

# DER Market Integration Consultative Forum



25 August 2022



We acknowledge the Traditional Owners of country throughout Australia and recognise their continuing connection to land, waters and culture.

**We pay respect to their Elders  
past, present and emerging.**

# AEMO Competition Law Meeting Protocol



AEMO is committed to complying with all applicable laws, including the Competition and Consumer Act 2010 (CCA). In any dealings with AEMO regarding proposed reforms or other initiatives, all participants agree to adhere to the CCA at all times and to comply with this Protocol. Participants must arrange for their representatives to be briefed on competition law risks and obligations.

Participants in AEMO discussions **must**:

- Ensure that discussions are limited to the matters contemplated by the agenda for the discussion
- Make independent and unilateral decisions about their commercial positions and approach in relation to the matters under discussion with AEMO
- Immediately and clearly raise an objection with AEMO or the Chair of the meeting if a matter is discussed that the participant is concerned may give rise to competition law risks or a breach of this Protocol

Participants in AEMO meetings **must not** discuss or agree on the following topics:

- Which customers they will supply or market to
- The price or other terms at which Participants will supply
- Bids or tenders, including the nature of a bid that a Participant intends to make or whether the Participant will participate in the bid
- Which suppliers Participants will acquire from (or the price or other terms on which they acquire goods or services)
- Refusing to supply a person or company access to any products, services or inputs they require

Under no circumstances must Participants share Competitively Sensitive Information. Competitively Sensitive Information means confidential information relating to a Participant which if disclosed to a competitor could affect its current or future commercial strategies, such as pricing information, customer terms and conditions, supply terms and conditions, sales, marketing or procurement strategies, product development, margins, costs, capacity or production planning.

# Today's meeting



Time	Item	Speaker
11:00 – 11:05	Welcome and introductions	Emily Pang (AEMO)
11:05 - 11:30	Project EDGE Trial Update & Market Suspension Tests Results	Nick Regan (AEMO)
11:30 – 12:15	DOE Objective Functions	Dr James Naughton, Prof. Pierluigi Mancarella (The University of Melbourne)
12:15 – 12:25	Q&A	All
12:25 – 12:30	Future Meetings & Close	Emily Pang (AEMO)

# Project EDGE Trial Update

Nick Regan (AEMO)



# Project EDGE update

## Current position

- Finalising stakeholder feedback into final CBA methodology
- Two new aggregators being onboarded for participation from September
- Ongoing customer acquisition (including additional) C&I customers
- Providing update on DOE Objective Functions study

## Key upcoming activities

- Publication of CBA Methodology Consultation Paper
- Further consultation on data exchange problem statements and use cases
- Wider sharing of results from Market Suspension tests
- Ongoing results analysis and input into reform

# Market Suspension Preliminary Results

Nick Regan (AEMO)



# EDGE Market Suspension field tests

- To operate the system AEMO needs:
1. **Visibility:** Telemetry in real time
  2. **Predictability:** Generator forecasts
  3. **Controllability:** Dispatch instructions
  4. **Measurement:** Telemetry (settlement)



The AEMO, AusNet and Mondo team reacted quickly to establish a test plan to learn from this rare event

## Why specific Market Suspension tests?

In Market Suspension AEMO was directing large scale generators.  
What should this look like in a high DER future (via VPPs)?

Hypothesis 1:  
 AEMO Dispatch Instructions that give a 'target' are more reliable than DOEs which give 'permissible limits'.

Hypothesis 2:  
 These two signals together will conflict at times and this needs to be understood to be managed in future operations.

## What did we do?

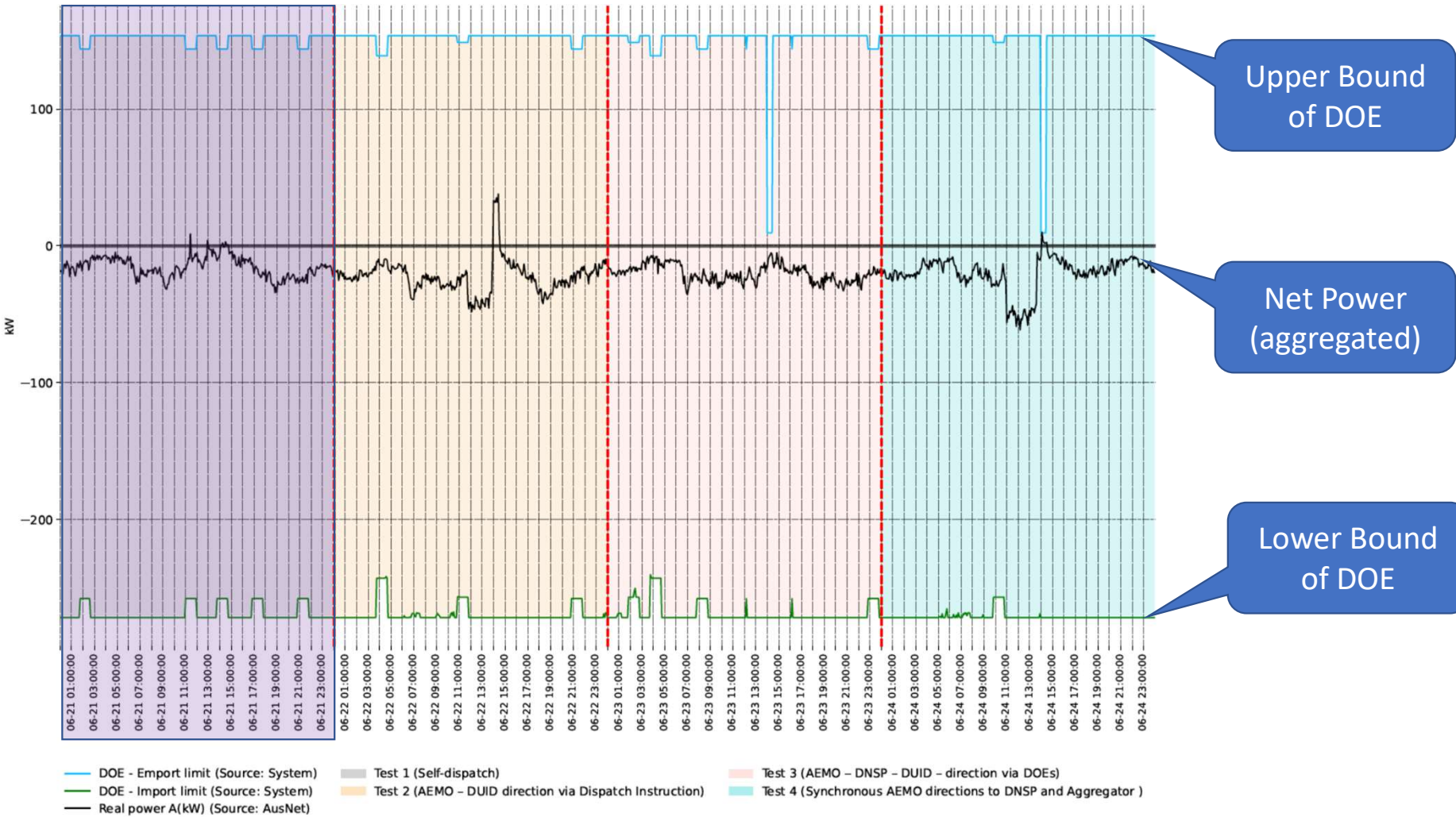
Test	Summary
<b>Test 1</b> Self-Dispatch (no AEMO direction)	<ul style="list-style-type: none"> <li>• In lieu of capability to dispatch VPPs at scale ('Controllability') i.e current state, AEMO needs visibility (telemetry) and predictability (forecasts via boffers) to consider when directing large scale resources</li> <li>• <b>Q: What do VPPs do without AEMO direction?</b></li> </ul>
<b>Test 2</b> AEMO -> DUID direction via Dispatch Instructions	<ul style="list-style-type: none"> <li>• Under market suspension AEMO instructs generators/loads test is for future where controllability exists for VPPs (i.e test will provide setpoints for aggregators to follow).</li> <li>• <b>How reliably can VPPs follow AEMO directions that differ from market incentivised behaviour?</b></li> </ul>
<b>Test 3</b> AEMO -> DNSP -> DUID direction via DOEs	<ul style="list-style-type: none"> <li>• Currently AEMO instructs NSPs to maintain a profile within their network, NSPs currently do this by shedding load or generation.</li> <li>• <b>Are DOEs a better mechanism than directing VPPs under a non-market use case (e.g market suspension) ?</b></li> </ul>
<b>Test 4</b> Synchronous AEMO directions to DNSP and Aggregator (Test 2+3)	<ul style="list-style-type: none"> <li>• Testing synchronous instructions from AEMO to DNSP and Aggregator to see if this helps reduce potential conflicts. Test 2 &amp; Test 3 together.</li> <li>• <b>Is it worth building capability to do both mechanisms for redundancy?</b></li> </ul>

