



**Energy Transformation  
Taskforce**

# Storage participation in the Reserve Capacity Mechanism

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# Abbreviations

The following table provides a list of abbreviations and acronyms used throughout this document. Defined terms are identified in this document by capitals.

| Term      | Definition                                |
|-----------|-------------------------------------------|
| AEMO      | Australian Energy Market Operator         |
| EFC       | Equivalent Firm Capacity                  |
| ETIU      | Energy Transformation Implementation Unit |
| IRCR      | Individual Reserve Capacity Requirement   |
| MW        | Megawatts                                 |
| NAQ       | Network Access Quantity                   |
| RCM       | Reserve Capacity Mechanism                |
| RCOQ      | Reserve Capacity Obligation Quantity      |
| RCR       | Reserve Capacity Requirement              |
| RLM       | Relevant Level Methodology                |
| SCADA     | Supervisory Control and Data Acquisition  |
| SWIS      | South West Interconnected System          |
| Taskforce | Energy Transformation Taskforce           |
| WEM       | Wholesale Electricity Market              |

# 1. Purpose

## 1.1 The Energy Transformation Strategy

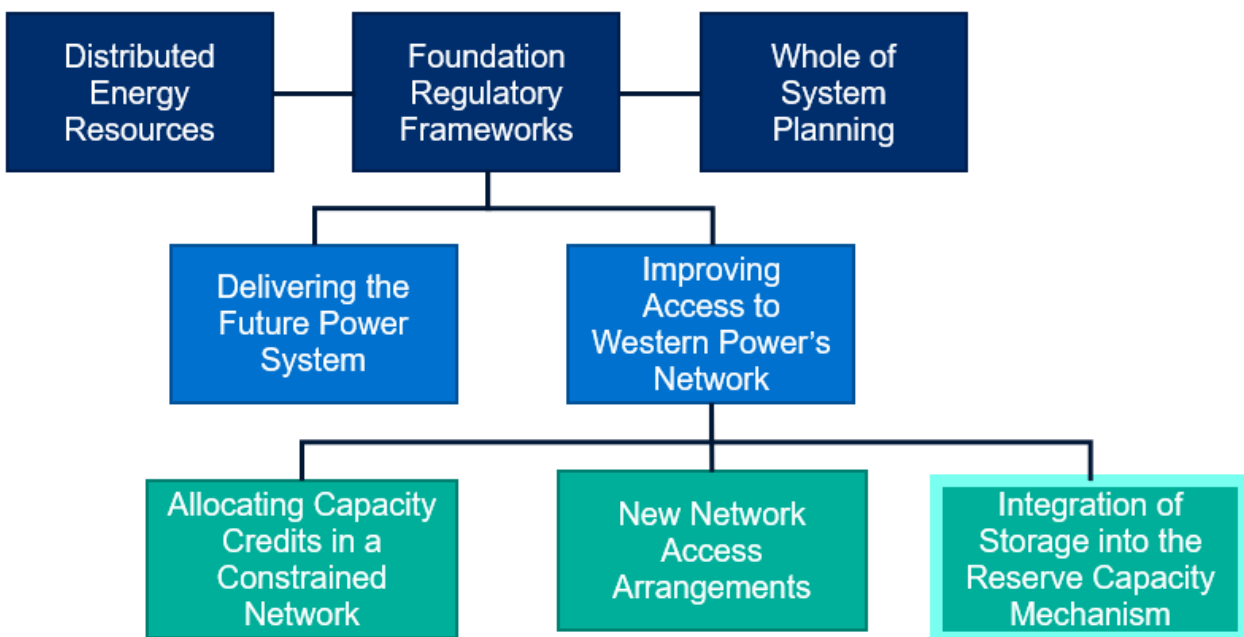
This paper forms part of the work to deliver the Energy Transformation Strategy. This is the Western Australian Government's strategy to respond to the energy transformation underway and to plan for the future of our power system.

The delivery of the Energy Transformation Strategy is being overseen by the Energy Transformation Taskforce (Taskforce), which was established on 20 May 2019. The Taskforce is being supported by the Energy Transformation Implementation Unit (ETIU), a dedicated unit within Energy Policy WA.

