



Natural Gas and Electricity Interdependency

February 2024



U.S. DEPARTMENT OF
ENERGY

OFFICE OF
ELECTRICITY

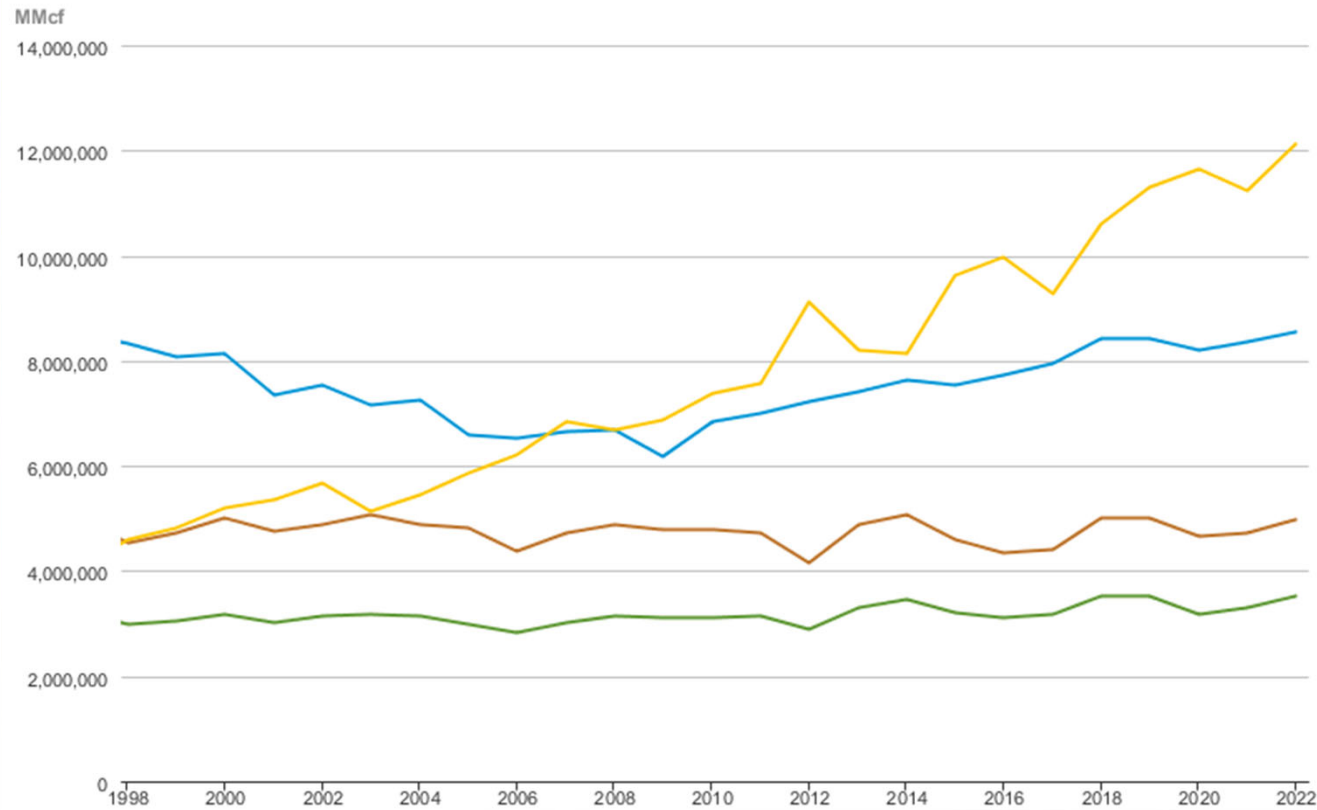
Panel Members

- Dr. Ali Ghassemian, Acting Director of Grid Modeling, Office of Electricity, U.S. Department of Energy
- Sandy Jenkins, Director of Grid Controls, Office of Electricity, U.S. Department of Energy
- John Brewer, Research Engineer, National Energy Technology Laboratory
- Heather Polzin, Reliability Enforcement Counsel to the Office of Enforcement, Federal Energy Regulatory Commission
- David Huff, Electrical Engineer, Office of Electric Reliability, Federal Energy Regulatory Commission



