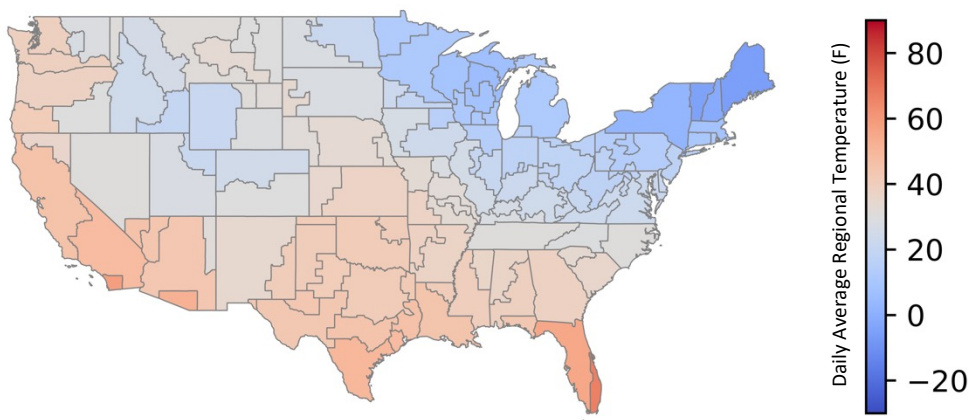


Cold weather risks appear to be moderate in the 7-day forecast

January 11 has cold temperatures forecasted with some risk to the power sector – highlighted below

- Northeastern and Mid-Atlantic states are expected to see colder-than-usual temperatures on January 11. Snow and ice accumulation are not a concern in the 3-day forecast horizon.
- Several states will see temperatures that may lead to high loads and/or increased risk of forced outages at thermal generators.
- Any impact should be short-lived, with temperatures warming up the next day.

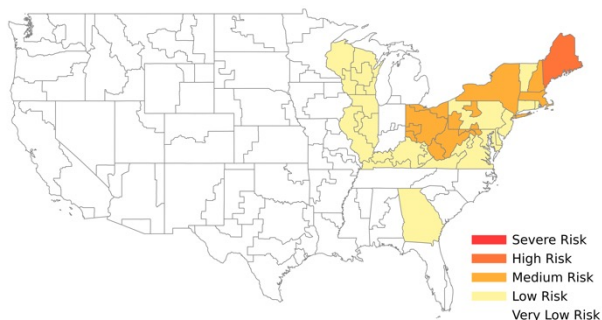
Regional daily average temperature forecast for January 11, 2022



Combined risk of generation loss and peak load is highest on January 11, dropping off quickly from January 12 onwards.

2022-01-11

2022-01-12

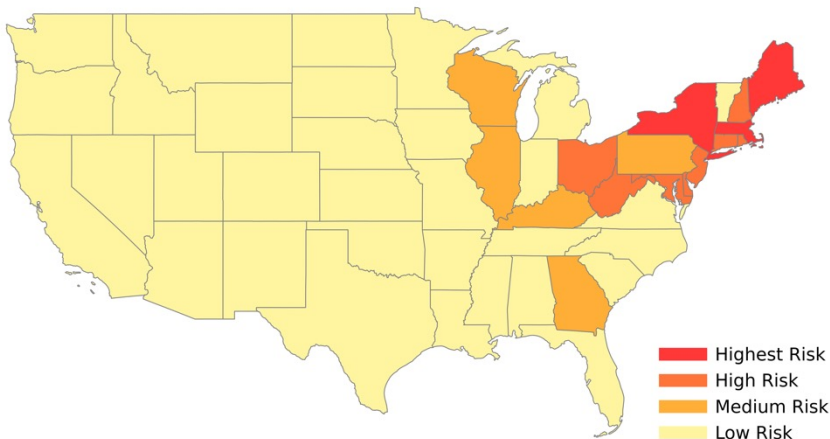


Renewable generation impact is anticipated to be minor.