Findings to be shared in coming weeks and relate to some gaps as highlighted in [the Engineering Frameworks Paper<sup>1</sup>](#)

<sup>1</sup> At <https://aemo.com.au/-/media/files/initiatives/engineering-framework/2021/nem-engineering-framework-march-2021-report.pdf?la=en&hash=3B1283D31B542115CC56E0ECCDFB3D69>



# Test 1 – Actual Net Active Power from Portfolio



Upper Bound of DOE

Net Power (aggregated)

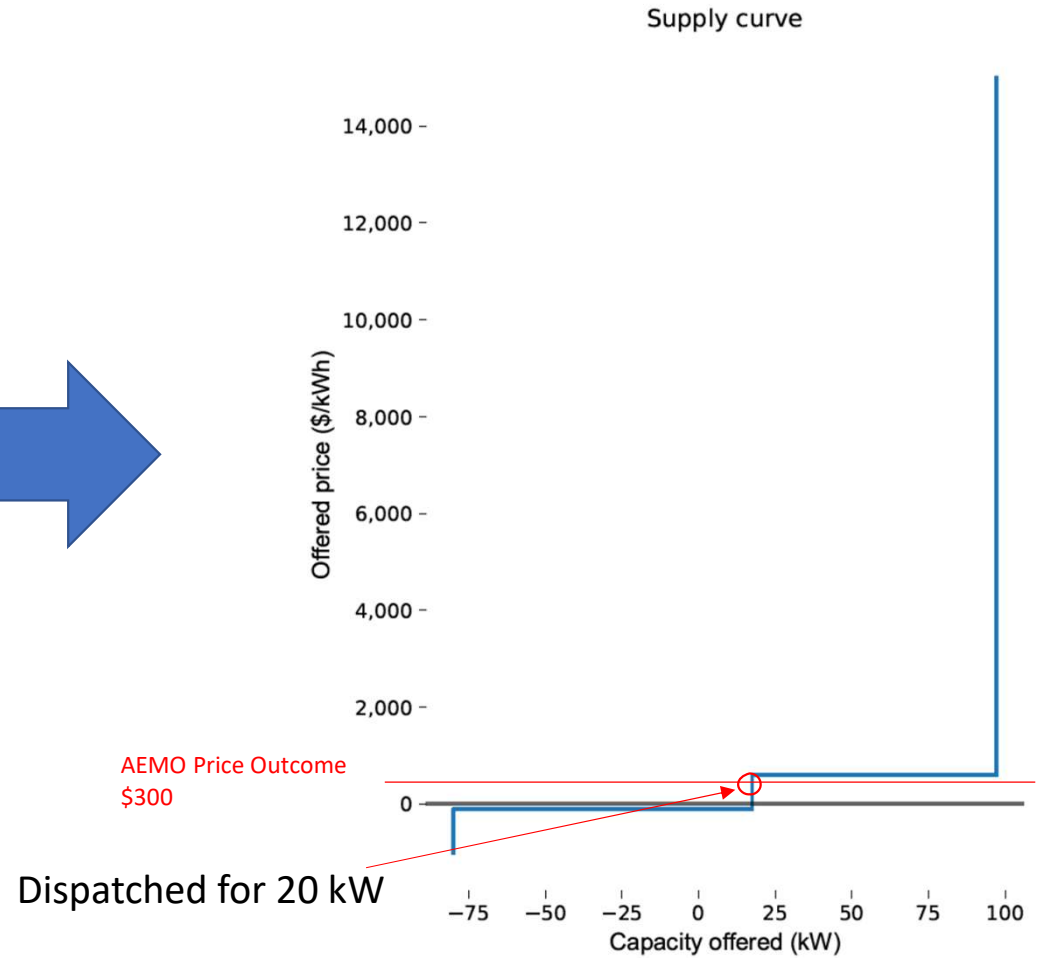
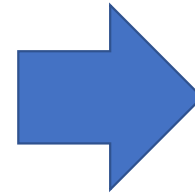
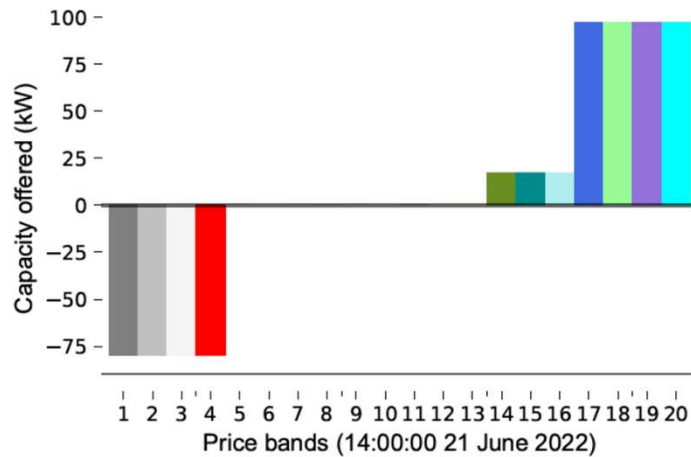
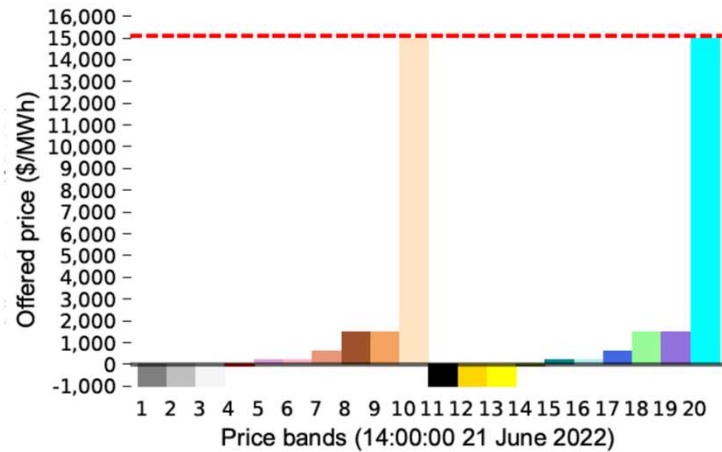
Lower Bound of DOE

