

# Capacity valuation method for intermittent generators

ERA's proposed method: rule  
change proposal (updated)

Market Advisory Committee meeting  
17 November 2020



Economic Regulation Authority

WESTERN AUSTRALIA

# Background

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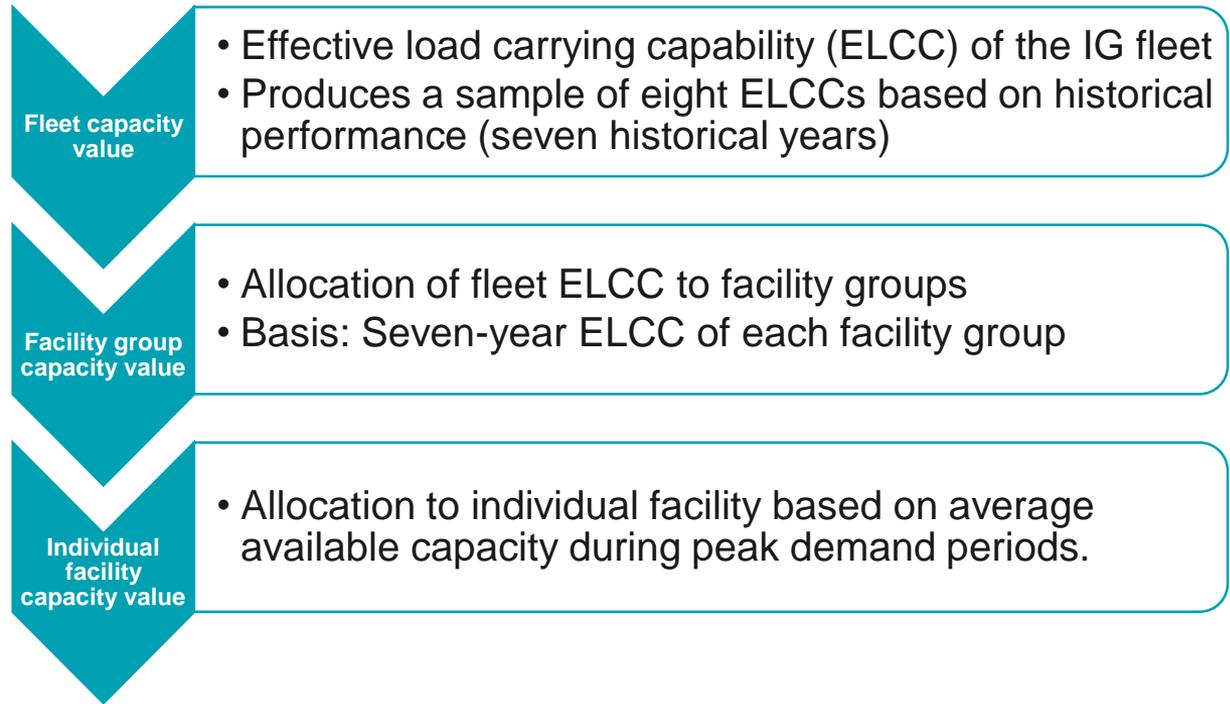
- Relevant level method (RLM): capacity valuation method for IGs
- ERA is responsible for reviewing the RLM
- March 2019, ERA completed its review of RLM
- ERA proposed a new method
  - Basis: measuring contribution to meeting the system adequacy target, while taking into account the evolving capacity resource mix.
  - Best international practice: IEA, IEEE, MISO, California ISO, PJM, UK, Ireland

# Outline of the proposed method

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**Aim:** produce the best forecast for the capacity value of IGs:

- Resource mix
- System demand
- Availability of capacity of IGs
- Cost and availability of data



# Previous pre-rule change proposal

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- July 2019, the ERA presented a pre-rule change proposal to the MAC
- The MAC assigned “high-priority” for the assessment of the rule change proposal.
- There was likely interaction with Government reforms to assign capacity credits in a constrained network access environment that were still in development.
- After consultation with RCP Support, EPWA and AEMO, the ERA decided to delay its submission of the rule change proposal until there was clarity about the reforms.

## ERA updated the rule change proposal in November 2020

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- After receiving EPWA's draft amending rules the ERA prepared an updated version of the rule change proposal.
  - Presented to the MAC for this meeting.
- Changes required because of EPWA's changes are minor
- We improved the proposal: addresses stakeholders' feedback.

# The proposed method - principles

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- **Principle 1**
  - **Consistency with market objectives and planning criterion**
  - Resources receive CRC based on their forecast contribution to meeting the requirement of the planning criterion.
  - The amount of additional demand the system can cover by adding IGs while maintaining the expected frequency of loss of load to one event in 10 years.
  - Uses LOLE of 4 hours in 10 years.

