Nuclear Generation and Data Centers

Presentation to SURFA Financial Forum

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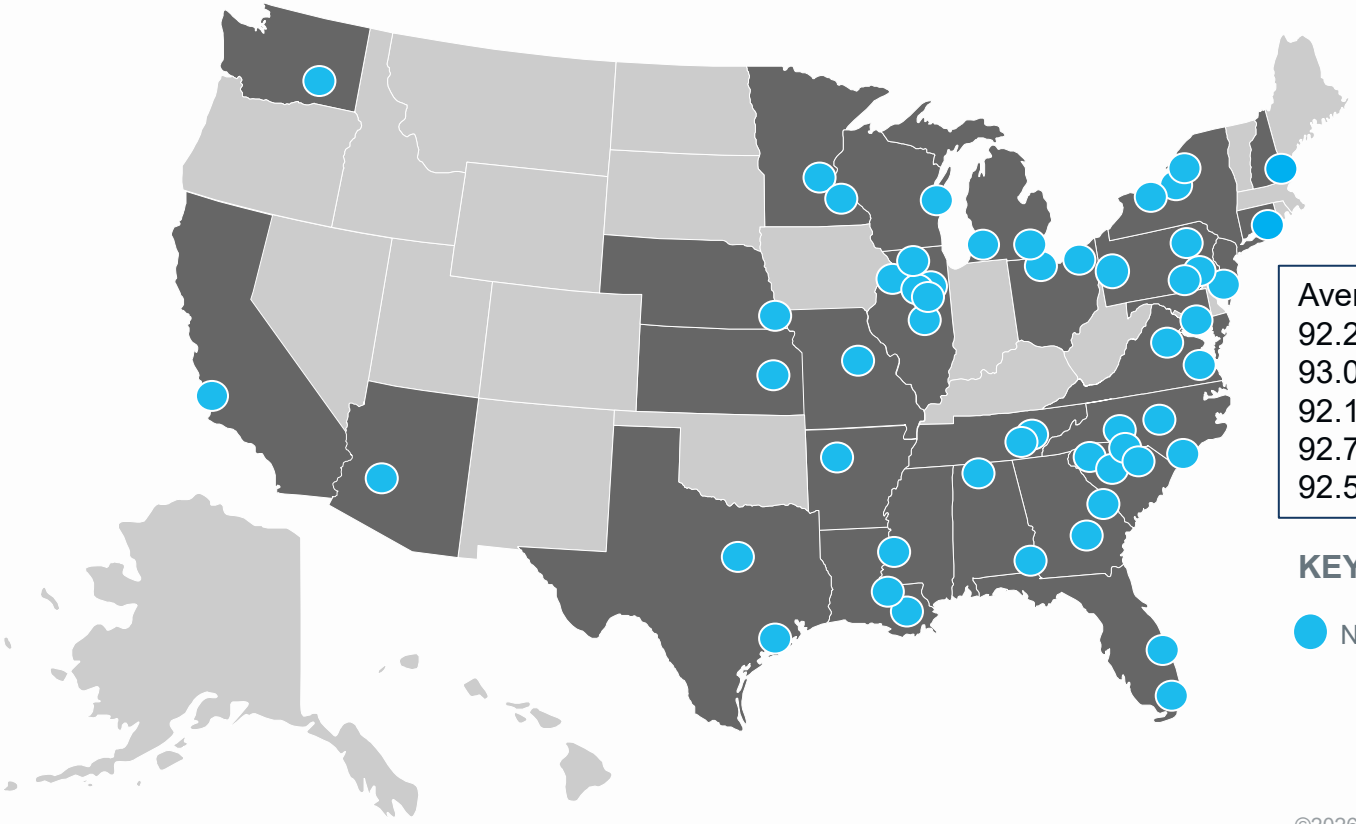
NUCLEAR ENERGY INSTITUTE

94 reactors at 53 plant sites across the country



Average Capacity Factor:
92.2% in 2024
93.0% in 2023
92.1% in 2022
92.7% in 2021
92.5% in 2020

KEY

Nuclear power plant site

Updated: May 2023

Five-Year Load Growth Up Six-Fold to 166 Gigawatts

The 166 GW forecast is equivalent to adding 15 times the peak load of New York City.

