

Illustrative Examples on Capacity Qualification

The following examples will illustrate the capacity qualification process, with the inclusion of the Performance Adjustment Factor (PAF) design. The final designs for the capacity qualification process are included in the following: Design Memo 1.1 – Capacity Qualification (Non-HDR), Design Memo 5.2 – HDR Capacity Qualification, and Design Memo 10.1 - Performance Adjustment Factor, which can be found on the [Capacity Auction Enhancements webpage](#).

The complete capacity qualification methodology that will be used for all resources, beginning with the 2023 Capacity Auction, can be generalized as follows:

$$\text{UCAP (MW)} = \text{ICAP (MW)} \times \text{Availability De-Rating Factor} \times \text{PAF}$$

Where:

- UCAP (Unforced capacity) is the maximum amount, in MW, that a resource is qualified to offer into the Capacity Auction as an output of the Capacity Qualification process.
- ICAP (Installed capacity, in the context of the Capacity Auction) should reflect the maximum expected capability, in MWs, of a resource given ambient temperature and operating conditions, as specified by the Capacity Auction Participant.
- Availability De-Rating Factor is based on a resource's historical data.
- PAF is the Performance Adjustment Factor, applicable to an individual resource, as based on assessed performance during a previous seasonal capacity auction capacity test.

Inputs Used for PAF Calculation:

The PAF will be calculated for the capacity qualification methodology based on three data inputs:

- A.** The cleared ICAP the resource was required to deliver to during the previous applicable seasonal obligation period's capacity auction test.
- B.** The capacity the resource was assessed by the IESO to have delivered during the previous applicable seasonal obligation period's capacity auction test.
- C.** The submitted ICAP for the seasonal obligation period for which the resource's capacity is being qualified.

HDR Qualification:

The lack of historical data for HDR resources means that the IESO is unable to apply availability de-rates as part of the pre-auction qualification.

Without an availability de-rate applied, the methodology for HDR capacity qualification will be:

$$\text{UCAP} = \text{ICAP}$$

To account for this, and to ensure fair treatment between different resource types, the IESO has worked with HDR stakeholders to design an In-period Cleared UCAP Adjustment as an alternative to an availability de-rate for HDR resources as outlined in [Design Memo 5.2 – HDR Capacity Qualification](#).

Parameters for Example Calculations:

The following parameters are used in each of the calculations below:

- Resource’s cleared ICAP during December 2023 auction: 100 MW for both winter and summer obligation periods.
- Summer 2024 Obligation Period Capacity Test Performance: 80 MW
 - Based on the capacity test performance, the resource failed its capacity test because the resource did not deliver to the cleared ICAP amount, within the relevant performance threshold.
- Winter 2024/25 Obligation Period Capacity Test Performance: 80 MW
 - Based on the capacity test performance, the resource failed its capacity test because the resource did not deliver to the cleared ICAP amount, within the relevant performance threshold.

A) Non-HDR Resource

Example 1: A dispatchable thermal generator resource registers for the December 2024 Auction with the following attributes:

- ICAP: 75 MW for the summer obligation period
- EFOR_d (Availability de-rating factor): 6%
- In the capacity test during the most recent Summer 2024 obligation period, performance data demonstrates that the resource delivered 80 MW, which was 20 MW below the cleared ICAP of 100 MW.
- Therefore, a PAF will apply because the resource failed the capacity test noted above.

For the purposes of determining the PAF, if the submitted ICAP is less than or equal to the capacity delivered during the most recent applicable seasonal obligation period’s capacity test, then the PAF is equal to the value of one, meaning the PAF will not change the UCAP calculation.

$$\text{PAF} = 1$$

Since the submitted ICAP for this dispatchable thermal resource is less than the capacity delivered during the most recent applicable capacity test, the PAF will be one, and UCAP is calculated as shown below.

$$\begin{aligned}
 \text{UCAP} &= \text{ICAP} \times (1 - \text{EFOR}_d) \times (\text{PAF}) \\
 &= 75 \text{ MW} \times (1 - 0.06) \times (1) \\
 &= 75 \text{ MW} \times 0.94 \times 1 \\
 &= 70.5 \text{ MW}
 \end{aligned}$$

Therefore, the resource would be qualified to offer 70.5 MW into the 2024 Capacity Auction.

