



Overview

Potential Nuclear Plant Closings in Illinois

IMPETUS

Illinois House Resolution 1146 adopted on May 29, 2014 requests the Illinois Commerce Commission, the Illinois Power Agency, the Illinois Environmental Protection Agency and the Illinois Department of Commerce and Economic Opportunity (collectively, “the Agencies”) to prepare reports addressing issues related to the premature closure of nuclear power plants.

HR 1146 further asks that the Agencies’ reports “include potential market-based solutions” to guard against premature closure of at-risk nuclear plants and associated consequences.

SUMMARY

The right energy policy has the potential to minimize cost increases, guarantee reliability, improve the environment, create and retain jobs and grow the Illinois economy. If Illinois is to move forward with a robust response, the full impact of such a policy would have to be fully explored.

Potential market-based solutions identified by the Agencies include the following:

- Relying purely on the market and external initiatives to make corrections
- Establishment of a Cap and Trade Program
- Imposition of a Carbon Tax
- Adoption of a Low Carbon Portfolio Standard
- Adoption of a Sustainable Power Planning Standard

The Agencies contributing to this report look forward to working with the Illinois General Assembly on the challenge of shaping Illinois’ energy policy to address the economic and environmental challenges facing our state as we help to craft a program that minimizes the rate impact and environmental harm to the citizens of Illinois, maximizes Illinois’ economic development, creates good paying jobs and increases our stature as an energy leader in the Midwest and the Nation.

ASSUMPTIONS

It cannot be overstated that the results of the specific Agency analyses, as well as the analysis of any of the potential solutions rely on assumptions. Modeling and analysis of rate, reliability, environmental and economic impacts in the highly complex energy sector require first making predictions as to what future scenarios will look like amid a myriad of interrelated, moving parts. *The assumptions made about each of these and a host of other questions in conjunction with longer term forecasting will impact every conclusion and issue under consideration:*

- Which nuclear facilities are at risk?¹
- Would their generation need to be replaced?
- If so, with what?

¹ All modeling and analysis assumed that the “at-risk” nuclear plants subject to premature closure were the facilities located in Byron, Clinton and the Quad Cities identified as unprofitable by Exelon in public statements.

Other external factors influence the decisions made with respect to the nuclear plants such as:

- Regional markets and their rules
- USEPA climate regulations and other guidelines
- Commodity prices (such as for natural gas)
- The number of coal plant retirements
- Investment decisions made by both private investors in generation and transmission assets as well as decisions by regulators in other states
- Technology improvements that change how energy is produced, stored or delivered
- Economic factors that increase or decrease end-use demand for electricity

All of these factors affect the discussion of the impact of nuclear power generation in Illinois and each may experience large shifts or disruptions in the coming years. Given the complexity of applying these variables across four distinct forward-looking Agency analyses, *the Agencies believe that results from modeling and analyses cannot be fairly segregated from the assumptions, caveats, and explanations which accompany them.*

ANALYSES

Developed on the heels of public statements made by Exelon corporation that it would consider closing select non-profitable nuclear plants in Illinois, HR 1146 urges the Agencies to focus on identifying potential impacts that could result from the premature closure of nuclear facilities related to specific attributes (rates, transmission, reliability, environmental, economic) for which the Agencies have subject matter expertise:

- The Illinois Commerce Commission examined the ability of the State and grid operators to expand transmission resources that might allow increased sales of electricity generated from low or zero carbon emitting facilities located within Illinois as well as any legislative impediments related thereto (Chapter 1). The Commission also studied the impact of nuclear plant closures upon customers' rates. Four entities provided analyses to the ICC addressing the effects on generation capacity and customer prices. Reports from Regional Transmission Operators PJM and MISO, the Illinois Institute of Technology and the PJM market monitor, Monitoring Analytics were used. The ICC's report summarizes those parties' analyses.
- The Illinois Power Agency examined how nuclear plant closures would affect reliability and the adequacy of generating capacity in the Midwest (Chapter 2). As modeling reliability impacts can be technically sophisticated and intricate, the Agency was assisted by its procurement planning consultant, PA Consulting, and PA's subcontractor, the Energy Consulting Department of General Electric International ("GE"). GE used the Multi-Area Reliability Simulation ("GE-MARS") model, a computer tool that is widely used within the industry to estimate resource adequacy metrics, to simulate reliability and capacity impacts. This reliability simulation was applied to the 2018-2019 delivery year, the first year for which PJM capacity obligations have not been determined, with four distinct scenarios or "cases" – base case, nuclear plant retirement, polar vortex (w/ nuclear retirements), and high load/high retirement (w/ nuclear retirements) – modeled

for reliability impacts. Those impacts are demonstrated and explained in the IPA's report.

- The Illinois Environmental Protection Agency examined how nuclear plant closures would affect the level and societal cost of greenhouse gas emissions (Chapter 3). The societal cost of increased greenhouse gas emissions refers to an economic estimate of the damages on physical and economic systems from climate change impacts caused by carbon dioxide emissions, the main greenhouse gas. The cost estimates are based on USEPA published social cost of carbon values. The cost range of damages due to increased carbon dioxide emissions is based on three nuclear plant retirement scenarios, which vary in the number of plants that would retire and the mix of electricity generation that would replace the lost capacity. The amount of climate-related damage due to increased emissions from nuclear plant retirements will ultimately depend upon the timing and actual amount of nuclear generation that is closed, along with the carbon intensity of the mix of generation that replaces the lost nuclear capacity. The IEPA's report explains these impacts.
- The Illinois Department of Commerce and Economic Opportunity examined the impact of nuclear plant closures on the job market and the economic climate in the affected areas (Chapter 4). The Department assembled a team of internal and external experts to conduct the assigned economic impact analysis. The project team included academics from Northern Illinois University and Illinois State University, and staff from the Department's Office of Coal Development and Bureau of Energy and Recycling. Economists from Northern Illinois University Center for Governmental Studies and Illinois State University Center for Renewable Energy were tasked to assess the primary and secondary economic impacts of the early retirements of the three targeted Exelon Nuclear assets. Primary economic impact was evaluated in the areas of Employment, Labor Income, and Value-Added economic activity. Secondary economic impact was evaluated in the area of electricity price impact resulting from the loss electricity generation outputs within the state. The project team utilized inputs from a variety of sources in conjunction with a selection of modeling tools to project the economic impact of the early retirement scenarios. This analysis is presented in the Department's report.

HR 1146 requested that these analyses "include potential market-based solutions" to guard against premature closure of at-risk nuclear plants and associated consequences.² Those solutions are identified above and discussed in the final chapter (Chapter 5) of the report.

² While these solutions are presented jointly and reflect the range of solutions considered by the Agencies, the specifics of each solution are intended to be starting points for further discussion and may not represent the specific policy recommendation of any given Agency.