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Generation Risk

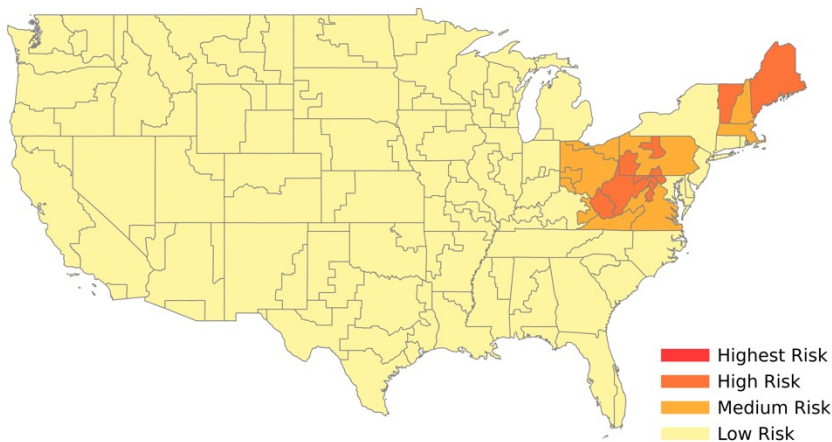
Based on historical analysis correlating failure rates with temperature, some states could experience higher than normal forced outage rates for thermal units due to forecast low temperatures.



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Load Risk

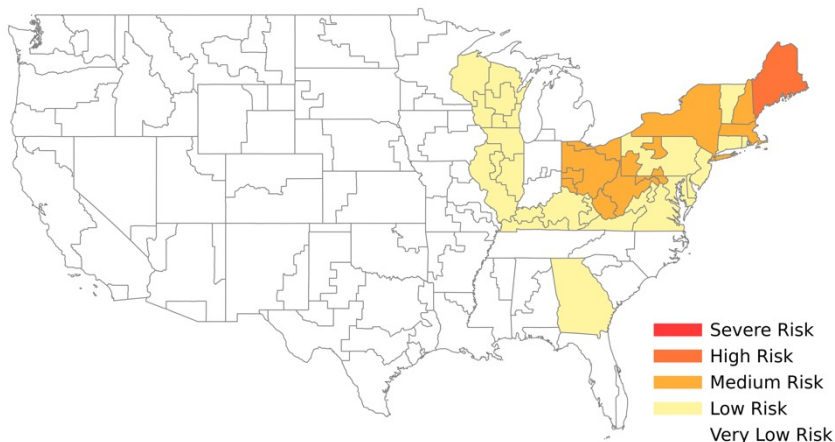
Highlighted regions may experience higher than average electricity demand as a result of forecast low temperatures.



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Combined Generation and Load Risk

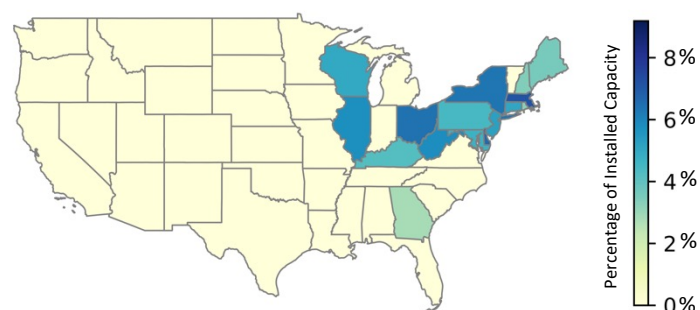
When combining the risk for generation outages and high loads, no regions reach a 'severe' risk state given the current temperature forecast.



Temperature risk in more detail

A detailed look at temperature-induced risks to both generator forced outage rates and electricity demand for January 11, 2022

- Several regions have significant risk percentages on both supply and demand side, indicating that conditions could lead to higher demands than normal and fewer MW of thermal generation available.
- However, no regions reach the “severe” risk category (see previous slide), and this is anticipated to be a moderate cold weather event.

