Demand Forecasting in the Age of Uncertainty

May 21, 2026

PNREC

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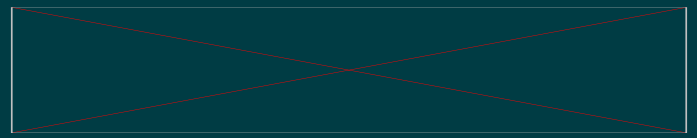
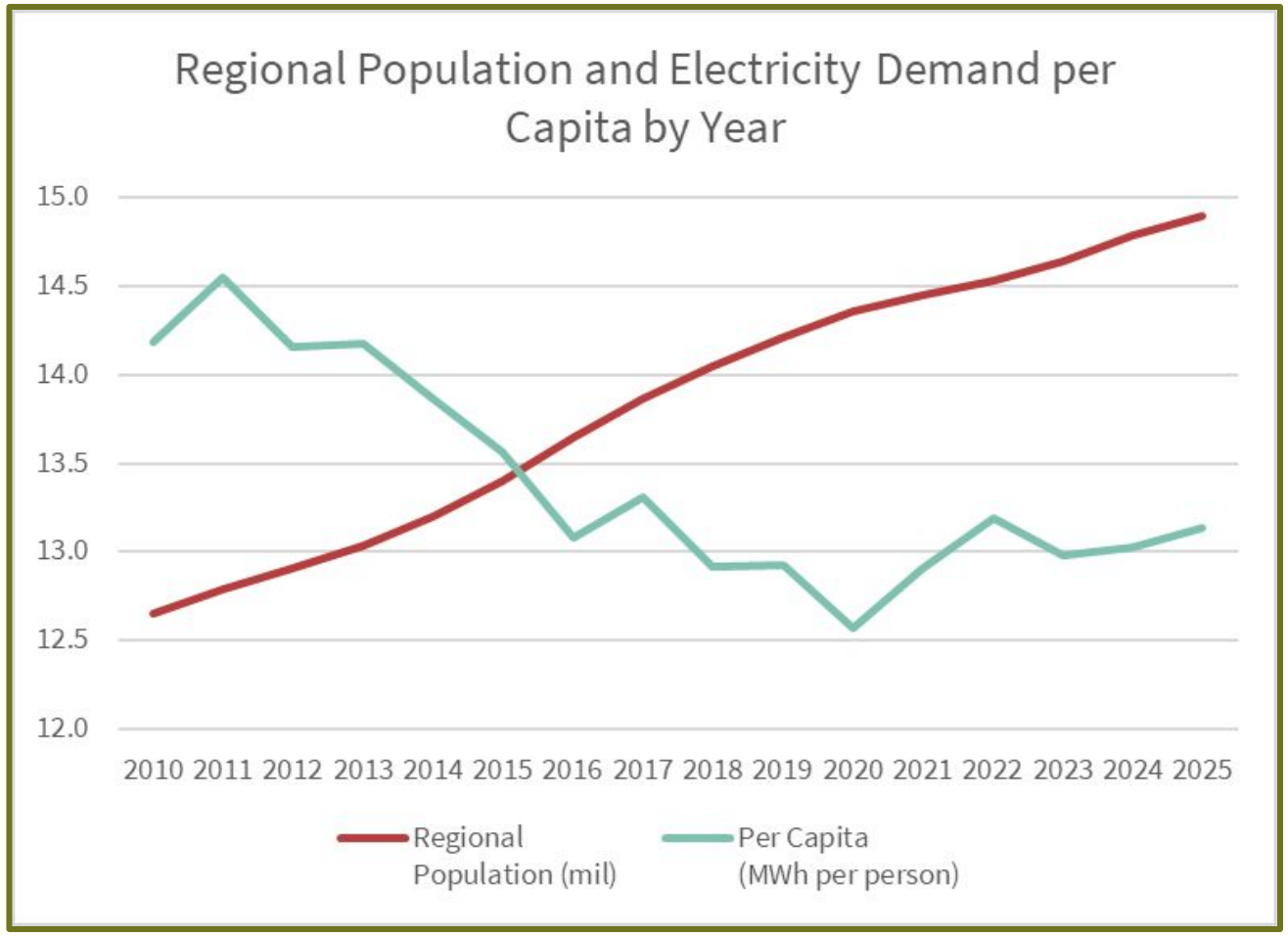


