Northwest **Power** and **Conservation** Council

September 4, 2024

MEMORANDUM

TO: **Council Members**

FROM: **Jennifer Light, Director of Power Planning**

SUBJECT: **Power Plan Global Assumptions Primer and Discount Rate**

BACKGROUND:

Presenters: Jennifer Light and Tomás Morrissey

Summary: In developing a power plan, the Council must establish a set of global assumptions that are used across the analytics. These include common financial assumptions, definitions for peak periods and related assumptions, and climate and weather files. Jennifer will provide an overview of the suite of global assumptions used in the Council's power planning and the staff plan for finalizing these assumptions.

After the introduction on global assumptions, Tomás will present on one element of the global assumptions: the assumed discount rate in the plan. This presentation outlines the staff's proposed discount rate assumptions and next steps in finalizing this for other plan analysis.

Relevance: Developing and documenting a common set of assumptions used across the many analytical elements of the plan is critical for ensuring consistency in analysis.

Workplan: B.2.1. Prepare for the ninth power plan, developing a draft scope, preparing models and inputs, and developing environmental methodology.

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Agenda

- Overview of power planning global assumptions
- Discussion of discount rate
  - What is a discount rate
  - Discount rates and power planning
  - Analysis inputs
  - Discount rates from Northwest utilities
  - **DRAFT** rate for Ninth Power Plan
  - Next steps

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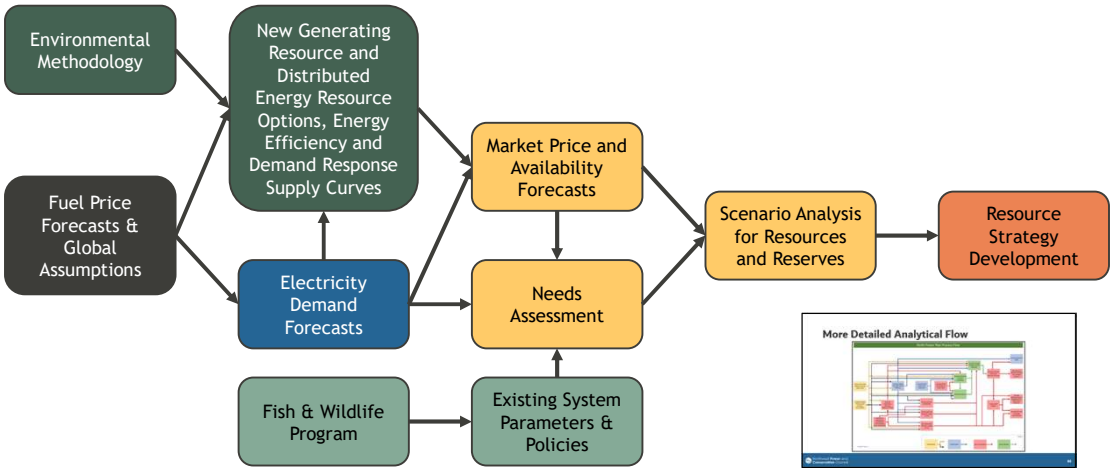
Power Plan Elements and Analytical Flow



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What's Included in Global Assumptions

- Forecast Period
- Financial Parameters
- Peak and Line Losses
- Climate and Weather Assumptions

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Forecast Period

Used across every element of the plan to ensure that staff is aligning the analysis period appropriately

Forecast Period - **DECIDED**
Q4 October 2026 – Q3 September 2046 (essentially 2027-2046)

Financial Parameters

Used across every piece of analysis to ensure that we are getting everything aligned in terms of dollar years, how we account for inflation, and how we think about other financial elements.

Real Base Year & Inflation – DECIDED
This is decided internally to have the most recent $ year possible and a single source for accounting for converting across years • **Real $ Base Year:** 2024 • **Inflation Rate Data Source:** Global Insights

Today!

Discount Rate
• Allows for the weighing of benefits and costs over time • Discussed with CRAC

Discussing over next 4 months

Financing Assumptions - TBD
• Common set of assumptions used for new resources based on who is paying for resource • Work with CRAC, DRAC, and GRAC

SCC - TBD
• Account for emissions damages from generating resources • Work with GRAC and SAAC

Peak and Line Losses

Used across various elements of the analysis (power system models, defining resource attributes, etc.) to understand the peak hour of need and account for resources on an even playing field.