More information on the Energy Transformation Strategy, the Taskforce, and ETIU can be found on the Energy Policy WA website at [www.energy.wa.gov.au](http://www.energy.wa.gov.au).

The strategy is being delivered under three workstreams. This paper has been prepared as part of the Improving Access to Western Power's Network project (highlighted in Figure 1) within the Foundation Regulatory Frameworks work stream of the Energy Transformation Strategy.

Figure 1: Energy Transformation Strategy Workstreams



## 1.2 Purpose of this paper

This paper sets out the key design parameters for the way that storage facilities will participate in the Reserve Capacity Mechanism (RCM).

This includes:

- the way that storage facilities will be certified;
- the obligations that storage facilities assigned Capacity Credits will have to make that energy available to the market;
- the reserve capacity refund rate that will apply to storage facilities; and

- the obligations that storage facilities will have to fund Capacity Credits through an Individual Reserve Capacity Requirement (IRCR).

Consultation on the detailed design required to implement the policy positions endorsed by the Taskforce in this paper will take place throughout mid-2020. It is intended that amendments to implement these decisions will be made to the Wholesale Electricity Market (WEM) Rules by the end of 2020.

## **1.3 Consultation**

The framework outlined in this document has been developed by the Taskforce in close consultation with the Australian Energy Market Operator (AEMO), Western Power and industry stakeholders. The Transformation Design and Operation Working Group was consulted on 20 April 2020 and no substantive concerns with the high-level design were proposed.

## 2. Introduction

Western Australia's electricity sector is experiencing an unprecedented transformation, characterised by increasing levels of large-scale renewable, generation; growth in distributed energy resources such as rooftop solar photovoltaic generation, and increasing levels of energy storage systems. Continued investment in these technologies is desirable to drive a lower-cost, lower-emissions energy future.

Large scale storage is a new technology that is not fully accommodated in the WEM Rules' framework for participating in energy, capacity and essential system services markets. The WEM Rules currently only contemplate the existence of facilities that either generate or consume electricity. Storage, which both generates and consumes electricity, is currently unable to fully participate in these markets and access revenue streams in return for the services it can provide across the power system.

Through the Energy Transformation Strategy, the Western Australian Government is progressing reforms to address the barriers to the participation of storage and harness the benefits that it can offer to the market, the grid and consumers. This includes changes to the way the storage facilities connect to the network, register to participate in the WEM, become accredited to provide capacity, and compete in energy and essential system services markets.

The Energy Transformation Strategy is seeking to ensure that the full benefits of the flexibility that can be offered by storage resources are captured across the energy value chain. This includes maximising access to existing energy markets, such as energy and capacity markets, alongside new opportunities, such as new essential system services and as an alternative to traditional network investment. In particular, reform progressed through the Energy Transformation Strategy will focus on enabling storage flexibility in the way it operates across a range of markets to access whole of system value.

The paper sets out the key design parameters that will enable storage facilities to participate in the RCM. This includes how storage capacity will be certified, the obligations on storage facilities to provide certified capacity into the market, and the obligations on storage facilities that charge during peak demand periods to contribute to the cost of the RCM.

In the WEM, the RCM supports investment in sufficient generation capacity to meet the Planning Criterion energy requirement of forecast peak demand plus a reserve margin of 7.6 per cent.<sup>1</sup> Each year, AEMO sets a Reserve Capacity Requirement (RCR) for a Capacity Year that is two years ahead. It then certifies facilities (generators and demand side providers) for the amount of capacity they can provide, and assigns Capacity Credits to meet the RCR.

The WEM Rules set out how the capacity contribution of different types of facilities should be assessed as part of the certification process, and defines the obligations placed on each type of facility to make their capacity available. However, there is not currently a method in the WEM Rules that is fit for purpose for assessing the capacity contribution of storage facilities. Hence, a new approach needs to be developed.

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<sup>1</sup> As defined in Clause 4.5.9 of the WEM Rules

### 3. Current approaches to certification in the RCM

Facilities in the WEM are certified for the amount of capacity they are able to provide. Under the current framework, there is a different certification method for scheduled generators, intermittent generators and demand side providers.

These various methods that AEMO must use to assess the capacity value of different types of facility technologies have a common element: an estimation of the contribution the facility can make to meeting peak demand. The key features of the certification and participation method for different technologies, and the inadequacies for storage facilities, are outlined in Table 1 below.

