Reliability & Capacity Assessment Update

2025 Integrated Resource Plan

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Topics

Reliability & Capacity Methodologies Overview

- Loss of Load Expectation
- Modeling Breakdown & Capacity Positions
- Effective Load Carrying Capability & Planning Reserve Margin

2025 Integrated Resource Plan Proposed Changes

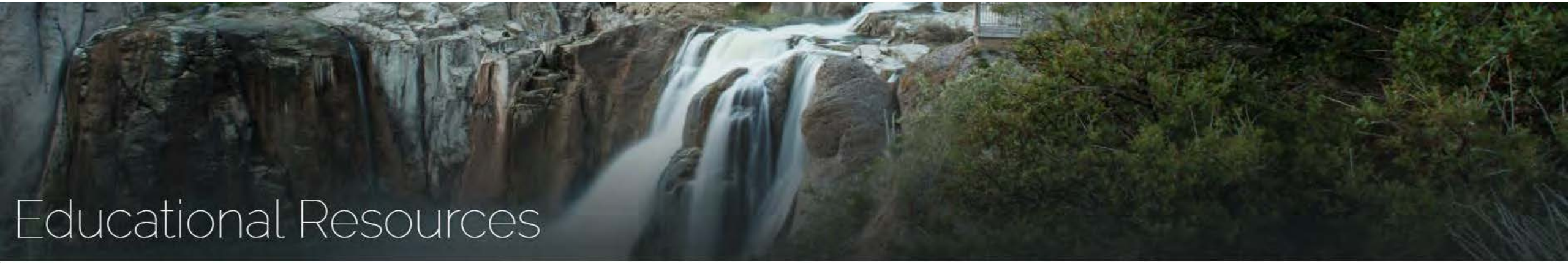
- Data Updates
- Multi-Metric Planning
- Load Forecast Percentile Analysis

Helpful Acronyms

Acronym	Meaning
EFORd	Equivalent Forced Outage Rate During Demand
ELCC	Effective Load Carrying Capability
IRP	Integrated Resource Plan
LOLE	Loss of Load Expectation
LOLH	Loss of Load Hour
LOLP	Loss of Load Probability

Acronym	Meaning
L&R	Load & Resource
LTCE	Long-Term Capacity Expansion
MW	Megawatt
PRM	Planning Reserve Margin
RCAT	Reliability & Capacity Assessment Tool
VER	Variable Energy Resource