Example 2: A dispatchable storage resource registers for the December 2025 Auction with the following attributes:

- ICAP: 120 MW for the winter obligation period
- EFOR_d (Availability de-rating factor): 5%
- In the most recent, Winter 2024/25, applicable seasonal obligation self-scheduled capacity test, performance data demonstrates that the resource delivered 80 MW, which was 20 MW below the cleared ICAP of 100 MW.
- Therefore, a PAF will apply because the resource failed the capacity test noted above.

For the purposes of determining the PAF, if the submitted ICAP in the current auction is greater than or equal to the cleared ICAP from the previous applicable seasonal obligation period, and the resource failed the capacity test in the previous applicable seasonal obligation period, then a PAF is applied and calculated using results from the most recent applicable seasonal obligation period capacity test.

Since the ICAP of 120 MW submitted for the winter obligation period of the December 2025 auction is greater than the cleared ICAP of 100 MW from the previous applicable seasonal obligation period, the PAF is calculated based on the formula shown below.

$$\text{PAF} = \text{Input B} / \text{Input A}$$

PAF Calculation:

$$\begin{aligned}
 \text{PAF} &= \text{Input B} / \text{Input A} \\
 \text{PAF} &= 80/100 = 0.80 \text{ (80\%)}
 \end{aligned}$$

UCAP Calculation:

$$\begin{aligned}
 \text{UCAP} &= \text{ICAP} \times (1 - \text{EFOR}_d) \times (\text{PAF}) \\
 &= 120 \text{ MW} \times (1 - 0.05) \times (0.80) \\
 &= 120 \text{ MW} \times 0.95 \times 0.80 \\
 &= 91.2 \text{ MW}
 \end{aligned}$$

Therefore, the resource would be qualified to offer 91.2 MW into the Capacity Auction

Example 3: A dispatchable hydro generator resource registers for the December 2024 Auction with the following attributes:

- ICAP: 95 MW for the summer obligation period
- Availability De-rating Factor: 10%
- In the capacity test during the most recent Summer 2024 obligation, performance data demonstrates that the resource delivered 80 MW, which was 20 MW below the cleared ICAP of 100 MW
- Therefore, a PAF will apply because the resource failed the capacity test noted above.

For the purposes of determining the PAF, if the submitted ICAP in the current auction is greater than the capacity delivered during the most recent applicable seasonal capacity test, but less than the cleared ICAP from the previous applicable seasonal obligation period, and the resource failed the capacity test in that previous applicable period, then a PAF is applied and calculated based on the formula shown below.

$$PAF = Input B / Input C$$

PAF Calculation:

Since the submitted ICAP value of 95 MW is greater than the 80 MW of capacity delivered during the most recent applicable seasonal capacity test, but less than the cleared ICAP of 100 MW from the previous applicable seasonal obligation period, a PAF is applied and calculated as shown below.

$$PAF = Input B / Input C$$

$$PAF = 80/95 = 0.8421 (84.2\%)$$

UCAP Calculation:

$$UCAP = ICAP \times (1 - \text{Availability De-Rating Factor}) \times (PAF)$$

$$= 95 \text{ MW} \times (1 - 0.10) \times (0.8421)$$

$$= 95 \text{ MW} \times 0.90 \times 0.8421$$

$$= 72 \text{ MW}$$

Therefore, the resource would be qualified to offer 72 MW into the Capacity Auction

B) HDR Resource

Example 1: A HDR resource registers for the December 2024 Auction with the following attributes:

- ICAP: 95 MW for the summer obligation period
- In the capacity test during the most recent Summer 2024 obligation period, performance data demonstrates that the resource delivered 80 MW, which was 20 MW below the cleared ICAP of 100 MW.

- Therefore, a PAF will apply because the resource failed the capacity test noted above.

The submitted ICAP value of 95 MW is greater than the 80 MW of capacity delivered during the most recent applicable seasonal capacity test, but less than the cleared ICAP of 100 MW from the previous applicable seasonal obligation period. Therefore, a PAF is applied and calculated based on the formula shown below.

$$PAF = Input B / Input C$$

PAF Calculation:

Submitted ICAP value of 95 MW is greater than the 80 MW of capacity delivered during the most recent applicable seasonal capacity test, but less than the cleared ICAP of 100 MW from the previous applicable seasonal obligation period. Therefore, a PAF is applied and calculated as shown below.

$$PAF = Input B / Input C$$

$$PAF = 80/95 = 0.8421 (84.2\%)$$

UCAP Calculation:

$$UCAP = ICAP \times (PAF)$$

$$= 95 \text{ MW} \times 0.8421$$

$$= 80 \text{ MW}$$

Therefore, the resource would be qualified to offer 80 MW into the Capacity Auction