Table 1: Existing certification and participation models and issues with applying them to storage facilities

| Generation type                                                        | Certification method                                                                                                                                                                                                                                                                 | Obligations to make capacity available                                                                                                                                                                                          | Issues with applying to storage facilities                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Conventional scheduled generation (e.g. coal or gas generators)</b> | <ul style="list-style-type: none"> <li>Based on capability to output energy at an air temperature of 41 degrees Celsius.</li> <li>Must meet certain fuel supply and transport requirements, including being able to demonstrate 14 hours of continuous fuel availability.</li> </ul> | <ul style="list-style-type: none"> <li>As a general rule, must make capacity available in every single interval or pay reserve capacity refunds.</li> </ul>                                                                     | <ul style="list-style-type: none"> <li>Storage facilities would not be able to meet fuel availability requirements without imposing uneconomic operating requirements.</li> <li>Storage facilities are limited duration resources and cannot be available in every trading interval.</li> </ul>                                                                                                                                                                                        |
| <b>Intermittent generators (e.g. wind, solar)</b>                      | <ul style="list-style-type: none"> <li>The Relevant Level Methodology (RLM) is used by AEMO to estimate a facility's contribution to peak demand.</li> <li>The RLM predicts future performance based on historical performance.</li> </ul>                                           | <ul style="list-style-type: none"> <li>Intermittent generators do not have any obligations to make their capacity available, reflecting the lack of control over their primary fuel source.</li> </ul>                          | <ul style="list-style-type: none"> <li>The RLM relies on assumptions about output patterns remaining relatively consistent, due to an intermittent facility's output being dependent on weather patterns. These assumptions may not hold true for a storage facility that has control over its output and response to variable market signals.</li> <li>It is appropriate to impose some obligations to make capacity available in peak periods given this controllability.</li> </ul> |
| <b>Demand side providers</b>                                           | <ul style="list-style-type: none"> <li>Based on the amount by which demand from a load can be curtailed</li> <li>This amount is based on historical levels of demand during intervals with the highest total sent out generation.</li> </ul>                                         | <ul style="list-style-type: none"> <li>Must have ability to reduce demand by a nominated amount between 8am and 8pm every Business Day.</li> <li>Can only be called on for a maximum of 200 hours per capacity year.</li> </ul> | <ul style="list-style-type: none"> <li>Market signals should be incentivising storage facilities to discharge at peak, not to charge in order to be compensated for reducing demand.</li> <li>Storage facilities cannot be available every interval from 8am-8pm without imposing uneconomic operating requirements.</li> </ul>                                                                                                                                                        |



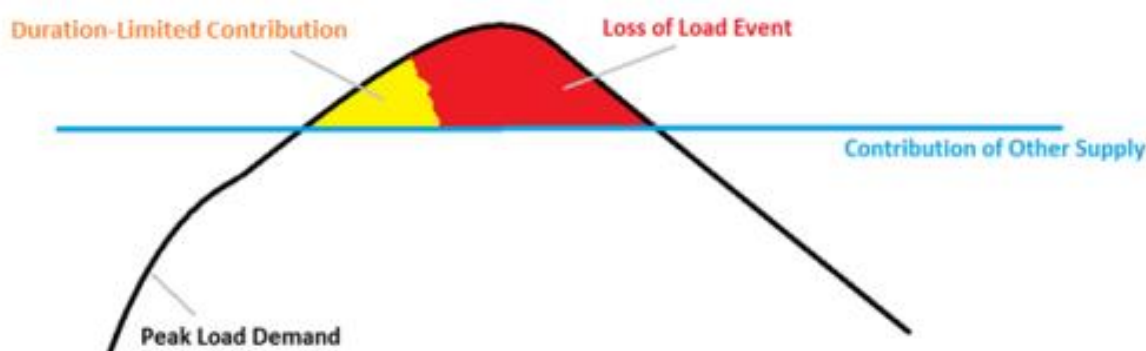
Storage facilities share some of the characteristics of the technologies listed in Table 1 above. They are fully controllable like conventional generators, yet like intermittent generators or demand side providers they cannot be available in every interval. They can also act like a generator or load depending on whether they are discharging or charging. This requires a unique method to assessing the value storage can provide to the electricity system in the context of the RCM and what operating standards should be required of them if they hold Capacity Credits. This method must recognise that storage can guarantee its availability during peak demand, but for a shorter duration in comparison to scheduled generators (because it is a limited resource).