IRP Educational Resources



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IRP Questions and Responses

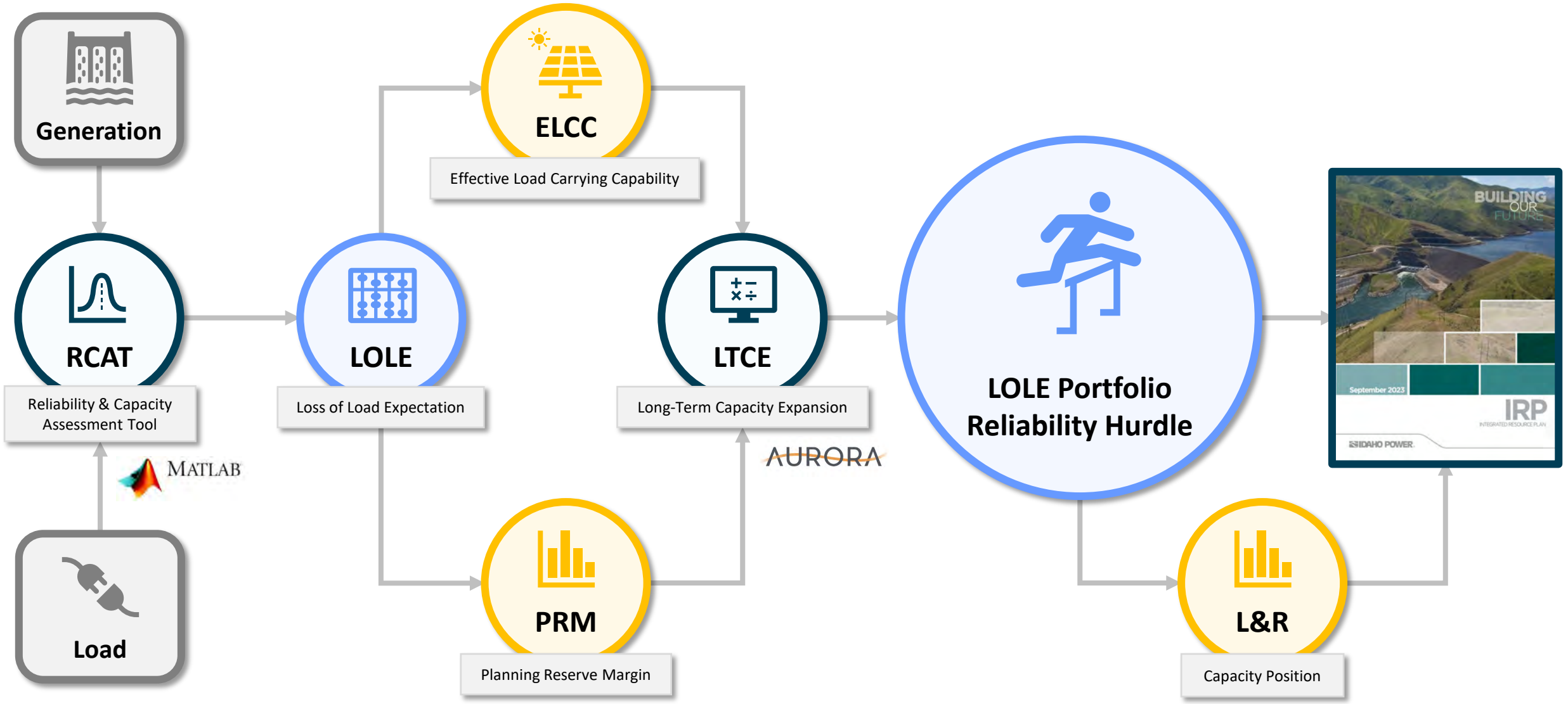
Educational Resources

Idaho Power has compiled these resources to help those participating in our *Integrated Resource Plan* (IRP) process or anyone who wants to know more about how their energy is generated and delivered. We will add links, presentations and videos as they become available.

A Deep Dive into How Idaho Power Assesses Reliability & Capacity in the IRP

Educational Resources - Idaho Power

IRP Relevance



Methodologies Overview

Reliability & Capacity Assessment

Reliability Definitions

Loss of Load Probability

LOLP: the probability of system peak or hourly demand exceeding the available generating capacity during a given period

