Mitigating the Effects of Climate Change on Power Supply: Linking Predictive Models to Business Decisions at the New York Power Authority

Cari Ficken (cari.ficken@nypa.gov), Maureen Golan, Kerry-Jane King, Andrew O'Neil, and Thomas Savin (New York Power Authority, White Plains, NY, USA)
Thomas Wall (Argonne National Laboratory, Lemont, IL, USA)

Background/Objectives. The New York Power Authority (NYPA) is the largest state-owned utility in the US, producing 25% of NYS electricity. Ongoing climate change is causing acute and chronic stresses to the nation's power producers and grid operators, leading to fluctuations in electricity demand and preference. NYPA is a key partner in helping New York state achieve its aggressive climate targets, such as the full decarbonization of its electricity by 2040. NYPA has also set forth ambitious goals of its own in its VISION2030 strategic plan, which aims to create a thriving, resilient New York state powered by clean energy. At the heart of this plan, resilience and sustainability are advancing NYPA's clean energy solutions and sustainable environmental practices across New York. Here, we will provide a broad level understanding of NYPA and its role in clean energy generation and the transition to a decarbonized grid, and discuss efforts to measure and mitigate the effects of climate change on NYPA's business functions. We will highlight two climate resilience strategies focused on our (1) infrastructure resilience and adaptation planning and (2) natural assets.

Approach/Activities. NYPA initiated an enterprise-wide approach towards defining its climate risk and enhancing its enterprise-wide resilience. (1) To predict the climate-sensitivity of its infrastructure, NYPA is collaborating with Argonne National Lab. Dynamically downscaled climate projections are being used to create inundation and heat stress maps at resolutions meaningful for business and operations decisions. (2) NYPA is collaborating with the Electric Power Research Institute and University of California Santa Barbara to identify the climate mitigation opportunities in NYPA's natural lands. Using the InVest model, NYPA can predict how different land management practices will affect carbon storage, greenhouse gas emissions, and nutrient retention of land owned in support of their power generation and transmission operations. These activities highlight how other modeling studies can improve enterprise-wide efforts to build resilience and sustainability in the power sector.

Results/Lessons Learned. Results from the climate downscaling models will be used to evaluate the near-term (through 2050) climate risk to individual facilities and local infrastructure and to prioritize climate mitigation efforts for specific assets. Results will allow NYPA to inform adaptation, risk mitigation, and capital expenditure planning efforts using realistic and focused risk assessments. Further applications range from understanding future hydropower generation outputs, to improved forecasting of customer usage patterns and demands from increased heat. Results from the natural land assessment will be used to increase the value of NYPA land for mitigating climate change and promoting biodiverse, resilient, sustainable ecosystems. Results will also be used as a business case to justify implementing climate-smart maintenance practices on NYPA land. Both projects involve close partnerships between outside research organizations and internal stakeholders with perspectives on NYPA's priorities. Identifying internal champions who can promote the results and streamlining the pipelines for integrating the results into ongoing maintenance and planning projects are both critical to the long-term success of these modeling-application efforts.