Steadily Increasing NG/E Interdependency

Natural Gas Consumption by End Use



Data from U.S. EIA 1/9/2024

Electric Power Consumption

Industrial Consumption

Residential Consumption

Commercial Consumption

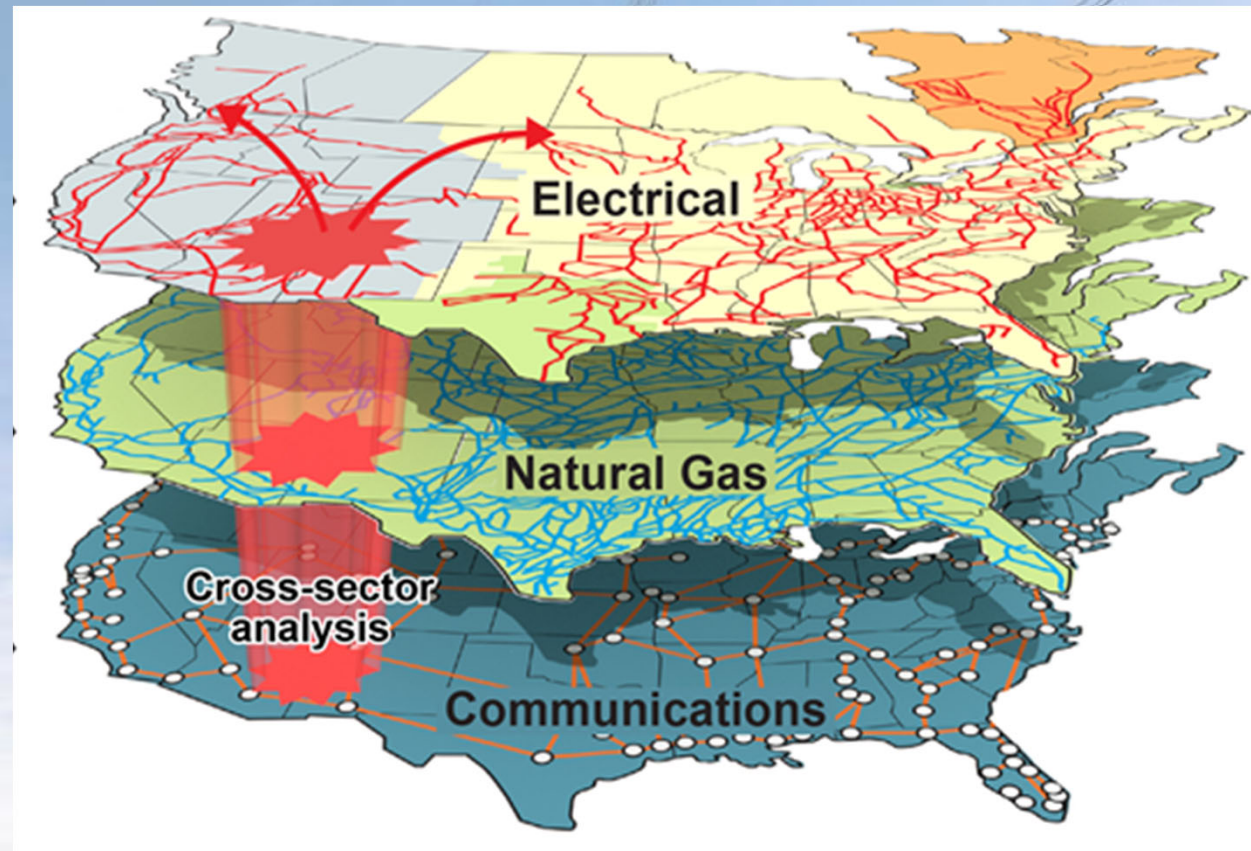


DOE Office of Electricity (OE) launched the North American Energy Resilience Model (NAERM) Program in 2018

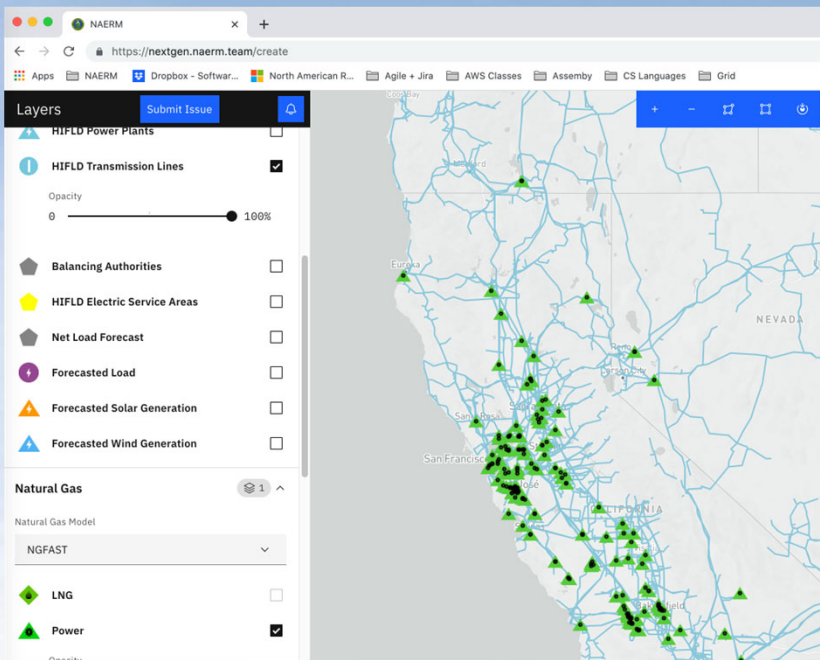
Vision - Rapidly predict energy system interdependencies, consequences and responses to extreme events at a national scale

