NASEO Annual Meeting 2024

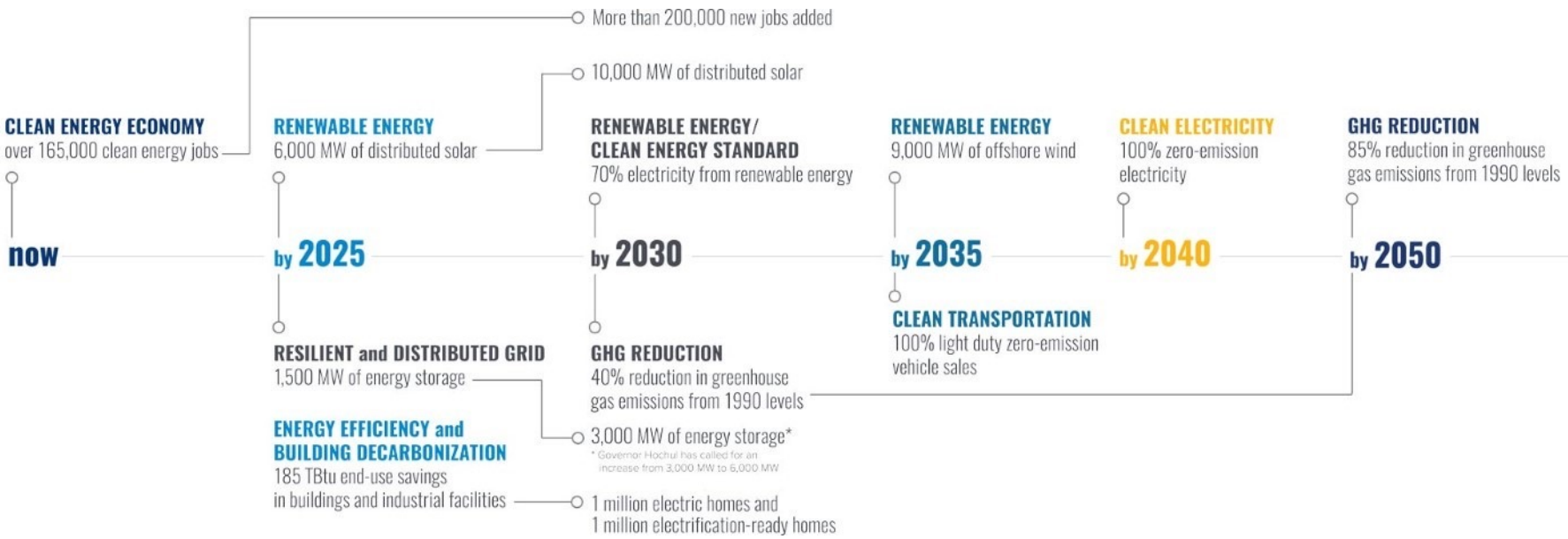
Solving for Reliability and Resource Adequacy

