DEIP DYNAMIC OPERATING ENVELOPES WORKSTREAM

Allocation Principles Workshop Summary

JULY 2021

Australian Government
Australian Renewable Energy Agency

ARENA

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BACKGROUND

As part of its 2021 Work Plan, the Distributed Energy Integration Program (DEIP) is exploring the value that dynamic operating envelopes (DOEs) could offer to the energy transition. This workstream aims to:

- build a shared understanding of the opportunities and challenges
- share insights on approaches currently under investigation
- identify reforms that could be implemented to establish dynamic operating envelopes.

The workstream is led by a DEIP DOE Working Group consisting of representatives from across the energy industry, including Australian Energy Market Commission (AEMC), Australian Energy Regulator (AER), Australian National University (ANU), Australian Renewable Energy Agency (ARENA), Commonwealth Scientific and Industrial Research Organisation (CSIRO), Energy Consumers Australia (ECA), Energy Networks Australia (ENA), SA Power Networks.

Background information and previous workshop summaries on consumer perspectives and national regulatory and policy design issues can be found on the DOE workstream webpage https://arena.gov.au/knowledge-innovation/distributed-energy-integration-program/dynamic-operating-envelopes-workstream/.

WORKING DEFINITIONS

Through prior consultation, the Working Group has adopted the following working definition of DOEs:

> *"Operating envelopes represent the technical limits within which customers can import and export electricity.*
>
> *Dynamic operating envelopes vary import and export limits over time and location based on the available capacity of the local network or power system as a whole."*

Capacity allocation, and the associated principles and models, refers to how the available capacity of the local network or power system is allocated between customers. Several principles and trade-offs will need to be considered when allocating available network capacity, including operating conditions, cost-effectiveness, DER location and capabilities, and equity.

INTRODUCTION

On 12 July 2021, the Working Group brought together over 60 participants from across the industry – consumer groups, networks, research organisations, market bodies, retailers, aggregators and other organisations – to discuss the preferred allocation principles for DOEs.

Participants were asked to discuss opportunities and challenges of two conceptual questions:

Session 1: At what scale should DOEs be applied?

Session 2: How should available capacity be allocated between customers?

Participants also discussed which aspects of these topics would benefit from nationally consistent market and customer-facing elements and how this might be achieved. This document provides a summary of those discussions.

THEMATIC SUMMARY OF GROUP DISCUSSIONS

Where possible, the discussions have been categorised into central takeaway messages and major themes from the day. Many of the comments fell outside of thematic categorisation and have been presented as such. It is important to note that these discussions were relatively conceptual to test ideas and see where stakeholders' thinking are, and are not supported by any costing or modelling.

SESSION 1: LOCATIONAL SCALES FOR DOES

Participants were asked to discuss the opportunities and challenges of four allocation levels:

All customers
All customers on the network get the same capacity allocation.

Zone substation
All customers in a suburb or small group of suburbs get the same capacity allocation.

Local LV area
All customers on the street get the same capacity allocation.

Individual customers
Each customer receives an different capacity allocation that may be different than their neighbour.

Overall, there was in-principle agreement amongst the participants that no single allocation level was ideal, nor was there a one-size-fits-all approach. Out of the models provided, the local LV area was often discussed as a sensible middle ground. Participants suggested that a hybrid approach may be appropriate to balance factors such as network need, equity and economic outcomes. However, there was strong agreement from the participants that an evidence-base is necessary for further decision-making on preferences.

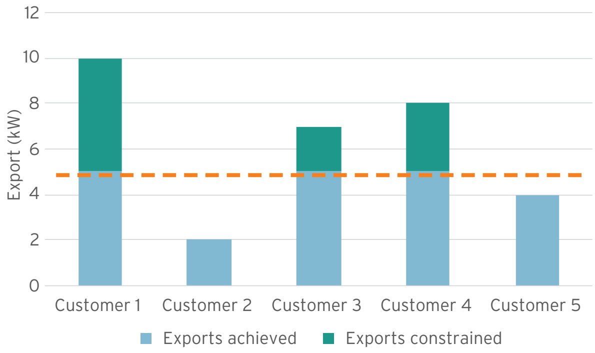
It was typically considered prudent that each DNSP should start with a baseline model applied to all customers on the network, and incrementally increase the sophistication of the allocation levels as required and/or capable.

