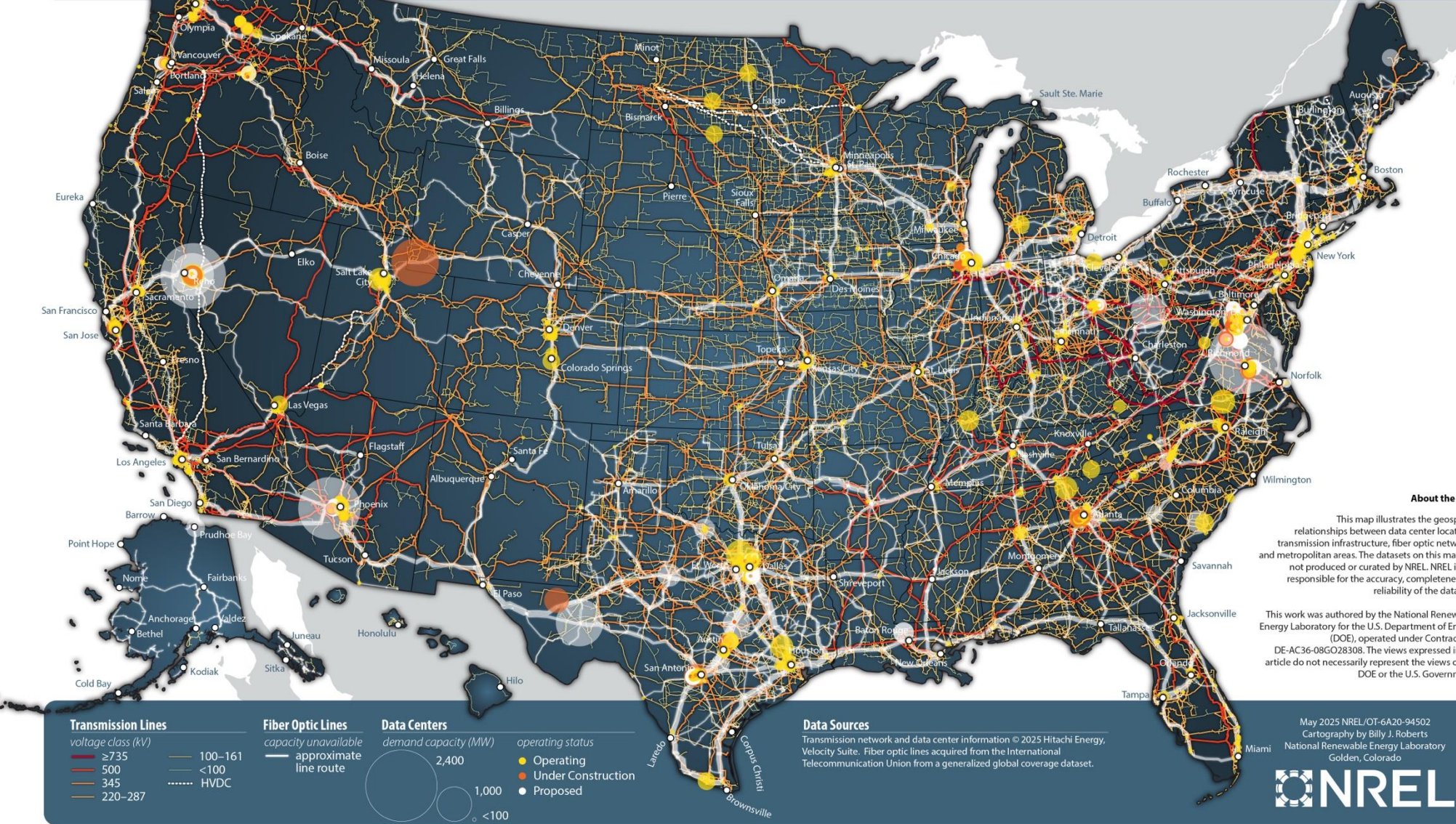# AI4E
AI FOR ENERGY

ARTIFICIAL INTELLIGENCE: IMPLICATIONS FOR ENERGY AND THE ENVIRONMENT

Fatima Ahmad, Founder & CEO, AI For Energy LLC

Environmental and Energy Study Institute Briefing (Sep. 25, 2025)

[T]here is no AI without energy. At the same time, AI has the potential to transform the energy sector."

-International Energy Agency, Energy and AI (April 2025)

Data Center Infrastructure in the United States, 2025

Transmission Lines
voltage class (kV)
≥735
500
345
220–287
100–161
<100
HVDC

Fiber Optic Lines
capacity unavailable
approximate line route

Data Centers
demand capacity (MW)
2,400
1,000
<100

operating status
● Operating
● Under Construction
○ Proposed

Data Sources
Transmission network and data center information © 2025 Hitachi Energy, Velocity Suite. Fiber optic lines acquired from the International Telecommunication Union from a generalized global coverage dataset.

About the Map
This map illustrates the geospatial relationships between data center locations, transmission infrastructure, fiber optic networks, and metropolitan areas. The datasets on this map are not produced or curated by NREL. NREL is not responsible for the accuracy, completeness, or reliability of the datasets.