## Test 1

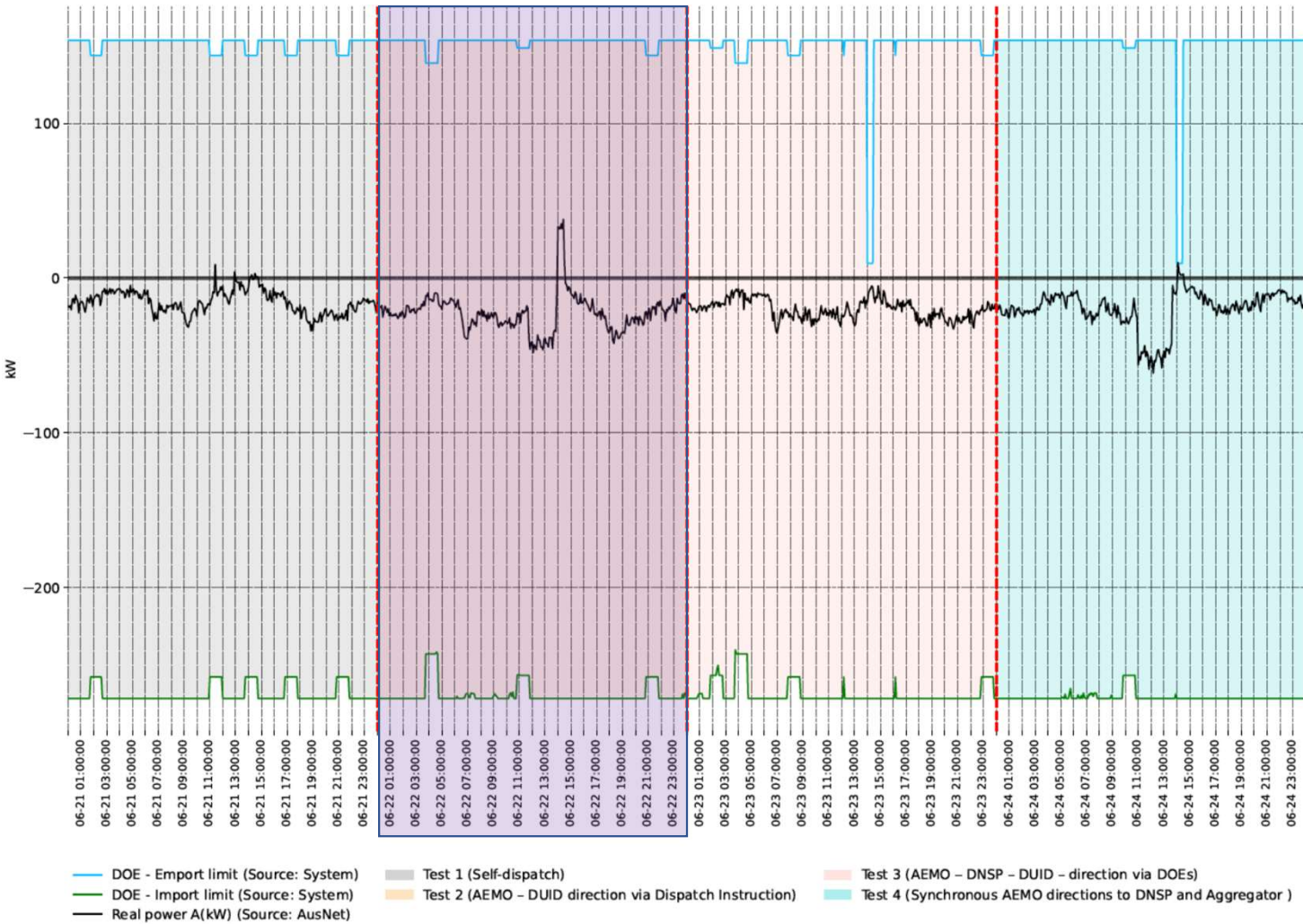
### Q: What do VPPs do without AEMO direction?

#### Self-Dispatch (no AEMO direction)

In lieu of capability to dispatch VPPs at scale ('Controllability') i.e current state, AEMO needs visibility (telemetry) and predictability (forecasts via boffers) to consider when directing large scale resources



# Test 2 – Actual Net Active Power from Portfolio

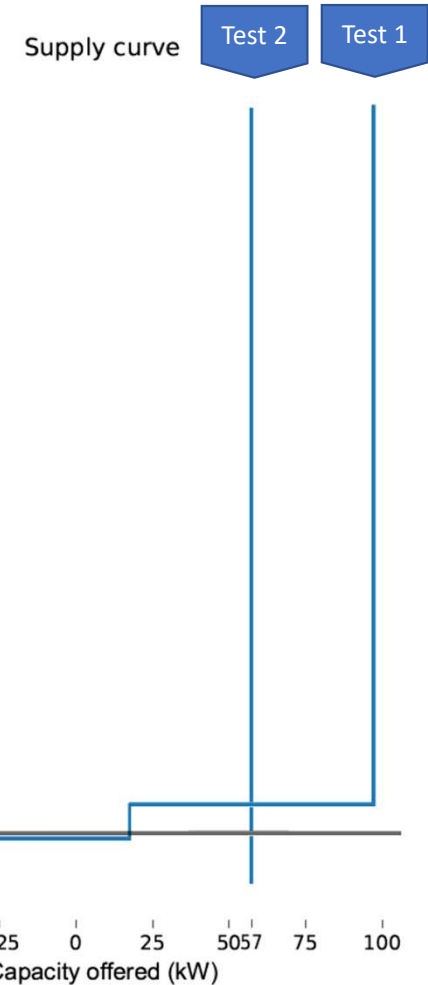
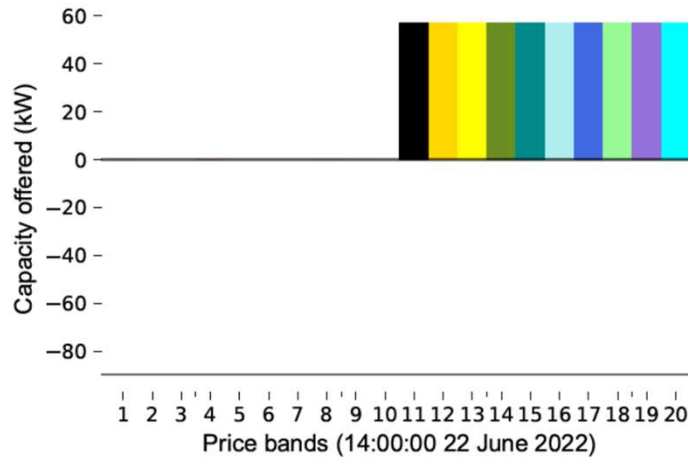
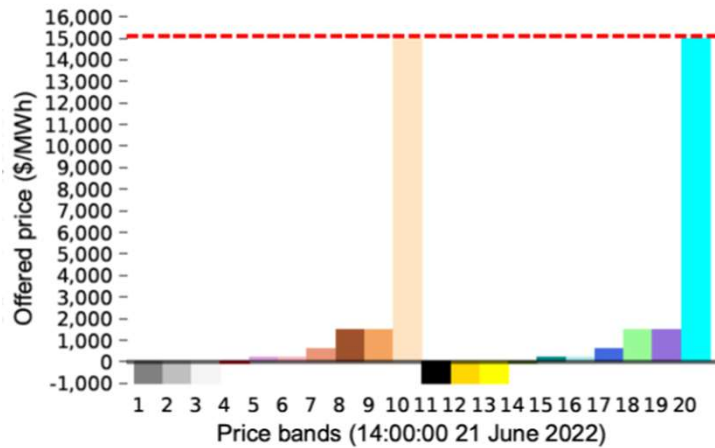


## Test 2

### Q: How reliably can VPPs follow AEMO directions that differ from market incentivised behaviour?

AEMO -> DUID direction via Dispatch Instructions

Under market suspension AEMO instructs generators/loads test is for future where controllability exists for VPPs (i.e test will provide setpoints for aggregators to follow).