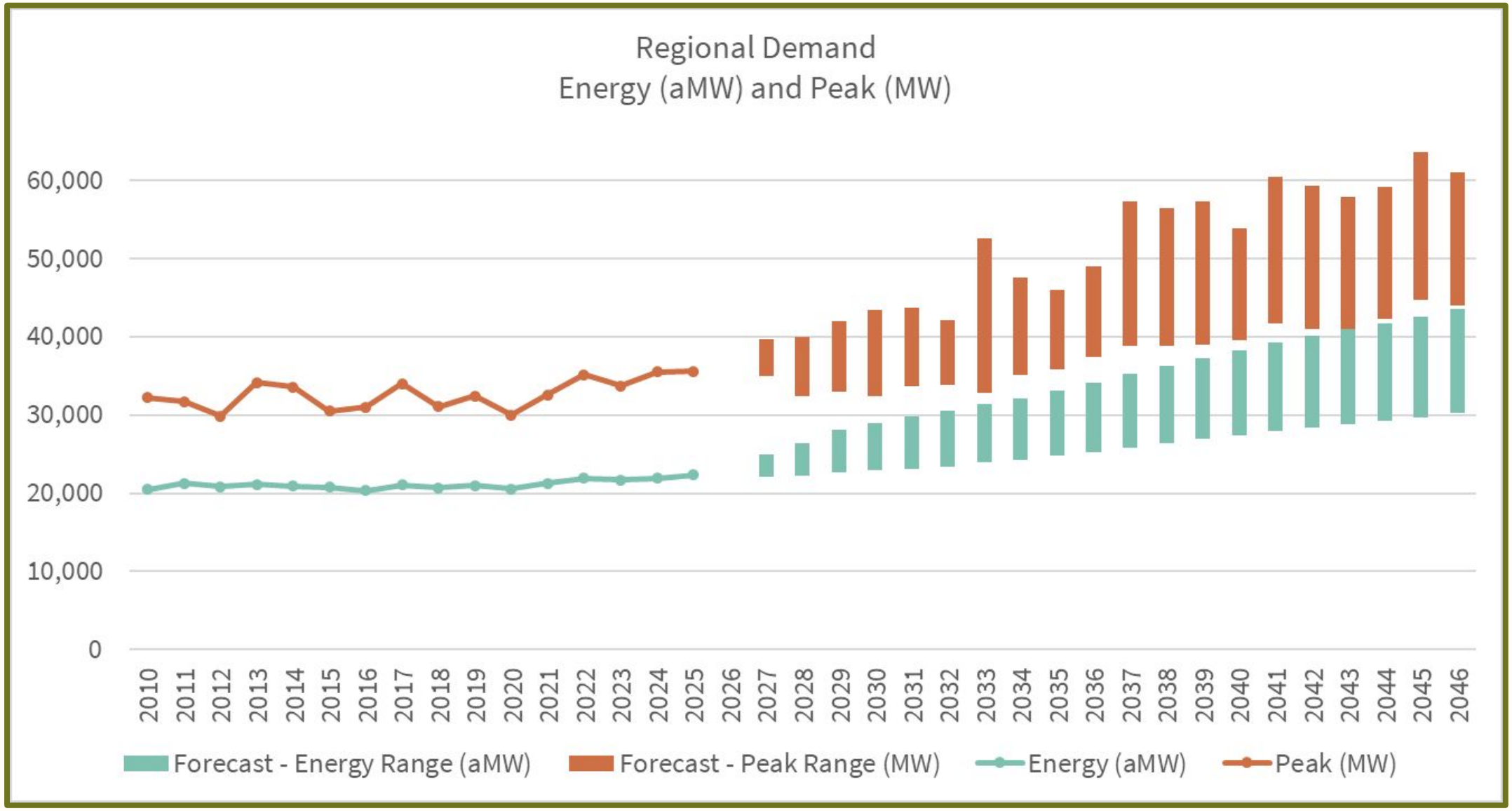
A Few Definitions

1. I'll be using the terms ***Demand Forecasting*** & ***Load Forecasting*** interchangeably
2. You might ask, what does ***aMW*** mean?
   a) This is annual regional energy or demand that we call ***Average Mega Watts (aMW)***
   b) It does **not** mean just an ordinary, mediocre Mega Watt
   c) It is the sum of Mega Watt Hours (MWh) of demand over the course of the year divided by the number of hours in that year
3. ***Annual Peak*** – this refers the single hour of maximum load, in Mega Watts (MW)
4. When I refer to our ***Region*** – this includes Idaho, Western Montana, Oregon and Washington
5. The ***Forecast*** I will be showing is what is known as the 9th Power Plan frozen-efficiency forecast – it is an input to the downstream power planning models, as such it does not reflect future conservation programs – therefore

Where We've Been



- The regional population has been growing steadily since 2010
- Electricity demand on a per capita basis steadily declined, hitting the nadir during Covid
- However, electricity demand per capita has jumped up a bit, likely due to data center related load growth (which is not population related)


Regional Demand
Energy (aMW) and Peak (MW)
60,000
50,000
40,000
30,000
20,000
10,000
0
2010
2011
2012
2013
2014
2015
2016
2017
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2046
Forecast - Energy Range (aMW)
Forecast - Peak Range (MW)
Energy (aMW)
Peak (MW)

Forecast pathways

We tested five different load trajectory pathways across three climate futures, so 15 in total

Pathway	What are we testing	Economics	Transportation	Data Center	Building Electrification	Industrial Electrification
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

