PJM Loss of Load Expectation (LOLE) Criterion

SCRSTF Meeting

April 26, 2016

Tom Falin

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BAL-502-RFC-02

http://www.nerc.com/pa/Stand/Reliability%20Standards/BAL-502-RFC-02.pdf

B. Requirements

R1 The Planning Coordinator shall perform and document a Resource Adequacy analysis annually. The Resource Adequacy analysis shall *[Violation Risk Factor: Medium]*:

R1.1 Calculate a planning reserve margin that will result in the sum of the probabilities for loss of Load for the integrated peak hour for all days of each planning year[1] analyzed (per R1.2) being equal to 0.1. (This is comparable to a "one day in 10 year" criterion).

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R2 The Planning Coordinator shall annually document the projected Load and resource capability, for each area or Transmission constrained sub-area identified in the Resource Adequacy analysis *[Violation Risk Factor: Lower]*.

R2.1 This documentation shall cover each of the years in Year One through ten.

R2.2 This documentation shall include the planning reserve margin calculated per requirement R1.1 for each of the three years in the analysis.

R2.3 The documentation as specified per requirement R2.1 and R2.2 shall be publicly posted no later than 30 calendar days prior to the beginning of Year One.

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Reliability Assurance Agreement (RAA)

Article 1 - Definitions

1.75 Reliability Principles and Standards

Reliability Principles and Standards shall mean the principles and standards established by NERC or an Applicable Regional Entity to define, among other things, an acceptable probability of loss of load due to inadequate generation or transmission capability, as amended from time to time.

Schedule 4 – Guidelines for Determining the Forecast Pool Requirement

A. Objective Of The Forecast Pool Requirement

The Forecast Pool Requirement shall be determined for the specified Planning Periods to establish the level of Capacity Resources that will provide an acceptable level of reliability consistent with the Reliability Principles and Standards.

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IRM Study

- Objective of the IRM Study is to compute the minimum installed reserve margin required to satisfy the “1 in 10” LOLE standard.
- PJM is a summer-peaking region. (The winter W/N peak is typically about 85% of the summer W/N peak.)
- Therefore, the IRM is minimized when virtually all the annual LOLE risk is permitted in the summer.
- With all the loss of load risk in the summer, the non-summer LOLE risk must be essentially zero. The non-summer period must also allow for generator planned maintenance. These two factors are why the winter reserves must be ~35% to satisfy the “1 in 10” LOLE criterion.

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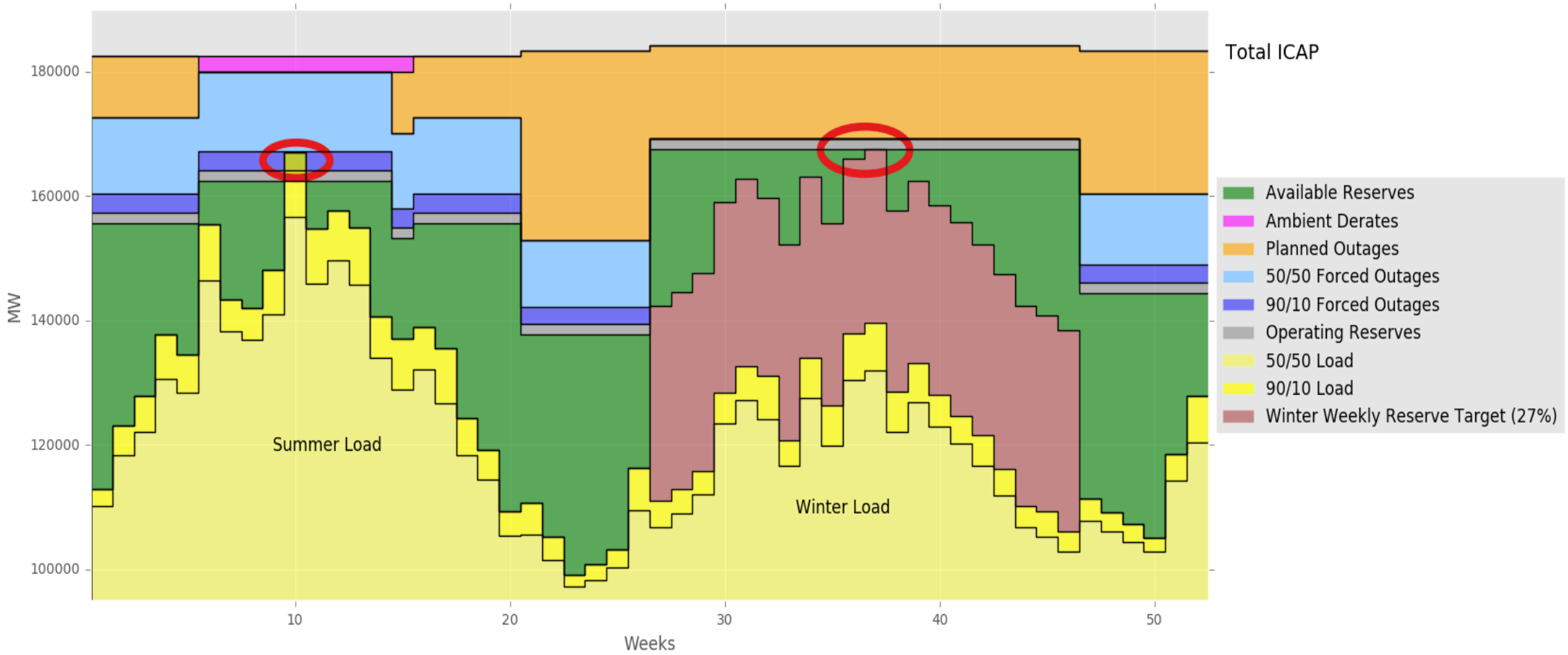
Seasonal Reserve Levels



NOTE: Forced Outages in Winter are covered by the Winter Weekly Reserve Target

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Limited Product Constraints under Capacity Performance

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Background

- The Capacity Performance rules allow RPM participation of Limited Availability Resources for the 2018/19 and 2019/20 Delivery Years.
- Base Capacity DR is available for interruption every day from June 1 through September 30 and unavailable rest of DY.
- Base Capacity Generation is assumed unavailable only during the peak winter week.
- Constraints must be established on the two Limited Availability products to ensure reliability is maintained at close to “1 in 10” LOLE.