$$LOLP = P(G_i - L_i)$$

G_i: *Generation available at hour "i"*

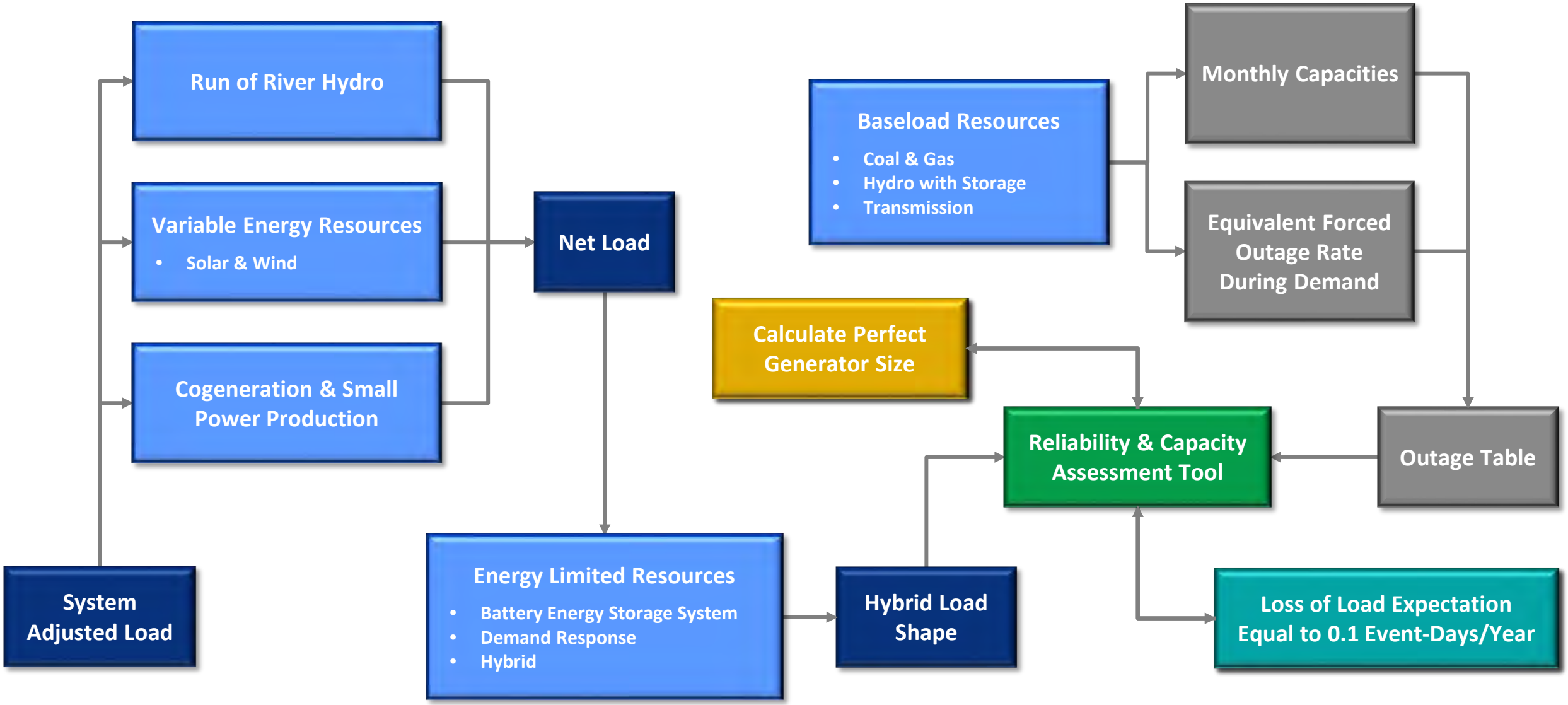
L_i: *Net load at hour "i"*

Loss of Load Expectation