Economic Uncertainty

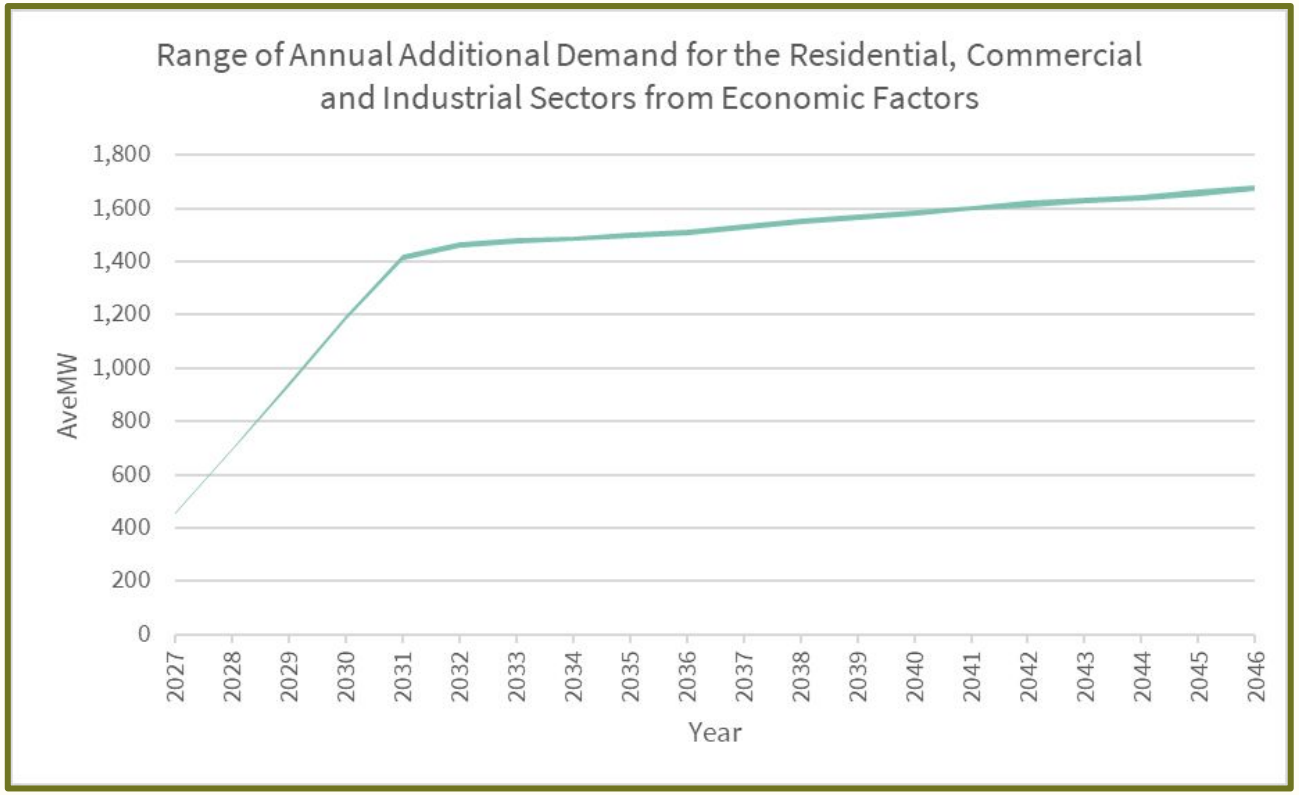
Two economic forecast trajectories were included:
1) Higher
2) Lower

Impacts the residential, commercial and industrial sectors

Two sets of economic trajectories were constructed and input to the forecast.
A benchmark, or higher, and a lower.
The benchmark economic data set was sourced from the S&P Global Market Intelligence Long-Term Annual report from January of 2025. Economic drivers impact the demand forecast for the residential, commercial, and industrial sectors and are available at the state level (ID, MT, OR, WA)
The key drivers include:

- Population
- Household Size
- Gross State Product (GSP)
- Unemployment Rate
- Real Personal Income (RPI)

For the lower economic forecast, these metrics were adjusted downward (or in the case of unemployment rate, upward) to reflect a lower economic growth future.