Similarly, discussions on a national minimum standard generally supported beginning with a baseline model that encompasses all customers, and increases in sophistication as the benefit was identified. Alternatively, some participants felt that rather than national consistency, there could be a minimum allocation level that all DNSPs must at least calculate to (e.g. zone substation), assuming it is reasonable and possible for them to do so.

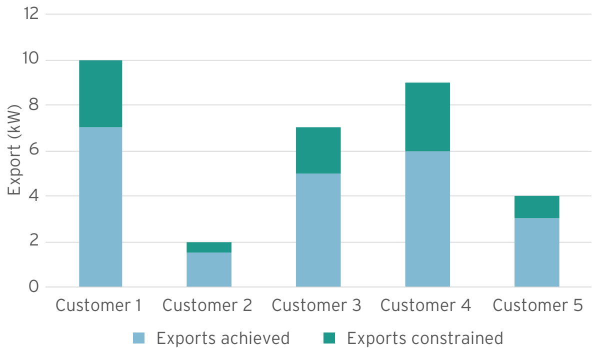
KEY THEMES		
AGGREGATION LEVEL	**IDENTIFIED OPPORTUNITIES**	**OTHER CONSIDERATIONS**
All customers	**Simplicity** › Start with all customers and work towards the right allocation level as capabilities increase. › Simplicity would aid in gaining customer trust, as well as being cost-effective. **Fairness** › Costs are currently borne by all consumers, not just those who export. Therefore, we should apply the least-cost approach unless the allocation costs can be applied to exporting customers only.	**Efficiency** › There is the potential for very conservative allocations that are based on the most constrained parts of the network. › This is effectively a blunt instrument that misses the potential efficiencies of granularity. › This level doesn't account for network circumstances. **Costs** › Potentially expensive, depending on the envelope.
Zone substation	**Efficiency** › This level takes into account the zone substation conditions, and allows for updating as zone substation equipment is upgraded. › Provides a good balance between efficiency and communication. › Aligns with the community energy/ battery value proposition. **Combinations** › Combining the zone substation and local LV areas could be a good compromise, depending on the trade-off between efficacy and cost. It absolutely needs to be local enough to be responsive to network capacity and end-user demands, and to properly incentivise DER investment.	**Fairness** › Allocation limits are likely to be higher in regional areas, which may present equity issues. **Efficiency** › Unlikely to be useful at this level.
Local LV area	**Efficiency** › Allows for greater efficiency and optionality. › Also aligns with the community energy/ battery value proposition. **Equity** › Balance between individual allocation and broader allocation provides equity at a 'street' level. **Customers** › Relatively easy to discuss allocation (e.g. transformer is X, there are Y customers, therefore X/Y). › Potentially easier to explain to customers. **Complexity** › Natural junction between HV and LV networks which can be more easily supported by network data. › Computationally feasible, technically closer linked to effective network limits.	**Complexity** › More difficult to implement, relative to the above options. › Complex for customers to understand. **Fairness** › Potential for gaming of capacity.
Individual customer	**Customers** › Enables maximum opportunity for DER assets to participate in future markets. › Has the potential to provide strong benefits to customers. **Efficiency** › Takes into account instantaneous high power usage (e.g. EV charging). › Enables customers to offer additional services to manage network issues. › Opens up opportunities to tailor allocation models (e.g. pay-for-more allocation). › NMI-level makes sense for the network, as the available capacity may be calculated at higher levels but the NMI-level is ultimately what would be published, and would change as new investment and data sources become available.	**Customers** › Potentially complex for customers to understand. › Inequity would be highly visible. › Places a potential burden of choice and complexity on customers. › There need to be clear and strict customer protections. **Fairness** › There is the potential for unequal allocations, especially for customers at the end of feeders. **Efficiency** › Potentially no trade-off or increase in cost to implement envelopes at this level. **Complexity** › Potentially very complex to calculate and/or implement.