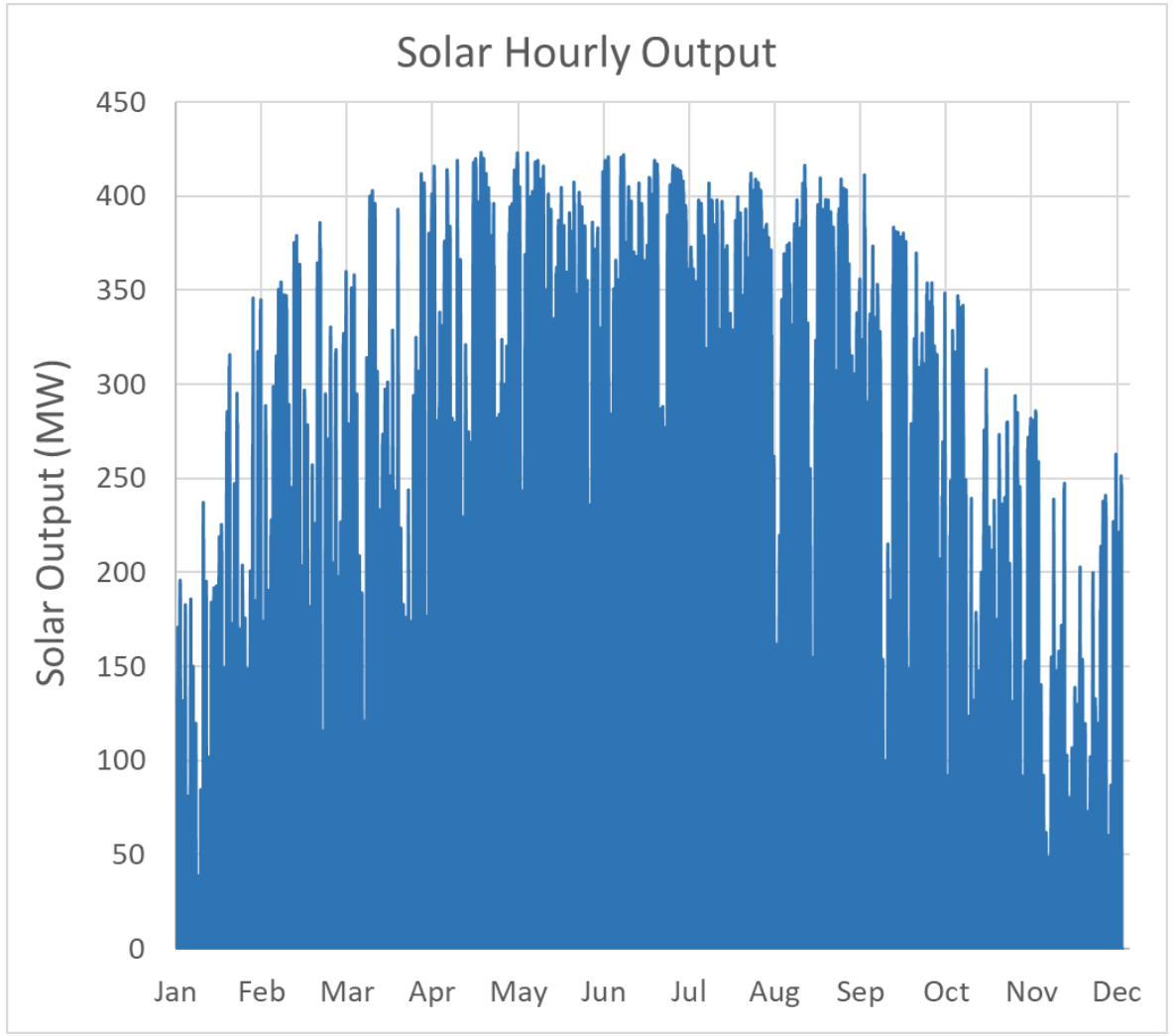
LOLE: the expected number of days per time period for which the available generation capacity is insufficient to serve the demand at least once per day