# Principle 1

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- **Improvement:** Calculation of capacity values at the target LOLE=4 hours/10years.
  - Provides a consistent basis upon which capacity values are estimated.
  - Prevents undervaluing the contribution of IGs.
  - Removes part of variation in the sampled capacity values.
- Choice of LOLE=4 is based on the planning criterion requirements; review of practice in other jurisdictions
  - Informed by sensitivity scenarios.

# Sensitivity to LOLE target (2019 RCC)

- Previously based on the observed LOLE
- Observed LOLE has been historically too low.
- At the target LOLE of 24 and 3 hours in ten years, fleet ELCC is larger.

Table 1. Relevant level of the fleet of candidate facilities (2019 reserve capacity cycle)

Relevant Period	Observed LOLE during the Relevant Period (trading intervals)	Relevant Level (MW) based on the observed LOLE during the Relevant Period	Relevant Level (MW), at the target LOLE=24 hours in 10 years during the Relevant Period	Relevant Level (MW), at the target LOLE=3 hours in 10 years during the Relevant Period
2014/15	0.000211915	304	332	324
2015/16	0.011383436	350	422	402
2016/17	0.0000114	239	293	280
2017/18	0.000208193	328	366	355
2018/19	0.000000105	176	238	217
<b>2014–19 (full period)</b>	<b>0.0118</b>	<b>347</b>	<b>384</b>	<b>370</b>

Note: the shaded cells indicate the selected relevant level (capacity value) for the fleet of candidate facilities, which is the smaller of the median of the relevant level for yearly samples and the relevant level for the full-period sample.

# Principles 2 and 3

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- **Principle 2:**
  - **Effect of network constraints are to be excluded** (accounted for through the NAQ process)
- **Principle 3: Transparency**
  - Uses conventional system adequacy assessment explained in detail.
  - Simple but not too simple or arbitrary.
  - Uses data as input comparable to the current method, or otherwise available data.

# Principle 4: practicality and cost

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- **Practicality:**
  - Possible in practice: conventional method
  - Commonly used in other jurisdictions
- **Cost:** ERA does not expect the implementation cost to be prohibitively large
  - Implementation overlaps with AEMO's system reliability assessment models (for ST and MT PASA)

# Input data

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## Expected system demand:

- Previous pre-rule change proposal was based on historical demand data
- Updated proposal includes an improvement

## IGs:

- Historical available capacity of IGs
- Estimated available capacity for new resources
- Audited historical available capacity for components of aggregated facilities.

# Input data...

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## **Scheduled generators, DSM and ESR:**

- Expected outages (ESR and Scheduled generator)
- Scheduled generators: rated capacity at 41 C (clause 4.11.1(a))
- DSM: expected CRC
- ESR: maximum discharge capability during the obligation interval.

# Expected system demand

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- Possible distortion of result due to the use of observed demand
- **Improvement:** historical demand scaled based on:
  - 10%PoE peak demand for the target capacity year
  - Expected energy consumption in the target capacity year
  - DER generation in the target capacity year.
- Benefit of scaling historical demand:
  - ELCC would be mostly determined by available capacity during very high demand periods (avoiding distortion)
  - Scales the sampled data based on expected DER in the target capacity year
  - Decreases possible variation in the sampled ELCC due to the use of historical demand.