## 4. Certification for storage facilities

### 4.1 Derating method

The Taskforce has endorsed a derating method for assessing the capacity value of storage facilities in the WEM. Under this approach, the amount of Capacity Credits awarded to a storage facility is a function of both its maximum output and duration, which determines its contribution to reliability during system peak events. This concept is demonstrated in Figure 2 and explained further below.

Figure 2: Premise of derating method



Source: National Grid, *Duration Limited Storage De-rating Factor Assessment – Final Report*, December 2017.

Under a derating approach, the nameplate capacity of a storage facility is assessed as the maximum output of the facility in megawatts (MW), and the duration over which it can sustain that output (e.g. 10 MW for 2 hours). The higher a storage facility's nameplate capacity and the longer it can operate for at a given output, the more it can offer to reliability during a peak event (i.e. the yellow area in Figure 1 gets larger), and the more it should receive in Capacity Credits.

To implement the derating method, a benchmark duration must first be set. The benchmark duration will align to the typical length of a peak demand event. Storage facilities that can operate for this period of time can be expected to contribute to reliability across the entirety of a peak event, and will be awarded close to their nameplate capacity in Capacity Credits.

After a benchmark duration has been set, a method for derating facilities that operate for a shorter duration than the benchmark must be determined. Derated facilities would receive a smaller proportion of their nameplate capacity in Capacity Credits.

Several methods for derating are discussed further below.

### 4.2 International examples

Derating to determine the capacity value of storage has been used in the United Kingdom (UK) for a number of years and is being implemented or actively considered in other markets such as Ireland and the Pennsylvania, New Jersey and Maryland (PJM) market.

In the UK Market, an Equivalent Firm Capacity (EFC) approach has been adopted to account for duration limits of facilities when calculating the contribution to security of supply. It is defined as the amount of perfectly reliable firm capacity that a duration limited resource can displace while still

maintaining the same level of system reliability.<sup>2</sup> This has resulted in the derating factors shown in Table 2 for storage facilities participating in the UK 2019 Capacity Market Auctions.

Table 2: Derating factors that apply to Storage facilities in the United Kingdom

| Maximum duration | Derating factor T-4 Auction (delivery year 2023/24) | Derating factor T-3 Auction (delivery year 2022/23) | Derating factor T-1 Auction (delivery year 2020/21) |
|------------------|-----------------------------------------------------|-----------------------------------------------------|-----------------------------------------------------|
| 0.5 hours        | 10.21%                                              | 10.59%                                              | 12.26%                                              |
| 1 hour           | 20.43%                                              | 21.36%                                              | 24.70%                                              |
| 1.5 hours        | 30.83%                                              | 31.94%                                              | 36.96%                                              |
| 2 hours          | 41.04%                                              | 42.53%                                              | 48.66%                                              |
| 2.5 hours        | 50.51%                                              | 52.18%                                              | 58.68%                                              |
| 3 hours          | 57.94%                                              | 59.43%                                              | 65.93%                                              |
| 3.5 hours        | 62.77%                                              | 64.07%                                              | 70.38%                                              |
| 4 hours          | 65.93%                                              | 67.04%                                              | 72.98%                                              |
| 4.5 hours        | 68.16%                                              | 69.27%                                              | 75.03%                                              |
| 5 hours          | 70.20%                                              | 71.13%                                              | 95.08%                                              |
| 5.5 hours        | 95.08%                                              | 95.08%                                              | 95.08%                                              |

Source: National Grid ESO, Capacity Market Auction Guidelines, 12 February 2020

In the context of the RCM, if these derating factors were applied, a 10 MW storage facility with a two-hour duration applying for Capacity Credits in the 2023/24 delivery year would receive 41 percent of its nameplate capacity (i.e. 4.1 MW) in Certified Reserve Capacity.

Derating is also used in Ireland to assess the capacity value of storage resources. In Ireland, a five-step approach is applied that calculates derating factors as a function of both generation size and storage volume. This has resulted in the derating factors shown in Table 3 for storage facilities participating in the Ireland 2021/2022 Capacity Year Auction.