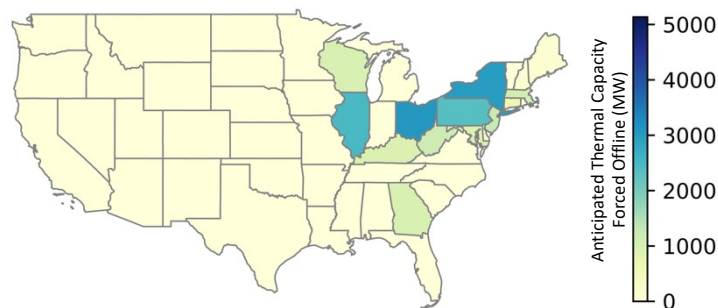


Generation: Percent of installed thermal capacity anticipated to be offline due to forecast low temperatures.

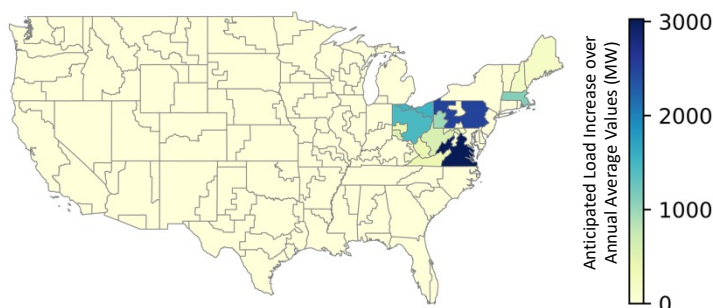


Load: Anticipated percentage increase in load compared to the annual average for each region

- In terms of thermal capacity and load increases, several gigawatts of generation may be forced offline in Mid-Atlantic states. However, this does not represent a large fractional outage, based on total installed capacity (see above).
- Multiple regions have gigawatt-scale increases in demand (compared to annual averages), and when combined with generation outages, the widespread risk is non-negligible.



Generation: Thermal generation capacity anticipated to be offline due to forecast low temperatures. Total offline capacity across all states is 19.5 GW.



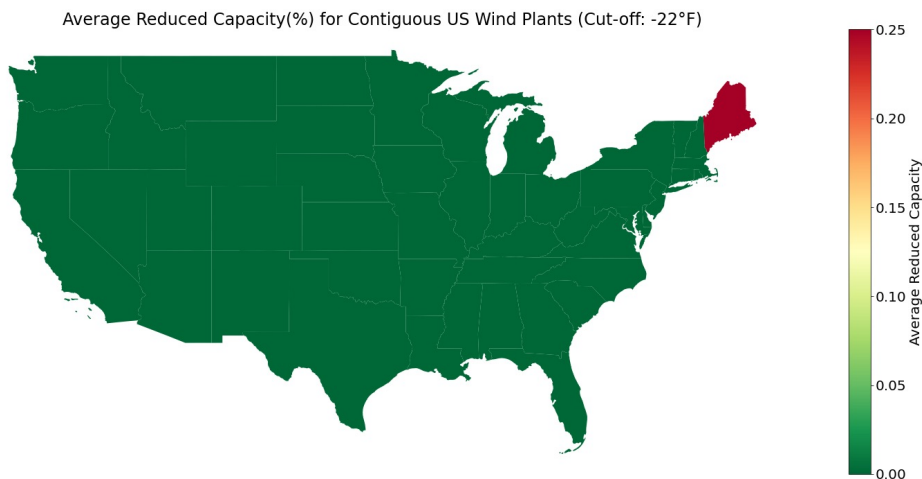
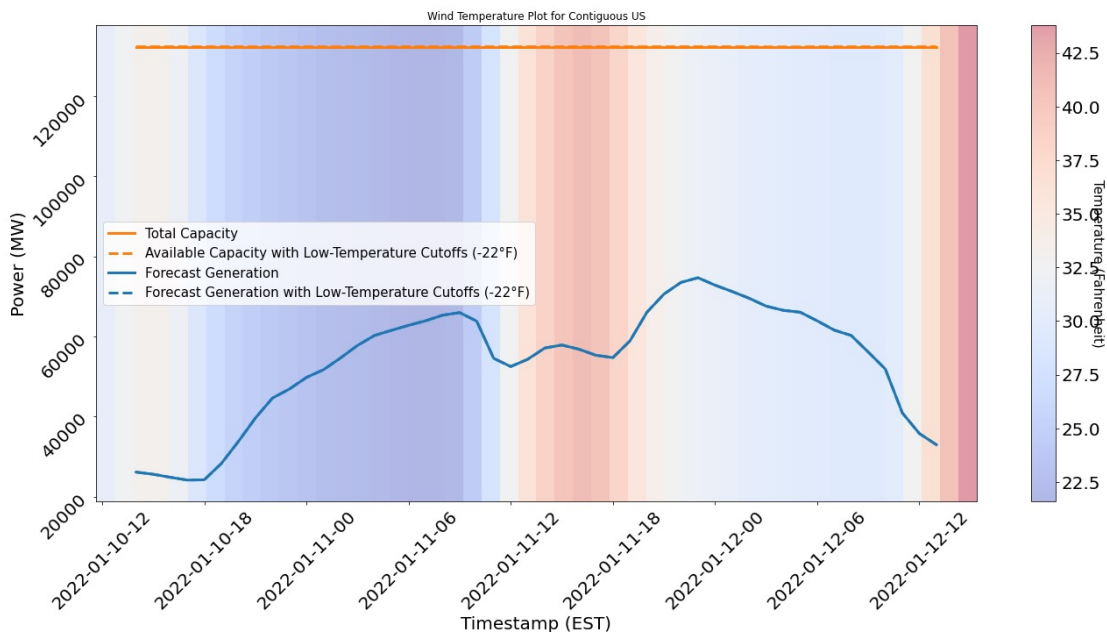
Load: Anticipated increase in regional load due to forecast low temperatures as compared to annual averages. Combined total load increase is 13.8 GW.