Develop over next 4 months

Peak Definition - TBD

- Defines the hour (or hours) of greatest need
- Informed in part by model testing based on identified hours of need and discussed with committees

Working on now and expect to have approach in fall

Line Losses - TBD

- Allows for the comparison of loads and resources at a common point of generation
- Work primarily by CRAC and DRAC

T&D Deferral - TBD

- Accounts for resources ability to defer transmission or distribution that is otherwise not captured by modeling
- Work with the CRAC, GRAC, DRAC, and SAAC

Climate and Weather Assumptions

Used to ensure that we are modeling weather and climate assumptions as consistently as possible across all elements of the plan

Weather Locations – DECIDED

This was decided internally based on locations used in the load forecasting model and aligning those with RTF informed analysis regarding representativeness of different weather stations

Climate Files + Years – NEAR DECIDED

- Ensures that we are aligning assumptions with the same climate change models
- Working primarily with the CWAC to revisit approach from 2021 Plan

Staff have final recommendation, will present this and other climate assumptions in a couple months

Next Steps

- Keep working through these internally and with advisory committees
- Documenting decisions as made in a single file for reference across the team
- Will bring assumptions to Council as needed with related analysis

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Discount rate warm up

- Over your career you will put $250,000 into your 401(k)-investment account
- Adjusted for inflation, do you care when in your career this money enters the investment account?
- If someone said you can have the $250,000, inflation adjusted, deposited on your first day of work or your last day of work, which would you choose?

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More on why we use discount rates

"Weighing benefits and costs that take place over time requires discounting those amounts to present value equivalents.

This necessitates selecting a discount rate which can adjust for the fact that resources are more valuable today than in the future if consumers prefer to consume today rather than wait, or if firms could be earning a positive return on invested resources."

- Council of Economic Advisors Issue Brief
January 2017

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Discount rate and NPV for power planning

- A higher discount rate reduces the net present value impact of future actions. The impact goes down as the discount rate increases or as the action occurs later in time. Consider a 20-billion-dollar investment in year 2040:
  - **At a 0% discount rate the NPV impact is 20 billion**
  - **At a 2% discount rate the NPV impact is 15 billion**
  - **At a 4% discount rate the NPV impact is 10 billion**
- On the one hand, a high discount rate is bad, since the full price of the investment will have to be paid eventually, and a high discount rate can distort this cost
- On the other hand, a high discount rate is good, since there is considerable uncertainty about what will occur in 2040, and maybe we want more weight on near-term actions

Discount rate and resource costs

- Discount rates reduce the cost of future expenditures
- Resources that have fixed or variable operating costs (like maintenance or fuel) are relatively cheaper at higher discount rates, upfront cost resources are relatively cheaper with lower discount rates

Table A - 5: Illustration of Impact of Discount Rate on Resource Selection

(Levelized cost 2012$/MWh at various discount rates)

Discount Rate	0%	3%	4%	5%	7%	20%
Energy Efficiency (TRC)	50	43	41	39	36	24
Combined-Cycle Combustion Turbine	79	58	53	48	41	18

Discount rate update steps

- Use utility IRPs and planning documents to determine utility discount rates
- Use a NY Stern database to determine non-utility sector discount rates
- Use Federal Reserve's Survey of Consumer Finances data (via a DOE report) to determine consumer discount rates
- Determine various percentage splits involving:
  - Demand vs. supply side resource build projects
  - IOU vs Public utility resource spend projections
  - Energy efficiency spend by economic sector

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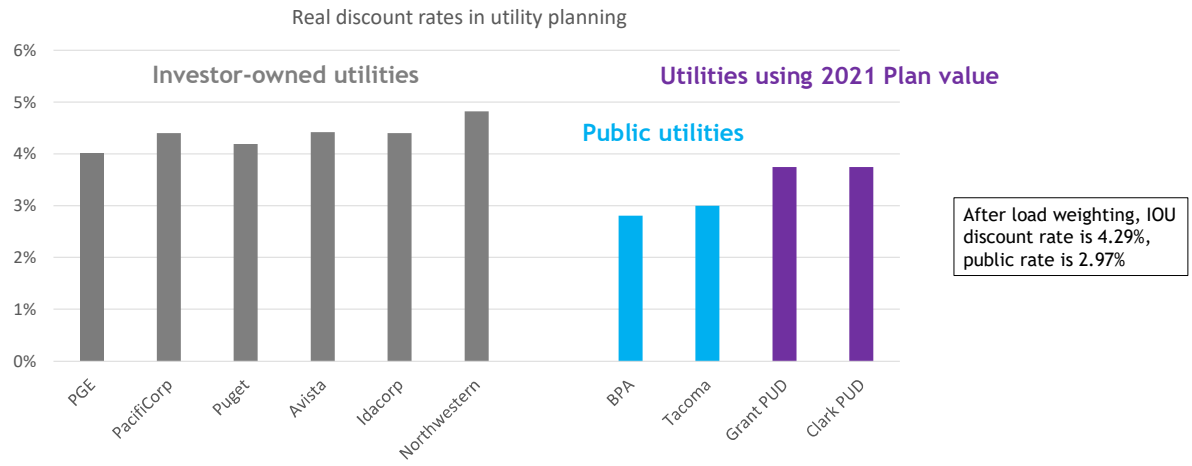
Utility discount rates across the Northwest