<sup>2</sup> National Grid, *Duration Limited Storage De-rating Factor Assessment – Final Report*, December 2017 (p.3). Available at: <https://www.emrdeliverybody.com/Lists/Latest%20News/Attachments/150/Duration%20Limited%20Storage%20De-Rating%20Factor%20Assessment%20-%20Final.pdf>

Table 3: Derating factors that apply to Storage facilities in Ireland

| Initial Capacity (IC) (MW) | Hours of Storage |       |       |       |       |       |       |       |       |       |       |       |                |
|----------------------------|------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------------|
|                            | 0.0              | 0.5   | 1.0   | 1.5   | 2.0   | 2.5   | 3.0   | 3.5   | 4.0   | 4.5   | 5.0   | 5.5   | 6.0 or greater |
| 0 ≤ IC ≤ 10                | 0                | 0.208 | 0.362 | 0.482 | 0.562 | 0.620 | 0.661 | 0.690 | 0.715 | 0.739 | 0.765 | 0.796 | 0.830          |
| 10 < IC ≤ 20               | 0                | 0.207 | 0.360 | 0.480 | 0.560 | 0.618 | 0.659 | 0.689 | 0.714 | 0.738 | 0.764 | 0.794 | 0.828          |
| 20 < IC ≤ 30               | 0                | 0.200 | 0.353 | 0.470 | 0.550 | 0.609 | 0.652 | 0.682 | 0.709 | 0.733 | 0.760 | 0.790 | 0.821          |
| 30 < IC ≤ 40               | 0                | 0.196 | 0.349 | 0.465 | 0.546 | 0.604 | 0.647 | 0.679 | 0.706 | 0.731 | 0.758 | 0.787 | 0.817          |
| 40 < IC ≤ 50               | 0                | 0.192 | 0.345 | 0.460 | 0.540 | 0.600 | 0.643 | 0.676 | 0.703 | 0.729 | 0.756 | 0.784 | 0.813          |
| 50 < IC ≤ 60               | 0                | 0.188 | 0.341 | 0.456 | 0.535 | 0.595 | 0.639 | 0.673 | 0.701 | 0.727 | 0.754 | 0.782 | 0.809          |
| 60 < IC ≤ 70               | 0                | 0.184 | 0.337 | 0.451 | 0.531 | 0.590 | 0.636 | 0.670 | 0.698 | 0.724 | 0.752 | 0.779 | 0.806          |
| 70 < IC ≤ 80               | 0                | 0.181 | 0.333 | 0.446 | 0.527 | 0.586 | 0.632 | 0.666 | 0.696 | 0.722 | 0.750 | 0.776 | 0.802          |
| 80 < IC ≤ 90               | 0                | 0.180 | 0.330 | 0.442 | 0.523 | 0.583 | 0.629 | 0.663 | 0.693 | 0.719 | 0.747 | 0.773 | 0.799          |
| 90 < IC ≤ 100              | 0                | 0.179 | 0.327 | 0.438 | 0.519 | 0.580 | 0.626 | 0.661 | 0.690 | 0.717 | 0.744 | 0.771 | 0.795          |
| 100 < IC ≤ 110             | 0                | 0.177 | 0.324 | 0.435 | 0.516 | 0.577 | 0.622 | 0.658 | 0.687 | 0.715 | 0.742 | 0.768 | 0.793          |
| 110 < IC ≤ 120             | 0                | 0.175 | 0.320 | 0.431 | 0.512 | 0.573 | 0.620 | 0.655 | 0.685 | 0.712 | 0.739 | 0.765 | 0.789          |
| 120 < IC ≤ 130             | 0                | 0.174 | 0.317 | 0.426 | 0.508 | 0.569 | 0.615 | 0.651 | 0.680 | 0.708 | 0.736 | 0.761 | 0.785          |
| 130 < IC ≤ 140             | 0                | 0.171 | 0.313 | 0.421 | 0.503 | 0.563 | 0.610 | 0.645 | 0.675 | 0.703 | 0.730 | 0.756 | 0.780          |
| 140 < IC ≤ 150             | 0                | 0.169 | 0.309 | 0.416 | 0.497 | 0.558 | 0.604 | 0.639 | 0.669 | 0.697 | 0.725 | 0.751 | 0.775          |
| 150 < IC ≤ 160             | 0                | 0.167 | 0.305 | 0.412 | 0.492 | 0.552 | 0.598 | 0.633 | 0.664 | 0.692 | 0.720 | 0.746 | 0.770          |
| 160 < IC ≤ 170             | 0                | 0.164 | 0.300 | 0.407 | 0.487 | 0.547 | 0.592 | 0.628 | 0.658 | 0.687 | 0.714 | 0.740 | 0.765          |
| 170 < IC ≤ 180             | 0                | 0.163 | 0.297 | 0.402 | 0.482 | 0.542 | 0.588 | 0.623 | 0.653 | 0.682 | 0.710 | 0.736 | 0.760          |
| 180 < IC ≤ 190             | 0                | 0.162 | 0.294 | 0.399 | 0.478 | 0.537 | 0.583 | 0.618 | 0.649 | 0.679 | 0.706 | 0.732 | 0.756          |
| 190 < IC ≤ 200             | 0                | 0.161 | 0.292 | 0.395 | 0.474 | 0.533 | 0.578 | 0.614 | 0.645 | 0.674 | 0.702 | 0.728 | 0.753          |