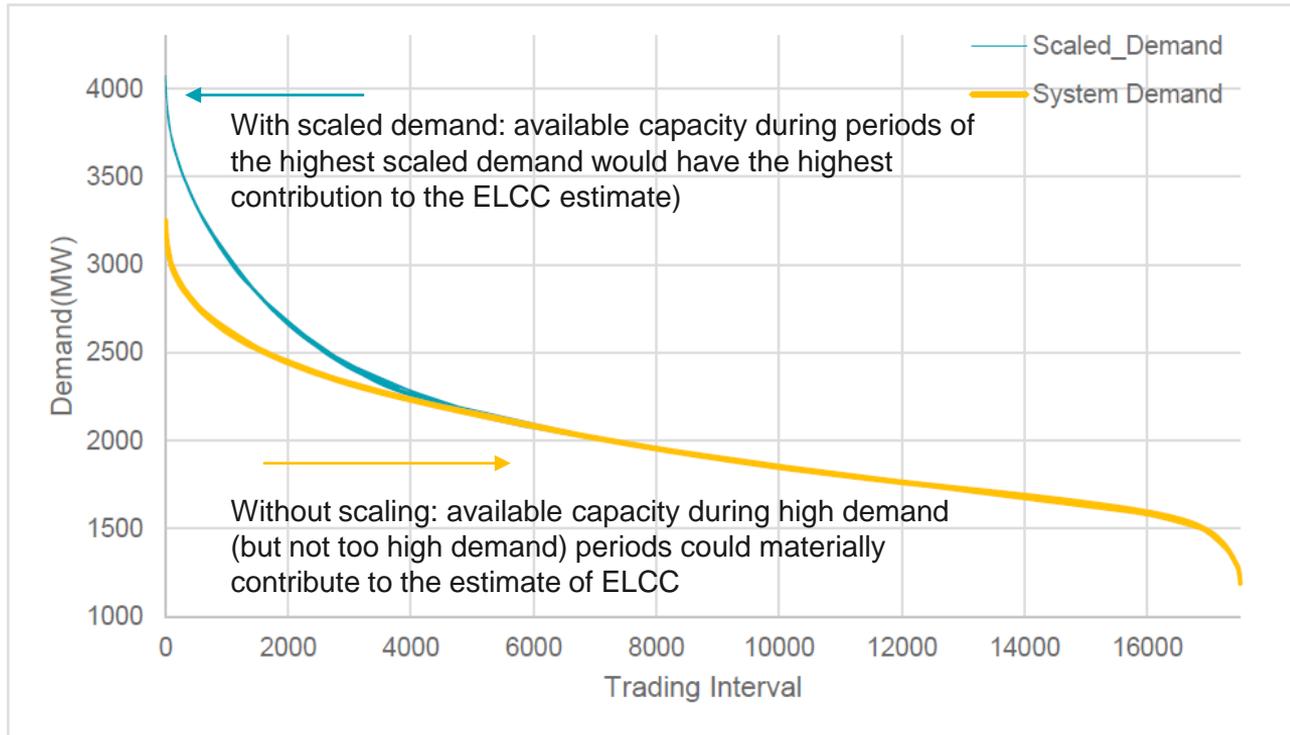
# Demand scaling function

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- AEMO already uses this scaling method for the purpose of calculating expected energy shortfall (clause 4.5.9(a)) for the target capacity year.
- Difference: scaling to 50% PoE vs 10% PoE.

# Scaled demand illustration

Figure 2. Scaled and observed demand for the 2018/19 sampled year



# Sensitivity analyses to investigate the effect of using scaled demand (2019 RCC)

- Based on LOLE=4 and scaled demand:
  - IG fleet capacity value decreases from 332 to 274MW.
  - The difference between the sample min and set IG fleet capacity value decrease to 24 MW.

Table 23. Fleet-wide ELCC values for the scaled demand scenarios

Relevant level scenario	Relevant Level based on observed demand (MW) (LOLE=24 hours in 10 years)	Relevant Level based on scaled demand (MW) (LOLE=24 hours in 10 years)	Relevant Level based on scaled demand (MW) (LOLE=4 hours in 10 years)
2014/15	332	328	328
2015/16	422	456	390
2016/17	293	320	281
2017/18	366	382	360
2018/19	238	262	250
2014-19 (full-period)	384	320	274

# Changes required to incorporate EPWA's changes

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- Energy storage resources to be included in the capacity mix
  - The expected available capacity of energy storage resources deducted from expected operational demand (during storage obligation intervals)
  - Also accounts for expected storage outages
  - A sensitivity analysis scenario was also included to show how the entry of a 100 MW (4-hour duration) storage can influence capacity values for IGs.

## Feedback received from AEMO

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- Supported the ERA's improvements: calculation at the target LOLE and use of scaled demand
- Suggested the scaling function to account for changes in demand profile due to DER uptake
  - This is already intended: drafting will be improved to clarify
- Guidance on early certification is needed.
- Consideration for extending the CRC assignment timeline given the requirements of the proposed RLM (or sequencing the CRC assignment)
- Suggested implementing the details of the proposed RLM in a market procedure; AEMO being custodian.

# AEMO's feedback...

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- Consideration for extending the CRC assignment timeline
  - Consideration can be given to provide AEMO with additional time for running the proposed RLM in the first few runs of the method.
    - Can AEMO use its existing discretion to extend the timeline?
  - After application in a few cycles: AEMO will have experience and confidence in running the method in the shortest time possible.

# AEMO's feedback...

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Implementing the details of the proposed RLM in a market procedure; AEMO being custodian.

- ERA Secretariat supports moving the details of the RLM to an AEMO market procedure.
- Subject to: principles to be specified in the market rules.
- Detailing the method in a market procedure would result in a change to the governance of the review of the RLM.
  - Out of scope for the ERA to propose a change to governance.
  - Perceived conflict of interest if the ERA proposes this change.

# Expected timeline

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- Submission to the RCP: December 2020
  - Please provide any feedback to the ERA by the end of November.

# Thank you

Ask any questions



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