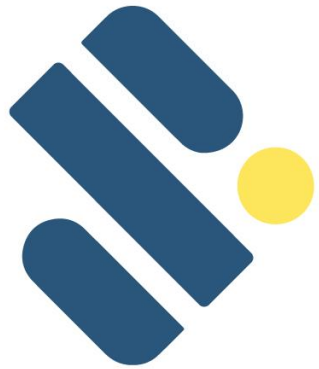




Are Utilities Fully Accounting for Future Load Growth? A Case Study Analysis

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Solar and **Storage** Industries Institute

The Solar and Storage Industries Institute (SI2) is accelerating the transition to carbon-free electricity.

We are developing pathways to widespread solar and storage use through clean energy research and analysis.

SI2 is the charitable and education arm of the Solar Energy Industries Association (SEIA) and is a 501(c)3 nonprofit.

Load Growth is Increasing

- After two decades of stagnant peak load growth, load forecasting landscape is changing
 - NERC now projects that the compound annual growth rate (CAGR) for aggregate load will nearly double from 0.6% per year as projected in recent years to about 1.1% per year over the next 10 years
- Growth Drivers
 - Electrification
 - Manufacturing
 - Data Centers
 - Climate Change



Implications of Increasing Load

- Investments in new generation resources
- Delay in decommissioning existing generation resources
 - Undercutting carbon reduction goals
- Increased transmission need
- Impacts on reliability, resiliency
- All generally leading to increased cost to ratepayers



Challenges in Forecasting Load

- **Landscape is changing rapidly**
 - Utilities are making more frequent updates to near-term electricity demand forecasts
- **Finding right balance is key**
 - Under-forecasting load can cause detrimental effects to resilience, reliability and health and safety of populations
 - Over-forecasting load can cause rising costs and wasted resources
- **Utilities faced with challenge of forecasting a more rapidly moving target**
 - But also in ensuring reliability and in meeting clean energy goals



Assessing Utility-Level Load Forecasts

- Are utility load forecasts broadly responding to and accounting for increased demand?
 - Are they accurately accounting for growth of distributed resources?
 - How are they justifying their forecasts?
 - How are outside observers critiquing those forecasts?
 - How are utilities resourcing based on these forecasts?

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Our Approach

- **Identified load forecast data at utilities**
 - Utilized EQ Research data tracking load forecasts in Integrated Resource Plans (IRPs)
- **Identified utility-level DG projections**
 - Sourced directly from IRPs
 - Compared these forecasts against outside forecasts (Wood Mackenzie)
 - Added estimated production from future DG to existing load forecast to better account for total expected load



Our Approach

- Compared load forecasts + DG projections against reference forecasts
 - Energy Information Administration Annual Energy Outlook (EIA AEO)
 - CAGR of 0.8% 2024 – 2040
 - NREL High Electrification (HE) Forecast
 - CAGR of 3.63% from 2024 – 2040
 - Applied growth rates from above scenarios to utility-level load forecasts
- Examined IRPs and press reports for utility and outside stakeholder comments on load forecast



Our Approach

- Approach builds on 2023 report from Grid Strategies
 - Sourced data from utility reports to FERC
 - Their approach focused on peak demand, and largely at the ISO level
 - <https://gridstrategiesllc.com/wp-content/uploads/2023/12/National-Load-Growth-Report-2023.pdf>