Mission - Develop and deploy engineering-class modeling system for planning and resilience analysis

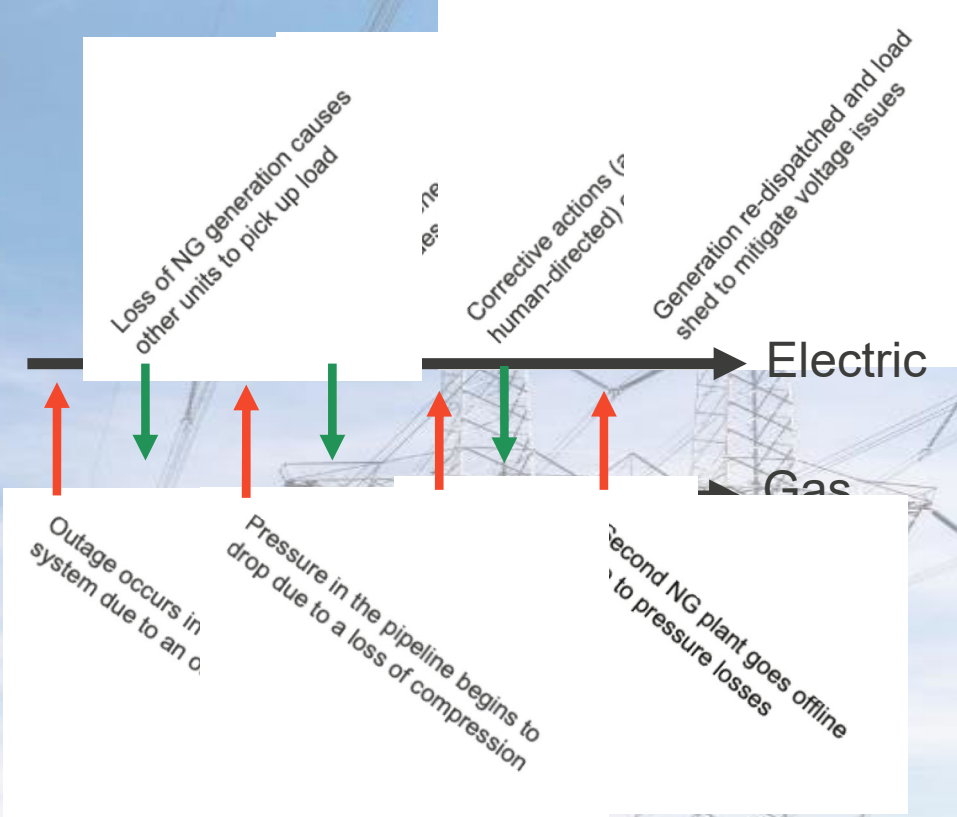
Key Objective – Catalyze partnerships with industry, national labs, states/communities and other federal agencies to enhance coordination to support energy resilience



NAERM team has developed a framework to model interactions between multiple infrastructure



NAERM Interface



Event Timeline

NG-BES Analysis

1) Assessment of Winter Storm Uri

- Post Event Analysis
- In 4 states an additional 2.8 GW of power could have been lost beyond what was seen in during the storm
- The analysis were cited by NERC-FERC report (please read the report)



NG-BES Analysis (Continued)

2) Assessment of the Potential Shutdown of the Everett Liquefied Natural Gas Import Terminal

- ISO-NE expressed concern
- NAERM was asked to investigate whether the loss of gas volumes by shutdown of Everett can be replaced by increased flows from other places
- Study by NAERM team lead by ANL is underway and the results are going to be checked and validated by the pipeline industry



NG-BES Analysis (Continued)

3) Single-Point-Of-Disruption Gas Contingency Analysis

- With collaboration with NERC the NAERM team lead by ANL is looking into the “Potential Bulk Power System Impacts due to Severe Disruption in the Natural Gas System”.
- The study is evaluating impacts to bulk electric system reliability due to the loss of major natural gas infrastructure (storage, compressor stations, key pipeline segments, and LNG terminals)