After load weighting, IOU discount rate is 4.29%, public rate is 2.97%

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DRAFT 9th Plan discount rate

Split comes from EIA-861 revenue data (MWh split is close to 56/44 IOU/public)

Discount rate calculation for 9th Power Plan

	Supply vs demand side	Share of investment		Utility revenue split		Real discount rate	Blend
Supply side resources	71%	Utility	100%	Public	40%	2.97%	3.76%
				IOU	60%	4.29%	
		Utility	60%	Public	40%	2.97%	3.76%
				IOU	60%	4.29%	
Demand side resources	29%	Consumer	40%	Residential	21%	4.16%	5.10%
				Commercial	49%	5.15%	
				Industrial	27%	5.79%	
				Agriculture	2%	4.89%	
				Utility	1%	3.76%	

Split comes from 2024 RAAC analysis using 2021 Plan inputs

Split comes from 2021 Plan selected EE

Final discount rate 3.92%

Currently rounding to 3.90%

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Comparison to past Power Plans & next steps

- Continue to refine calculation
- Presenting our approach at September Council meeting in Astoria

	Discount rate (real)
Ninth Plan (DRAFT)	3.90%
2021 Plan	3.75%
7th Plan	4.00%

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Stakeholder feedback

- Use utility specific discount rates
  - Likely not possible in modeling setup
- Discount rates and the social cost of carbon
  - Important but not related to this process (discussed elsewhere)
- Use the newest discount rate values possible
  - We can check for large utility changes over the next few months
- Use consumer rather than utility discount rates
  - Interesting idea, but unsure if that is the right perspective for this planning document
- Use different discount rates for different resources to differentiate on risk
  - Interesting idea, but difficult to get data to implement, likely not possible in modeling setup, and we will try to incorporate risk elsewhere

Next steps

- Looking for a head-nod on general methodology
- We will discuss some of the details with other Council Committee's this fall
- We will skim utility planning documents in the upcoming months to see if there are any major shifts in discount rates
- If time allows during model setup/testing, we will test a different discount rate to see how big of an impact it has on results
  - If the impact is large, we may reopen this discussion

Questions?

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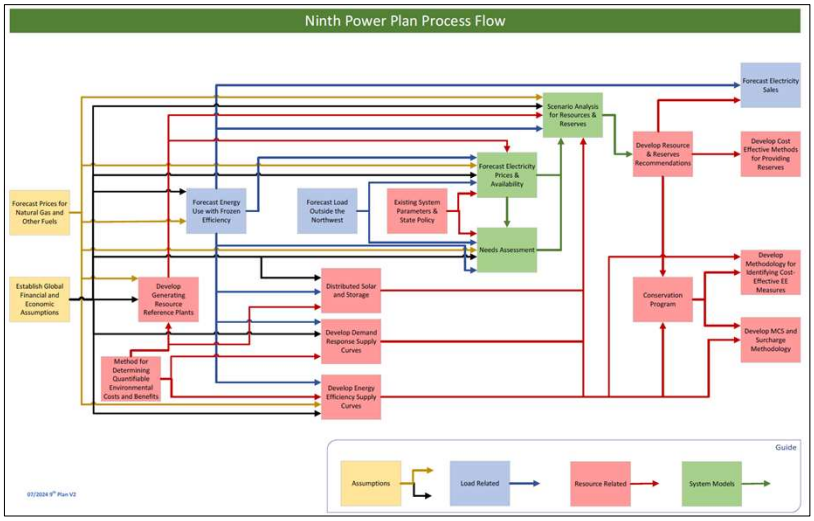
More Detailed Analytical Flow



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