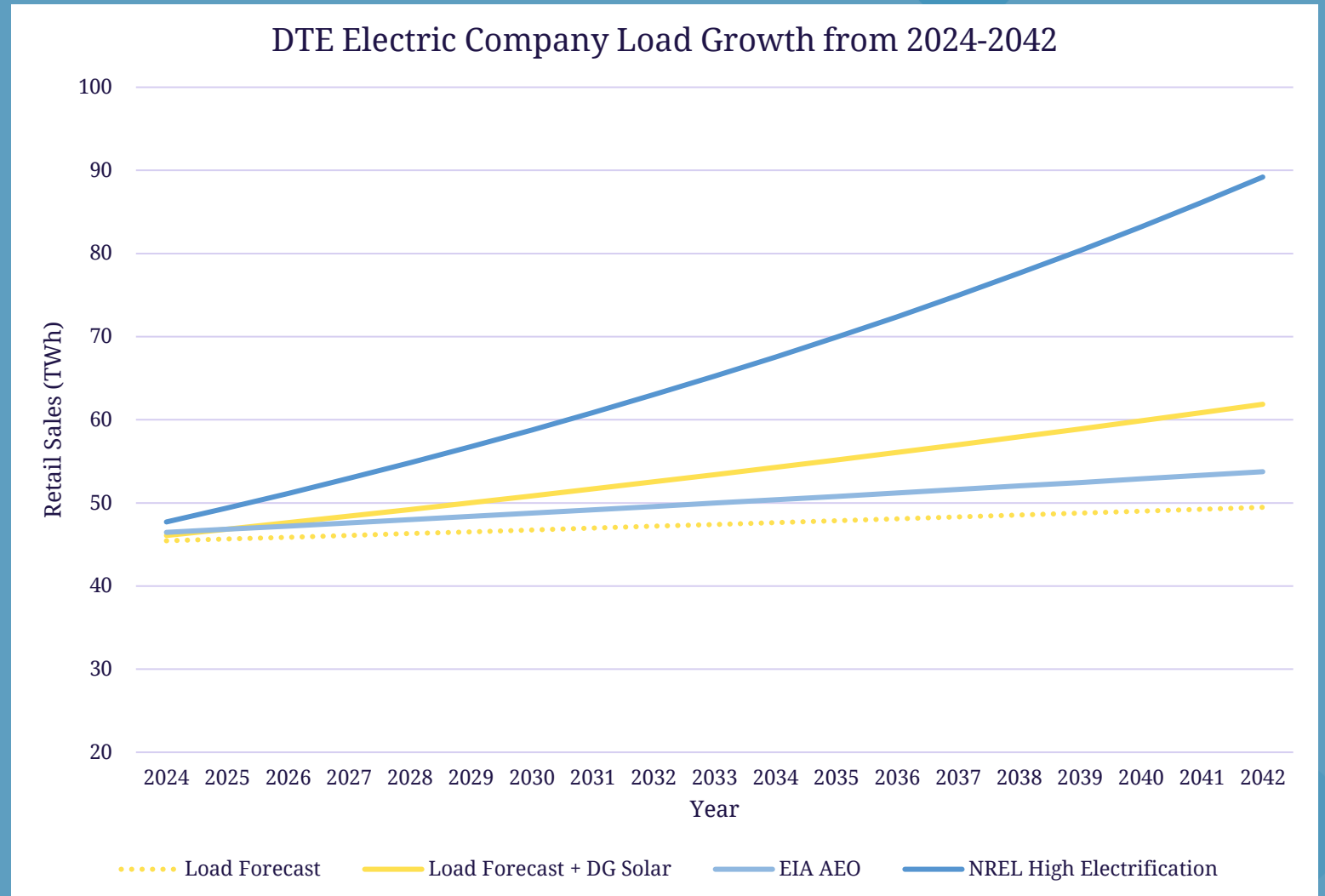




Select Case Studies

DTE Electric Company

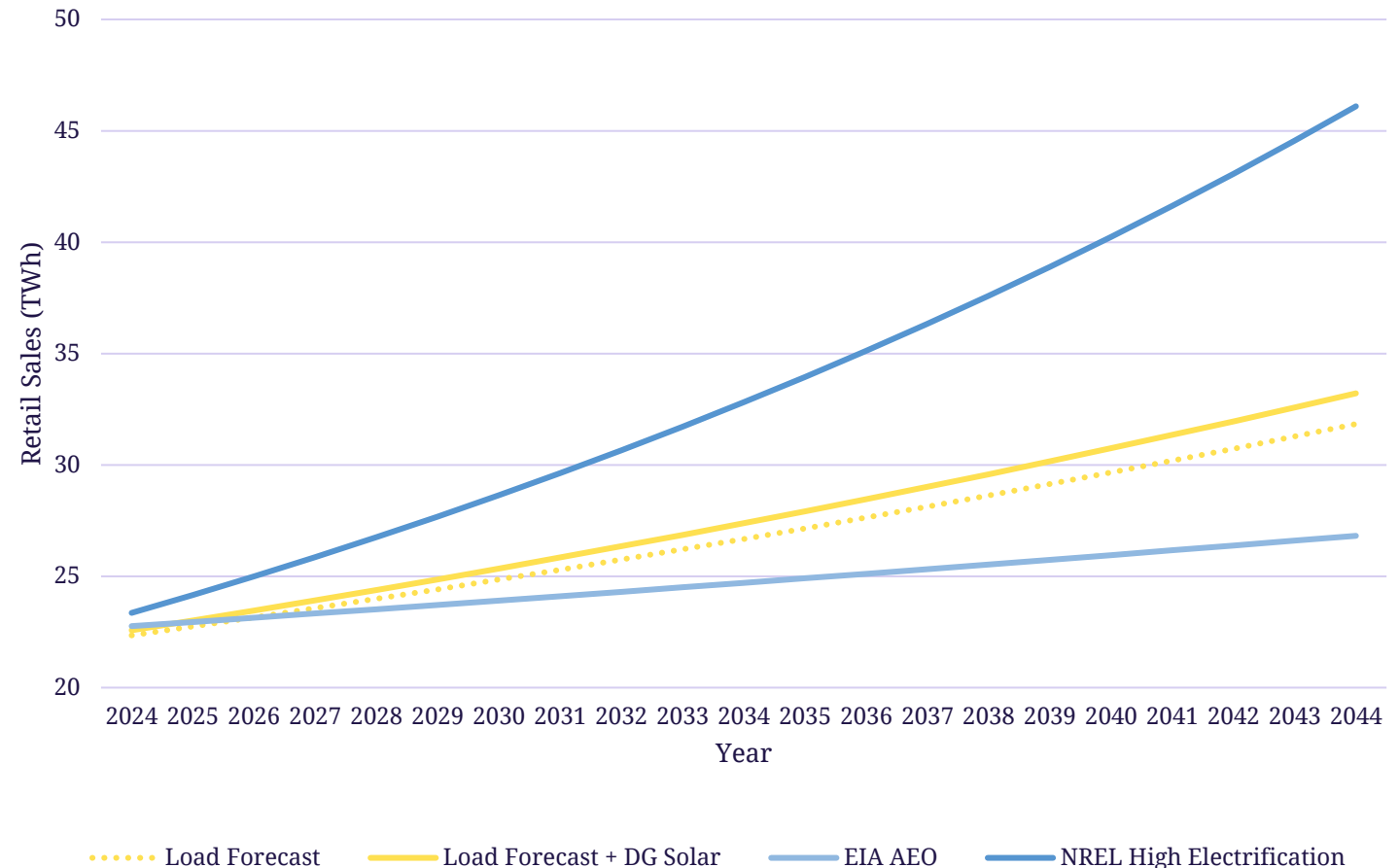
- Published in November 2022, DTE's IRP plans for 2023-2042
- DTE Electric serves 2.2 million customers in Michigan
- DTE's load forecast is lower than the EIA AEO, but load forecast with DG is higher
- At the end of 2020 in a stakeholder session, Michigan Public Service Commission requested feedback related to forecasting, including the need to consider DER employment, increasing electrification and changing load patterns because stakeholders reported incomplete picture of utilities current load
- This IRP claims to have taken this feedback and that load forecasts were run with different DG adoption sensitivities, and EV electrification forecasts were modeled using historical trends