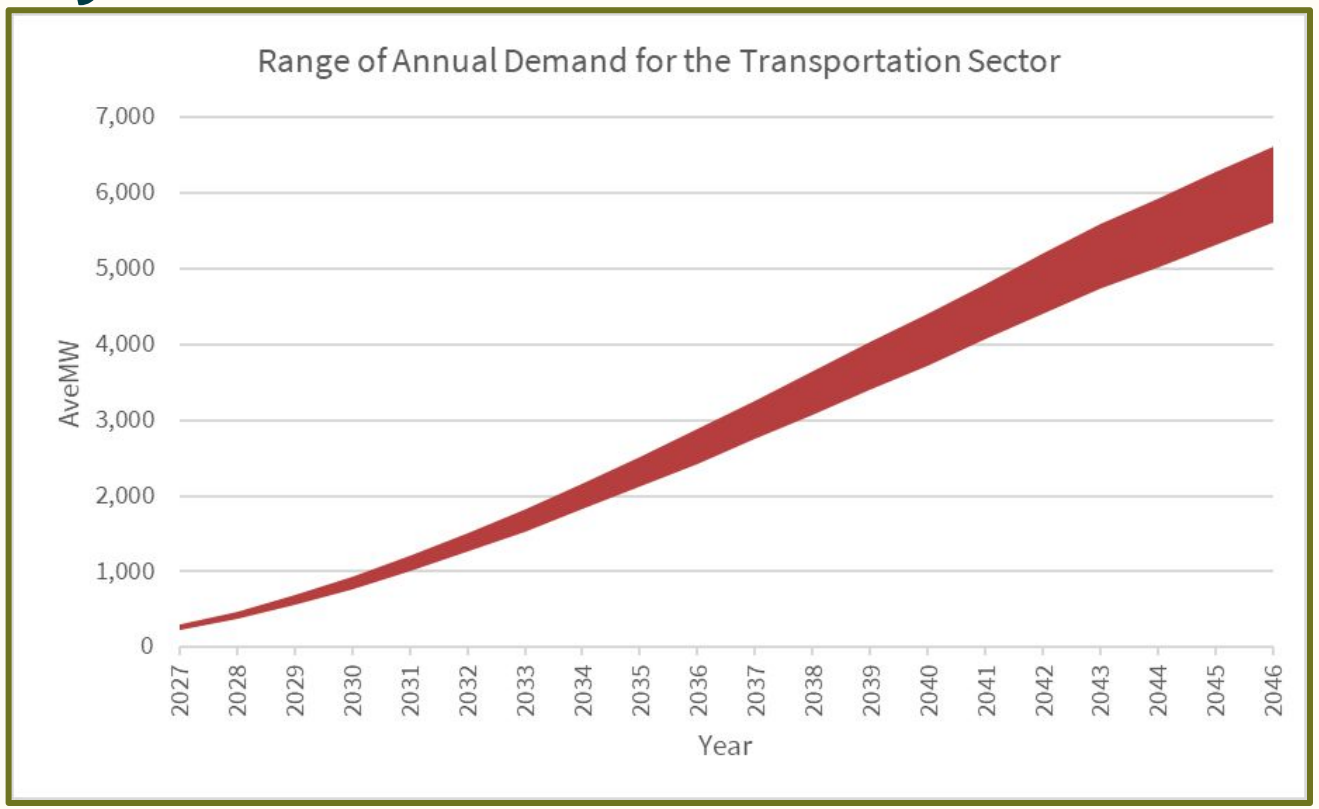
Electric Vehicle Uncertainty

Two transportation forecast trajectories were included:
1) Higher
2) Lower

In late 2025, there were approximately 393,000 electric vehicles registered in the states of Oregon and Washington. This is nearly double the number of electric vehicles in 2022. Oregon and Washington have both adopted the California Clean Cars II rules which will require 100% of new vehicles sales to be zero-emission by 2035.

Both trajectories are designed to meet Oregon and Washington state policies that 100% of new sales are to be zero-emission vehicles by 2035. The lower case assumes that the overall demand for transportation is less, meaning there are fewer cars on the road.

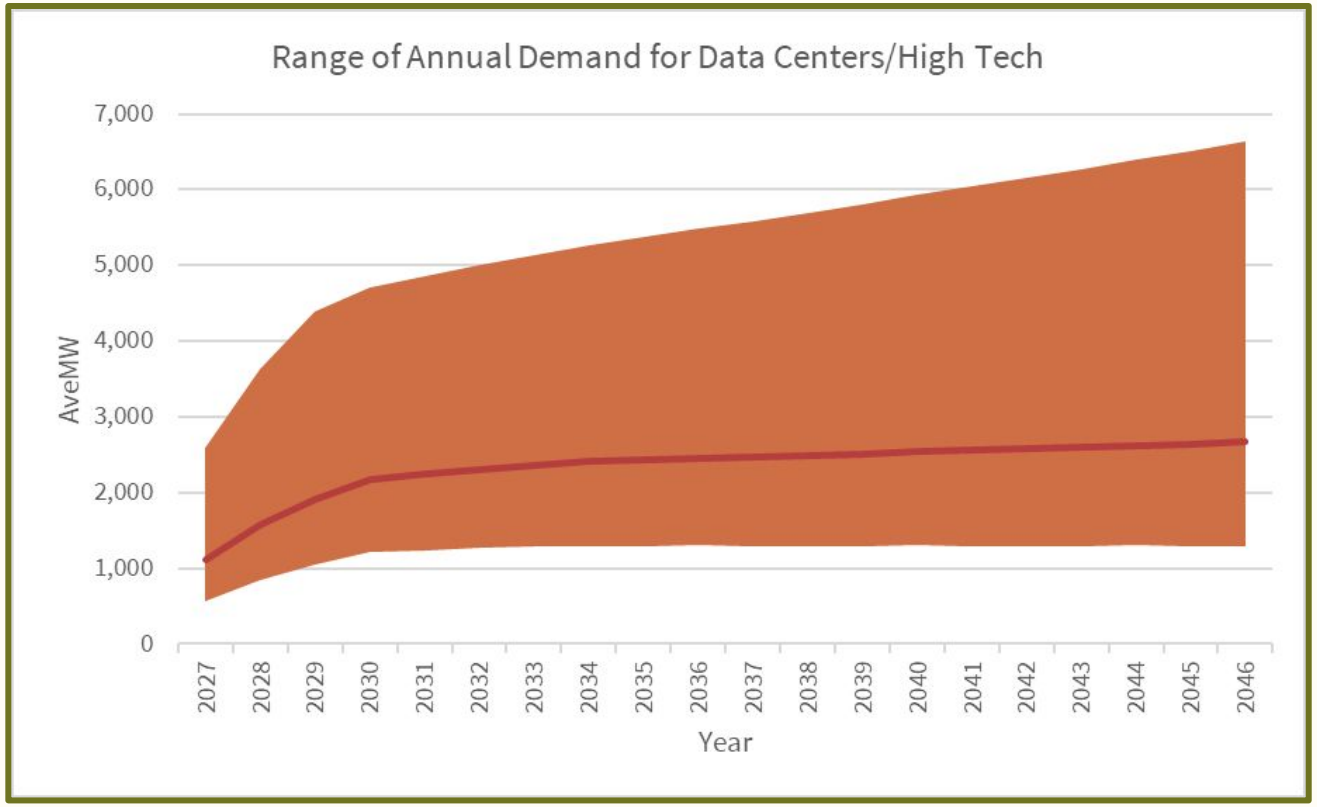
Impacts the residential, commericial and sectors - depending on the vehicle charging location.The graphic is for the Electric Vehicle loads only



