

May 27, 2026

Paul Talbot, Ph.D.
Integrated Systems and
Thermal Analysis

Data Center Interest in Nuclear Power

Panel, DOE-LSU UPRISE

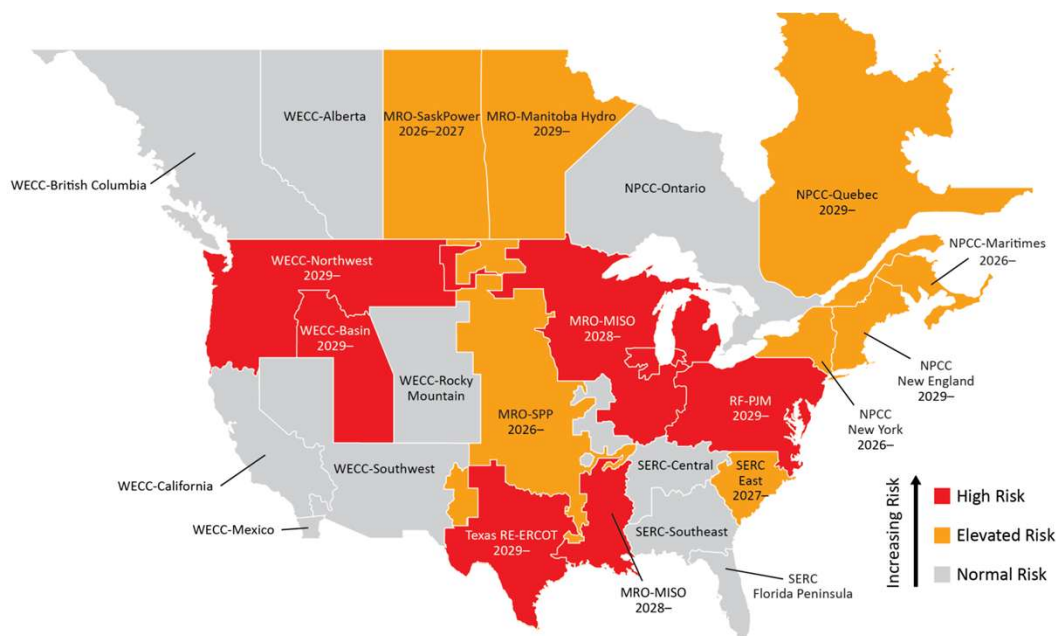
Battelle Energy Alliance manages INL for the
U.S. Department of Energy's Office of Nuclear Energy