THE ERA OF FLAT POWER DEMAND IS BEHIND US …

Electricity usage is forecast to grow by an average of 5.7% per year over the next five years, with peak demand growth forecast at 166 GW, a 3.7% annual rate.

- Over the past three years, the 5-year forecast of utility peak load growth has increased by more than a factor of six, from 24 GW to 166 GW.
- Electricity use is forecast to increase even more quickly than peak power demand. By 2030, forecasts indicate that **total electricity use will increase by 32%**.
- The higher growth rate for electricity use likely reflects high load factors of data centers as well as forecast changes in off-peak energy use by other customers.

Data centers are the largest driver of demand and energy growth, accounting for about 55% of demand growth in utility load forecasts over the next five years.

- Even though smaller than data center growth, new load for industrial / manufacturing, oil & gas / mining, and other load types is large compared to recent decades.

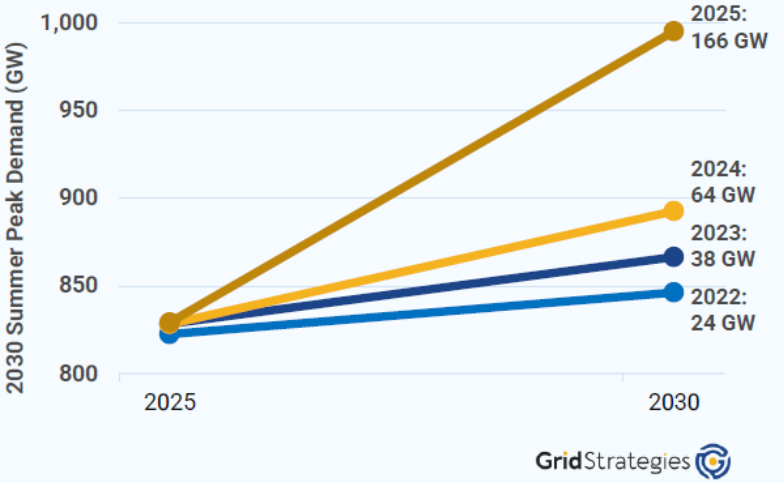
The data center portion of utility load forecasts is likely overstated by roughly 25 GW, based on a review of reports published by market analysts.

- This discrepancy indicates that utility forecast practices need improvement to better reflect the probability of projects completing, their total loads, supply constraints, or timing of load growth.