SESSION 2: CAPACITY ALLOCATION MODELS

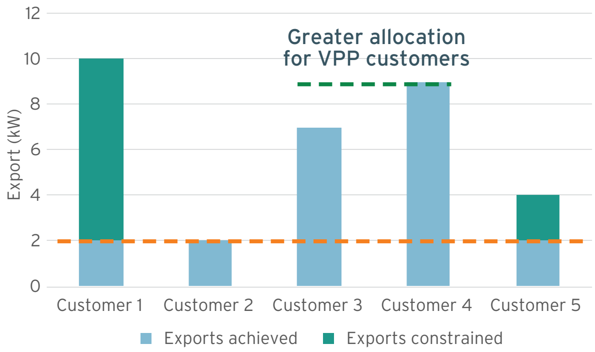
Participants were next asked to discuss the opportunities and challenges of four allocation models:

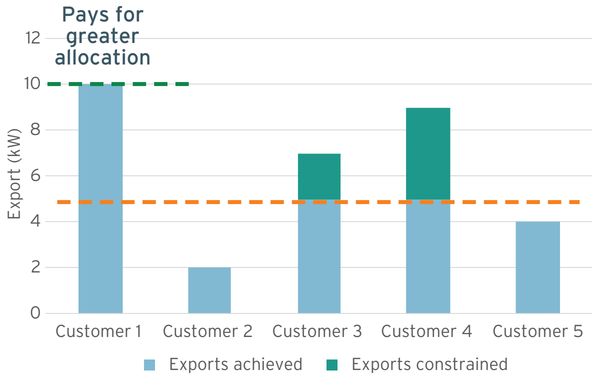


Equal allocation
All customers receive the same capacity allocation, regardless of their system size.



Proportional allocation
Customers are constrained by a proportion of their system size (i.e. larger systems receive greater allocation).





There was in-principle support from participants for allocation models based on equal or proportional methods. In contrast, there was opposition to the value-based and pay-for-more options, primarily based on equity concerns. Participants also discussed a fifth allocation model based on a purely technical (i.e. export based) optimisation of DOEs. This would be a simpler version of the value-based model, and would have the benefit of not requiring a party to decide on what "value" was. However, this model may impact customers disproportionately depending on the capabilities of installed systems.

With regard to implementation, complexity and national standards were consistently raised. Participants noted a preference for a nationally consistent approach to technology, customer protection and governance, and a desire to start simple and build greater complexity when required or justified.

A number of additional questions were raised, including: whether the capacity covered by a DOE applies to a customer's entire site/meter or only the DER that is controllable; whether customers will be able to trade their capacity; and what is communicated to customers about what they receive if they sign up for DOEs.