Puget Sound Energy

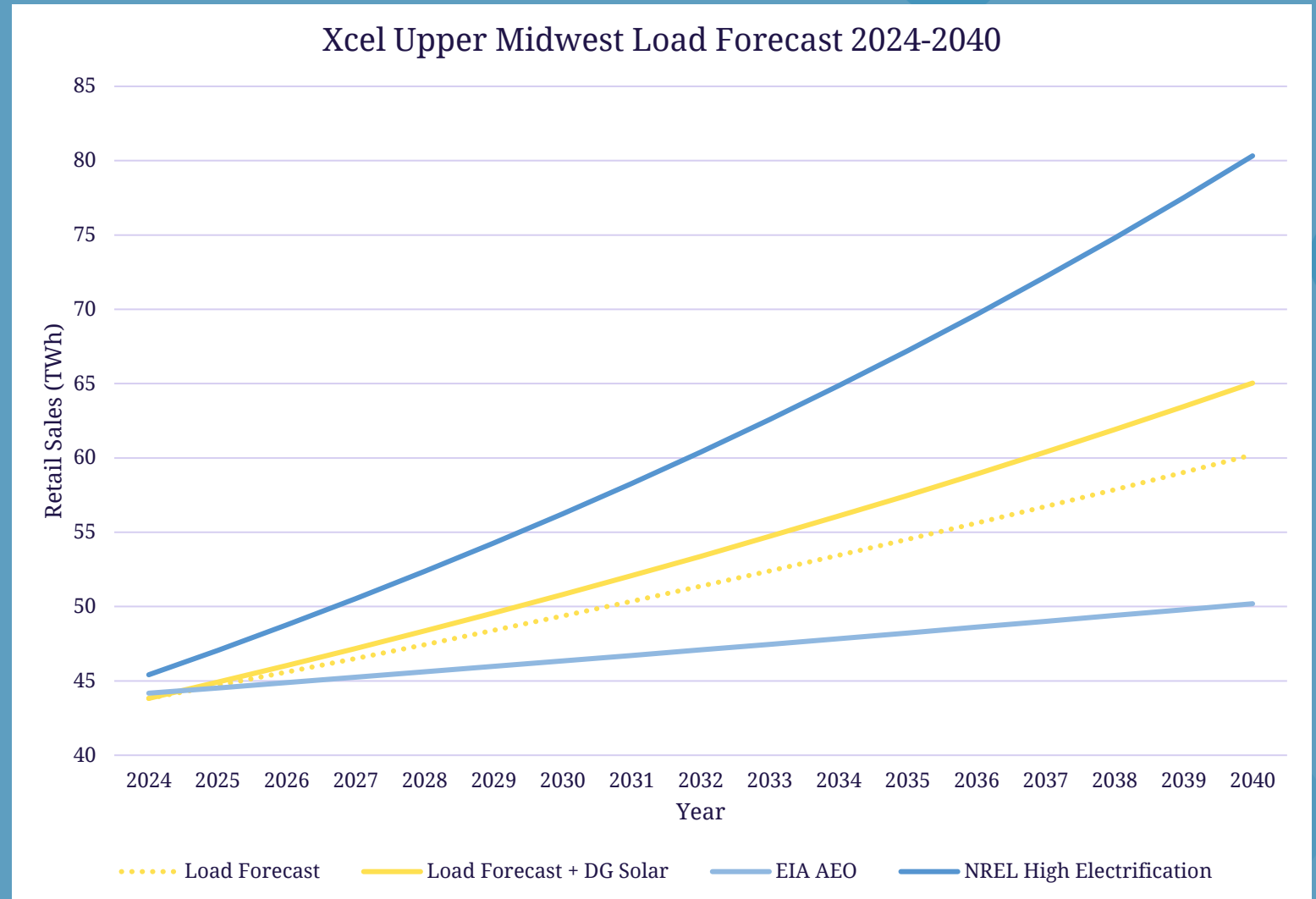
- IRP published in April 2021 to run from 2024 to 2045
- PSE serves 1.1 million electric customers and 840,000 natural gas customers in 10 counties, with a service area of over 6,000 square miles in Washington state
- Load growth predicted is higher than AEO predictions but lower than HE scenarios
- Expect electric energy demand to grow at average annual rate of 1.2% from 2022-2045
- Challenge is to meet growing energy demands in a way that is cost-effective, but also mitigates climate change, and PSE plans to meet this by relying on energy efficiency, renewables and “clean-burning natural gas”
- Critics say that IRP finds electrification to not be cost effective approach because they include the costs associated with expanding the electric system’s capacity in its portfolio cost analysis but do not include these costs within its cost analysis for gas