Idaho National Laboratory

Current State of the Grid

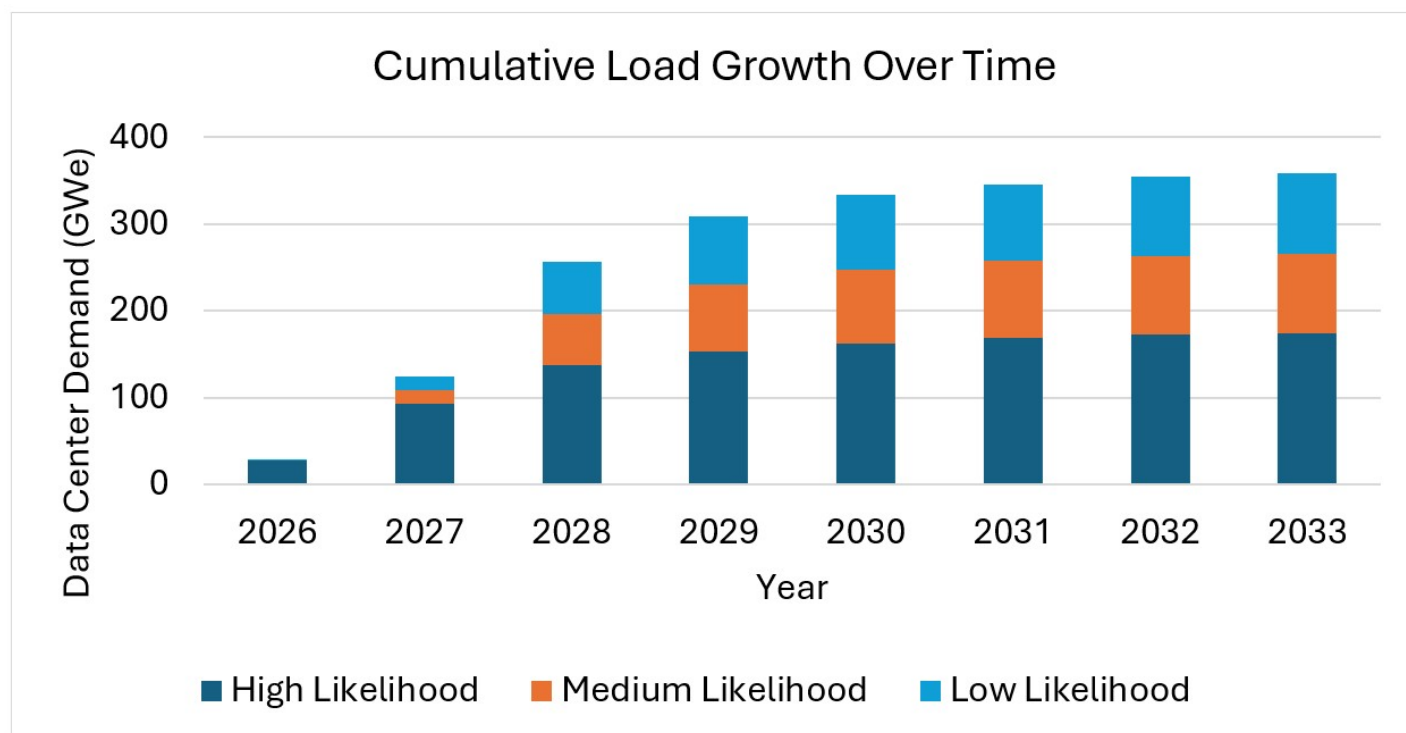
NERC Long Term Regional Outlook(2026-2030)



- Resource adequacy risk by region
- MISO: Reserve margins predicted to decline and approach deficiency
- SPP: Potential summer, winter energy shortfalls from low-wind and natural gas fuel risk
- PJM: Additions not keeping up with retirements and demand growth
- ERCOT: Surging demand growth, dispatchable share struggles to keep pace
- etc.