September 30, 2024

Vlad Gutman-Britten
Director, Policy & Analysis

NEW YORK STATE | NYSERDA

New York's Nation-Leading Climate Targets

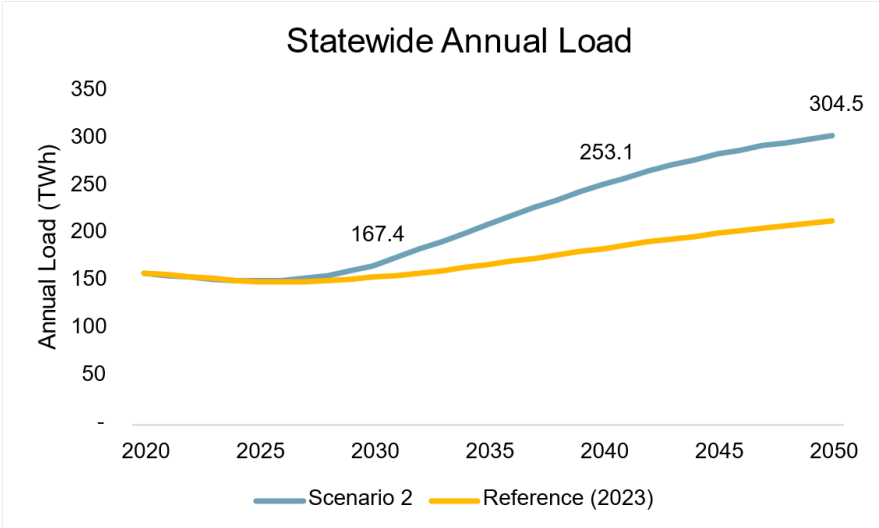


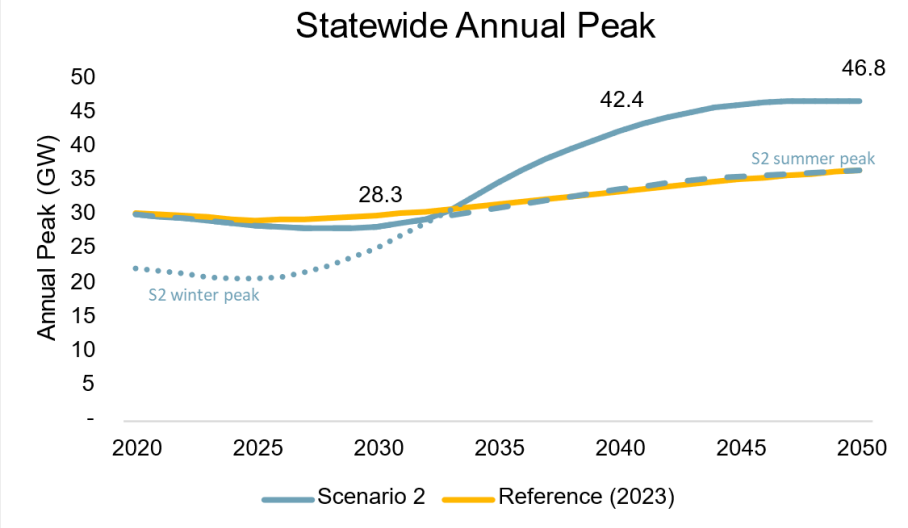
Goal - Minimize impacts on New Yorkers - emphasis on affordability, climate justice, job creation, and grid reliability.

Electricity Transition in a Decarbonized Future

Loads and peaks are driven by significant economywide electrification, but mitigated by significant energy efficiency (e.g., building shell investments, flexible EV charging) in mitigation cases.

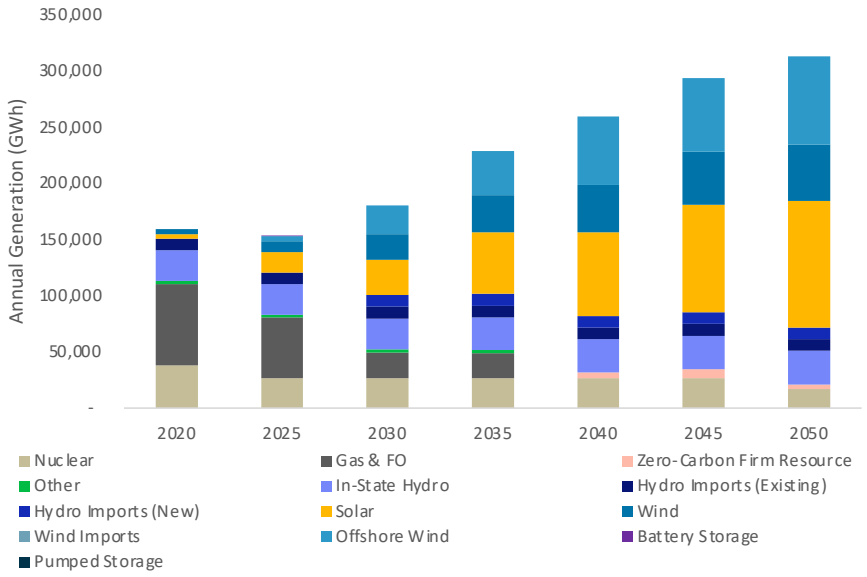
By 2050, loads increase by 90+% and peaks increase by 55+% relative to starting year values. By 2035, the Mitigation scenario shifts from summer to winter-peaking.



