Consumer
Challenge
Panel

Customer Export Curtailment Value (CECV) Methodology

Response to the AER Draft CECV Methodology, April 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 CCP operates. We respect the elders of these nations, past and present along with the 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 Network Service Providers' DER investment proposals and the development of networks to meet the future energy landscape.

1. Overview of our response

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 '*Draft customer export curtailment value methodology – April 2022*', and the accompanying explanatory statement (together the **draft report**).

Overall, we are supportive of the application of a Customer Export Curtailment Value **(CECV)** tool, and the proposed initial methodology for the estimation of the CECV, as presented in the draft report. We believe that it will assist distribution network service providers **(DNSPs)** in their decisions to invest in network assets or programmes that will reduce the risk of curtailment of customers' energy exports where that investment is efficient and warranted by the value of reducing the curtailment.

We also recognise that the development of the alleviation profile with any level of certainty, particularly over time, will be very complex. This is the case given that many 'customer centric' inputs such as the DER use case are highly sensitive to so many other initiatives and unknowns in relation to the consumer energy sector as it is today, as well as those that are likely to arise in the future. We acknowledge the factors noted in Table 4.1 of the draft report (which is reproduced below for ease of reference) as being reasonably comprehensive, while also raising concerns as to the subjectivity in determining many of the input values.

Table 4.1: Factors likely to determine the alleviation profile

Factor	How it affects the proposed alleviation profile
Current and forecast DER penetration, sizes and potential (unconstrained) export (DER use cases)	Existing DER penetration will affect the existing level of headroom available within the network for the export of DER. The forecast penetration of additional DER (and the size of these systems) will likely be a key determinant of how quickly (and the specific times at which) any existing headroom will be used up, thereby influencing the amount and timing in which curtailment would be expected to be needed, absent any investment by the DNSP to increase hosting capacity. For example, the forecast number of behind the meter batteries (and how they are operated) will likely influence the amount of solar that, absent any network constraints, would be generated and available, net of the host facility's electricity needs, to be exported to the grid.
New and evolving tariffs and price signals	Solar sponge tariffs and/or two-way pricing or other price signals to be introduced over the analysis horizon could reduce the need to curtail energy by incentivising more internal consumption or less export during periods where curtailment may otherwise have been required. Such developments should be taken into account in the development of the expected alleviation profile.
Current network hosting capacity	The amount of export that can be accommodated in each specific part of the network will be limited by the capacity of the local network and available controls. That amount will vary over time based on the amount of electricity that is trying to be exported and other aspects of the electrical environment in the area, such as voltage levels and the location at which the export is seeking to access the network.
Curtailment profile	This is the amount and timing of the curtailment that would be expected to occur based on the current hosting capacity in the network and the export potential of existing and forecast DER systems.
Characteristics of the project being proposed to increase hosting capacity (investment case)	The nature of the project and operating practices being proposed by the DNSP will likely determine how much of the export that could be made available by existing and forecast DER systems will be able to be exported and how much may still have to be curtailed. For example, if the project results in the inherent export capacity of a part of the network increasing from 5kW to 7kW, curtailment may still be needed at those times when the average export available exceeds 7kW. The alleviation profile should consider situations in which the additional hosting capacity may not be sufficient to accommodate all available export.

Source: Oakley Greenwood

The DER-CCP strongly supports the application of the CECV for DNSPs to consider investing in non-asset solutions such as consumer information programmes, and the development of innovative customer-focused products that influence the inputs to the alleviation profile 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.

As a result, our advice is not so much about the development of the CECV *per se*, but more in regard to how the AER will remain vigilant in considering the other inputs into the various DNSP business cases, in particular the alleviation profile.

The energy environment now is a very dynamic system, with various signals likely to affect other behaviours. Our question is: "*Will the application of the CECV as intended support the overall objective of an efficient and low carbon environment, or does it bring the risk of unintended outcomes that will influence consumers to take sub-optimal decisions regarding their DER investment and use?*"

2. Response to Questions

Q1. What are your views on the value streams to be captured in the CECV?

We support the AER's initial methodology to estimate the CECV. Our support not to include less tangible and more subjective elements in the value stream is largely because the risk of over-estimating the value of the energy curtailed increases when those elements are included.

We also acknowledge that the basis of the market modelling that has been undertaken will be seen by some as restrictive, including the fact that it excludes factors such as consumers' willingness to pay, which of course varies between consumers.[1]

There are risks in both over- and under-estimation of the CECV.