Data Center Uncertainty

Three data center / tech forecast trajectories were included:
1) Higher
2) Lower
3) Medium

Data centers and chip fabs have the potential to add significant amounts of demand to the Northwest power system in the upcoming decades. While both industries have existed in the Northwest for decades, in the past few years there has been an increase in development, particularly for data centers. Part of this drive is due to the advancement of artificial intelligence. Data centers (single large loads) present a uniquely challenging forecast assignment. Unlike most load sources, the constraint on tech load growth may be due to infrastructure needs, construction timelines, permitting, supporting power infrastructure and supply, etc. Load growth is certain, however there is a large range of uncertainty over exactly how much load growth will occur, and when.



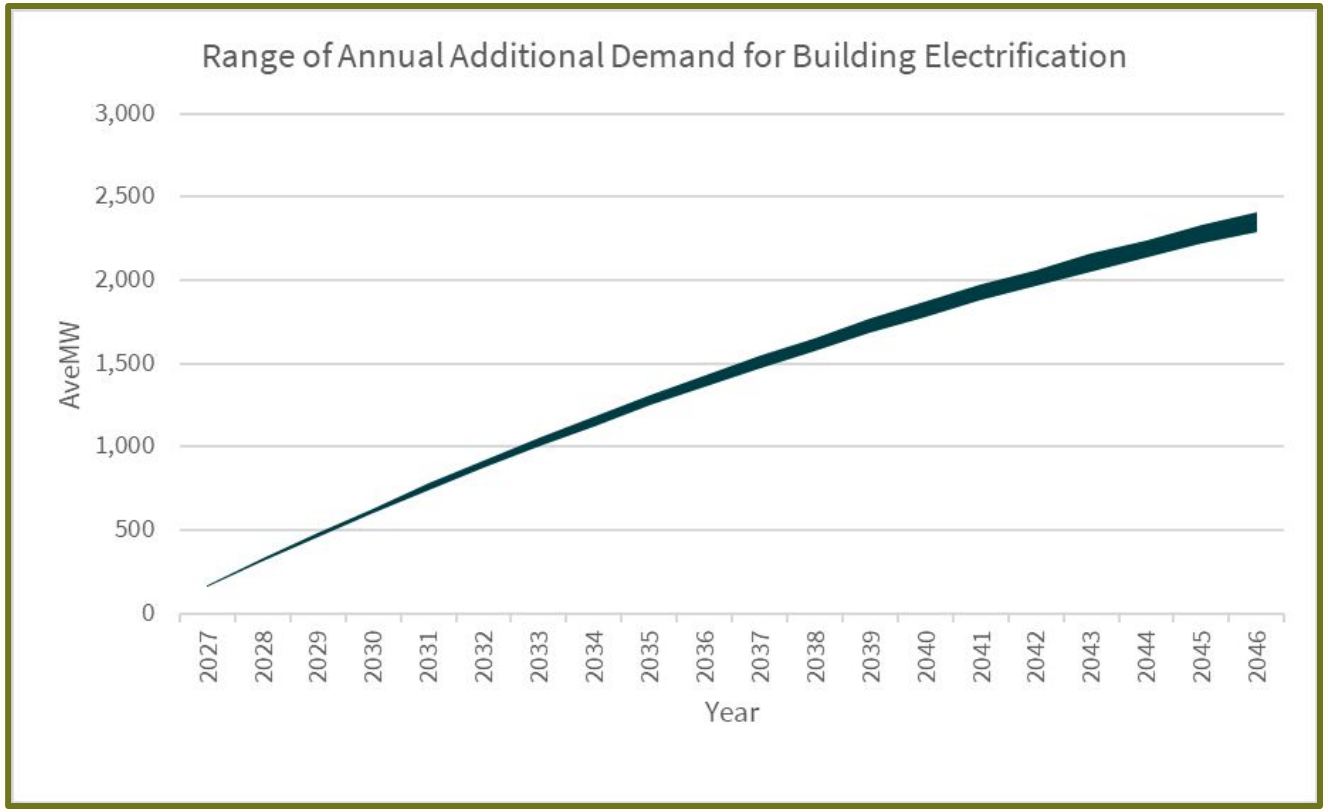
Building Electrification Uncertainty

