April 30, 2019

MEMORANDUM

TO: Power Committee Members
FROM: Gillian Charles, Mike Starrett
SUBJECT: Development of generating resources reference plants

BACKGROUND:

Presenter: Gillian Charles, Mike Starrett

Summary: In preparation for the 2021 Power Plan, staff will be providing the Power Committee a series of presentations on different aspects to developing the Plan. This presentation will be on the development of generating resources reference plants.

Relevance: A generating resource reference plant is a collection of characteristics that describe a realistic and likely implementation of a given technology within the region. It includes estimates of costs, operating and performance specifications, and developmental potential. These reference plants become resource options – along with energy efficiency and demand response - for the Council’s power system models (e.g. the Regional Portfolio Model) to select to fulfill future resource needs.

Workplan: A.4.1 Develop generating resource reference plants for 2021 Power Plan
Developing a Reference Plant: Generating Resources

Gillian Charles, Mike Starrett
Power Committee
May 7, 2019

How Generating Resources Fit in the Power Plan Process...

- Natural Gas/Fuels Forecast
- Environmental Methodology
- Financial and Economic Assumptions

Generating Resource Reference Plants

- Electricity Price Forecast
- Resource Strategy Analysis
- Resource Adequacy

- Price Effect Load Forecast
What is in scope?

Resources and technologies to be considered in the power plan analysis must be:

- Per the NW Power Act, §839a(4)(A)(i) “‘Cost-effective’, when applied to any measure or resource... must be forecast- to be **reliable and available within the time it is needed...**”
  - i.e. within the 20 year power planning horizon (2021-2040)
  - Typically applied through consideration of resources that are commercially available at the start of the planning horizon
- Utility-scale generation resources, proven technologies, with potential in the region
  - Includes energy storage
- Demand-side generation resources, proven technologies, with potential in the region

Developing a Reference Plant

- Categorization of New Resource Options
- Secondary
- Microfin
- Long-term
- Fuel Price Forecast

- Develop Reference Plant
  - Environmental Methodology
  - Financial Assumptions
  - Microfin

- Model Analysis
  - RPM
  - AURORA

- Resource Option(s)
Resource Categories

Prioritization based on a resource’s commercial availability, constructability, cost-effectiveness, and quantity of developable resource in the region.

- **Primary; Significant**: Resources that look to play a major role in the future PNW power system.
  - Assessment: In-depth, quantitative characterization to support system integration and risk analysis modeling. Will be modeled in RPM.

- **Secondary; Commercial w/ Limited Availability**: Resources that are fully commercial but that have limited developmental potential in the PNW.
  - Assessment: Mix of qualitative and some quantitative analysis sufficient for potential modeling in the RPM.

- **Emerging/Long-term**: Resources that have long-term potential in the PNW but that are not commercially available yet.
  - Assessment: Qualitative discussion of status & regional potential, quantify key numbers as available. Will not be modeled in RPM.

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What is a reference plant?

A reference plant is a collection of characteristics that describe a resource technology and its theoretical application in the region. It includes estimates of typical costs, logistics, and operating specifications.
Example Seventh Plan Ref Plant(s): Onshore Wind

Multiple wind reference plants based on
- Location
- Transmission availability
- Potential MW (maximum build-out)

... become resource options for RPM to select, based on*
- Resource need
- Cost
- Availability/location
- Seasonal shape

*simplified for presentation purposes!

Use of the Generating Resources Advisory Committee (GRAC)

Council staff presents its preliminary analyses to the GRAC for discussion and feedback on,
- Resource categorization into primary, secondary, and emerging/long-term
- Resource attributes and operating characteristics of a reference plant representative of a “typical” PNW configuration
- Estimated cost assumptions, especially the overnight capital cost and 20-yr cost curve

The GRAC is a valuable regional resource and we appreciate their participation in our process!
Next Steps

Categorization of New Resource Options
- Primary
- Secondary
- Long-term

Develop Reference Plants

Environmental Methodology

May 14 GRAC Mtg
June/July P4 Mtg

Q3 - Q4 2019
GRAC and Power Committee Mtgs

Discussion at summer 2019
Council Meeting

Q1 2020