- Over-estimation of the CECV may lead to inefficient investment in network assets which would reduce curtailment of solar PV generation as a primary effect. This may lead as a secondary effect to over-investment in solar PV, which could then lead again to more curtailment.
- Under-estimation of the CECV may lead as a primary effect to lower than efficient levels of network investment, and more curtailment of solar PV generation than should be the case. As a secondary effect, this may lead to less investment in solar PV, or may lead to alternate investment in solar PV where it will not be curtailed.

The AER needs to consider and analyse those risks in finalising its decision on which value streams to include.

We agree with the AER's plan to set the CECV to be region and time specific, with a focus on avoided marginal generator SRMC. Given the high risk of negative daytime prices, we infer from this that the CECV will be low or even negative during some daytime periods, as noted in the draft methodology:[2]

> *During low operational demand periods, additional DER export could also add cost to wholesale system costs if the minimum generation level constraints of thermal units are binding.*

We support this position, as it reflects the impact of DER on most electricity consumers, including those who are not able to invest in DER at their premises. We acknowledge that most DNSPs consider this method of assignment as being a 'floor' only, and that willingness to pay (**WTP**) or other factors should also feature in the calculation. While we appreciate that many variables can be considered in estimating the CECV, we do not support their inclusion. This is on the basis that they are variable across consumers, largely subjective and subject to shifts in customer attitudes from a range of influences.

Introducing WTP consideration could though lead to differences in DER investment levels across each region, reflecting differences in consumer WTP for DER investment. While this can be consistent with the principle of allocative efficiency as DNSPs investment decisions reflect customer preferences in the area, such a state could also generate inequity for customers seeking to export energy to the grid using DER (e.g. prosumers). The trade-offs in gains and losses between different segments of customer, such as energy customers vs. prosumers, are worth investigating further.

While there may a strong argument for other factors, in particular consumer preference, to be considered, any discussion must consider consumer equity. It is likely that WTP will be very different across locations or demographic segments. Ultimately this would mean that DER investment decisions would reflect differences in preferences of the people in that region. From an equity perspective, someone in one region

[1] These views from some stakeholders were already expressed in submissions to the AER's CECV methodology consultation in December 2021.
[2] AER, Draft CECV Methodology, April 2022, p 7

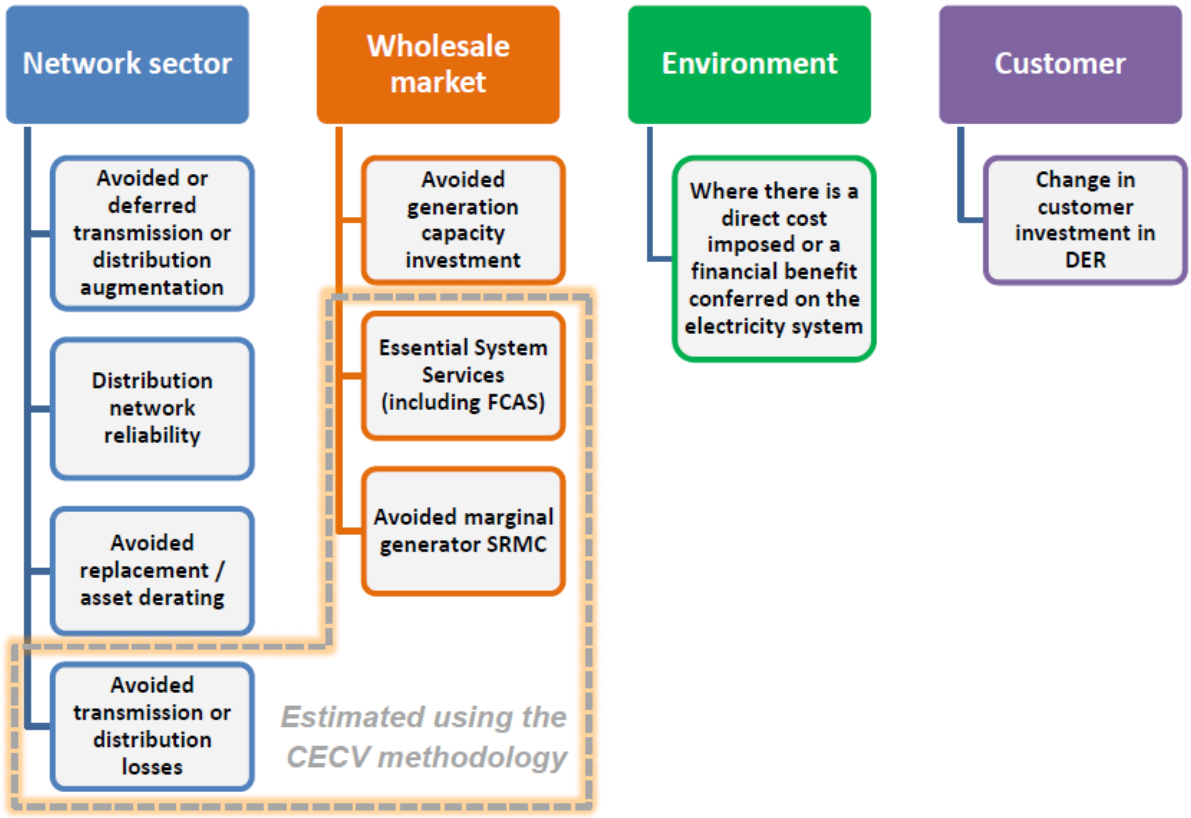
may not be able to export as much as a customer in another area. While the perspective of investment decisions reflecting actual consumer preferences is strong, the issue of cross-subsidy arises. Therefore, the concept of user-pays through the form of customer-funded upgrades should prevail.