Finding Question:  
How should boffers which  
have been directed by AEMO  
be formed.

Trial simulated a directions  
for 57kW of flexible export  
from 14:00-14:30.

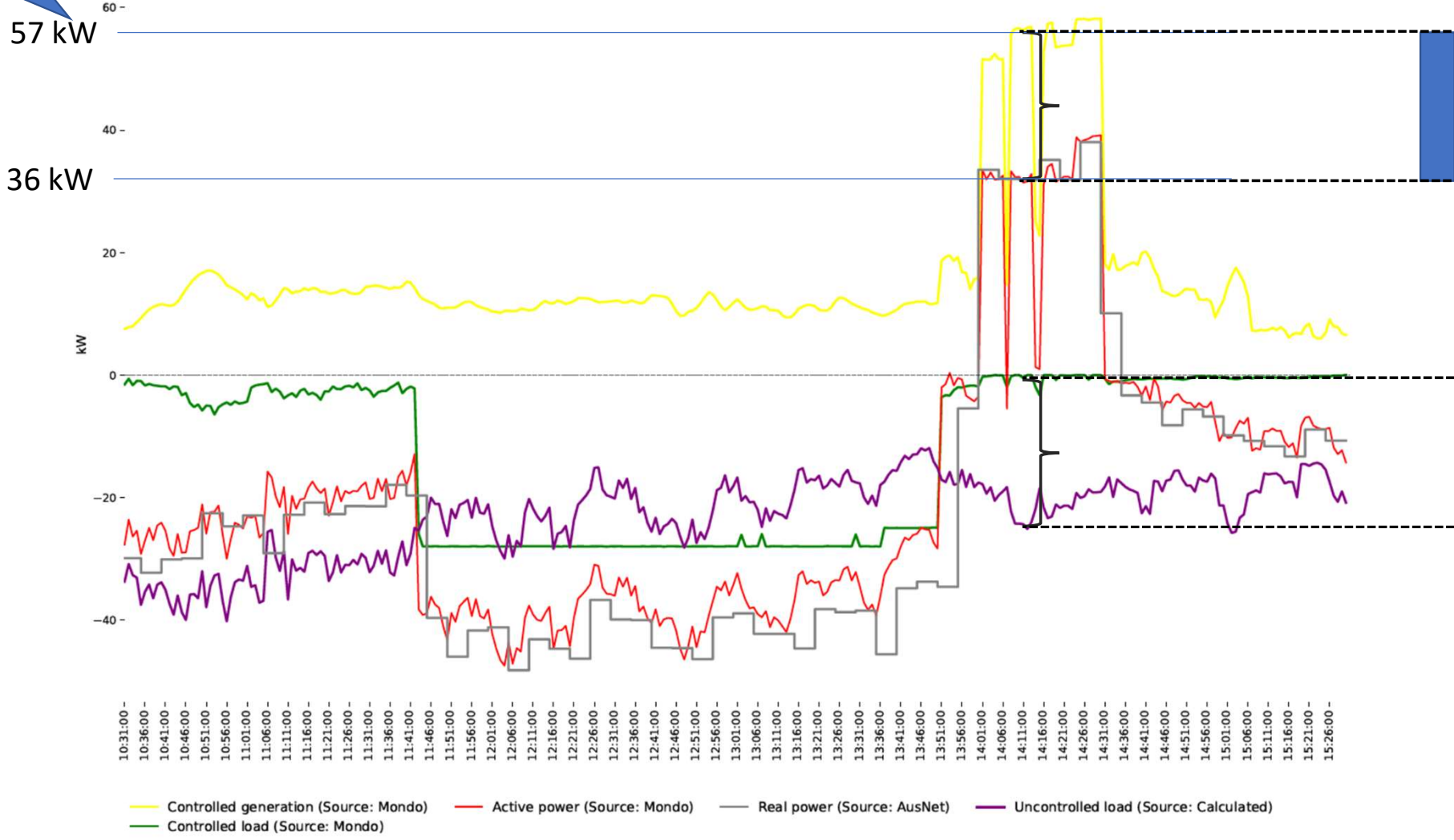
Energy Fixed Loading a better  
Boffer?