Two Building Electrification forecast trajectories were included:
1) Higher
2) Lower

Building electrification impacts the residential and commercial sectors.
Our approach to studying the impact of building electrification was concerned with adjusting the number of homes and businesses with electric space heating and cooling, electric water heating, and electric cooking. There is some level of building electrification in the lower trajectory, especially with space heating with electric heat pumps, and space cooling with central AC and electric heat pumps.

The higher trajectory increased the forecast of homes and businesses moving to heat pumps for space and water heating, and to electric cooking.

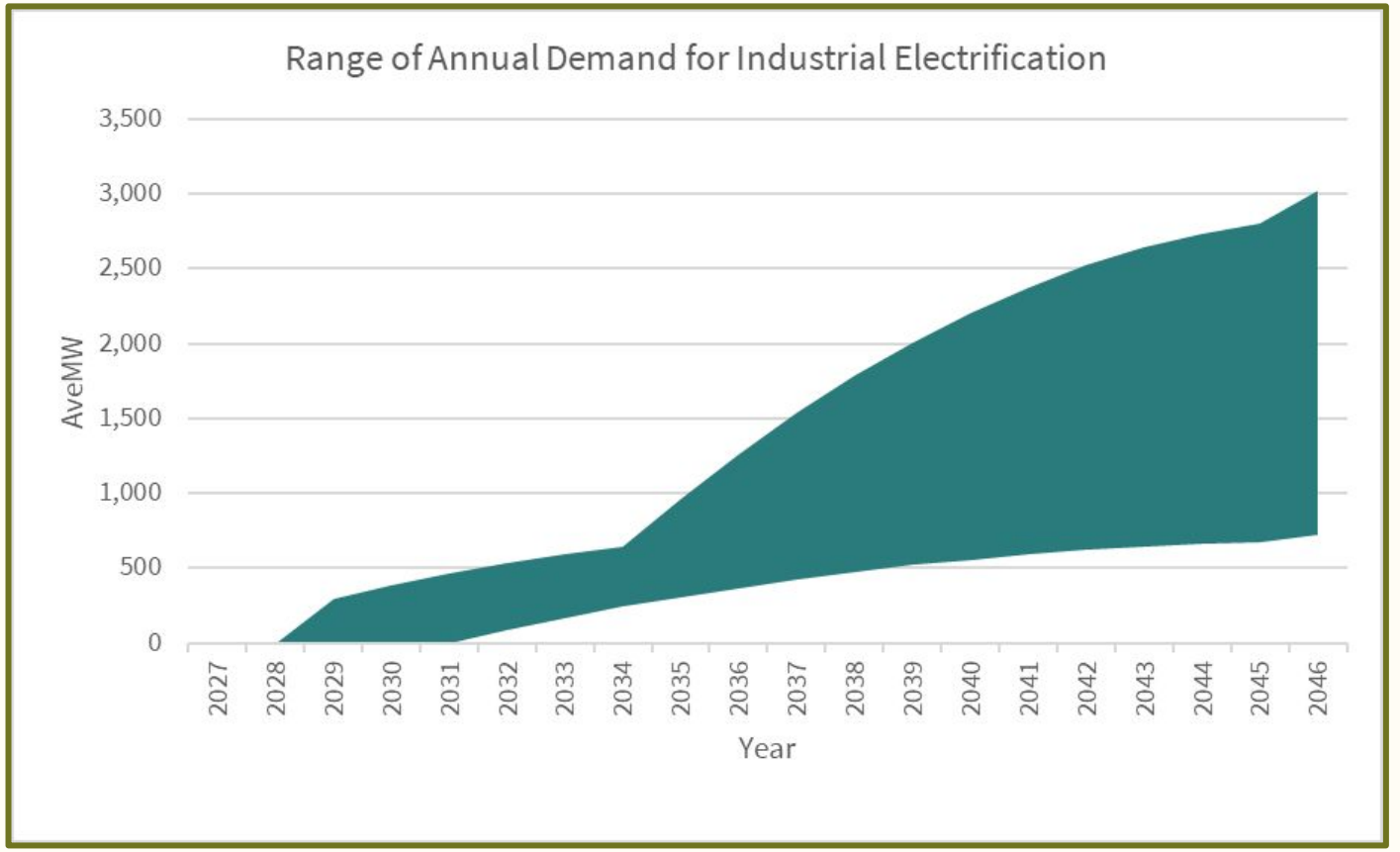
Building Electrification has much more of an impact on peaks that it does overall energy - primarily, the electrification adds demand in the winter morning hours which impacts winter peaks.