Demand Growth Outlook

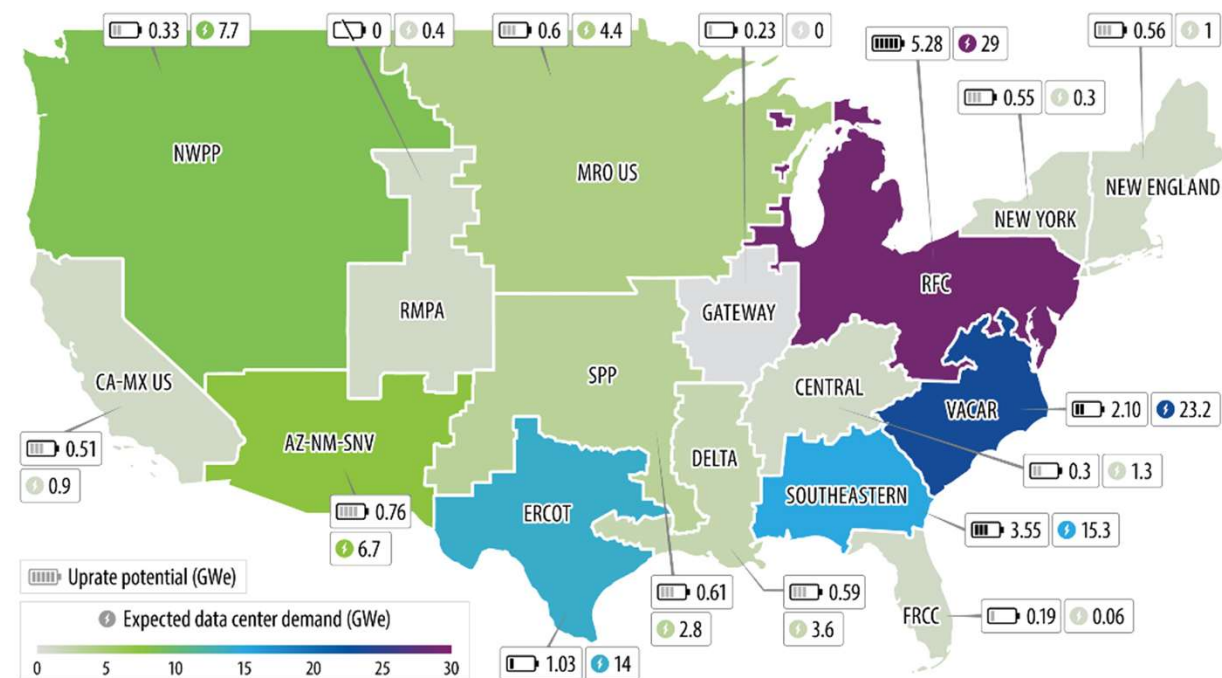
- Already-announced data center growth include over 300 GW demand growth for digital infrastructure
- Scale:
 - Large city power ~3 GW
 - U.S. avg power 475 GW
- Even conservative estimates (under construction) call for 150+ GW new generation



"Regional Market Assessment for Power Offtake Agreements", Idaho National Laboratory, INL/RPT-26-91053, 2026

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Regional Opportunity



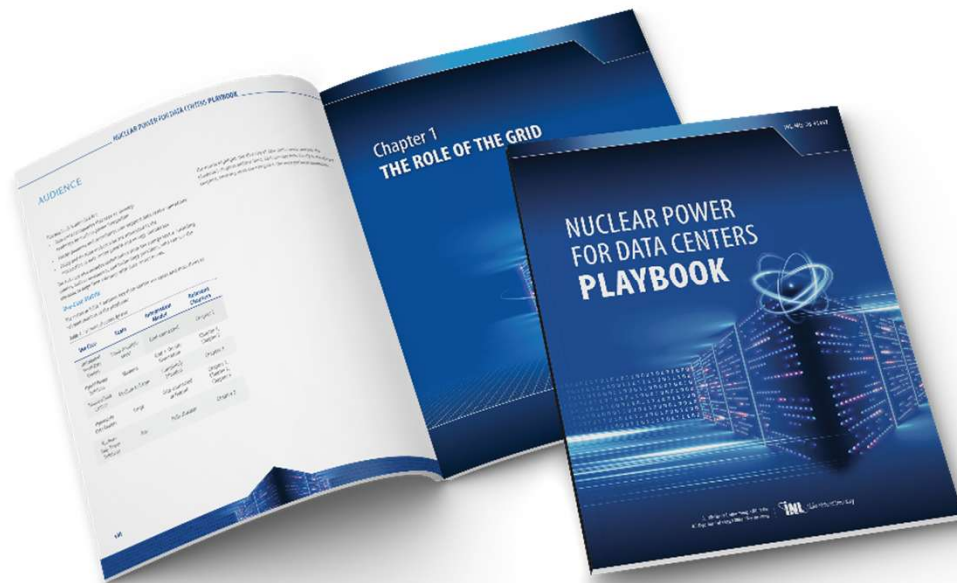
- Uprate-able nuclear capacity shown as batteries, by area
- Data center energy demand forecast shown by color
- Largest opportunities in Ohio, Virginia, Carolinas, Southeast, and Texas
- Strong regional correlation between nuclear uprate potential and forecast demand
 - However, demand far exceeds uprate potential in most regions