# Trial simulated a directions for 57kW of flexible export from 14:00-14:30.



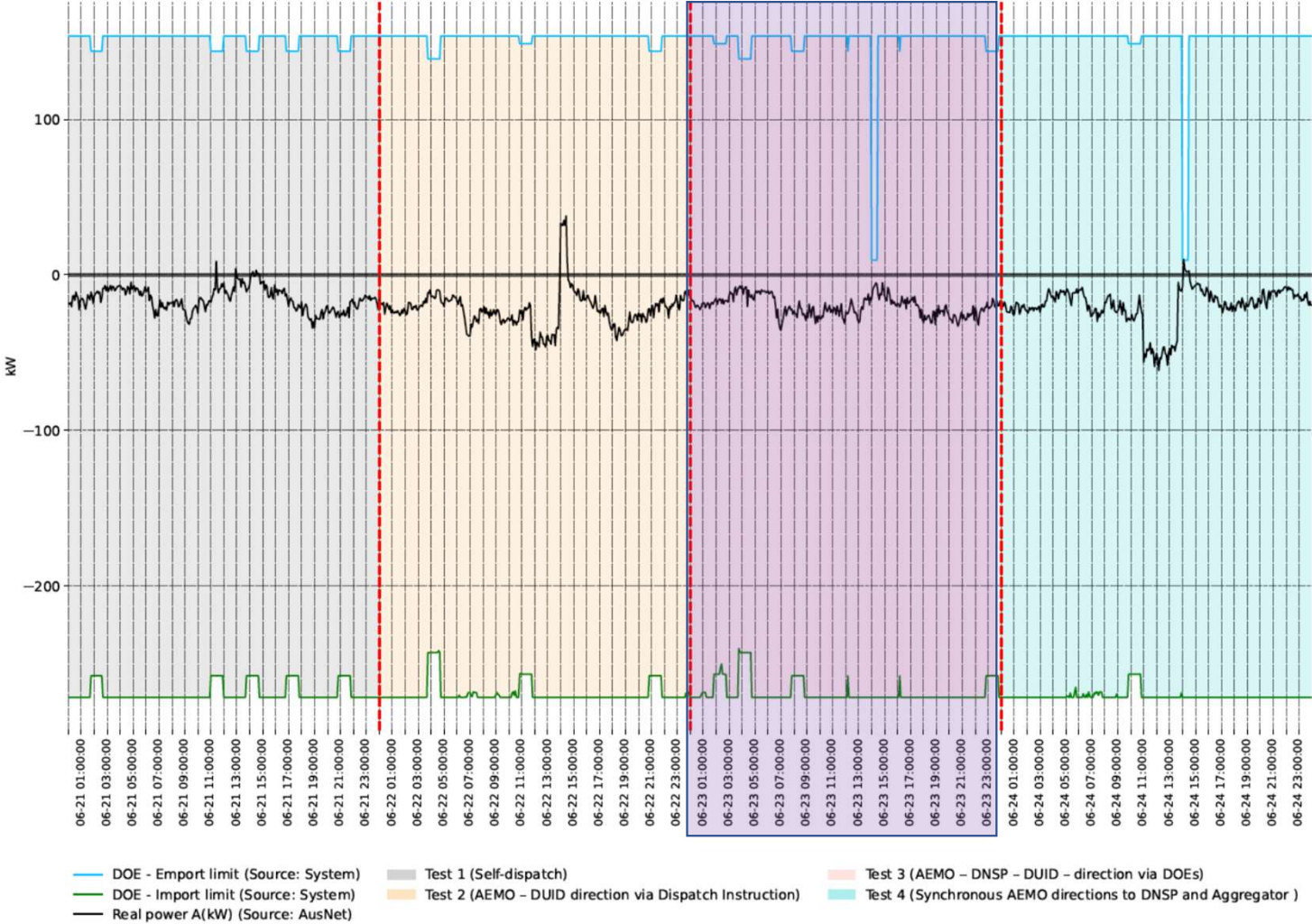
Flexible Target achieved

Test 2: AEMO - DUID direction via Dispatch Instruction (22 June 2022)



Difference between Flex and Net equals the amount of non-controlled load

# Test 3 – Actual Net Active Power from Portfolio

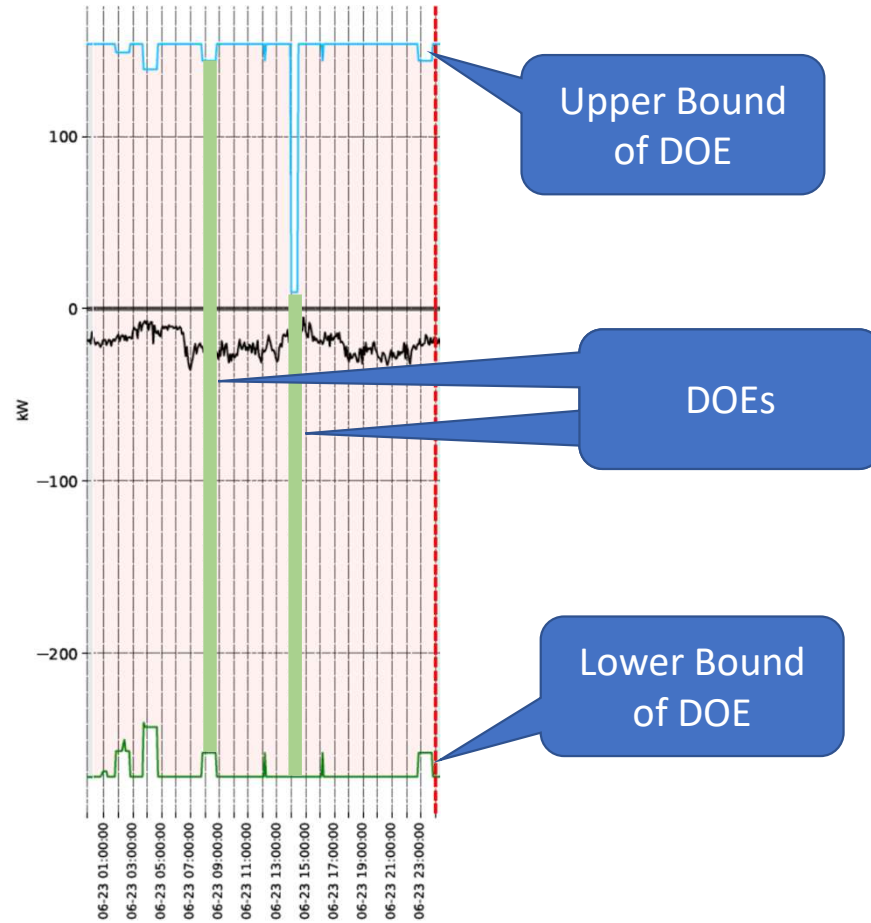


### Test 3

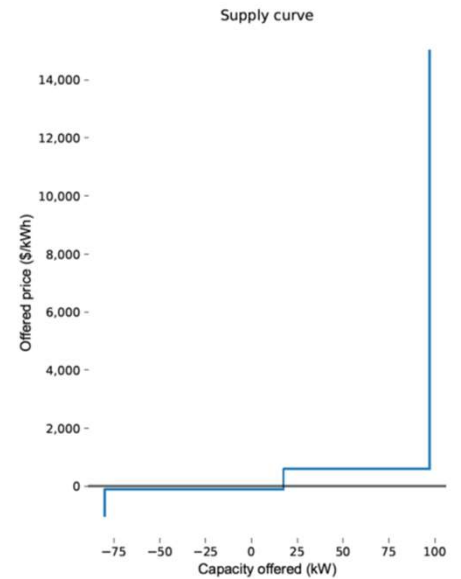
Q: Are DOEs a better mechanism than directing VPPs under a non-market use case (e.g market suspension) ?

AEMO → DNSP → DUID direction via DOEs

Currently AEMO instructs NSPs to maintain a profile within their network, NSPs currently do this by shedding load or generation.



**Hypothesis 1:**  
 AEMO Dispatch Instructions that give a 'target' are more reliable than DOEs which give 'permissible limits'.