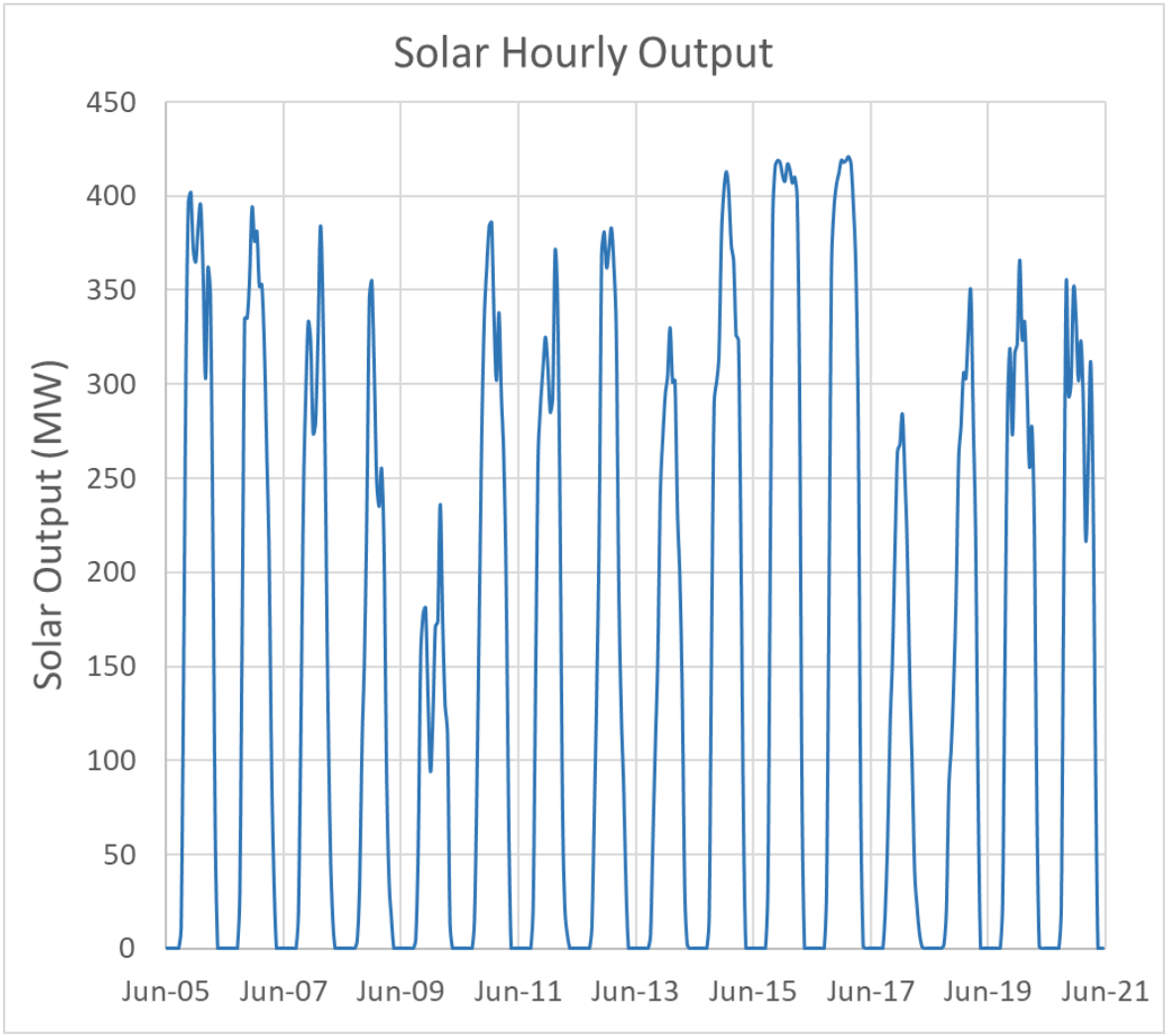
$$LOLE = \sum_{d=1}^{D} \max[_{i=1}^{H} (LOLP_i)]$$

