

ABSTRACT/SUMMARY

Accounting for the Impact of Climate Change in Long Term Energy System Planning

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Energy systems need to consider the impact of climate change when long term planning despite its uncertain nature and magnitude. There are cost and reliability implications of changing temperatures and weather patterns on both renewable and firm generation – fossil fueled or not. A changing climate will also affect peak loads, especially as building electrification grows, with cooling and heating demand peaking from extreme hot and cold temperatures. The implications will be different depending on the region and energy system, but accounting for climate change will certainly grow into a complex planning challenge for cold climate regions like the Northeast US and Atlantic Canada.

Energy and Environmental Economics' most recent analysis on New York State's energy system looked at three possible climate futures and two distinct infrastructure and policy pathways. The impacts of warming temperatures on heating and cooling demand, transmission ampacity, thermal generator output, and solar output were captured. With reliability and capacity expansion modeling that followed, the impacts that these warming adjusted variables have on electric system reliability need, resource effective load-carrying capability (ELCCs), resource portfolios and costs were estimated.

There is significant uncertainty around the extent to which we will be able to limit the impact of climate change throughout this century, and even more uncertain are the regional and seasonal dynamics we will experience. It is important to incorporate this uncertainty into scenario design and planning practices in order to ensure that energy systems maintain reliability and are robust to a broad range of plausible climate futures.

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