Source: EIRGRID, SONI, *Capacity Market – Initial Auction Information Pack*, 6 June 2019. [https://www.sem-o.com/documents/general-publications/Initial-Auction-Information-Pack\\_IAIP2122T-2.pdf](https://www.sem-o.com/documents/general-publications/Initial-Auction-Information-Pack_IAIP2122T-2.pdf)

In the context of the RCM, if these derating factors were applied, a 10 MW storage facility with a two-hour duration would receive 56.2% of its nameplate capacity (i.e. 5.62 MW) in Certified Reserve Capacity.

The PJM market currently employs a 10-hour rule for valuing capacity contribution of storage resources. Under this rule, a storage resource’s capability for the purposes of the capacity market is calculated by the power output it can provide for 10 continuous hours. Following an announcement by the Federal Energy Regulatory Commission (FERC) that they intended to investigate the reasonableness of this approach, the PJM is engaging with stakeholders to explore alternative methods to valuing the capacity contribution of storage resources.

While this process is not finalised, the current method under consideration for derating is Effective Load Carrying Capability (ELCC), which assesses the capacity value (or reliability contribution) of a resource (or a set of resources) based on the additional load that can be met by the system following the introduction of that resource with no net overall change in the reliability of the system.

In its recent review of the RLM, the Economic Regulation Authority (ERA) has recommended the RLM be amended such that the capacity contribution of intermittent generators is calculated using an ELCC approach. The implementation of this approach is subject to a Rule Change Proposal being made by the ERA and assessed by the Rule Change Panel.

### 4.3 Implementation in the SWIS

Consultation with stakeholders will take place to determine an appropriate benchmark duration, which will include how peak demand events are defined and the boundaries to be set for their

duration, and to develop an appropriate derating curve for storage facilities with a shorter duration than this. Consideration will be given to the trade-offs between simplicity and accuracy, considering the size of the WEM and the amount of storage likely to be installed in coming years.

#### **Taskforce decision**

- A derating approach will be adopted for certifying storage facilities in the SWIS.
- Consultation on the definition of the benchmark duration and method for determining the derating curve will be undertaken during H2 2020.

## 5. Availability requirements for storage facilities

As shown in Table 1 above, certain types of facilities that have been assigned Capacity Credits have an obligation to make at least this level capacity available to the market. This is called a Reserve Capacity Obligation Quantity (RCOQ) and applies in every interval for scheduled generators, and between 8am and 8pm for demand side providers. Intermittent facilities do not have an obligation to make capacity available, reflecting their inability to control their primary fuel source, and that their Capacity Credits have already been 'derated' based on historical output during peak periods.

Facilities that have a RCOQ have several key obligations: to have their planned outages approved by the AEMO, to bid their accredited capacity into the market,<sup>3</sup> and to respond if dispatched by AEMO. If a facility fails to meet any of these commitments, it must pay capacity refunds.

