workshop on 22 August 2022,[9] as a potential solution to the data issues, DNSPs may be able to acquire inverter data from the relevant party: solar retailer, aggregator, or inverter manufacturer. Metering data may also be a possible source. These options need to be explored fully.

The Australian Energy Market Operator (AEMO) now publishes estimated curtailment data in its Quarterly Energy Dynamics (QED) reports.[10] Should DNSPs not provide actual data on curtailment, the AER could consider using the AER methodology to estimate curtailment volumes for each DNSP.

a) What is efficient?

Based on the discussion of the underlying incentives (section 4.2 in the consultation paper), it is very difficult to assess whether inefficient levels of curtailment are taking place. As the AER notes, the prospects of grid defection could incentivise DNSPs to increase investment in export services. At the same time, it is likely that CECV values are likely to decline in coming years.

Having such data would also help both DNSPs and the AER identify the circumstances where static zero export limits may be reasonable, as mentioned by the AEMC in its *Access, pricing and incentive arrangements for distributed energy resources* final determination.[11] The AER mentions that zero export limits may be reasonable where there are network export constraints.

b) Establishing a basic export level

We support the concept of a basic export level or right of access to export services. This right should have parallels with load connections – that is, that not all consumers with CER will be exporting energy at the same time, and some if not all that energy will be consumed by nearby premises. A nominated level of access embodied in an implied connection agreement such as the Medium Embedded Generator (MEG) connection agreement under Chapter 5A of the NER could apply, reflecting a level of non-zero but valid risk being taken by the distributor.

Q2 Do stakeholders agree with these objectives for assessment of the merits of enhancing incentives for export services?

We agree with the objectives in principle.

Under "support efficient and informed customer investment" – the AEMC discussed enabling new tariff options that reward consumers for making investments that help smooth consumption and reduce peak usage. Much of the AER discussion paper has focused on incentivising DNSPs' investment behaviour. Very little has been said about incentivising the investment behaviour of exporting consumers in ways that promote their efficient investment. More could be done to consider what "efficient" investment looks like for exporting consumers, and it differs across DNSPs.

To that end, the AER should not only "be flexible to accommodate the differing starting points of DNSPs", but also be flexible to accommodate the differing starting point of consumers, both exporting and non-exporting segments, as they may have fundamentally different views on what constitutes "efficient" levels of export curtailment.

[9] See https://www.aer.gov.au/networks-pipelines/guidelines-schemes-models-reviews/incentivising-and-measuring-export-services-performance/initiation#step-83374

[10] See https://aemo.com.au/energy-systems/major-publications/quarterly-energy-dynamics-qed

[11] See https://www.aemc.gov.au/rule-changes/access-pricing-and-incentive-arrangements-distributed-energy-resources

We must be careful not to encourage 'investment in export capacity at all costs'. There will be some desire for this – increasing the RAB and hence long-term returns. Any enhancement must focus on efficiency, and meeting validated demand for export services.

Utilisation of assets is an important objective.

Q3 How significantly does the average low level (and value) of constraints currently experienced by most NEM exporting consumers influence the need to enhance incentives for the provision of export services?

In line with our answer to question 1 above, "the need to enhance incentives" is very hard to assess without actual data on curtailment ratios and volume of curtailment across DNSPs. Some consumers do not suffer significant export curtailment, while others do. These results will change by location and over time as Variable Renewable Energy (VRE) penetration grows. To assess the material impact of curtailment issues, more data is needed.

From the standpoint of basic cost benefit analysis, in a scenario where exporting consumers have their energy curtailed, the AER should consider not only the monetary loss incurred by consumers via lost generation value but should also consider other costs the consumer may incur from investing in solar PV that could also be impacted by curtailment.

For example, many solar consumers take out loans to cover the upfront cost of solar PV. Export curtailment could also increase the length of these loans as well as increase the interest foregone by consumers. Second, the AER should acknowledge that investing in export curtailment could disincentivise solar consumers from self-consuming energy, as highlighted in the presentation by SA Power Networks at the stakeholder workshop on 22 August 2022.