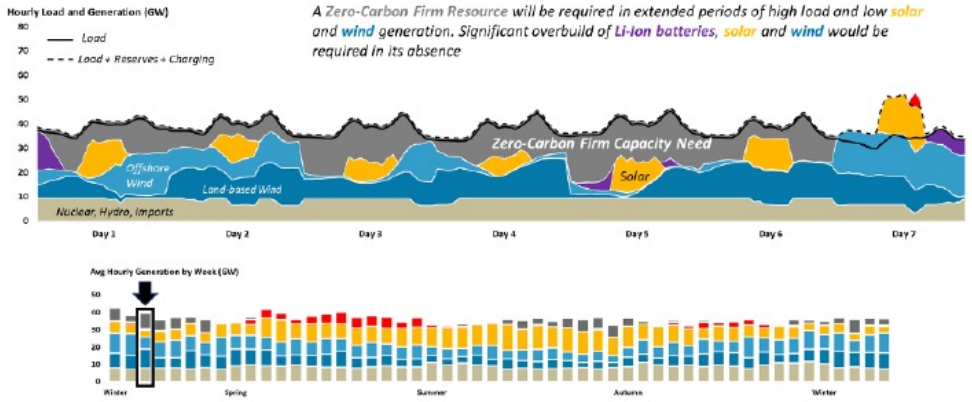


A Gas-like Resource is Needed Even in a Deeply Renewable System

Annual Generation Fuel Mix



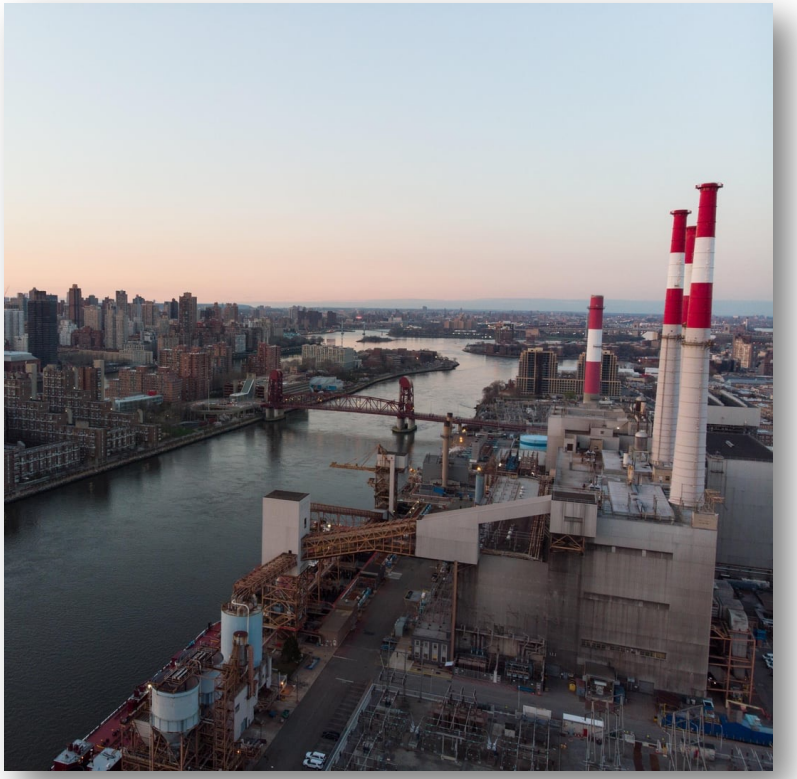
Zero Carbon Firm Resources Help Solve the Hard Weeks



Case Study: New York State “Peaker Rule”

Grid planning now has broader goals—not just affordability and reliability, but now also sustainability and equity. These goals at times can be at cross purposes.

- NYS DEC regulation to limit NOx emissions from combustion turbines during ozone season.
  - The rule led to the retirement of 1,027 MW of generators by May 2023.
  - Additional retirements were slated for 2025
- Allows temporary extensions of facilities that exceed emissions limits if they are deemed a “reliability resource” via a number of mechanisms, primarily NYISO evaluation.