# Test 3 – Actual Telemetry Active Power from Portfolio

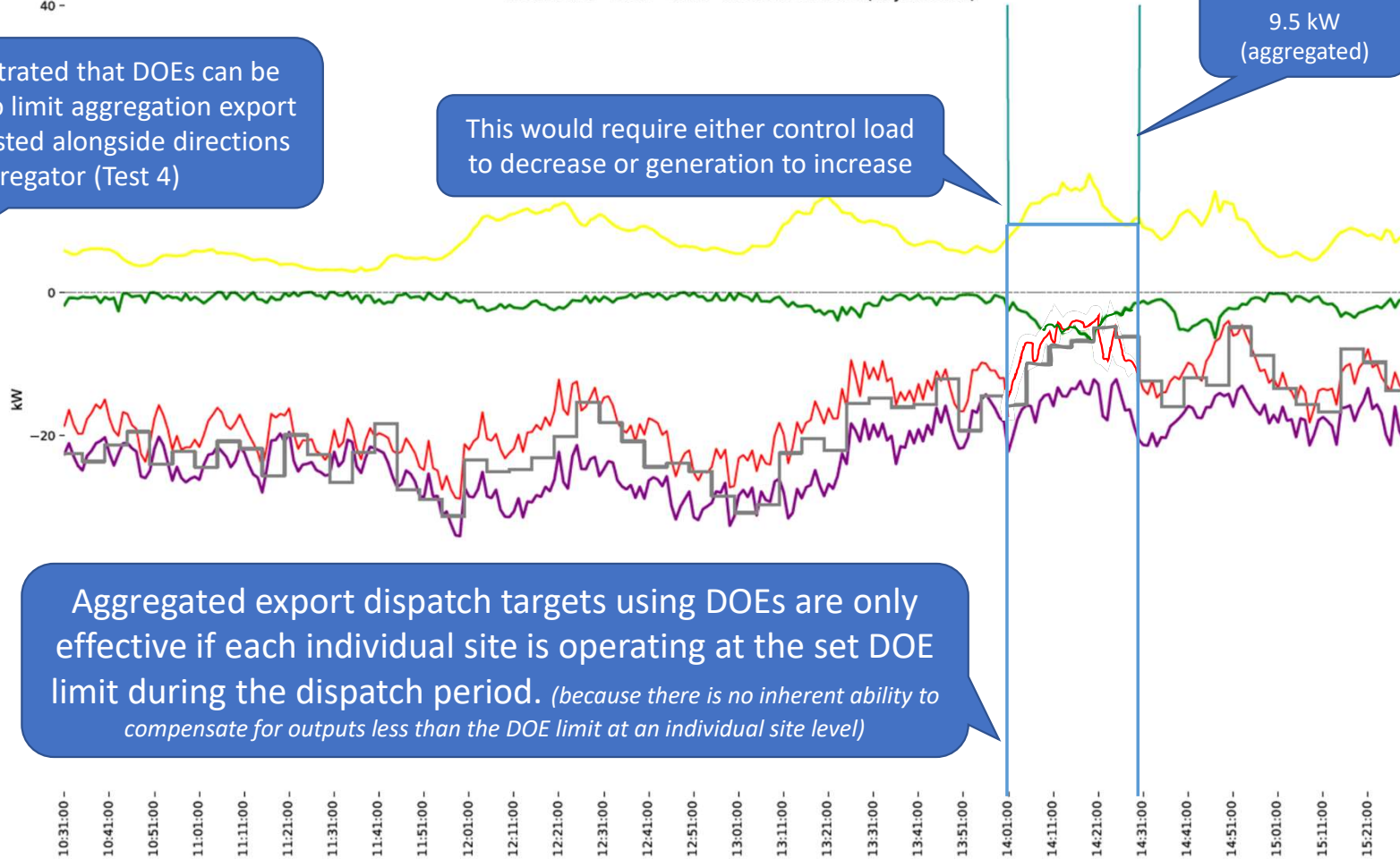
40 -

Test 3: AEMO – DNSP – DUID – direction via DOEs (23 June 2022)

Test 3 demonstrated that DOEs can be set calculated to limit aggregation export and this was tested alongside directions to aggregator (Test 4)

This would require either control load to decrease or generation to increase

DOEs  
9.5 kW  
(aggregated)

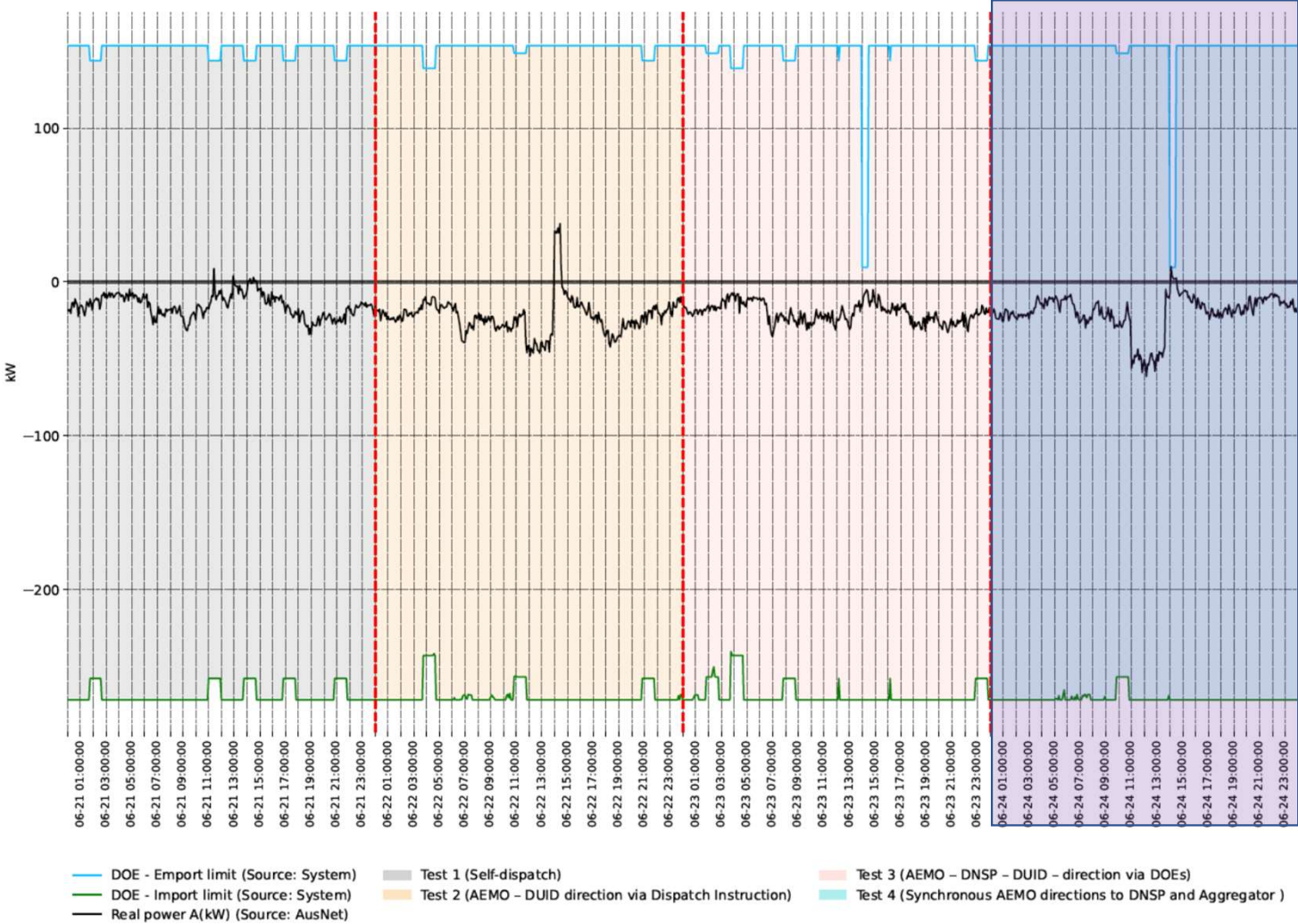


Aggregated export dispatch targets using DOEs are only effective if each individual site is operating at the set DOE limit during the dispatch period. *(because there is no inherent ability to compensate for outputs less than the DOE limit at an individual site level)*

- Controlled generation (Source: Mondo)
- Controlled load (Source: Mondo)
- Active power (Source: Mondo)
- Real power (Source: AusNet)
- Uncontrolled load (Source: Calculated)
- DOE: Export limit (Source: System)