We reiterate our earlier point that the AER should explicitly consider the interests of non-CER consumers, acknowledging that incentives given to DNSPs to invest in export capacity will also tend to increase energy bills for all consumers. Any investment in export capacity that is NOT explicitly linked to CECV values runs the risk of effectively being a cross subsidy for CER consumers that creates welfare losses for non-CER consumers. This is also an equity issue, as many of the poor segments of consumers do not have the capacity to invest in solar PV.

Q4 Options for providing incentives

a) What level of accuracy and robustness of data metrics would stakeholders consider appropriate for a financial incentive mechanism to operate? For example, are stakeholders comfortable with the use of approximated/modelled inputs for the purpose of a STPIS export service performance measure given most DNSP face significant data visibility issues?

See our response to question 1.

In general, the argument put forward in Box 1 in the consultation paper on why measuring network export curtailment is challenging is not convincing. While there are certain situations which make measuring curtailment complex, the AER needs to settle on a least-worst metric that could be subject to revisions in future consultation periods.

As mentioned in discussion on question 1, AEMO has already developed estimates of curtailment volumes that could be used as a starting point. If DNSPs are not forthcoming with curtailment data, these estimates should be used and developed.

Internationally, Yasuda et al (2022) note that Ireland and Germany already publish data on curtailment. We encourage the AER not to fall behind its international peers by not requiring DNSPs to provide this data.

b) Do stakeholders agree that the CECV is the appropriate valuation of improvements or decline in export service performance? Should a non-symmetrical (penalty only) STPIS mechanism apply for export service levels about the basic export level?

A critical issue with the CECV is that these values will likely decline dramatically in future years. As such, the AER should keep in mind that the value of improvements in export services are also likely to decline. Given that investment decisions are forward looking, we suggest that it would be better to use the mean CECV over the lifetime of the planned Improvement in export services. Doing so would help ensure that planned improvements consider likely future falls in CECV value as VRE penetration increases.

c) Do stakeholders agree that there are significant concerns with implementing a STPIS mechanism for export services at this time? Are there any other issues we have not considered?

See response above.

d) Should the AER explore establishing a paper trial to test the robustness of a selection of potential metrics? What metrics do stakeholders suggest should be included in a paper trial?

We support a trial, including testing:

- Improving the utilisation of the network with measures that consider two-way flow;
- Consumer complaints related to DER curtailment (connection and in service), and the cost to address them;
- Consumer taking up advanced connection options, such as dynamic operating envelopes; and
- Energy 'taken up' into the grid.

Q5 Guaranteed Service Levels (GSLs)

a) Should a GSL for export services be further explored?

Here we emphasise the cross-subsidisation issue: the AER needs to consider the extent to which GSL payment to export consumers effectively creates a cross subsidy through which non-CER consumers incur welfare losses. These payments will effectively create upward pressure on energy bills for all consumers. Whether or not non-CER consumers benefit from greater investment in export capacity by operators is only true to the extent to which these investments generate downward pressure on wholesale prices.

b) If a GSL were to be implemented, do stakeholders agree a GSL would best relate to the basic export level and would the applicable jurisdictional CECV be the appropriate compensation for failing to meet the basic export level?

Because GSL payments are not explicitly linked to CECV values, we are not in favour of GSL payments. If GSL payments were to be pursued, they would need to be the underlying value of the additional energy exported to the grid by CER. The AER should not force GSL payments in situations where the value of the additional exports to the grid is negative. This would be highly inefficient. It would therefore make more sense to link GSL payments to CECV values.

We oppose the GSL payment approach.

Q6 Should a bespoke export service incentive mechanism be explored further?

We generally support the introduction of a bespoke export incentive mechanism. However, to some extent the bespoke option will face the same problems of defining the appropriate parameters that are measurable, that reflect the DNSP's understanding of consumer needs, and are efficient. We encourage any consideration to include assessment of the following:

I. What is the need – data is required – as discussed above.

II. How do bespoke incentive schemes measure capacity? This is not clear.

III. What is the marginal value of the additional capacity being supplied to the market? How much is actually being used? There is a need to consider marginal value.

More information is needed to assess the merits of the bespoke incentive scheme.

There are considerable benefits in introducing an incentive scheme that rewards networks that efficiently improve the utilisation of their assets, including load factors. In addition, such a scheme is more effective than the regulatory capex and opex proposal framework, as it provides opportunities for networks to be rewarded for actual improved performance and optimum allocation or resources to drive good outcomes.