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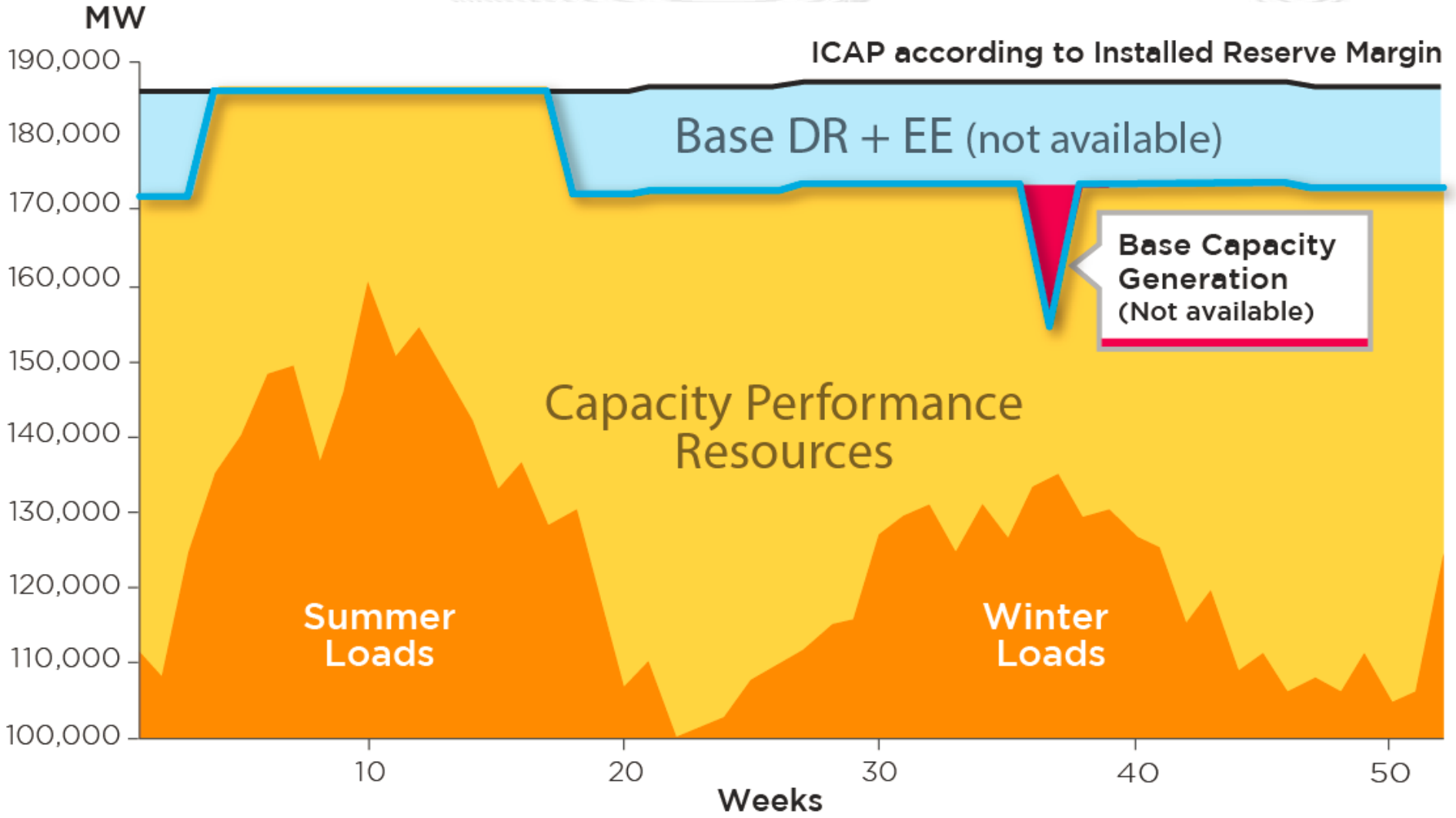
Limited-Availability Resources



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Constraint Methodology

- Constraints are computed using the LOLE model PRISM and the most recent IRM Study case for the respective DY.
- The amount of Base Capacity DR is increased in the case until the PJM LOLE is increased by 5%. This establishes the Base Capacity Demand Resource Constraint.
- Base Capacity Generation is then added to the case until the combined impact of both Limited-Availability products increases the PJM LOLE by 10%. This establishes the Base Capacity Resource Constraint.

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Constraint Methodology

- The constraint computation is performed for the RTO and for any LDA that is modeled separately in the RPM auction.
- The details of the procedure were added as Section 6 of Manual 20. The manual section is based on the language approved in 151 FERC ¶ 61,208

<u>RTO Constraints posted for the 2019/20 Base Residual Auction</u>

Base Capacity Demand Resource Constraint = 8.7%

Base Capacity Resource Constraint = 19.9%

Constraints are expressed as a percentage of the forecasted peak load and are updated for each Incremental Auction

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