



Gateway for Accelerated
Innovation in Nuclear

Trends in State-Level Energy Markets and Policy: Minnesota



Prepared by

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Minnesota

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EXECUTIVE SUMMARY

Introduction

The U.S. Department of Energy (DOE), through its Office of Nuclear Energy, has made significant investments in the technology development and demonstration of advanced nuclear reactors. Ultimately, the advanced nuclear community seeks wide scale deployment of their technology. However, wide scale deployment of advanced reactors into the U.S. market will require customers who see value in that technology as part of their generating portfolio. Planning and purchasing of new generating capacity occur on a routine basis for electric utilities, and a lack of education and trusted information about advanced nuclear energy prevents utilities from incorporating advanced nuclear into their long term planning process and could negatively impact deployment. This issue was raised at the March 8–9, 2018 symposium “Enabling Advanced Reactors for the Market,” where a local utility stated they did not understand how advanced reactor technology fits into their resource plans.

To begin a conversation with prospective utility/end users, a pilot study was started in July 2018 (based in Minnesota) to gather information and build relationships while highlighting the future power supply needs of utilities and end users. Minnesota was selected because of its position as a state with current nuclear generation, an existing moratorium on new nuclear construction, and the potential for changes in state energy policy. An evaluation was undertaken using an interview process and expanded in October 2018 to include generation and transmission cooperatives, investor owned utilities, as well as relevant NGOs, stakeholders, and state legislators. By the end of January 2019, 17 interviews had been conducted in the state:

- 5 Municipal Joint Action Agencies
- 3 Investor Owned Utilities
- 1 Generation & Transmission Cooperative
- 3 State Legislators
- 5 NGO's

To provide perspective on the size of utility participants included in the study, **Figure 1** shows total sales of electricity to customers while **Figure 2** shows the retail service areas and member service areas of participating utilities.