Q7 Allowance and margin mechanisms

a) Should an allowance and/or margin incentive mechanism be explored further?

We suggest that consideration should be given to incentivising the use of current capacity (given that there is excess).

b) Do stakeholders think appropriate output measures could be used to assess a DNSP's performance given the flexibility of these approaches? Should consumers drive these types of proposals?

We support efforts to promote greater disclosure and the publication of quality metrics. Reputational incentives can only work if consumers who care about exporting are appropriately aware of this information. The AER may wish to consider how best to communicate the results with the key stakeholders of the network businesses. The AER should also consider communicating such data directly with the network businesses' boards and other key stakeholders (e.g. investors).

Such non-pecuniary incentives would target the network businesses' public reputation with key stakeholders. The practice of "regulatory shaming" is increasingly used in the US and could prove a more effective deterrence against capital overspending (see Yadin 2019, Johnson 2020).[12]

The AER should consider reporting on the application of community batteries.

Q8 Reputational Incentives

a) What sorts of reporting measures do stakeholders consider are likely to impose reputational incentives on DNSPs?

In recent engagement, DNSPs have carried out extensive consumer research into the attitudes of consumers into network investment to support export services. In generally, consumers are highly supportive of utilities investing in a low carbon future, but not at any cost.

There will be a desire for utilities to carry out significant investment 'because consumers asked for it'. This on its own is not the basis for efficient investment.

b) Do stakeholders consider reputational incentives are sufficient to address concerns about DNSPs' provision of efficient export services?

Reputational incentives will help. However, the desire to be seen as highly supporting export energy may be seen as positive by consumers in the short term but will have longer term impacts on network costs.

Q9 What export service performance metrics should we ideally capture, even if this is only feasible or practical in the long-term?

[12] Yadin, Sharon (2019). Regulatory Shaming. Environmental Law, vol. 49, no. 2, 2019, pp. 407–51.
Johnson, Matthew S. (2020) *Regulation by Shaming: Deterrence Effects of Publicizing Violations of Workplace Safety and Health Laws*. American Economic Review, 110 (6): 1866-1904.

a) Do stakeholders agree that the ideal measurement of export service performance would use equivalent measures to those used to measure import service performance – and that this would entail measuring interruptions to exports (or network export curtailment) per exporting customer?

This would be useful, but it is unclear how this data would be obtained efficiently. We suggest collection of connection approval data – how many are reduced from the initial request due to network limitations.

b) Do stakeholders agree with our view that it would not be feasible to report involuntary export curtailment per exporting customer in the short term (that is, for the inaugural export performance report due by end-2023)? That is, do you agree with our understanding that this metric is not currently measurable, or cost effective to measure?

We agree with this view.

Q10 Metrics

a) Do stakeholders agree that financial year 2020–21 is a reasonable base year to start reporting data for most export service performance metrics? If not, what would you recommend and why?

We do not agree with this. We suggest starting with the current round of regulatory proposals (forecast curtailment for 2023) and seeing how each DNSP is considering the energy curtailed in their future grid investment cases. The other DNSPs are probably already considering a number.

b) Considering current constraints to collecting export service performance metrics, what metrics are useful and feasible to collect for the inaugural export performance report (to be published by end-2023)? Do you agree with using the potential metrics summarised in Table 5, and are there particular factors we should consider in tracking those metrics? Relatedly, Attachment B summarises our understanding of current data holdings and limitations, and the potential usefulness of each metric. Please provide comments if you have any views on Attachment B.

The indicators proposed in Table 5 in the consultation paper seem reasonable, in particular to consider:

- The ratio of approved to requested export capacity;
- Consumers with dynamic export arrangements;
- The proportion of export consumers, installed capacity;
- Overvoltage reports due to DER that cannot be rectified by 'simple' means (tapping, connection);
- Energy exported (similar to reported After Diversity Maximum Demand (ADMD) in various customer segments); and
- The ratio of energy exported to energy demand.

We look forward to the DNSPs' responses.

Q11 Do stakeholders agree with the data imitations, impacts and potential solutions summarised in Table 6? Advise if there are other key limitations we have overlooked or if there are further solutions to explore. Several of the potential solutions in Table 6 refer to the need for the AER to tightly specify how data should be collected or estimated to ensure comparability. What should the AER consider or be aware of in pursing such an approach?

