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March 4, 2025

MEMORANDUM

TO: **Council Members**

FROM: **Dor Hirsh Bar Gai, Power System Analyst**

SUBJECT: **Primer on Needs Assessment**

BACKGROUND:

Presenter: Dor Hirsh Bar Gai

Summary: Staff will present about the role of the Needs Assessment and the overall methodology of conducting one as part of a Power Plan.

The Needs Assessment is an important component of the Power Plan process to evaluate the need – resource gap – in a future year for the region to be adequate. The need is evaluated with GENESYS, the Council's adequacy model. Using the Council's multi-metric adequacy framework it defines a capacity and energy signal - the adequacy reserve margins - for OptGen, the portfolio expansion model, to find a resource strategy that meets the region's needs under different futures.

Relevance: Resource adequacy is a critical component of the Council's mandate to develop a regional power plan that "ensures an adequate, efficient, economic and reliable power supply." The Needs Assessment derives the Adequacy Reserve Margins necessary to develop the Council's resource strategy.

Workplan: B.3.2 Conduct assessments of regional needs to inform scenario modeling.

Background: An adequate power supply can meet the electric energy requirements of its customers within acceptable limits, considering a reasonable range of uncertainty in resource availability and in demand. Resource uncertainty includes forced outages, early retirements and variations in hydro, wind, solar and market supplies. Demand uncertainty includes variations due to temperature, economic conditions, and other factors. Resource availability and demand are also affected by environmental policies, such as those aimed at reducing greenhouse gas emissions.

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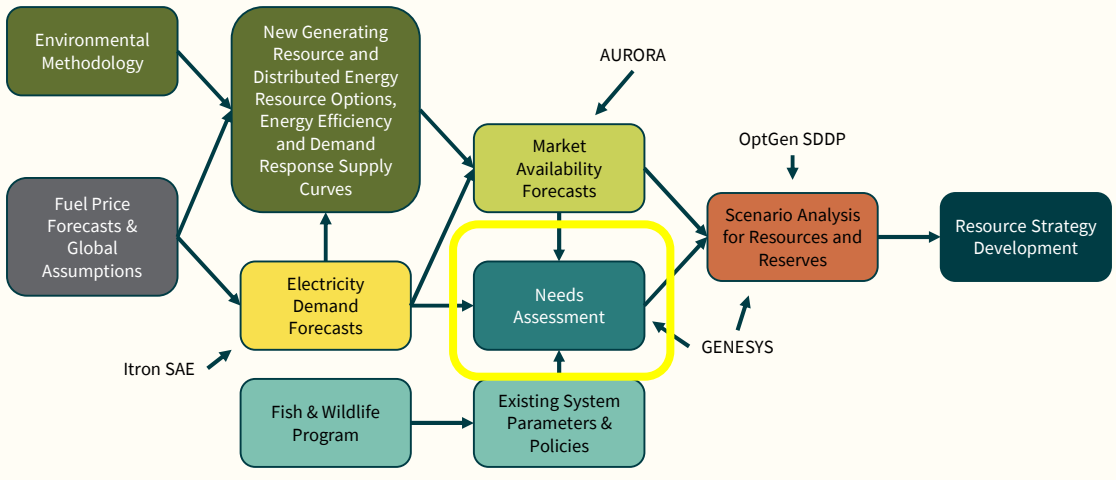
Power Plan Elements and Analytical Flow



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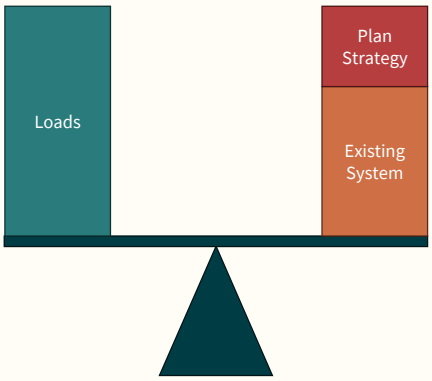
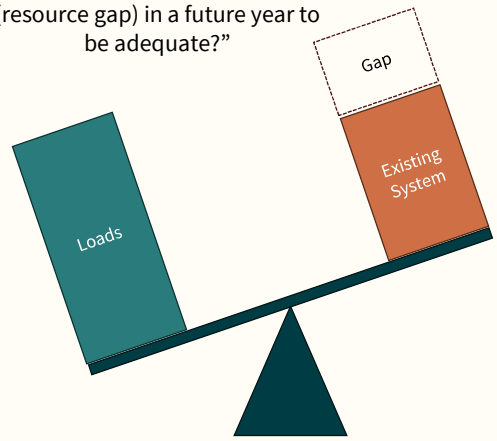
Adequacy Assessment vs Needs Assessment?

Adequacy Assessment asks:
"Is the region adequate in a future year WITH the Plan Strategy?"



Needs Assessment asks:
"What does the region need (resource gap) in a future year to be adequate?"