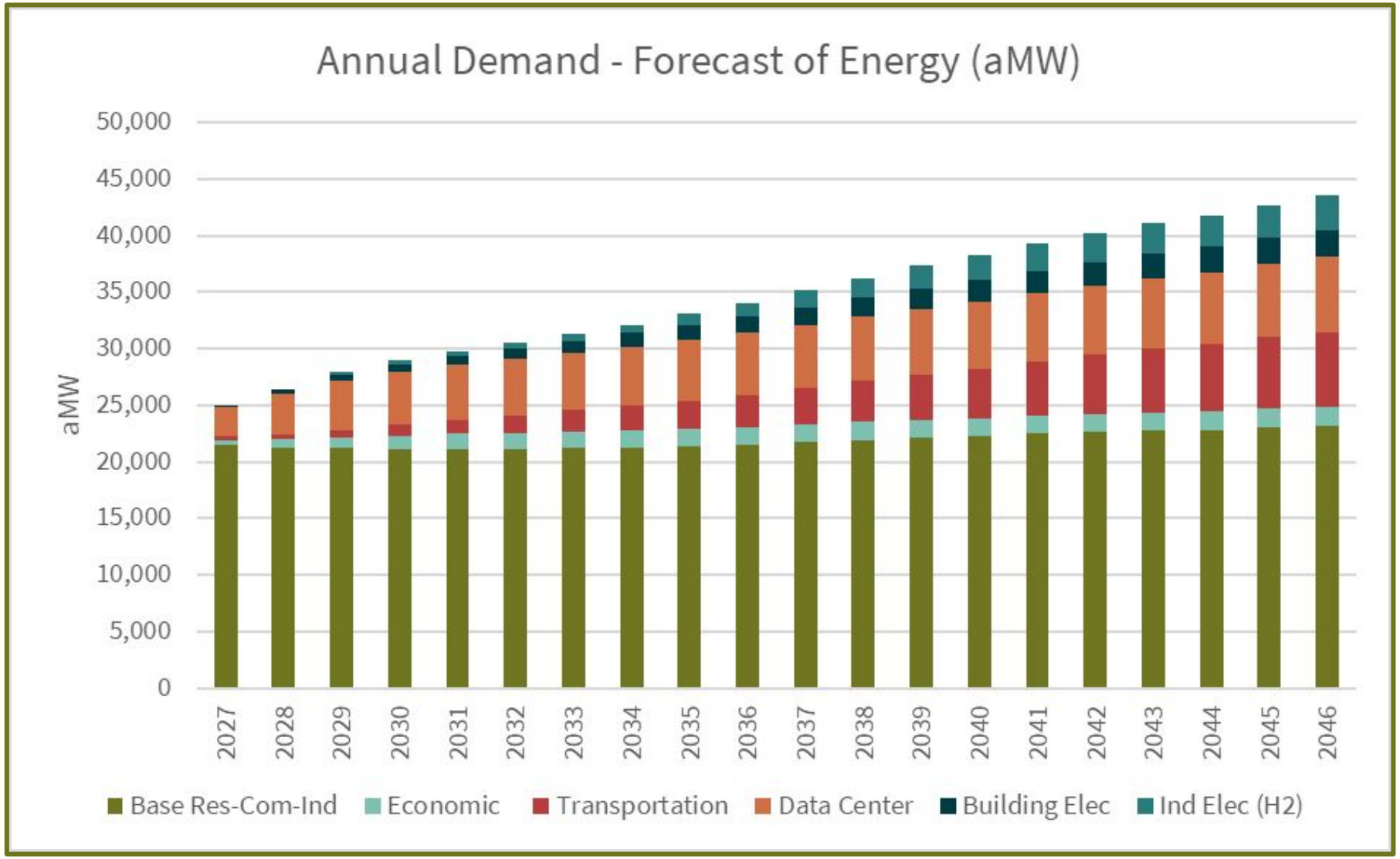
Industrial Electrification Uncertainty

Two Industrial Electrification forecast trajectories were included:
1) Higher
2) Lower