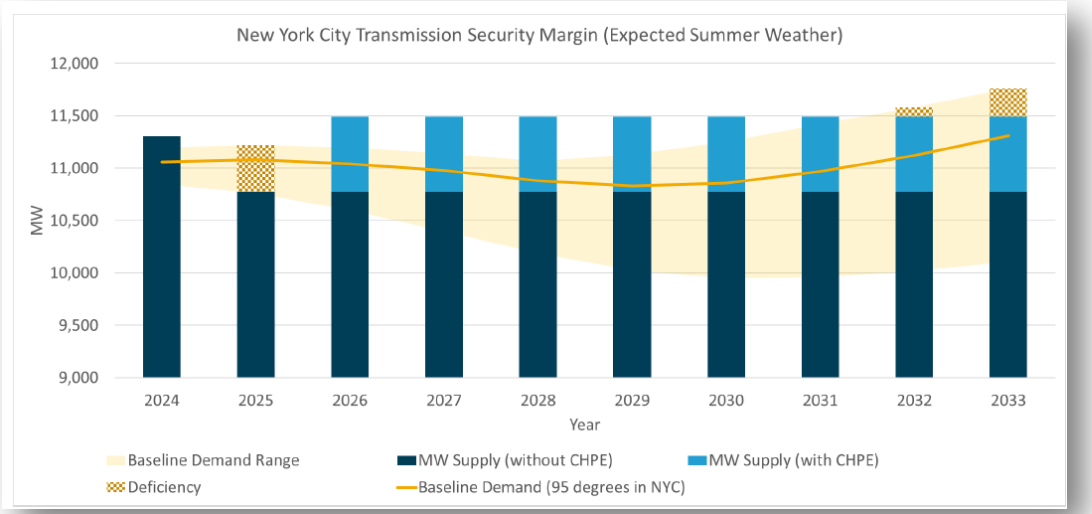


Case Study: New York State "Peaker Rule"

A mismatch in resource deployment timelines led to a risk of system deficits

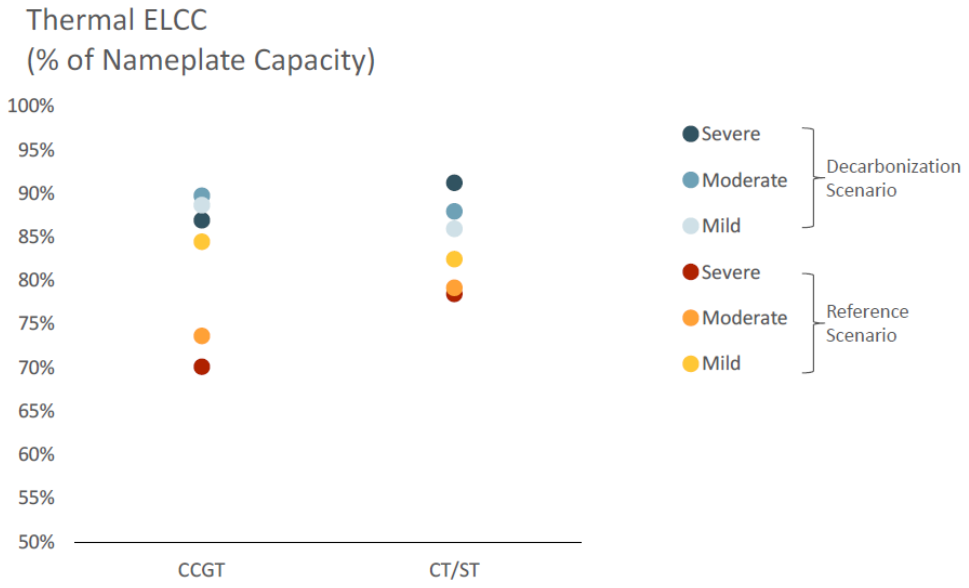
- Projections of peak day demand under expected weather conditions, NYC may have reliability margin deficit as much as 446 MW for 9 hours on peak day; Extreme heat can exacerbate this issue
- These findings led to the activation of Peaker Rule's built in reliability provisions.

A key policy design principle: pursue ambitious policy coupled with temporary, tailored off-ramps.