# Test 4 – Actual Net Active Power from Portfolio

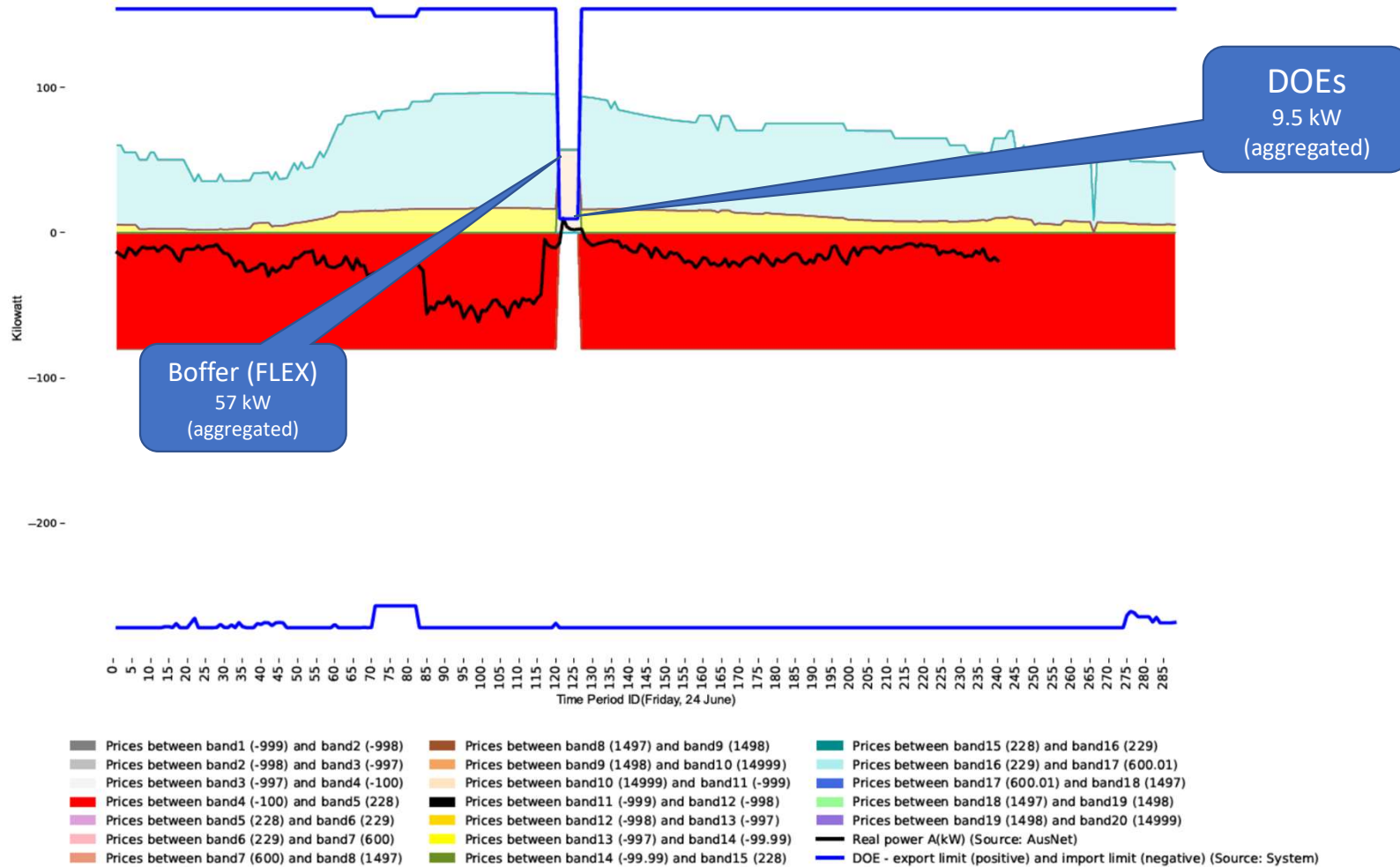


## Test 4

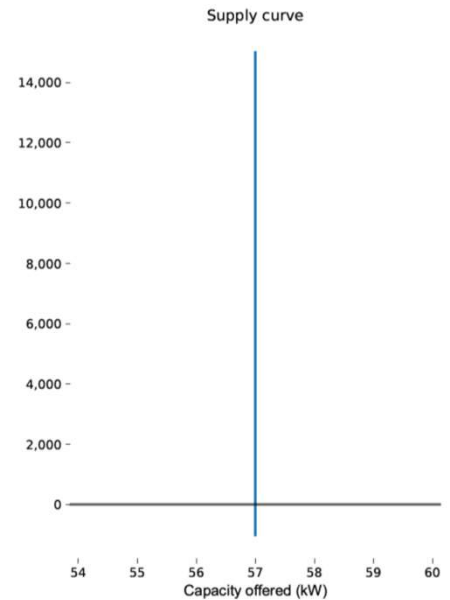
### Q: Is it worth building capability to do both mechanisms for redundancy?

#### Synchronous AEMO directions to DNSP and Aggregator (Test 2+3)

Testing synchronous instructions from AEMO to DNSP and Aggregator to see if this helps reduce potential conflicts. Test 2 & Test 3 together.



Hypothesis 2:  
These two signals together will conflict at times and this needs to be understood to be managed in future operations.



# Trial simulated directions for 57kW of flexible export from 14:00-14:30.



Test 4: Synchronous AEMO directions to DNSP and Aggregator (24 June 2022)