Puget Sound Energy Load Forecast for 2024-2044



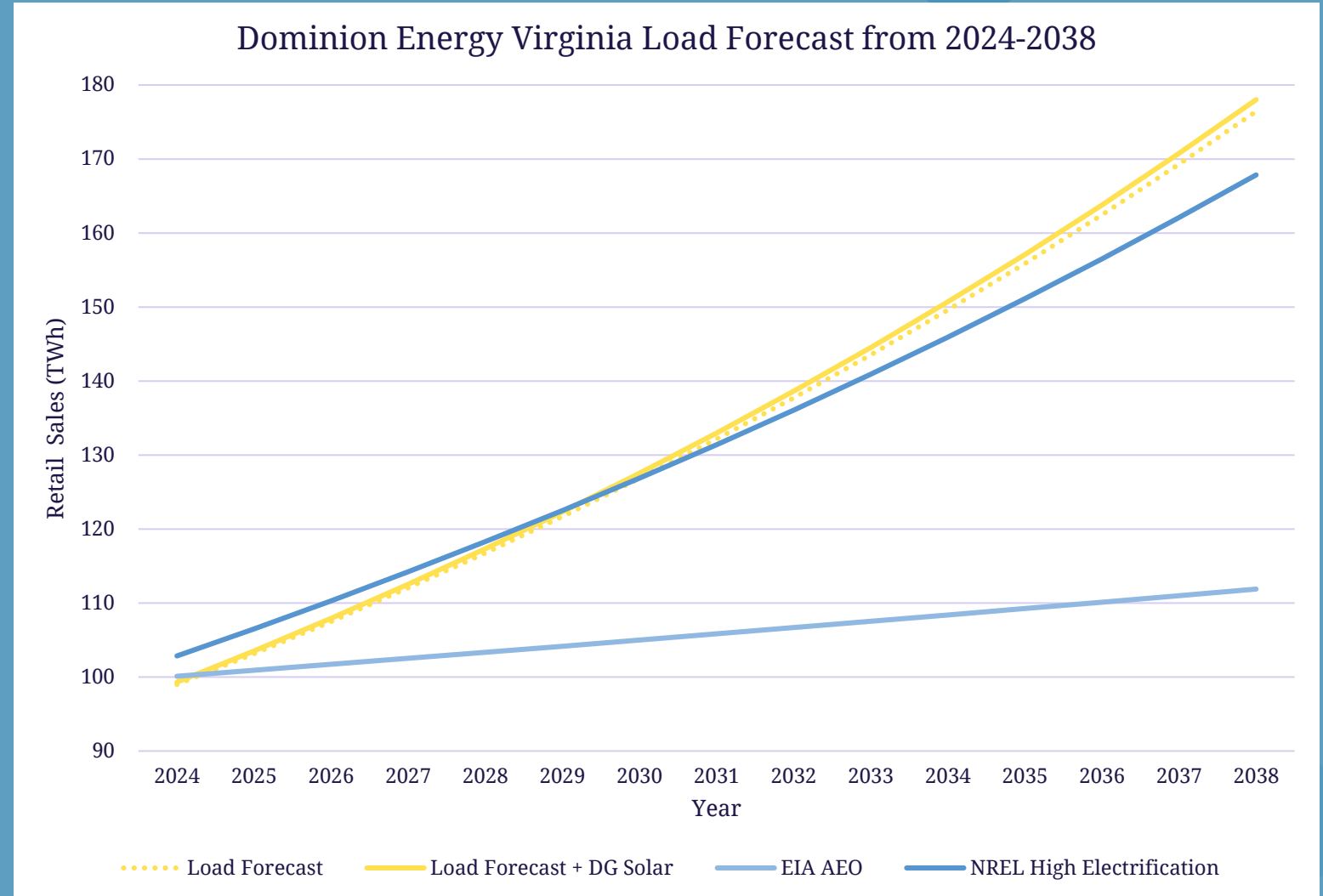
Xcel Energy Upper Midwest

- IRP was filed in February 2024 to plan for 2024-2040
- Northern States Power Company, subsidiary of Xcel Energy, serves customers in Minnesota, Wisconsin, North Dakota, South Dakota, and Michigan
- Load growth that Xcel predicts is lower than high electrification scenario, but higher than AEO EIA load growth predictions
- IRP predicts average annual growth rate of 2% for energy forecast over 2024-2040
- Xcel says that primary factors leading to this load forecast are from data centers and accelerating adoption to EVs



