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

April 1, 2025

MEMORANDUM

TO: **Council Members**

FROM: **Tomás Morrissey, Senior Power Analyst and Steven Simmons, Senior Energy Forecasting Analyst**

SUBJECT: **Developing Demand Forecast Pathways**

BACKGROUND:

Presenter: Tomás Morrissey and Steven Simmons

Summary: At the March Council meeting, staff presented their proposed approach to developing a long-term load forecast for power plan modeling. As described, staff are working to develop a suite of demand pathways that will capture a range of potential load growth over the twenty-year power planning horizon. These pathways are intended to reflect differences in the size of future loads, timing of demand growth – such as earlier in the study horizon or later – and the shape of potential future demand.

At this meeting, staff will share their proposed approach to selecting these pathways. The purpose is to get Council member feedback as to whether the proposed suite of pathways cover the uncertainties and risks that members are most interested in planning for, and whether there is anything that staff might be missing in this approach. Staff will use feedback from this discussion in developing the final load forecast suite which it plans to present to the Council during the April 29th Council meeting webinar.

Relevance: Per the Northwest Power Act, as part of its regional power plan, the Council is required to develop and include "a demand forecast of at least twenty years…". In addition to producing the long-term demand forecast, data from the load forecast is used to inform the energy efficiency and demand response potential assessments, capital expansion modeling, the market price forecast, and the needs assessments.

Workplan: B.2.2. Finalize long-term load forecasts for plan analysis.

More info: Presentation on proposed approach for Ninth Plan demand forecast development: https://www.nwcouncil.org/fs/19131/2025_03_03.pdf

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Purpose

- To share early thinking on staff's approach to develop load forecast pathways in advance of the April 29 load forecasting Council meeting
- Better understand how well the proposed pathways align with member perspectives on load risk

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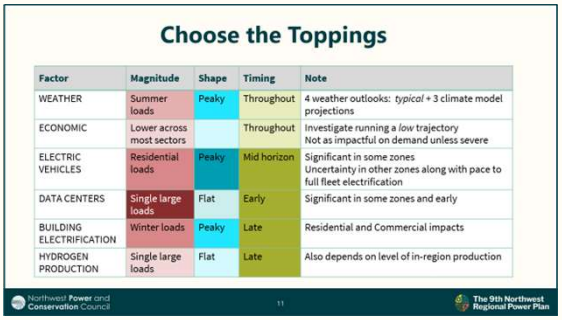
Reminder from March Council Meeting

- Goal is to create a range of pathways that capture differences in magnitude, timing, and shape of demand
- Staff is proposing to create five pathways based on a combination of different forecasts
  - Weather impacts (3 climate models and "normal" weather) will be layered on top of the trajectories to create the full suite of pathways



Choose the Toppings

Factor	Magnitude	Shape	Timing	Note
WEATHER	Summer loads	Peaky	Throughout	4 weather outlooks: *typical* + 3 climate model projections
ECONOMIC	Lower across most sectors		Throughout	Investigate running a *low* trajectory Not as impactful on demand unless severe
ELECTRIC VEHICLES	Residential loads	Peaky	Mid horizon	Significant in some zones Uncertainty in other zones along with pace to full fleet electrification
DATA CENTERS	Single large loads	Flat	Early	Significant in some zones and early
BUILDING ELECTRIFICATION	Winter loads	Peaky	Late	Residential and Commercial impacts
HYDROGEN PRODUCTION	Single large loads	Flat	Late	Also depends on level of in-region production

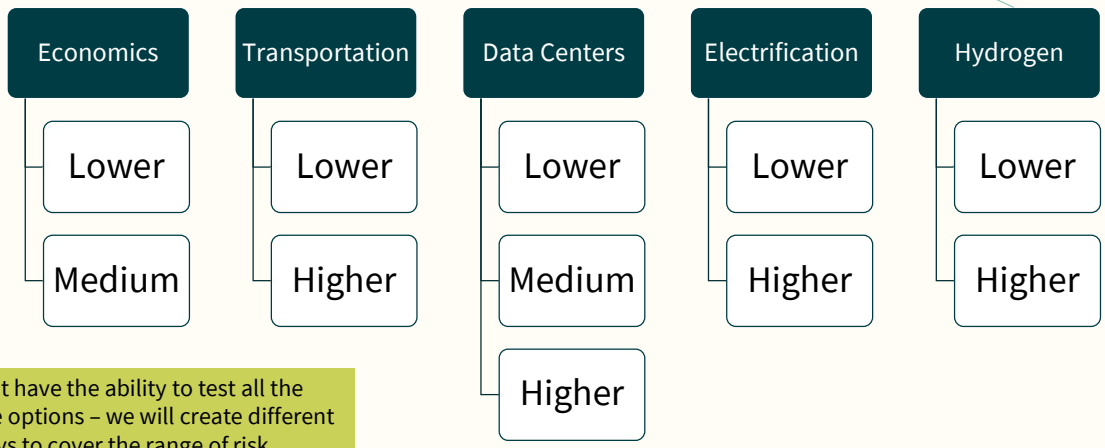
Thinking about risk

We are seeking feedback on our proposed pathways, and if they cover an appropriate level of load risk. We tend to view load risk through:

- **Magnitude:** how much new load is added? Are we risking overbuilding or underbuilding resources?
- **Timing:** when do the loads arrive? How does load growth early vs. later impact resource selection?
- **Shape:** is the new load expected to be flat or add to peak load? Does that impact what resources are selected?