We agree with Oakley Greenwood's advice that:

- Between now and the medium term, DER curtailment will mostly occur when there is an abundance of system generation and/or low system demand (i.e. high solar output period). The periods in which additional generation capacity is needed are often after dark where curtailment of most of the DER currently and expected to be in place is unlikely; and
- The amount of DER curtailment is small relative to the system generation.[3]

Figure 2.2 in the draft report (which is reproduced below for ease of reference) indicates that the AER is proposing to omit the consideration of how the CECV will impact customer investment in DER. By omitting this value stream, it opens the possibility that the CECV estimation approach will ignore the potential rebound effect that will be induced by investment. The rebound effect will take place as DNSP investments to reduce export curtailment will reduce the per unit price of DER exports by customers, and will effectively act to encourage more customer to invest in DER. This second order increase in demand (induced demand) will act to partially offset the stated benefits of DNSP investments designed to reduce export curtailment The DER-CCP encourages the AER to investigate the size of these potential rebound effects to help support the validity of omitting this important value stream.

Figure 2.2: DER value streams provided by AER guidance



[3] Oakley Greenwood, CECV Methodology – Interim Report, 6 April 2022

Q2. What are your views on our interpretation of customer export curtailment and the concept of the alleviation profile?

Curtailment is a scenario where a lower level of DER export occurs relative to an expected level. We believe that the interpretation of the 'expected level' of DER has the potential to be highly subjective and imprecise.

The AER notes:[4]

> *Identifying export curtailment, along with its cause, is a challenging exercise due to location-specific and temporal factors. It also requires a degree of estimation, as DNSPs lack visibility of conditions on their low-voltage networks and are unable to identify instances of curtailment solely based on metering data.*

We support the application of the alleviation profile as a construct to consider curtailment. The challenge will be providing inputs to the profile model that are verifiable, quantitative and timely.

We stand by our initial advice of December 2021, where we highlighted that while the methodology itself is well-considered, establishing the range of inputs and allocation of the CECV to various customer demographics would continue to be a difficult task.

The AER notes:[5]

> *for the purpose of calculating CECVs, we do not necessarily need to identify instances of curtailment and estimate the impacts on specific customers*"

There are so many influences on customers with DER and those looking to invest in DER that estimating the export potential from customers will be extremely difficult. There are many initiatives in play that will encourage consumers to 'self-curtail' and avoid or limit the export of excess energy, such as falling feed-in tariffs, increased benefits of energy storage, electric vehicle charging and energy tariffs that reward reducing energy consumption at peak times such as the early evening.

In developing the profile, issues such as forecast penetration and the consumer's view of curtailment versus incentives to self-consume will be highly variable, and subject to many influences.

Therefore, our advice is that should the alleviation profile be accepted, it is critical that in the early stages the AER is highly vigilant in examining how DNSPs establish the inputs. Over time, a guidance note to establish some accepted practices may be necessary.

As a side note, we continue to support further investigation into validating the option of lowering network supply voltages in lieu of investment in greater capacity, given the transition to modern household devices that can function safely at lower voltages.

Q3. What are your views on our interpretation of the distribution of costs and benefits, including the relationship between CECVs and export charges?

We support the approach by the AER to estimate a set of CECVs that reflect the detriment to all customers from the curtailment of DER exports, and similarly, the benefit to all customers from the alleviation of curtailment, particularly as the common distribution service is classified as a Standard Control Service (SCS) under the Distribution Service Classification Guideline because all customers benefit from the service. In the context of investment planning, it is necessary that DNSPs demonstrate that the total market benefit to all customers exceeds the proposed costs, and not distinguish between customer types.