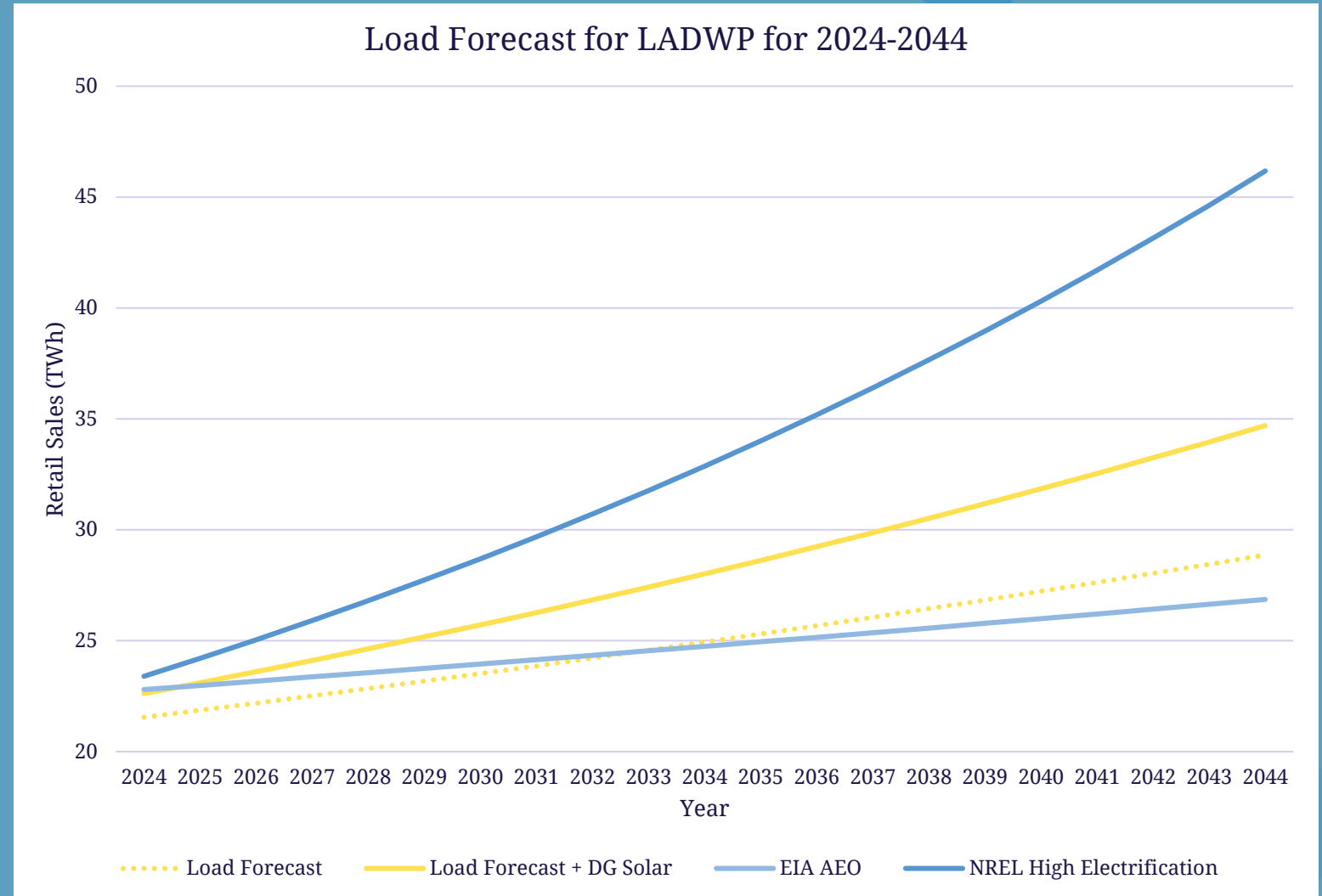
Dominion Energy Virginia

- Dominion published IRP in May 2023 to begin in 2024 and continue through 2038
- Virginia Electric Power and Company (subsidiary of Dominion Energy) serves 2.7 million customers in 30,000 square miles of Virginia and North Carolina
- Load growth predicted by Dominion is higher than high electrification scenario
- Dominion bases their load forecast on the PJM load forecast, where data center growth is a key driver
- Critics have said that projected load forecast accounts for short term increases in energy demand but does not accurately model how the data center energy demand will change in the future and will affect load in the long term. 10 customers account for 80% of data center demand, so changing plans has big impact
- Docket has closed without a consensus, starting a new filing in October 2024 and have started stakeholder meetings to better address complaints



Los Angeles Department of Water and Power

- IRP filed in April 2022, planning for 2022-2045
- In Fiscal Year 2020-2021, LADWP supplied 20,936 gigawatt-hours (“GWh”) to more than 1.55 million residential and business customers
- Load growth is higher than AEO predictions but lower than HE scenarios
- Increasing electric vehicle sales key load growth driver





Conclusions



Case Study Summary

- Of 25 utilities profiled, only 4 had load forecast CAGR on par with NREL HE forecast
 - 3 had CAGR below EIA AEO
- The 21 utilities with forecasted growth rates below the NREL HE forecast could be facing a combined shortfall of 300 million MWh by 2040 if HE scenario becomes a reality in all territories
 - Represents a 26% more demand than currently forecasted
 - Equivalent to annual electricity use of 29 million homes
- Most utility-level distributed generation forecasts in line with outside expectations
- Utilities acknowledging new demand sources, but forecasting remains conservative



Where we go from here


- Utilities will need to find ways to account for growing demand in the near-term
- Many have and will seek to delay the decommissioning of incumbent resources
- Scalable solutions like distributed solar and storage can play a role in plugging gaps between IRPs
 - But barriers to deployment remain and are increasing in some areas



Benefits of DERs

- Easily scaled
- Can be deployed quickly
- Battery costs have come down
 - As have resi and C&I solar costs
- Helps address state and utility climate targets
- With smart inverters, can be more easily managed





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Thank You