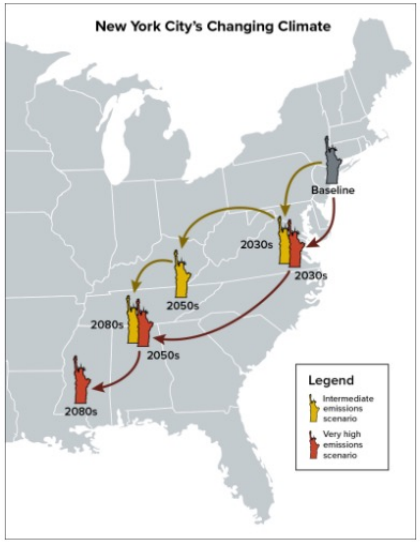
Weather Impacts Resource Performance

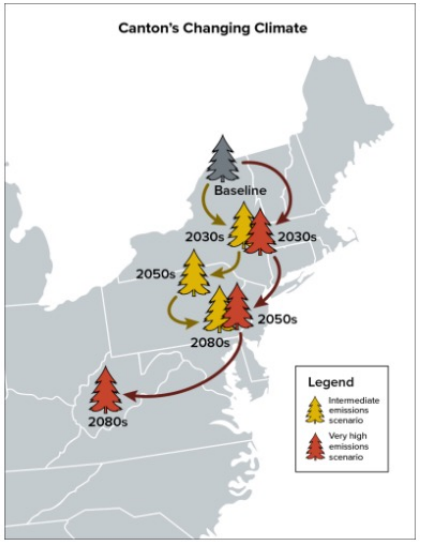
- Every resource's performance will change in response to changing weather patterns.
- Even thermal units, generally considered the most dependable, are not safe from the impacts of warming.
  - As temperatures increase, thermal units' ability to use air circulation is reduced and thus output declines.
  - Extreme temperatures also correlate to outage risk.
- Renewables likewise see impacts. Solar production declines under high temperatures, but generation is more coincident to peak demand.