Modeling Breakdown

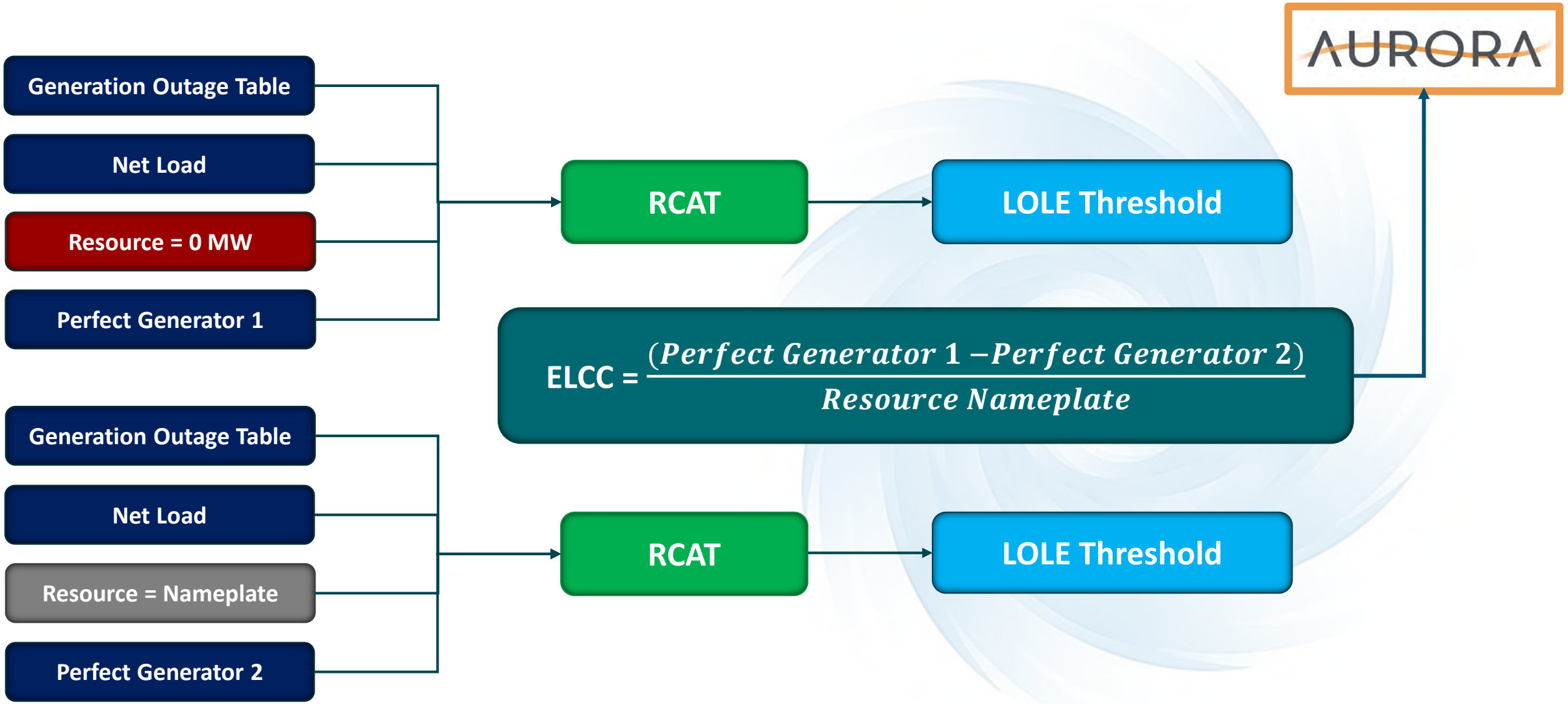


Variable Energy Resources



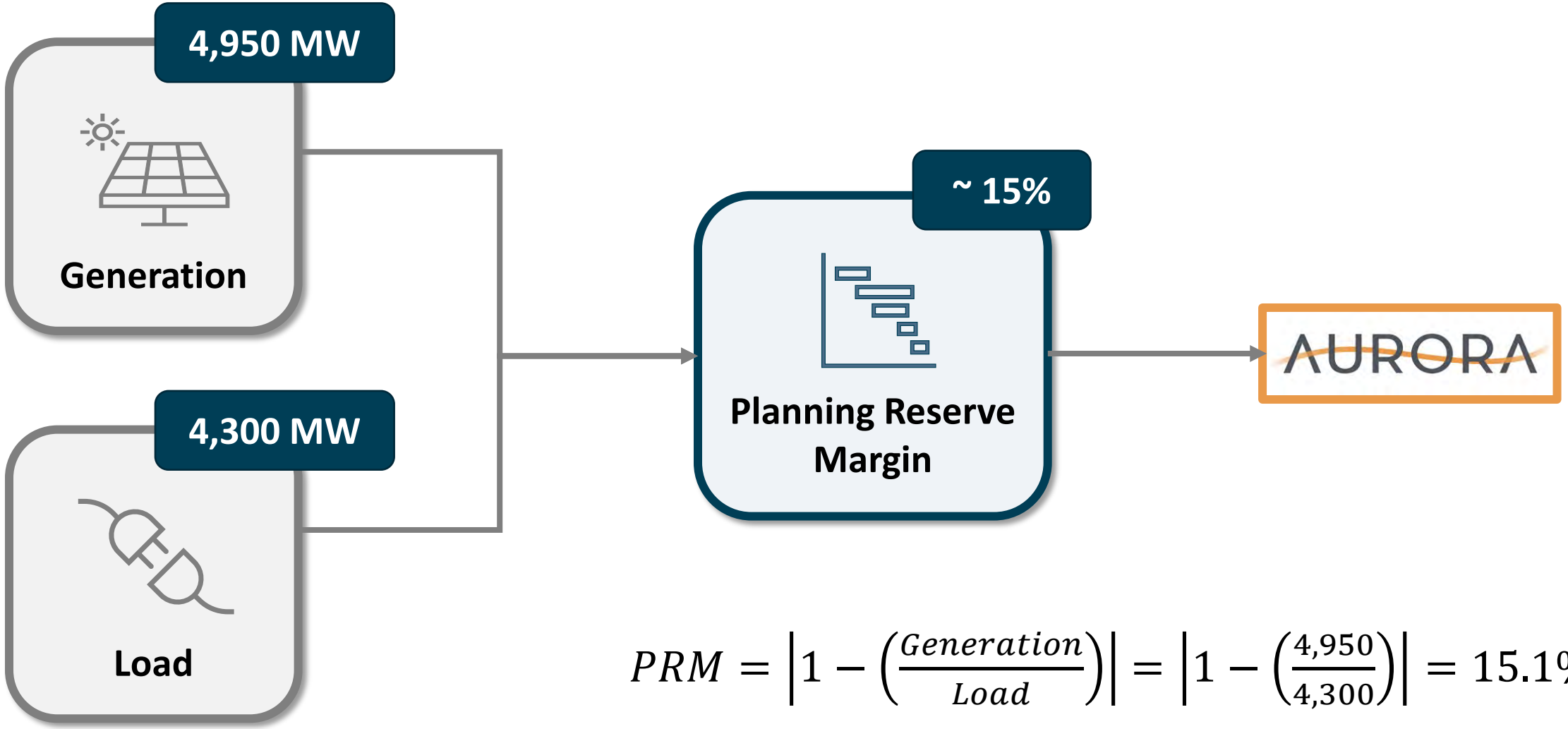


Effective Load Carrying Capability



Planning Reserve Margin

Example Calculation



$$PRM = \left|1 - \left(\frac{Generation}{Load}\right)\right| = \left|1 - \left(\frac{4{,}950}{4{,}300}\right)\right| = 15.1\%$$

2025 Integrated Resource Plan Updates

Reliability & Capacity Assessment

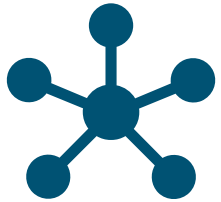
Data Updates

2023 IRP Data	2025 IRP Data Updates
• Use **6 Test Years** of Historical Data	• Use **7 Test Years** of Historical Data
• **Capacity Benefit Margin of 200 MW**	• **Capacity Benefit Margin of 0 MW**
• Update EFORds with **2022 NERC GADS** (5-Year Rolling Average) Data	• Update EFORds with **2024 NERC GADS** (5-Year Rolling Average) Data

NERC GADS: North American Electric Reliability Corporation (“NERC”) Generating Availability Data System (“GADS”)

LOLE Portfolio Recalibration

Multi-Metric Approach



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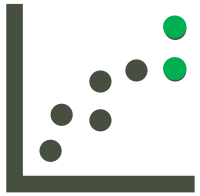
Transition to a Multi-Metric Criteria