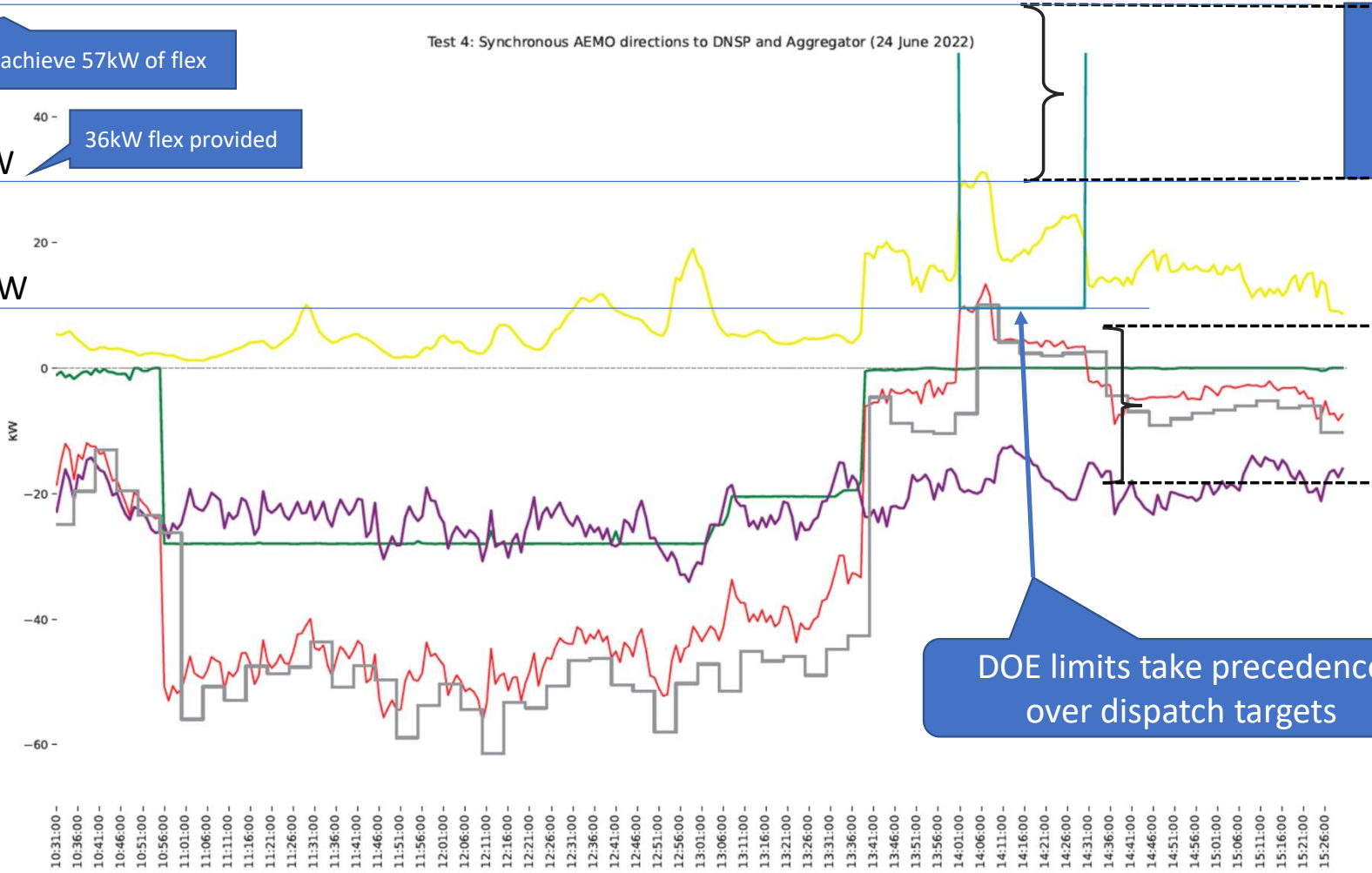
57 kW

Unable to achieve 57kW of flex

36 kW

36kW flex provided

9.5 kW



DOE limits take precedence over dispatch targets

Reduction in Flex achievement caused by the DOE limits and uncontrolled load

- Controlled generation (Source: Mondo)
- Active power (Source: Mondo)
- Uncontrolled load (Source: Calculated)
- Controlled load (Source: Mondo)
- Real power (Source: AusNet)
- DOE: Export limit (Source: System)

# EDGE Market Suspension field tests

To operate the system AEMO needs:

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The AEMO, AusNet and Mondo team reacted quickly to establish a test plan to learn from this rare event

## Why specific Market Suspension tests?

In Market Suspension AEMO was directing large scale generators.  
**What should this look like in a high DER future (via VPPs)?**

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## Key take aways

- 1) Aggs can hit intervention targets when directed
- 2) DNSP can calc DOEs to achieve a set point under certain conditions
- 3) DOEs take priority to keep network within operating limits
- 4) In designing directions to VPPs in future, AEMO needs to consider DOEs so that aggregators do not receive unachievable targets (test 4).
- 5) Visibility of DOEs in Project EDGE was provided by the Data Exchange Hub allowing multiple subscribers to include AEMO and Aggregators.
- 6) Target assessment was only achieved with telemetry of aggregated DER generation and load response ('flex') as opposed to only the site meter (Net NMI)

Findings to be shared in coming weeks and relate to some gaps as highlighted in [the Engineering Frameworks Paper](#)<sup>1</sup>

<sup>1</sup> At <https://aemo.com.au/-/media/files/initiatives/engineering-framework/2021/nem-engineering-framework-march-2021-report.pdf?la=en&hash=3B1283D31B542115CC56E0ECCDFB3D69>

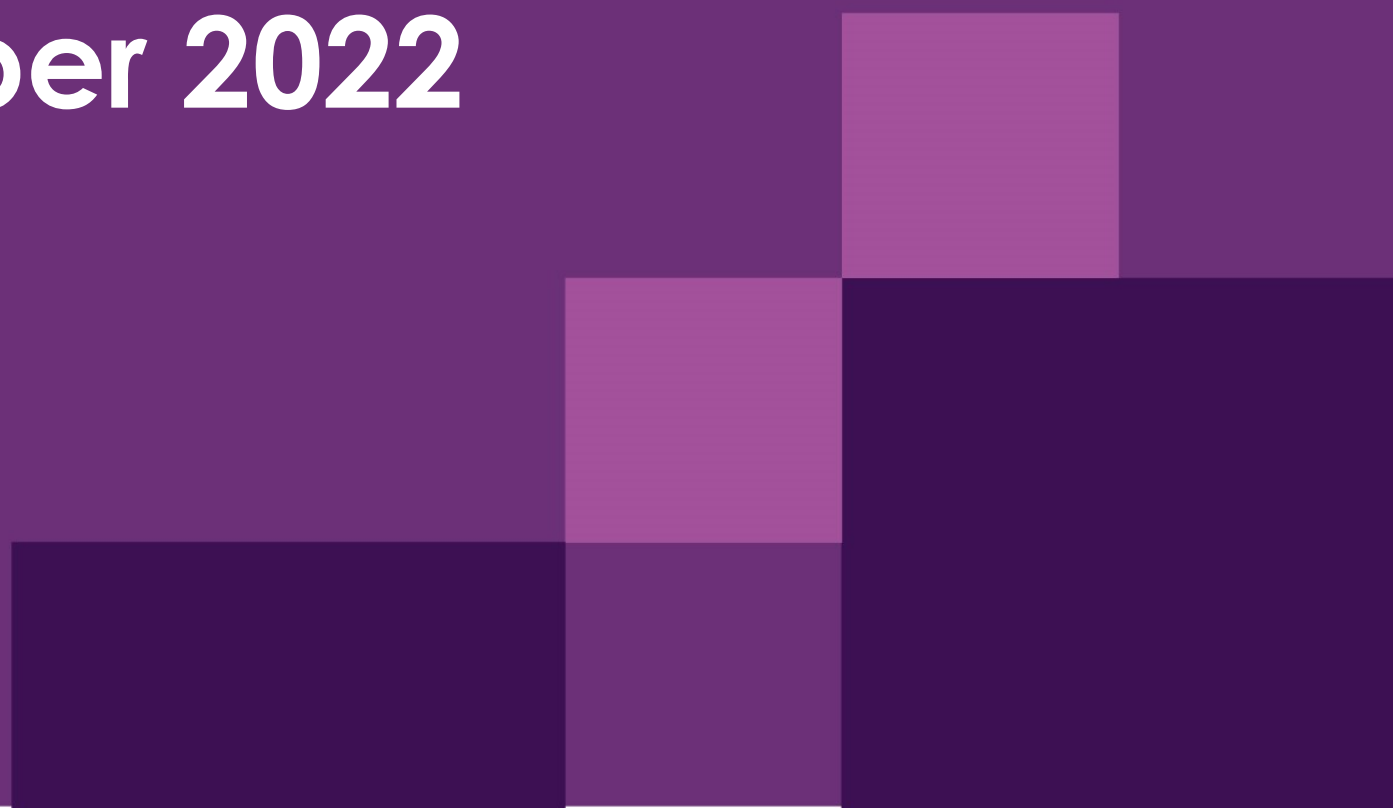
# Any other business





# Next meeting: 22 September 2022

Future Meetings & Close



# Project EDGE Publications

Publications	Publication Date
<a href="#">Project EDGE CBA Methodology Consultation Paper</a>	July 2022
<a href="#">Project EDGE Public Interim Report</a>	June 2022
<a href="#">Project EDGE Customer Insights Study</a>	June 2022
<a href="#">Project EDGE Research Plan</a>	March 2022
<a href="#">Project EDGE MVP Showcase</a>	December 2021
<a href="#">Project EDGE Lessons Learned Report #1</a>	May 2021
<a href="#">Project EDGE Public Webinar #1</a>	March 2021
<a href="#">Project EDGE Factsheet</a>	January 2021

For further news and knowledge sharing publications, please visit the [Project EDGE website](#)

For any questions, comments or feedback please contact: [EDGE@aemo.com.au](mailto:EDGE@aemo.com.au)



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[aemo.com.au](http://aemo.com.au)