Nuclear Power for Data Centers Playbook

A guide for accelerating data center deployment

Designed as a practical guide for data centers and other key players in digital infrastructure expansion



IDAHO NATIONAL LABORATORY

Panelists

- **Brian Smith**, Idaho National Laboratory
- **Evan Bates**, Quanta Infrastructure Solutions Group
- **Chris Bronsdon**, EmberVault
- **Paul Talbot**, Idaho National Laboratory (moderator)



Battelle Energy Alliance manages INL for the U.S. Department of Energy's Office of Nuclear Energy. INL is the nation's center for nuclear energy research and development, and also performs research in each of DOE's strategic goal areas: energy, national security, science and the environment.

WWW.INL.GOV

UPRISE of Nuclear Energy for Power Demand Growth

Industry Needs, Opportunities and Perspectives

EMBERVAULT



Empowering Sustainable
Infrastructure Solutions

EmberVault

EVT is not (just) a project developer — it is a platform that unlocks nuclear-powered AI infrastructure at scale by integrating energy, compute, and capital.

Formed from the basis that a ‘single silo’ approach is too slow to be effective for delivery at pace and scale

Brings experience, realities & cynicism of the development of GW scale project sites in the UK, USA and Europe

Focused on power advantaged sites that can be progressed with strong partnerships in place & fully financed.

EmberVault

AI-Scale Data Centre Infrastructure

15,150 MW Portfolio Across US, UK & EU

The Conventional DC Industry Is Hitting a Wall

Sources: Data Center Watch 2025; DCD Feb 2026; U Chicago Sustainability Dialogue 2026; Food and Water Watch Dec 2025

THE PERMITTING WALL — Conventional Greenfield DCs

\$64B

Community opposition: \$64B blocked or delayed

\$18B blocked, \$46B delayed May 2024–Mar 2025. 25 projects canceled in 2025 alone — 4x the 2024 rate. 188 organized opposition groups active in 40 states. Source: Data Center Watch, 2025.

40%

Water: #1 complaint driver

Cited in >40% of contested projects. Two-thirds of U.S. DCs built since 2022 are in water-stressed regions. By 2030 global DC water demand doubles to 1,200 billion liters/yr. Source: Data Center Watch; DCD, Feb 2026.

CO2

Air: lawsuits under the Clean Air Act

Stargate/Oracle Michigan: 1.5M tons CO2/yr from gas turbines, 1.8B gallons/yr water draw. Elon Musk's xAI Memphis facility: NOx spikes from backup generators. Class-action Clean Water Act suit filed Feb 2026. Source: Sustainability Dialogue, U Chicago, 2026.

14+

Moratoriums: 14 states and counting

State legislatures now moving to codify local opposition into law. Senator Bernie Sanders called for a national construction moratorium, Dec 2025. 230+ organizations signed a letter to Congress calling for a full freeze. Crossing party lines: 55% R, 45% D among opposing politicians. Source: Data Center Watch; Food & Water Watch, Dec 2025.

VOTE

Electoral consequences are real

Warrenton, Virginia: every council member who approved Amazon's DC lost re-election. Court ordered 1-year project stall. Virginia governor's race: data center policy was the defining issue. Source: E&E News 2024; Data Center Watch 2025.

UPRISE + Nuclear Fenceline Sites = Structurally robust, low risk

Sources: INL Director Brian Smith (Roll Call Dec 2025); Westinghouse design specs; NRC 10 CFR Part 52; DOE EO 14318 Jul 2025