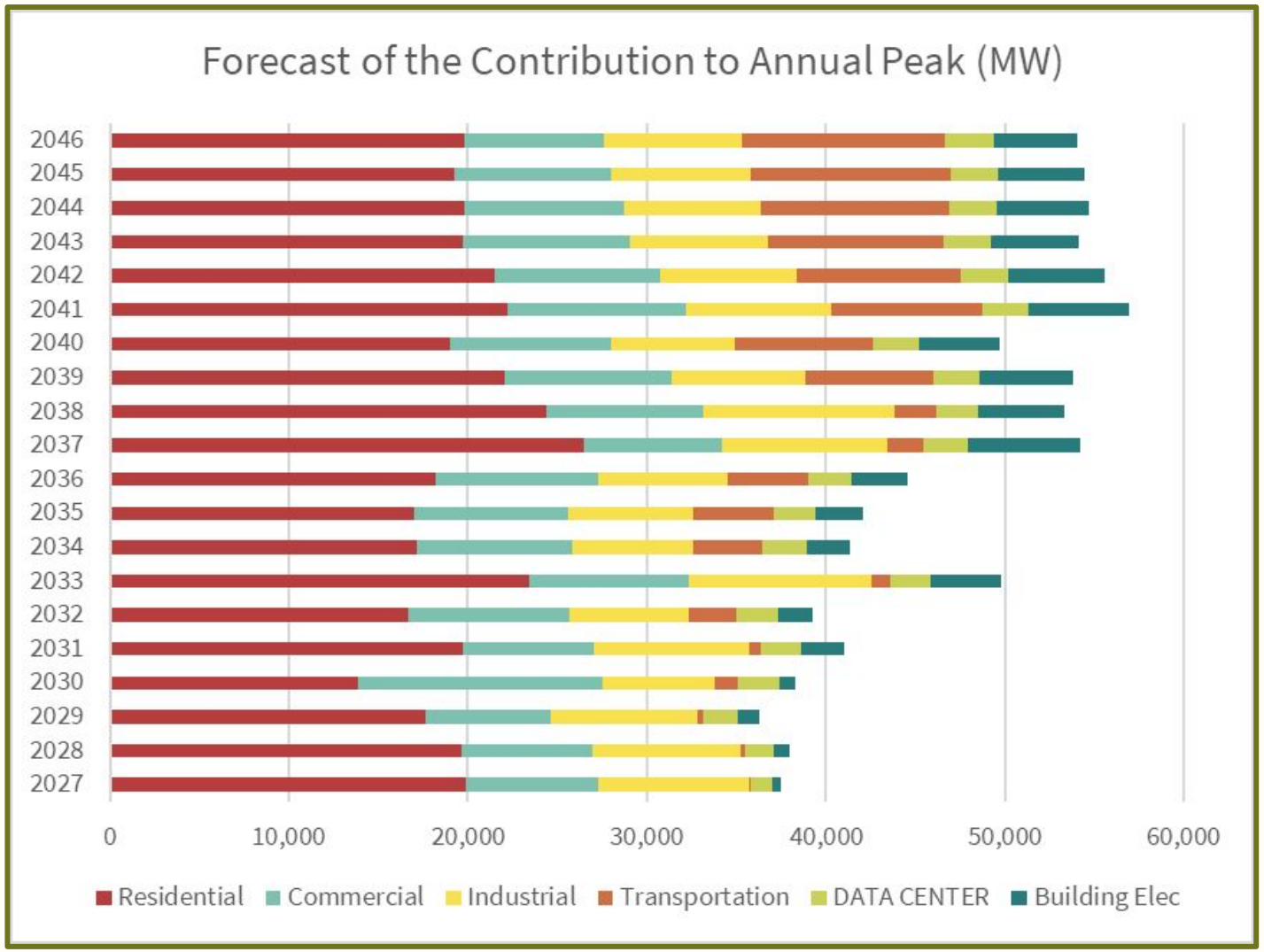
Hydrogen fuel has the potential to electrify some industrial and transportation end-uses.
For the Ninth Power Plan, hydrogen demand is modeled to be curtailable, therefore this demand is not included in the peak forecast, but it is included in the energy forecast.
Hydrogen, if created using low carbon processes, can be used to decarbonize hard-to-reach economic sectors like high-heat industrial applications and medium/heavy duty transportation.
Hydrogen can be used as a fuel directly, or as an intermediary step when developing other fuels like ammonia or drop in liquid fuels.



All Together Now



What about Peaks?



Contribution from each load category on the annual peak hour for each year – which generally occurs in the winter or summer

Pathway 4: Late Growth with Climate G Weather

What to note: **Residential, Commercial, Industrial and Building Electrification are highly Temperature Sensitive**

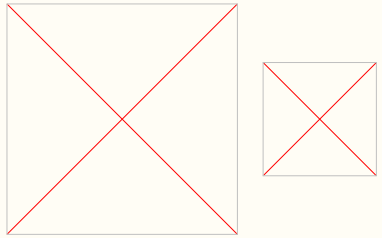
Electric Vehicle Charging is temporal – primarily peaks in late afternoon/early evening – significant peak impact (which can be mitigated by managed charging)

"It's tough to make predictions. Especially about the future."

– Hall of Fame Catcher
Yogi Berra

or possibly…

– Hall of Fame Physicist
Niels Bohr



Thanks for listening today!

Follow up, comments, concerns, questions – please reach out

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