<table>
<tr><th colspan="3">KEY THEMES</th></tr>
<tr><th>ALLOCATION MODEL</th><th>IDENTIFIED OPPORTUNITIES</th><th>OTHER CONSIDERATIONS</th></tr>
<tr><td>Equal allocation</td><td>Fairness
› Equal allocation is preferred if we expect a market will develop to help consumers pay for more themselves, in a more competitive setting.
› Open access should be the starting principle.
Communication
› Easy to communicate.
Efficiency
› This model seems to have the clearest connection with the actual network constraint, so it's potentially the most cost-reflective and defensible.
Incentives
› Provides good incentive to participate, assuming it doesn't come at the expense of those who choose less or no to participate.
› Consumers will be able to sell their excess capacity if they wish, so this isn't necessarily inefficient - and consumers will receive the value directly.</td><td>Fairness
› Would these allocations also be equal for C&I customers? Does 10kW get the same allocation as 100kW?
› The degree of grandfathering. Are these options just for new connections or for all connections?
Efficiency
› Network hosting capacity would be underutilised.
› If this is dynamic, why can it not be flexible if the network can accept greater exports at a certain time?
› Interaction with network support unclear
› Arbitrary when network constraints should be managed by procurement service from DER.
› How will greater battery/EV penetration in the future impact this model?
Simplicity
› Basic access and pay-for-more is similar to current principles of demand now, just in reverse.
› Allocations can change over time. Can start simple then make more complex.</td></tr>
<tr><td>Proportional allocation</td><td>› The model could work if there was a floor to prevent small systems (under an identified threshold) from being limited.</td><td>Fairness
› This may prevent fairness concerns if customers can't afford larger systems. This may only benefit high-wealth customers that can afford larger systems.
› This model appears to leave the outcome to a previous investment decision (i.e. system size), which is not necessarily equitable.
› What about those who don't have DER?
Efficiency
› This model encourages oversizing systems to maximise export allocation.
› This model appears to muddle price signals on the value of the service.
› Is system size the right metric? Should it be tied to average export?
Implementation
› Can allocation be real-time adjusted to ensure maximum aggregate allocation achieved?
› Does this apply to all DER assets and devices, or only controllable loads?
Customers
› Certainty of access and payback is important to customers.</td></tr>
<tr><td>Value-based allocation</td><td>Fairness
› This model makes sense to be fair to all, but the value judgement may change
› This model seems most closely aligned with the NEO
› This model could be a fair default for customers who don't wish to pay for more or participate.
Efficiency
› This model is preferable to equal allocation because it accounts for system and service value.
› Good for VPPs.
› VPPs earning more revenue could use this model to pay for access.</td><td>Fairness
› Those who cannot participate in VPP, or provide other high-value services, may be disadvantaged.
› Not sure if this is fair for everyone else.
Efficiency
› How would 'value' be defined? What criteria would be needed? Who defines the value? How is it determined?
› This option is too complex and prescriptive.
› Difficult to value services per customer, and may be oversimplified.
› How will multiple benefit streams be balanced?
› When constraints are binding, energy may not be that valuable (other than non-energy services like FCAS raise).
› Basing total stack on rated system size reduces the incentive for customers to invest to optimise.</td></tr>
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KEY THEMES		
ALLOCATION MODEL	**IDENTIFIED OPPORTUNITIES**	**OTHER CONSIDERATIONS**
Pay-for-more allocation	Simplicity › This model may be beneficial for C&I customers (nb: there is already the option to negotiate). Efficiency › This approach lines up value with cost. › Enables the market to price allocation. › The value proposition to customers will determine whether they participate or not. Fairness › If this model does't negatively impact the 'equal' allocation, then it is the fairest as it simply allows a customer to purchase more if they have the capacity.	Fairness › There are potential equity issues - does this mean those who can afford it could receive a better service, and those who can't therefore miss out? › This model advantages customers with the greater awareness and pay the most attention (e.g. will my FiT cover the extra cost to pay-for-more allocation?) › This is the least desirable as it incentivises more resources being made available for wealthier customers. › While it is assumed that other customers wouldn't be penalised for not paying-for-more allocation, there will always be limited resources. › Will those who don't export be cross-subsidising? › Should customers be required to pay for more allocation if their assets are able to contribute (more) to network services? › Customers have already paid for a certain amount of export capacity, either through a standard connection agreement (i.e. mostly ✣ 5kw) or a negotiated connection agreement, in which they have paid for exactly the level of export they need. › This will have a disproportionate impact depending on the location (e.g. customers at the end of the feeder will need to pay more than customers closer to the transformer due to impact on others allocation). Implementation › This model is not flexible, as it implies that the network has been augmented to provide greater export capacity, and if that's the case why hasn't it been offered to the other customers? › If the network has not been augmented, then where does the extra capacity come from (if other customers aren't penalised)? › Who are customers buying the additional capacity from? Is this the same concept as equalalloction but the network controls the trading, not the aggregator/ retailer? › How will the amount be determined? How to determine the base level of access?

NEXT STEPS

The DEIP DOE Working Group will consider the findings of this workshop and prior activities to inform future steps for the workstream.

Ongoing DOE activities include:

- Review of current and proposed DOE settings, parameters and approaches by DNSPs. This review will seek to identify the key features of the DOEs that each DNSP is implementing or planning to implement. The objective of this work is to identify common approaches and share opportunities for alignment and harmonisation of approach.
- Customer Energy Management System review will investigate and demonstrate effective coordination across multiple behind-the-meter (BTM) devices through a single Customer Energy Management System (CEMS). The review will build a better understanding of the BTM environment. This work is focused on the coordination of multiple BTM resources at the customer connection point, as opposed to Virtual Power Plant (VPP) and device level optimisation. The purpose of this investigation is to identify how to unlock the consumer benefits associated with CEMS, understand the key gaps and barriers preventing the deployment of CEMS, and review CEMS options and customer choice.

It has also been noted by the participants that further in-depth customer engagement and modelling are necessary to better understand the conceptual models discussed at this workshop.

In the next stages of the DOE work program, we also intend to undertake a review of how customers may interact with DOEs as well as the regulatory requirements that should sit around DOEs.

Background information and previous workshop summaries can be found on the DOE workstream webpage https://arena.gov.au/knowledge-innovation/distributed-energy-integration-program/dynamic-operating-envelopes-workstream/.

Further information is available at
arena.gov.au

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