Capacity resources are remunerated under the RCM for making their capacity available to ensure system reliability, and the Taskforce considers it reasonable to impose capacity obligations on storage facilities. These obligations must strike a balance between:

- ensuring that facilities with control over their output that participate in the RCM are available in the energy market when required to ensure that system reliability criteria is met; and
- ensuring appropriate flexibility for storage resources given that there is a range of services they can provide in the market, and that their capacity is duration limited.

The Taskforce has endorsed that the WEM Rules should provide AEMO with the flexibility to determine the RCOQ that is placed on storage facilities, within a specified framework, and that these obligations should apply for a limited, defined number of hours per day. The obligation placed on storage facilities will be calculated by reference to the maximum output of the facility and the duration that this output can be sustained as nominated at the time of certification.

The RCOQ period for storage facilities will be determined and advised in advance of a Capacity Year, and may be adjusted on a seasonal basis to account for differences in the load profile and timing of peak demand at different times of the year. Additionally, the Taskforce recognises that there may be value in providing AEMO the flexibility to shift the RCOQ period from time to time (with limited notice to the market) to reflect changing or unexpected system conditions (for example, in response to unexpected low reserve conditions). Further consultation will take place to determine whether this flexibility should be allowed for in the WEM Rules, and if so the conditions under which AEMO may exercise this flexibility.

Where the RCOQ period is shifted, whether on a seasonal basis or in response to shorter-term need for capacity, it is only the window of time that would be shifted, with the length of time a facility is required to be available being held constant. For example, if the requirement is for a facility to be available for 3 hours, the RCOQ period may change from 16:00 – 19:00 to 17:30 – 20:30 but will not be extended beyond the three-hour window.

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<sup>3</sup> In the new market design, all facilities will be able to bid into both energy and essential system services markets simultaneously. If a facility with an RCOQ does so and is dispatched for essential system services, it will be deemed to have met its RCOQ obligations.

### **Taskforce decision**

- Storage facilities that are assigned Capacity Credits will have an obligation to make that capacity available at a time specified by AEMO each day (the RCOQ period).
- Further consultation on the framework for setting the RCOQ period, and the flexibility allowed for AEMO to shift the RCOQ period on a shorter-term basis, will take place throughout 2020

## 6. Treatment of hybrid facilities

In the short term, it is more likely that storage facilities will enter the market as a part of a hybrid facility. Hybrid facilities could consist of either a conventional generation facility and storage facility behind a single connection point, or an intermittent generation facility and storage facility behind a single connection point. Certification for these types of facilities, that comprise of multiple elements behind a single connection point but participate in the WEM as a single entity, must also be addressed as part of the certification framework.. The key issue is that the certification method for one element of a hybrid facility will not be suitable for the other. To accurately determine the capacity contribution of a hybrid facility, the certification process should consider each element of the facility separately.

### Taskforce decision

- Hybrid facilities with different generating technologies behind a single connection point that participate as a single entity in the WEM will be required to have each component of that facility certified separately in accordance with the relevant certification method.

### 6.1 Hybrid conventional and storage facilities

These are facilities where a conventional generation source, like coal or gas, is combined with a storage component. For these facilities, this process will be reasonably straightforward. The capability of the conventional component can be assessed (generally) as it is currently, noting some refinements to the process may be required. The capability of the storage facility will be assessed in accordance with the proposed derating method.

The sum of these two elements will be the facility's Certified Reserve Capacity. Capacity Credits will then be assigned in accordance with the current Capacity Credit assignment process and the Network Access Quantity (NAQ) framework being developed by the Taskforce.

### 6.2 Hybrid intermittent and storage facilities

These are facilities where an intermittent generation source like wind or solar is combined with a storage component. It is slightly more complex to determine the capacity contribution of each element of this type of hybrid facility separately. This is because the method for certifying intermittent facilities (the RLM) uses historic output (as measured at the connection point) as an input into the Certified Reserve Capacity calculation for that facility. Given this, there is a need to separately measure the output of each component to accredit each element separately. If output is not separated between the components behind the connection point, the battery output will be included in the assessment of the relevant level for the facility, and double counted if the capability of the battery is also assessed under the derating method.

There are several options for breaking down this output to determine the output of each component. These include the installation of Western Power revenue quality metering, the use of Western Power Supervisory Control and Data Acquisition (SCADA) points for generators that are connected to the transmission network, or use of meters installed on storage facilities by participants for operational reasons. Further consultation will be undertaken with AEMO and market participants to determine the most appropriate method for separately measuring the output of each component of a hybrid intermittent/storage facility.