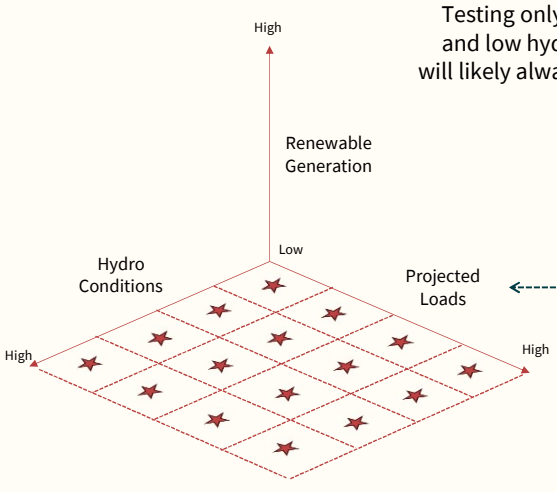


3

Accounting For Uncertainty

Uncertain Generation:
Different wind profiles
Forecast error (reserves)

Testing only o[illegible] with high loads and low hydro an[illegible]ewable generation will likely always [illegible]dequacy challenges



Uncertain Hydro:
Stream flows
Climate-dependent

Uncertain Loads:

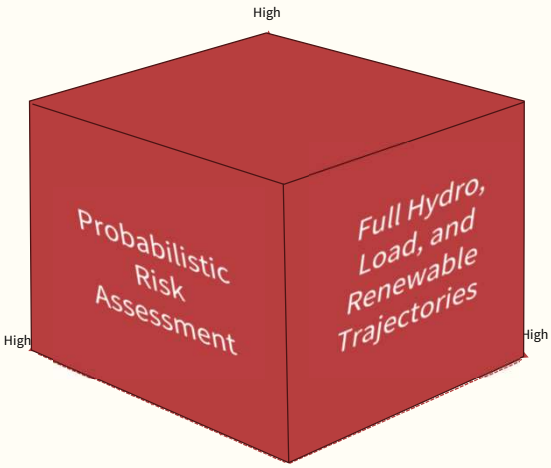
Temperature sensitive

Load Forecast

4

Accounting For Uncertainty

Uncertain Generation:
Different wind profiles
Forecast error (reserves)



Uncertain Hydro:
Stream flows
Climate-dependent

Uncertain Loads:

Temperature sensitive <-- **Load Forecast**

Conducted across 3 climate scenarios

5

The Existing System Goes into the Needs Assessment

LOADS | TRANSMISSION | HYDRO | THERMAL | RENEWABLES | STORAGE

MARKET | RESERVES | ENERGY EFFICIENCY | DEMAND RESPONSE

Embedded into loads

6

Multiple Needs Assessment?

- Substantial changes to the existing system require new needs assessments
- Staff are planning multiple needs assessments for hydro flexibility
- Pending if other changes require assessments

7

Needs Assessment Methodology

Existing System Setup in GENESYS → GENESYS Studies → Linking Adequacy Metrics to Adequacy Reserve Margins

8

Linking Adequacy To Reserve Margins

Sending the appropriate signal to the portfolio expansion model

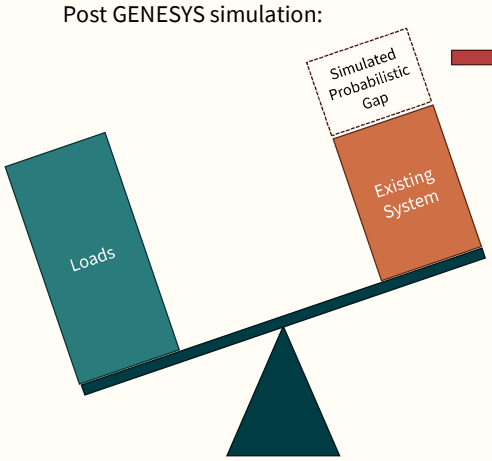
Historically, derived for annual energy and winter and summer capacities

Including a pure capacity need for achieving adequacy

9

Role of Council's Needs Assessment

Post GENESYS simulation:



Define Risk by Multi-Metric Adequacy Framework:

Peak
Energy
Duration
Frequency

Define Adequacy Reserve Margin to signal Portfolio Expansion model:

Annual and Seasonal capacity and energy

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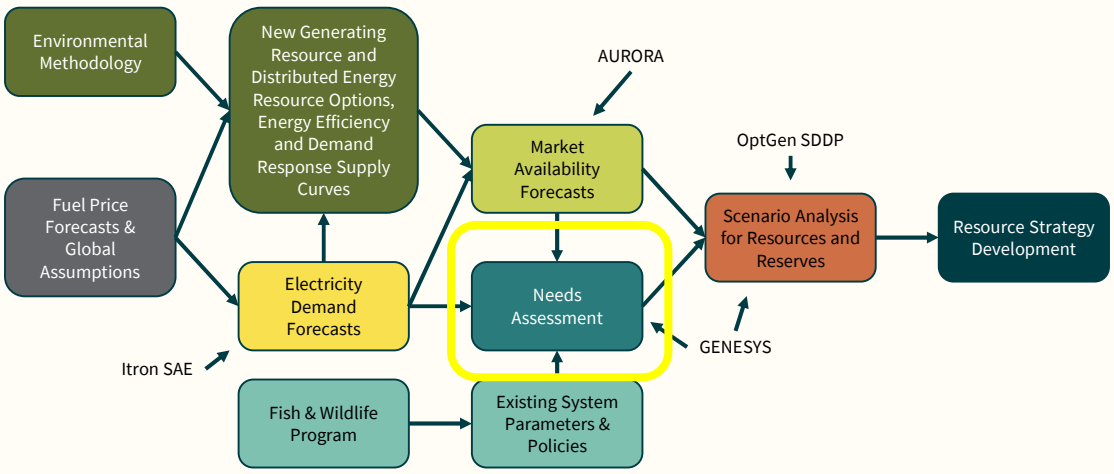
Power Plan Elements and Analytical Flow



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