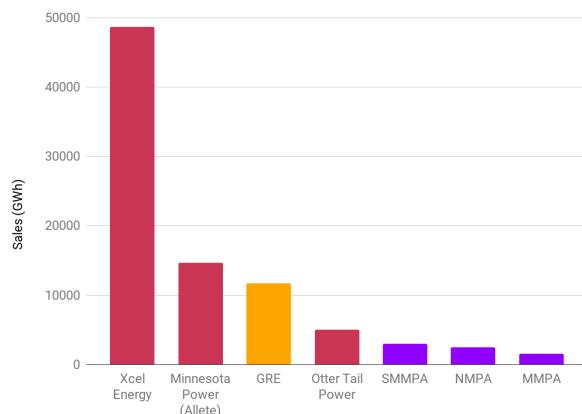


Figure 1
Power Sales by Participating Utilities

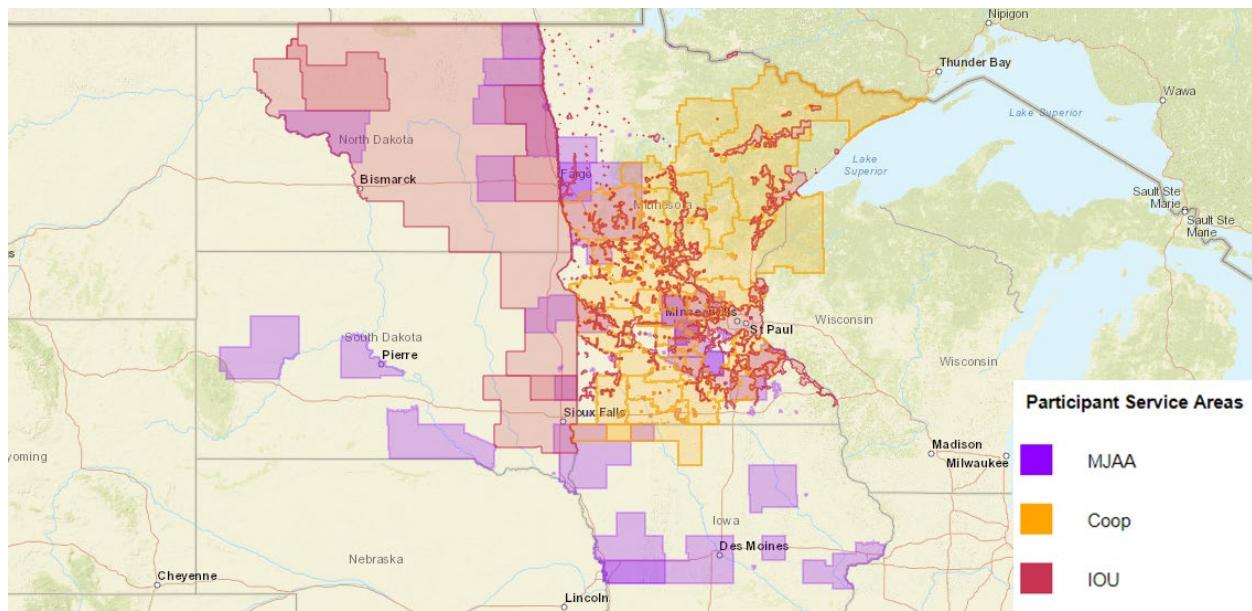


Figure 2
Participating Utilities Service Areas

This study was undertaken to determine if and how utility/end users are preparing to deploy advanced nuclear technologies. The focus of the work was to build an understanding of the electric utility industry's (EUI) procurement processes, identify utility characteristics that would make them likely candidates to deploy advanced nuclear technologies, and determine what outreach efforts should be made to encourage deployment of advanced nuclear technologies. Ultimately, the goal of this work is to guide decision-making about when, and by what means, the advanced nuclear industry should engage these utilities to make deployment possible.

Results

These interviews revealed that a majority of utilities, as well as the other stakeholders interviewed, were generally aware of advanced nuclear technologies. In particular, some interviewees pointed to the planned project between NuScale and Utah Associated Municipal Power Systems (UAMPS) to be sited at Idaho National Laboratory as their key (and, often sole) industry awareness indicator. Despite their general awareness of the technology, none of the five Municipal Joint Action Agency (MJAs) have any plans to evaluate advanced nuclear generation. Follow up interviews with investor-owned utility (IOU) and cooperatives show that no utility in Minnesota has the data necessary to incorporate advanced reactor technologies into the modeling and planning processes that will determine procurement decisions through the mid-2030s.

The central finding of this study is the lack of interest in advanced nuclear technology is ultimately rooted in the advanced nuclear industry's reluctance to publicly provide adequate information to allow utilities to properly plan for the technology. Moreover, the lack of basic information regarding costs and recent design improvements has bred general skepticism

amongst utility/end users that developers can generate reliable figures. As a consequence, the EUI views nuclear as a technology to be both financially and politically prohibitive.

Cost is the chief concern for all utilities. Political concerns stem from a historically controversial nuclear waste storage issue, and the resulting nuclear moratorium that stands today as the nation's sole outright ban on new nuclear construction. Further, the political landscape is shaped by a 2007 Renewable Portfolio Standard that is likely to be increased to mandate that utilities in Minnesota generate 50% of their electricity from renewable energy sources by 2030. The current path in Minnesota for advanced nuclear developers is daunting, but transformative change within the state's utility industry has been achieved in this century and could provide insights to deploying nuclear by the end of the next decade in Minnesota. The CapX2020 project provides a unique case study that is analyzed in detail by this report.

Key Takeaways

Further study is necessary to assess the extent to which the attitudes expressed by the EUI in Minnesota are shared across regions or nationally. However, preliminary findings from this pilot study suggest the following:

- **Lack of engagement by AR developers to their domestic customer base is having real consequences that will delay commercial domestic deployment.** Only one utility in Minnesota indicated strong familiarity with advanced nuclear technologies; critically, all other respondents suggested they had little or no knowledge of current AR developers. Without data to plan for or model the technology, all respondents indicated that they have no plans to incorporate advanced nuclear energy into their generation mix through the 2030 planning horizon.
- **Building trust and relationships with the EUI is the key human capital challenge facing developers of advanced nuclear technologies.** More troubling than the knowledge gap is the engagement gap between AR developers and their potential customers. The industry is conspicuous in its lack of engagement with potential customers relative to all other current energy generation technologies. General skepticism of advanced nuclear energy's viability is symptomatic of a lack of trust among potential customers - who do not consider themselves stakeholders in the technology's success.
- **Low-dollar opportunities for AR developers to engage with potential, domestic customers exist now and have the potential to yield high returns.** The EUI community in Minnesota is highly interconnected; respondents described consistent vectors by which they communicate with one another, their stakeholders, and energy technology developers. Understanding these channels of communication - and how to participate in them - will be critical to creating the buy-in amongst potential customers required for commercial deployment of advanced nuclear technologies.

The Need for a National Strategy

Utilities are not just potential customers of advanced nuclear technologies - they also are political stakeholders in the technology, who must be prepared as social leaders within their community to effectively communicate the virtues of the technology, and will be responsible for operation and regulatory compliance when the technology is deployed. A strategy document, detailing steps for further data acquisition, model refinement, and development of stakeholder relationships, has been prepared for GAIN by Envoy Public Labs in addition to a pilot summary report on Utility/End User relationships in Minnesota and a web-based GIS targeting map. This strategy identifies areas where public dollars can be leveraged to support the engagement process, as well as low-dollar engagement opportunities that have the potential for high returns on a limited investment for AR companies and their trade representatives.