AND FORECAST CONTINUES TO GROW …

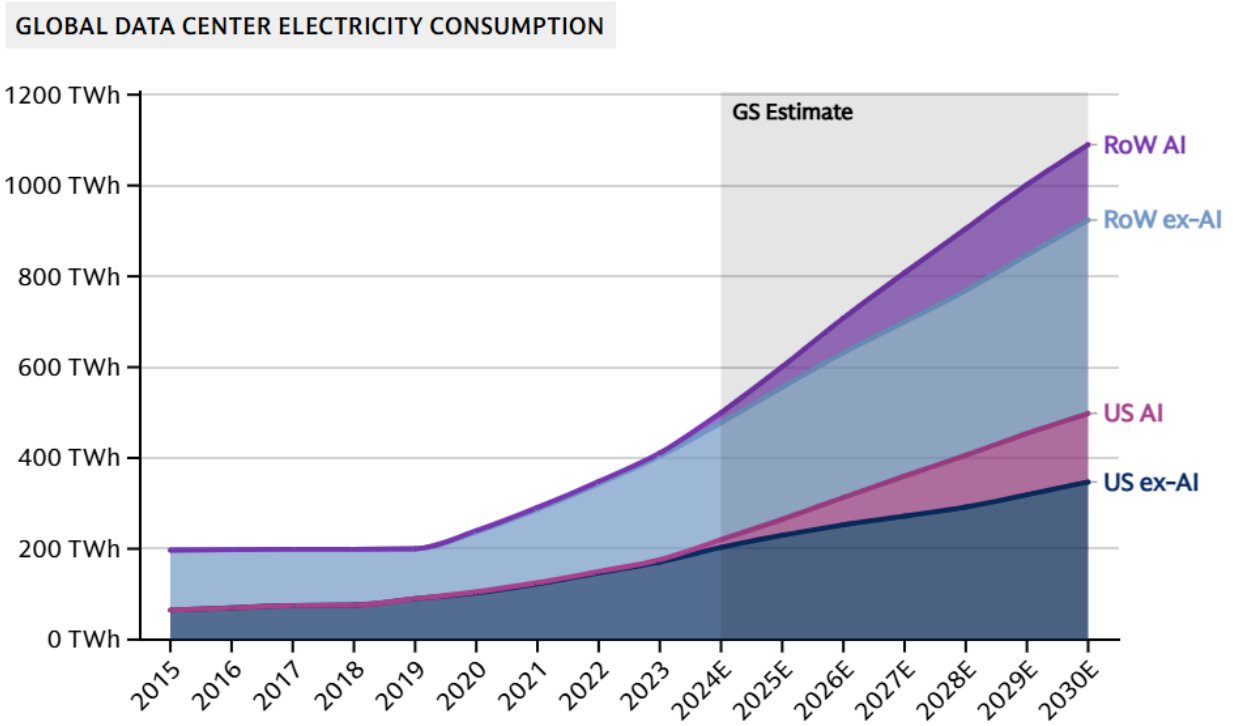
5-year Nationwide Summer Peak Growth

Aggregate of Forecasts Submitted to FERC in 2022-2025



Post FERC 714 Adjustments:
SPP: SPP, 2025 Integrated Transmission Planning Assessment Report, Draft v. 0.3 (October 6, 2025).

Global power demand from data centers is soaring



Source: Goldman Sachs Research

Electric utilities are planning for more nuclear

License Renewal/ Plant Restarts

- **93%*** of fleet expects to operate to at least **80 years**
- **21*** additional LR/ SLR applications expected 2025-2030
- **3*** units pursuing/ considering restart of shutdown

Investments

- **24*** power uprate applications expected by 2030 (>3 GWe)
- **26*** Extended Fuel Cycle applications being considered or planned
- **>$8B*** in other capital investments by the end of the decade