Potential Impacts to Wind Generation

Wind production impacts are not anticipated to be significant, as regions experiencing cold temperatures are likely to have cold-weather packages installed on turbines, allowing them to operate down to -22°F .

In the 48-hour time series plot below, the orange line is the capacity, blue is forecasted power output. Dashed lines account for low-temperature outages, solid lines do not. There is no discernable difference at this time, given the temperature forecast for all wind sites across the continental US.

- Should temperatures at wind sites drop below -22°F , we would see a difference between the dashed and solid lines.

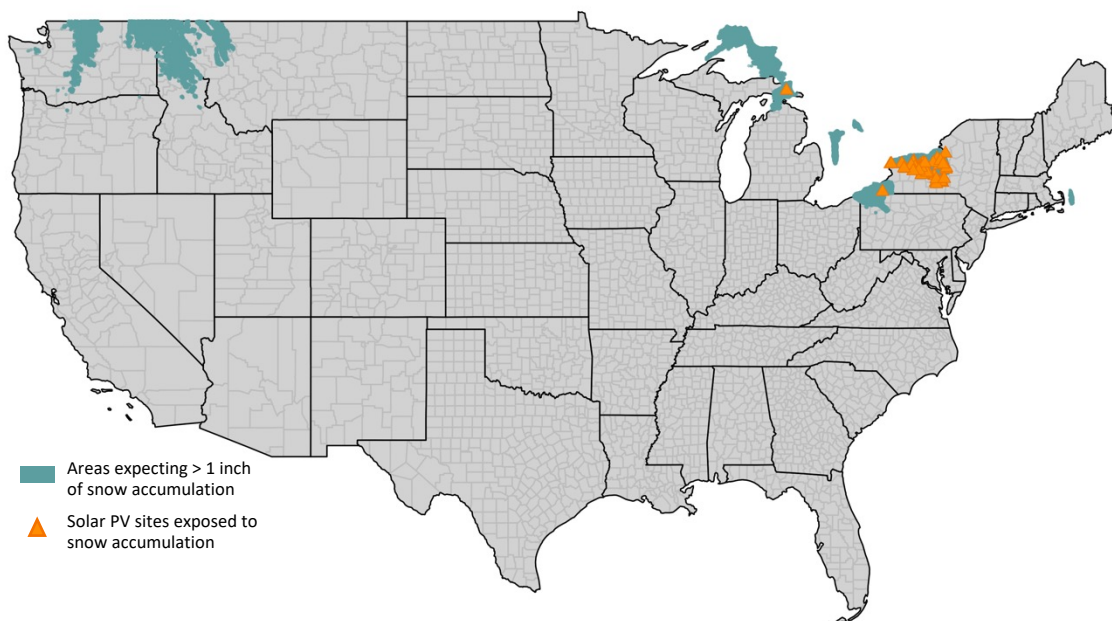


Potential impacts to Solar PV Generation

While not at risk from cold weather, we also evaluate the potential for solar PV sites to have reduced production due to snow accumulation.

- On January 11, there are a few small areas with greater than 1 inch of snow accumulation anticipated. Potential impacts to solar PV generation are minimal overall