We agree that this is a difficult task. We remind the AER to check back to the fundamental objectives of this work, and avoid any requirement where there is not a clear benefit flowing from the costs incurred to collect and analyse the data.

We caution against the number of voltage complaints being a core indicator. For some time, we have been canvassing utilities to consider reducing supply voltage. If high voltage complaints does become an indicator, we suggest the number of low voltage complaints also be tracked.

Q12 Do stakeholders have input on our proposed approach to develop the inaugural export performance report as part of the 2023 electricity network performance report? Please provide any views on the proposed project steps and timelines, including suggestions to improve the approach? If option one (early release of the export performance report based on 2021–22 data) is feasible, do you prefer this over option two (December 2023 release of the export performance report based on 2022–23 data)?

We look to the DNSP responses to inform this question.

Q13 To what extent do the existing benchmarking techniques in Box 4 account for and / or do not account for export services? How does this impact the productivity results generated by these techniques, and are these impacts currently material? How do you see these issues changing over time as the level of installed export capacity increases and technology changes?

We strongly support a review into how network utilisation is measured and reported. Any incentives that encourage networks to improve the utilisation of their assets in the face of falling load factors and two-way flows must be encouraged. We suggest an extensive worldwide investigation into how progressive utilities and regulators consider reporting utilisation in a high-DER environment.

The efficiency scores produced by such analysis tend to be sensitive to the choice of input and output variables. In some circumstances, inappropriate choices may lead to relatively inefficient firms defining the frontier. The AER's Annual Benchmarking report for DNSPs uses multilateral total factor productivity to compare productivity across networks. Productivity is measured as the ratio of the quantity of total outputs produced to the quantity of inputs used. The benchmarking is based on data for customer numbers, circuit length, ratcheted maximum demand, energy delivered, reliability, and share of undergrounding.

The number of consumers and peak demand are likely strongly driven by factors that are beyond the control of the DNSPs. Customer numbers are co-determined by the decisions of DNSPs, retailers, transmission businesses and generators, as well as changes in customer location and customer preferences.[13] Customer numbers are also likely influenced by regional growth drivers and urbanisation patterns. These exogenous factors need to be taken into account in the benchmarking exercise. The AER attempts to consider differences in operating environments via the operating environment factors (OEFs). However, these factors are relatively limited in scope (e.g. differences in vegetation management requirements, jurisdictional taxes, exposure to cyclones, and termite exposure). In the context of DER and CER, it makes sense to take into account export service penetration. However, this does not go far enough.

As argued above, demand for export services is itself a function of FiTs which vary significantly and should also be taken into account in the benchmarking model. Furthermore, the urban density of the population of consumers is likely to influence penetration levels, given that CER penetration rates vary significantly across rural and urban areas.

Without taking this into account, the current configuration exercises effectively positively bias NSPs in high consumer growth regions and negatively biases small regions. As noted by Lawrence and Diewert (2004),[14] the 'output' of distributors should not be independent of the size of the consumer base and should instead focus on the availability of infrastructure and the condition in which it has been maintained.

[13] This reflected in the AusNet Services (AusNet) (2016), *AusNet Services' Submission on the 2016 distribution and transmission benchmarking reports*, Melbourne, 14 October.

[14] Lawrence, Denis, and W. E. Diewert, *Regulating electricity networks: The ABC of setting X in New Zealand*, Performance measurement and regulation of network utilities (2006): 207-241.

Q14 Do you agree that the options identified above are possible options for adjusting the benchmarking framework to account for export services? Are there any other options?

We encourage back-to-back performance measures for export and load services wherever possible, as the direction of power flow becomes less of a key issue in networks.

Developing Partial Productivity Indicators (PPIs) for export services will be tough, as the vast majority of investment or operating costs related to export services also have a close relationship to capacity and load capability. It would be very difficult to peel out costs that are exclusively related to export services.

We are likely getting to the level of diminishing returns looking at how networks segregate costs, to what outcome? Does the outcome justify the detail of cost capture and analysis? Will this be digging into cost allocation models?

There are so many variables in the assessment, that while precision may apparently be high, the practical application, accuracy and usefulness of the information gathered will be highly questionable, not to mention the cost of deriving and reporting.