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Specifically Consider Extreme Events

- **Industry is transitioning towards the utilization of multi-metric criteria for assessing resource adequacy**
- **No singular metric is the solution**
- **Multi-metric framework is needed to consider size, frequency, and duration of shortfalls**

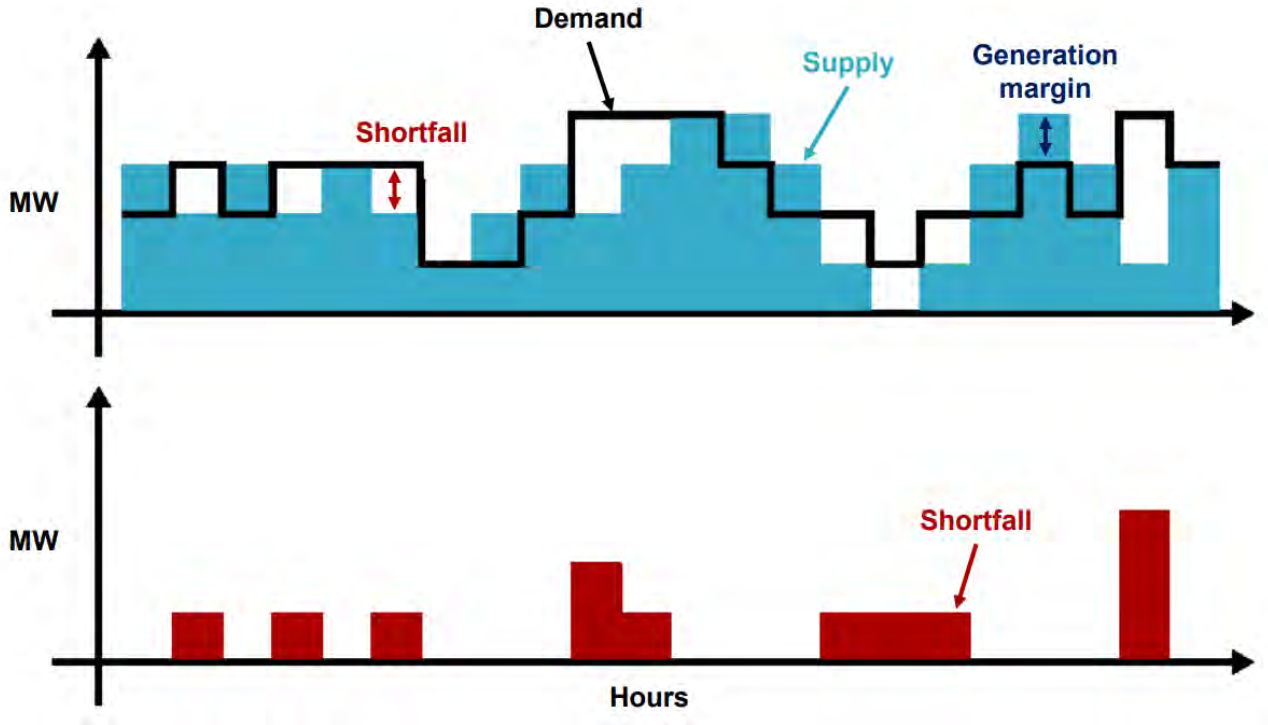
Final Energy Systems Integration Group (“ESIG”) Task Force Recommendations from 2024 Institute of Electrical and Electronics Engineers (“IEEE”) Resource Adequacy Tutorial

Loss of Load Hour Metric

Loss of Load Hour

LOLH: the expected number of hours per time period when a system's hourly demand is projected to exceed the generating capacity

$$LOLH = \sum_{i=1}^{H} LOLP_i$$



From 2024 IEEE Fundamentals of Resource Adequacy for Modern Power Systems Morning Session

From the above Basic Example

Total Hours of Shortfall = 9 Hours

Shortfall Event Count = 6 Events

2026 LOLE & Peak Load Forecast