- Blue areas are forecasted to receive more than one inch of snow, the orange triangles are PV site locations that may experience prolonged periods of zero production due to snow cover
 - Note: we are working on ways to consider how long of a duration of outage could be anticipated, but it is challenging to predict snow sliding

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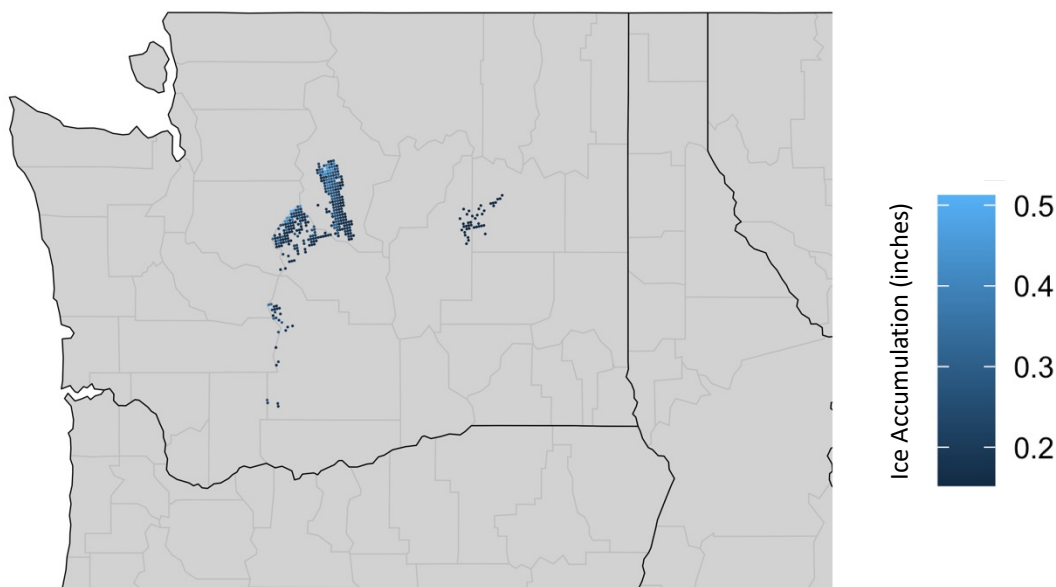
Overall, 164 MW of Solar PV Capacity across 61 PV sites is anticipated to have reduced production, with some lingering capacity impacts from snow occurring on previous days.

The majority of production impact occurs in NYISO, with 155 MW affected, representing 21% of NYISO solar PV capacity.

Potential Icing Disruption

Ice accumulation over the three-day forecast horizon is expected to be minimal.

- There is a small region with anticipated icing in central Washington state, leading to potential disruption of transmission lines and local damage to the distribution system. For this, we plan to run the Interdependency Analysis Tool based on ice-risk polygons.
- There are not significant critical infrastructure assets within the impacted region.



Placeholder for Interdependency Analysis Tool results