Low Risk	Away from people — by design, but engagement and communication is still critical Nuclear exclusion zones keep residential communities at minimum 0.5-1.0 mile radius. Fenceline land is rural industrial. No 500-person town hall. No recall election. Federal DOE site designation removes state/local permitting jurisdiction entirely. Source: INL Director Brian Smith: 'Doing it on federal lands is a way to get at this and get at it quickly.' Roll Call, Dec 2025.
Low Risk	Zero water competition — by technology selection; SOFC's + SMR +LWR's Bloom SOFC: electrochemical reaction produces water as a byproduct — net zero water withdrawal. AP-1000 passive cooling: closed 1.7M-gallon recirculating tank on containment shell — no river or aquifer draw. eVinci: heat pipe cooling — no water at all. None of the three compete with municipal water supply. Source: Westinghouse design specs; NRC 10 CFR Part 52 Appendix D.
Low Risk	Zero combustion air pollutants at point of use SOFC electrochemical reaction: no combustion, no NOx, no particulates at the point of electricity generation. AP-1000/AP-300/eVinci: zero CO2, zero criteria air pollutants in operation. No Clean Air Act permit threshold triggered. No backup diesel generator NOx spikes — nuclear provides continuous firm power eliminating generator runtime. Source: EPA Clean Air Act S.112; Westinghouse AP-1000 Environmental Report.
Low Risk	Existing designated Nuclear sites = federal permitting = lower risk of community veto; Federal land – no risk DOE Executive Order 14302 (May 2025): rebuild the U.S. nuclear industrial base by prioritizing 5 GW of uprates to existing reactors and getting 10 new large reactors with complete designs under construction by 2030, while expanding domestic nuclear fuel-cycle capacity, supply chains, reactor financing, and workforce programs on 30- to 240-day implementation timelines. DOE Executive Order 14318 (Jul 2025): federally designated AI data center sites bypass state/local permitting processes. DOE identified 16 federal sites : existing regulatory perimeter eliminates new community permitting baseline. Source: DOE press release Jul 24 2025; Congress.gov CRS R48762, Dec 2025.
Medium Risk	Pre-cleared fiber — few Nuclear sites may already have secure backbone Assessment required to ensure available Dark Fiber capacity, or ability to utilise RoW for new fiber

Speed to Power – Solid Oxide Fuel Cell (SOFC) BTM as the Revenue Bridge



KEY: SOFC BTM is 2-4 years faster than grid interconnection and generates revenue WHILE the nuclear uprate License Amendment Request (LAR) runs in parallel. The bridge funds the development budget and proves DC off-take to the plant owner before uprate completion.

Data Center Project Development + UPRISE

Infrastructure bottleneck (not just power)

- AI/data center growth needs **power + land + integration**
- Traditional models stall at **single projects, technologies or silos**

AI demand is exploding, but infrastructure can't be deployed fast enough — power, compute, and capital are not coordinated

UPRISE is a key UNLOCKING mechanism

- DOE UPRISE = **\$289B budget authority but ZERO committed capital**
- UPRISE workshop series connects **plant owners + offtakers + investors**

The U.S. government has created the framework — but hasn't yet mobilized capital. That gap is where value is created

OPPORTUNITY

EmberVault

INCENTIVE

Integrates **DevCo + DataCo + PowerCo** · Structures cross-silo execution consortium · Turns U.S. Government framework into **bankable projects**

Development at Scale

10GW Data Center campus + 10GW Onsite Power Generation – 10-year delivery



FLUOR

Brookfield



olsson

Bloomenergy

Consortium partners

- **EmberVault** — Project developer/integrator, asset owner, asset operator
- **Brookfield Asset Management** — Capital backbone
- **Fluor** — Lead Engineering, Procurement, and Construction
- **Olsson** — Data center and infrastructure engineering
- **Bloom Energy** — Natural gas SOFC firm-power OEM

Delivery plan

A transformative, secure, scalable, and financeable AI and energy infrastructure program

- Phase 1: 2.4GW of compute and associated power by 2030; first power in 2027 (18 months after project initiation); first nuclear power in 2033
- Phase 2: 7.2GW of compute with follow-on baseload from onsite SMR/LAR; first nuclear power from 2034
- **>\$150Bn CAPEX — fully backed by Brookfield**