This work was authored by the National Renewable Energy Laboratory for the U.S. Department of Energy (DOE), operated under Contract No. DE-AC36-08GO28308. The views expressed in the article do not necessarily represent the views of the DOE or the U.S. Government.

May 2025 NREL/OT-6A20-94502
Cartography by Billy J. Roberts
National Renewable Energy Laboratory
Golden, Colorado

NREL

DATA CENTER ENERGY USE IS RISING

"Data center load growth has tripled over the past decade and is projected to double or triple by 2028."

Source: U.S. Federal Energy Regulatory Commission
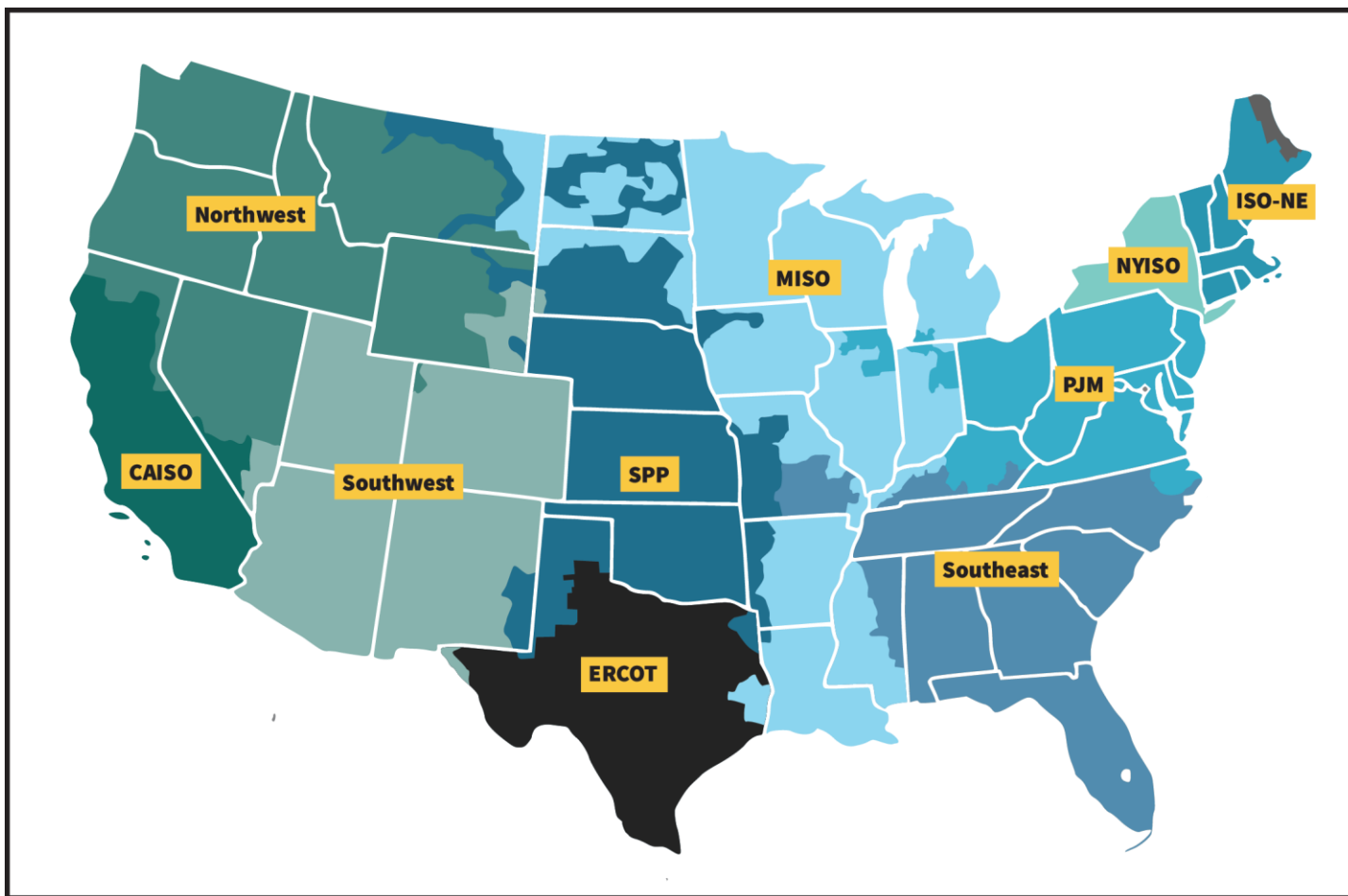
REGIONAL GRID OPERATORS

NEW ENERGY POLICY RECOMMENDATIONS

"Develop a Grid to Match the Pace of AI Innovation"

U.S. DEPARTMENT OF ENERGY

The DOE National Labs are at the leading edge of AI for Energy & AI for Science.

U.S. DEPARTMENT OF **ENERGY**

AI for Energy

Opportunities for a Modern Grid and Clean Energy Economy

April 2024

U.S. DEPARTMENT OF ENERGY

- The Pacific Northwest National Laboratory is "clearing the path for critical infrastructure"

AI FOR ENERGY

AI for Nuclear Energy

AI for Fusion

AI for Geothermal Energy

AI for Critical Minerals

AI for the Electric Grid

AI for Energy Efficiency

AI for Water

QUESTIONS?

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