Key forecast components

Hydrogen in this slide deck is for non-power system uses (ex. high heat industrial applications)



We don't have the ability to test all the possible options – we will create different pathways to cover the range of risk

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For the load adders, lower is relative

- Lower levels of transportation electrification, data centers, building electrification, and hydrogen still increase load relative to today
- We still see data center load growth under the lower pathway, the transportation forecast still meets state (OR & WA) policy under the lower pathway, and so on.

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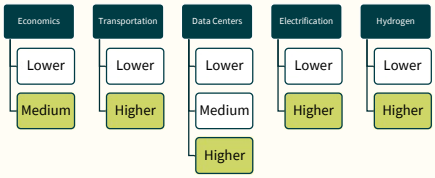
Pathway one – persistent high growth

1. **Persistent high growth**
   - The economy is good, and we get it all: data center growth accelerates, electric vehicle sales are strong, and electrification and hydrogen reach higher levels.



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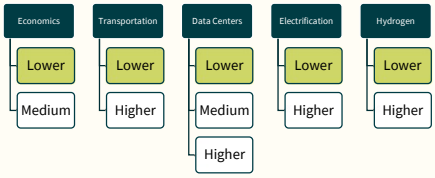
Pathway two – persistent low growth

1. Persistent high growth
2. **Persistent low growth**
   - The economy slows, and it slows the pace of development across the board. There is a relatively slower pace of data center development, electric vehicle sales, electrification, and hydrogen load growth.



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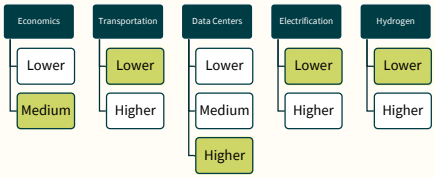
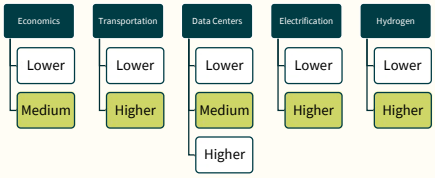
Pathway three – early growth

1. Persistent high growth
2. Persistent low growth
3. **Early growth**
   - The economy is good, and data center growth accelerates. There is a relatively slower pace of electric vehicle sales, electrification, and hydrogen load growth.



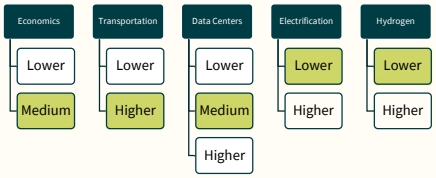
Pathway four – late growth

1. Persistent high growth
2. Persistent low growth
3. Early growth
4. **Late growth**
   - The economy is good, and data center growth follows recent trends. As we enter the 2030s electric vehicle sales are strong. Building electrification and hydrogen usage reach higher levels.



Pathway five – mixed bag

1. Persistent high growth
2. Persistent low growth
3. Early growth
4. Late growth
5. **Mixed bag**
   - The economy is good, and data center growth follows recent trends. As we enter the 2030s electric vehicle sales are strong. There is a relatively slower pace of electrification and hydrogen load growth.



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Proposed pathways

Pathway	What are we testing	Economics	Transportation	Data Center	Building Electrification	Hydrogen
P1	Persistent high growth	**Medium**	**Higher**	**Higher**	**Higher**	**Higher**
P2	Persistent low growth	**Lower**	**Lower**	**Lower**	**Lower**	**Lower**
P3	Early growth	**Medium**	**Lower**	**Higher**	**Lower**	**Lower**
P4	Late growth	**Medium**	**Higher**	**Medium**	**Higher**	**Higher**
p5	Mixed bag	**Medium**	**Higher**	**Medium**	**Lower**	**Lower**

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Caveats

- We may tune the approach/pathways as we make the forecasts and see the results
  - For example, perhaps two of the pathways overlap more than expected
  - We may need to consider peak vs flat load diversity as well
- Staff need to think about the sampling approach of the load pathways in modeling
  - Some forecasts may feel less likely than others; we may want to sample them less in modeling

Discussion Questions

- Does staff's approach to forecast pathways cover the uncertainties and risks you want to plan for?
- Is there anything that we are missing with this approach?