Climate Change Vulnerabilities and Adaption Strategies for NY State's Future Electric System

Stakeholder Workshop

May 16, 2017

Five of top-10 storms by customer outages have occurred in the 3 years of 2010-2012

Date	Type of Storm	Customers Interrupted
29-Oct-12*	Superstorm Sandy	1,115,028
28-Aug-11*	Tropical Storm Irene	203,821
13-Mar-10*	Nor'easter	174,800
29-Oct-11*	Nor'easter	135,913
9-Sep-85	Hurricane Gloria	110,515
2-Sep-06	Tropical Storm Ernesto	78,300
25-Feb-10*	Snow	65,200
18-Jan-06	Wind/Rain	61,486
31-Mar-97	Nor'easter	45,180
19-Oct-96	Nor'easter	41,830

Post-Sandy initiatives

- 2013: filed electric, gas and steam rate cases for $1 billion capital investment for 2013 – 2016:
  - Protect infrastructure
  - Harden impacted components
  - Mitigate impact
  - Facilitate restoration
- Established collaborative process to incorporate recommendations, set design standards, determine role of climate change in storm hardening.

Collaborative Phase One

- Adoption of flood protection design standard based on FEMA 100-year flood plain plus three feet of freeboard
- Company commits to consider revision of design standard every five years beginning 2018
  - Monitoring sea level rise projections from NYC Panel on Climate Change and others
- Redesigned risk assessment and project prioritization model
  - Includes storm surge inundation prediction model developed by NYC Mayor's Office of Long Term Planning and Sustainability

Commission's 2014 Rate Order

- Collaborative process "commended", continue to review planned storm hardening projects
- Company to conduct "comprehensive climate change vulnerability study" with Collaborative participation
  - Developments in climate science forecasts require on-going review of storm hardening design standards
  - Look at long-term climate impacts; incorporate into long-term basis for project review

Climate Vulnerability Study Proposal

- Develop a shared understanding of key climate and weather factors
  - Work with NYC Panel on Climate Change and others
  - Consider long term research needs
- Quantify climate change risk & uncertainties
- Understand potential design standards that may need to change as a result of projected changes to climate and weather
- Incorporate design changes appropriate to risk mitigation
- Utilize expertise within Storm Hardening Collaborative and other stakeholders whenever possible

Study will focus on five “chapters” relative to climate change impacts

- Temperature and humidity
- Temperature variability and load
- Precipitation and inland flooding
- Extreme events (wind, long duration heat waves, etc.)
- Sea level rise & coastal storm surge
- Each “chapter” will have three basic components:
  - Climate science
  - Engineering solutions
  - Risk analysis

Relevance of NYSERDA/EPRI project to Con Ed's Climate Vulnerability Study

- Contributes to the "downscaling" of climate change impacts
- Electric system modeling work focused on the New York system, often mischaracterized in IPM and similar models
- Con Ed supports the effort of the NYSERDA/EPRI study to look at statewide resources
  - Study contributes to understanding future capital requirements
  - Study helps to identify vulnerabilities under future climate scenarios
- Con Ed service territory includes EJ communities that will gain special attention through the NYSERDA/EPRI study

Suggestions

- It may be easier to predict the climate of the future than the electric system of the future
  - Assumptions about electric system should be clear to project reviewers so that modeling results can be compared to other “futures” predicted by other modeling efforts (e.g., RGGI)
- Role of 6 NYCRR Part 490 should be taken into account in projecting possible sea level rise and its impact on electric generation