Again, the sum of these two elements would be the facility's total Certified Reserve Capacity, which would then be assigned in accordance with the current capacity credit assignment process and the NAQ framework being developed by the Taskforce.

### **6.3 RCOQ obligations for hybrid facilities**

A hybrid conventional/storage facility that secures Capacity Credits for both elements would have an RCOQ for the certified capacity associated with its conventional component for all intervals of the day, as is the case for scheduled generators under the current rules. For the window of time that AEMO determines storage facilities must make their capacity available, the combined facility's RCOQ would increase by the level of certified capacity associated with its storage component.

A hybrid intermittent/storage facility that secures Capacity Credits for both elements would have an RCOQ of zero for most intervals of the day. For the window of time that AEMO determines storage facilities must make their capacity available, the combined facility's RCOQ would increase to the level of certified capacity associated with its storage component.

It is not intended that hybrid facilities will be required to bid each component of the facility separately for dispatch in energy or essential system services markets. The RCOQ in its entirety would apply to the facility, and the facility would have an obligation to make the required amount of MWs available to meet its RCOQ in any given interval.

## 7. Reserve capacity refunds

Under the current WEM Rules, facilities that do not meet their RCOQ obligations are required to pay capacity refunds. There are two elements to the refund formula: the dynamic refund factor and the per interval reserve capacity price.

The dynamic refund factor changes from interval to interval to reflect the relative value of capacity during different intervals. When capacity reserves are low, refunds are higher and vice versa. The refund factor ranges from 0.25, applicable at off-peak times in winter and shoulder seasons, to a maximum of 6.

The per interval reserve capacity price differs across facility types. For scheduled generators, the per interval price is the monthly reserve capacity price divided by the number of trading intervals in the relevant trading month. For demand side providers, the per interval reserve capacity price is the DSM Reserve Capacity Price divided by 400.<sup>4</sup>

The calculations for a DSM provider work out to a higher per interval capacity price, reflecting the relatively fewer hours of RCOQ obligations that DSM providers have.

The Taskforce considers that storage facilities should be required to pay dynamic refunds if they don't meet their RCOQ obligations, and that the per interval capacity price should be adjusted to reflect the shorter availability requirements they will have in comparison to other facility types. Further consultation will be undertaken with industry on the method for calculating refunds for storage facilities as the RCOQ arrangements are finalised. Consideration will also be given to the method for determining the refund rate for hybrid facilities that do not meet their RCOQ obligations.

### Taskforce decision

- The refund rate for storage facilities will be adjusted to reflect their relatively limited obligations to make capacity available in comparison to conventional generators

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<sup>4</sup> Following the change to the WEM Rules commencing 1 October 2021, the per interval reserve capacity provide for demand side providers will be the Monthly Reserve Capacity Price multiplied by 12 and divided by 400.

## 8. Individual reserve capacity requirements

To fund the Capacity Credits procured through the RCM, Market Customers (generally retailers and large industrial loads) incur an IRCR obligation based on their contribution to system peak demand.

As set out in the Taskforce Information Paper [Registration and Participation in the Wholesale Electricity Market](#), the registration taxonomy in the new WEM will not differentiate between Market Customers and Market Generators, and will instead place obligations on Market Participants based on whether they consume or produce energy in a given interval.

As such, IRCR obligations will be placed on any market participant (including storage facilities) that consumes electricity during the relevant peak demand intervals. Consideration will be given to circumstances where a storage facility is instructed or directed to consume during peak, which may occur in some rare circumstances. IRCR obligations will not be imposed on a facility if it is responding to a direction from AEMO to charge during a peak interval.

### Taskforce decision

- Storage facilities that consume energy during peak periods, without having been directed to do so by AEMO, will be required to contribute to the cost of reserve capacity through an IRCR.

## 9. Next steps

The framework for participation of storage facilities in the RCM will be progressed as shown in below.

Figure 3: Next steps for integrating storage into Reserve Capacity Mechanism



For further information, or if you would like to meet with ETIU to discuss any storage related matters, please contact [energytransformation@energy.wa.gov.au](mailto:energytransformation@energy.wa.gov.au).