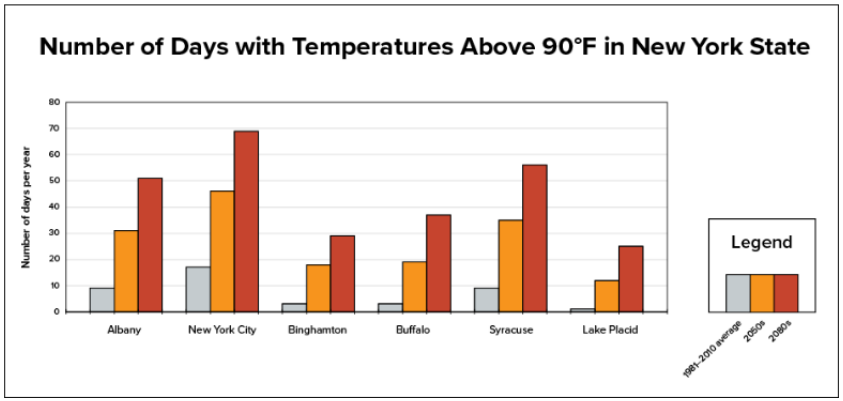


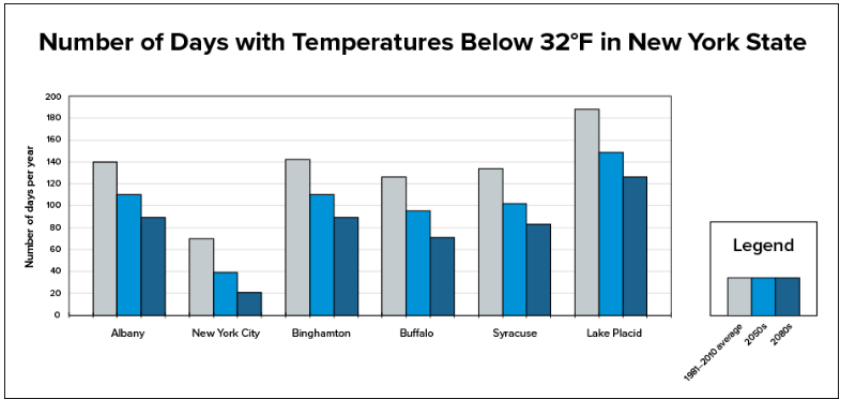
Appendix

The Future Looks Different







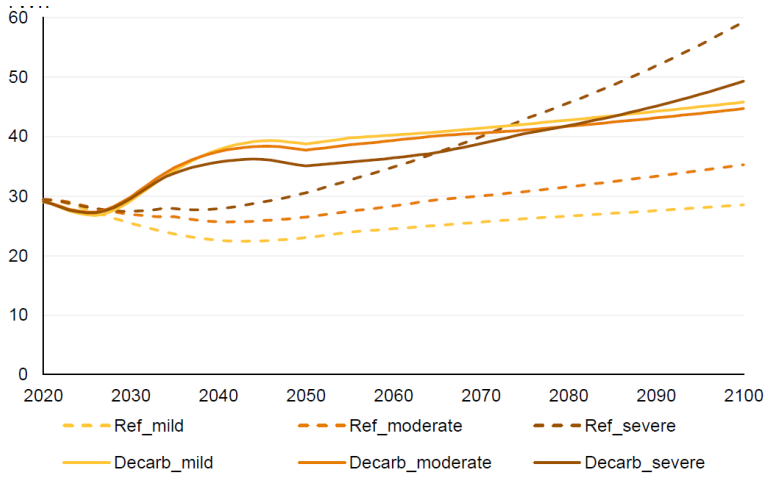


Resultant Loads and Peaks with Climate Impacts

Climate change will drive substantial changes in energy consumption, even if we don't undertake transformation of our energy system. Under extreme (but unlikely) climate change scenarios, heating and cooling energy use would be *lower* if we decarbonized than if we stayed the course.

Extreme warming scenarios are more relevant for evaluating peak conditions, in which case under Reference Case energy usage patterns, electricity system peaks would exceed any decarbonization scenario by the end of the century. Even under moderate warming, peak needs are nearly identical whether we decarbonize or not.

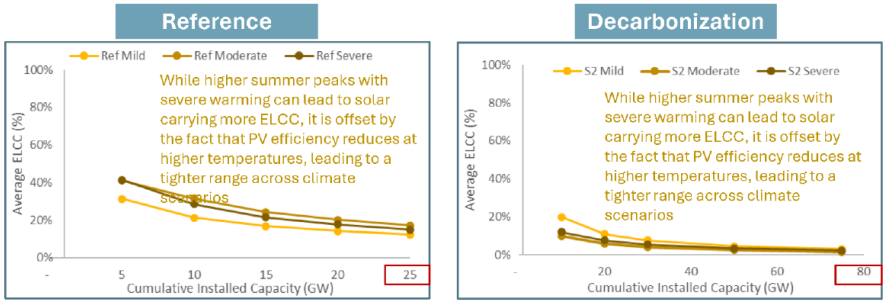
Heating + Cooling Load Under Warming Conditions



Peak Demand Under Warming Conditions

Renewable ELCCs under Climate Change

Figure 15. Solar ELCCs across All Scenarios in 2050

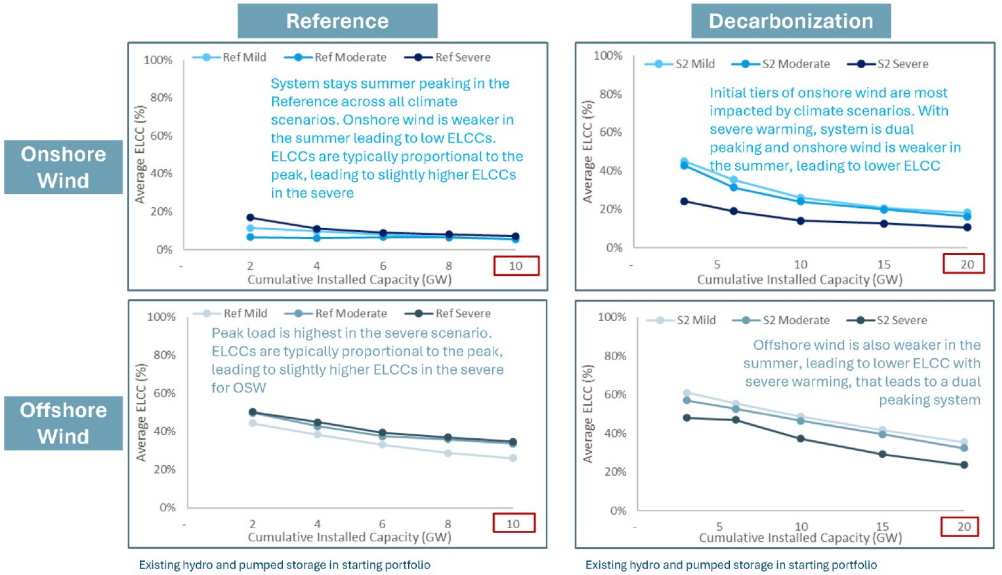


Existing hydro and pumped storage, 10 GW each of LBW and OSW in starting portfolio

Existing hydro and pumped storage, 20 GW each of LBW and OSW in starting portfolio

Note the difference in X axis

Figure 17. Wind ELCCs across All Scenarios in 2050



Existing hydro and pumped storage in starting portfolio

Existing hydro and pumped storage in starting portfolio

Note the difference in X axis