[4] AER, Explanatory statement: Draft Customer export curtailment value methodology, April 2022, p 12
[5] AER, Explanatory statement: Draft Customer export curtailment value methodology, April 2022, p 12

Those with DER investments will be subject to a specific set of influences, including connection agreement conditions, falling daytime export tariffs and incentives for storage. We concur that DNSPs should demonstrate how their proposed pricing structures will affect the demand for consumption and export services, make best use of existing network hosting capacity and potentially defer network investments.

Specific capital connection charges can still be appropriate when an individual customer seeks to export a significant amount of energy that requires a specific, localised network response.

Q4. Do you agree that half-hourly CECV estimates are appropriate?

We agree with the AER's draft decision that the draft methodology should provide for the estimation of CECVs on a half-hourly basis. We concur that this represents a sufficient degree of disaggregation and will adequately capture the differences in marginal export value over the course of each day.

Q5. Do you agree that CECV estimates for each NEM region are appropriate?

We agree with the AER's draft decision to estimate CECVs by NEM region. This reflects the structure of the wholesale market, and DNSPs are expected to apply the CECVs for their own region.

We also note that the draft methodology allows DNSPs to obtain a CECV for a specific location within a region to reflect the relevant curtailment (and alleviation) pattern.

Q6. Do you have any views on the model inputs and assumptions and the process of estimating CECVs?

The AER writes:[6]

> *The draft methodology applies electricity market modelling to estimate CECVs (using PLEXOS). Although we note the potential drawbacks of this approach, including the need for agreement on inputs and lack of transparency, we consider these can be overcome by simplifying the modelling process. Importantly, we consider that electricity market modelling will provide a greater degree of accuracy in CECV estimates.*

We share the AER's concerns regarding the potential drawbacks of this approach, including the need for agreement on inputs and lack of transparency.

Regarding the proposal to run a single simulation using POE50[7] demand traces,[8] it would be interesting to see if the benefits of reduced export curtailment would have a larger impact under POE10 peak demand when the network is under more operational pressure. This would help ensure that the CECV reflects avoided generation capacity investment as well as transmission capacity investment. Transmission expansion is usually assessed against POE10 peak demand.

Q7 – Q11. Reviews, self-selection and characteristic days

The DER-CCP has concerns that the proposed flexibility in giving DNSPs three different approaches to modelling aggregate CECVs could reduce the overall transparency in the application of CECVs. Given that these approaches reflect a high degree of heterogeneity in the type of investments that use CECVs, it may

[6] AER, Explanatory statement: Draft Customer export curtailment value methodology, April 2022, p 20

[7] POE refers to probability of exceedance. A POE is generally organised in a distribution curve and uses 90, 50 and 10 marker values to present and measure data. The POE50 represents the average, or middle value, in any range of measurement, and is the most likely to occur. This means 90% of the data will be greater than the POE90 marker and only 10% of the measured data will be higher than the POE10 marker. (See AER, Draft CECV Methodology, April 2022, p 9, footnote 9)

[8] AER, Draft CECV Methodology, April 2022, p 9

be worth AER explicitly specifying which subgroup of investments designed to reduce export curtailment may use each of the three methodologies.

The DER-CCP suggests adding elements of basic risk analysis into the process. In light of the relatively long time horizon involved, the AER should consider featuring robustness checks when the DNSP model is used to produce alleviation profiles. This can be achieved by requiring DNSPs to vary key parameters featured in Table 3.1 in the draft report when making the case for DER Investment. This table is reproduced below for ease of reference.

Table 3.1: Model inputs

Input	Source
Existing and committed unit capacity	Draft ISP 2022 assumptions (2021 IASR)[7]
Existing and new generator operating characteristics	Draft ISP 2022 Step Change (2021 IASR)[8]
Intra- and inter-regional transmission capacity	Draft ISP 2022 Step Change modelling output including the Optimal Development Path for transmission expansion
Demand, wind and solar traces	Draft ISP 2022 Step Change (2021 IASR), ESOO and ISP traces
Fuel prices	Draft ISP 2022 Step Change (2021 IASR)

For example, given the current volatility in fuel prices, it would make sense for DNSPs to report how the alleviation profile of projects change if fuel prices vary by 10 or 20 per cent. If the alleviation profile is found to be sensitive to key parameter input, DNSPs should address these risks when reporting the alleviation profile.

We also ask for the AER to be vigilant for any events that may suggest that the estimation of the CECV may be materially misstated.