Applications

Action or Interest

	Sites	GWe
Hydrogen	12	>0.9
Data Center	25*	>6
Other	2	1.6

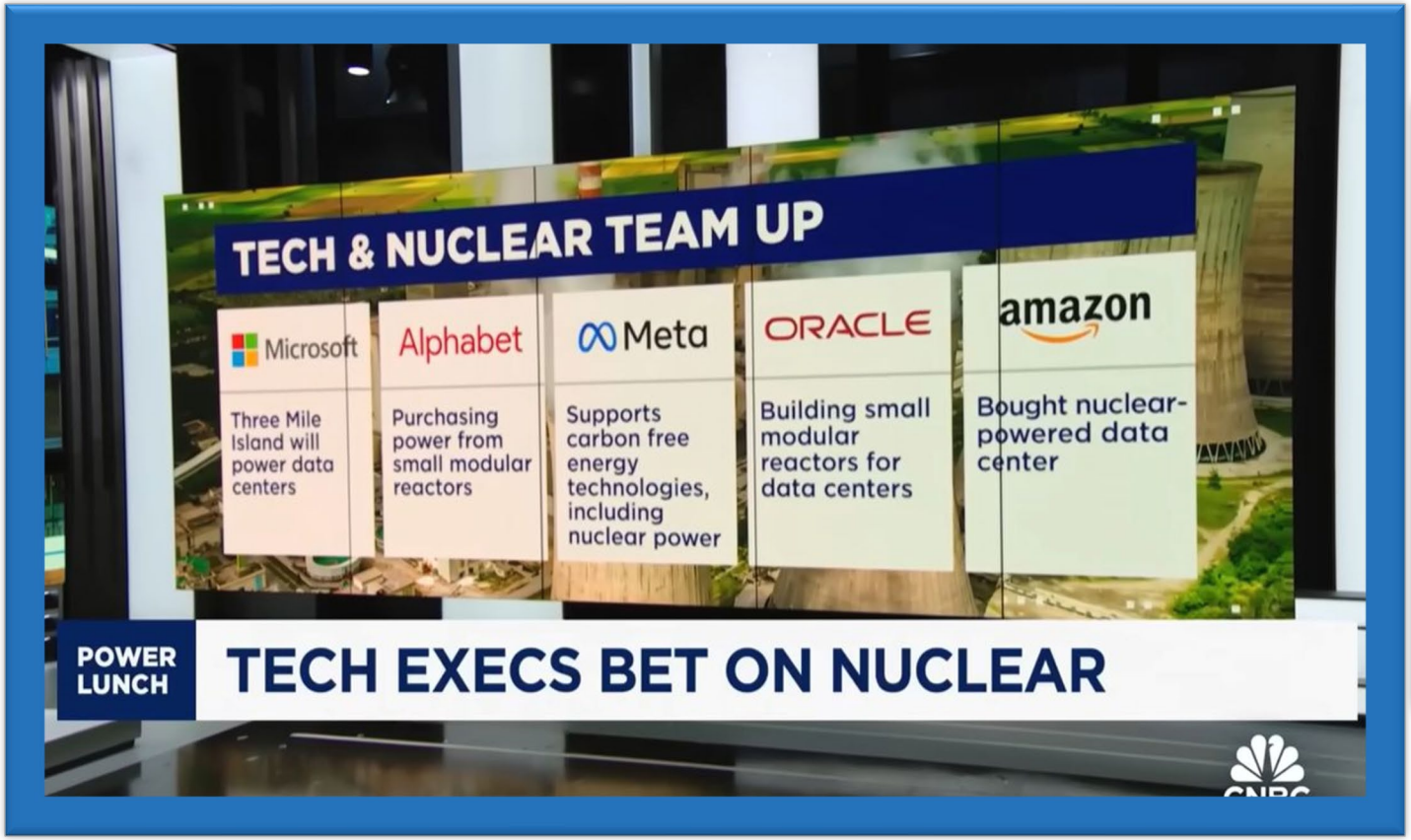
New Nuclear

- **~50%** of companies increased interest in new nuclear
- **>100*** GWe of new nuclear by 2050s
- Applications in next 10 Years:

ESP	**25***
CP	**19***
COL	**8***

* - Increase from prior survey

Tech Companies Going Nuclear:



- ✓ Amazon
- ✓ Microsoft
- ✓ Alphabet (Google)
- ✓ META
- ✓ Oracle
- ✓ NVIDIA
- ✓ Equinix
- ✓ Switch
- ✓ Standard Power
- ✓ Endeavour Energy
- ✓ Digihost
- ✓ Green Energy Partners
- ✓ Wyoming Hyperscale
- ✓ Sabey Data Centers
- ✓ New Era Energy and Digital
- ✓ Creekstone Energy

Nuclear Executive Orders – May 23, 2025

Deploying Advanced Nuclear Reactor Technologies for National Security

Reinvigorating the Nuclear Industrial Base

Reforming Nuclear Reactor Testing at the Department of Energy

Ordering the Reform of the Nuclear Regulatory Commission

Lead to at Least 7 Workstreams

- Deployment at DOE sites
- Deployment at DOD sites
- Growth of Fuel Supply
- NRC Reform
- Nuclear Exports
- Used Fuel Policy
- Workforce Development

Data Centers on Federal (DOE) Lands

(16 sites considered, 4 selected)

2027 – Operation

1. Idaho National Laboratory (ID)
2. Paducah Gaseous Diffusion Plant (KY)
3. Portsmouth Gaseous Diffusion Plant (OH)
4. Argonne National Laboratory (IL)
5. Brookhaven National Laboratory (NY)
6. Fermi National Accelerator Laboratory (IL)
7. National Energy Technology Laboratory (PA)
8. National Renewable Energy Laboratory (CO)
9. Oak Ridge National Laboratory (TN)
10. Pacific Northwest National Laboratory (WA)
11. Princeton Plasma Physics Laboratory (NJ)
12. Los Alamos National Laboratory (NM)
13. Sandia National Laboratories (NM)
14. Savannah River Site (SC)
15. Pantex Plant (TX)
16. Kansas City National Security Campus (MO)

Types of Advanced Reactors

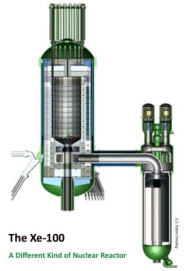
Range of sizes and features to meet diverse market needs*

Water Cooled | Non-Water Cooled | Either

Westinghouse AP1000® (shown)
GE ABWR
GE ESBWR

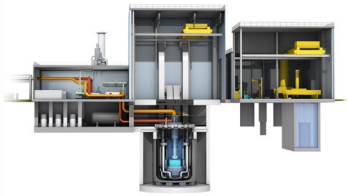
GEH BWRX-300 (shown)
NuScale
Holtec SMR-300
Westinghouse AP300

High Temp Gas Reactors



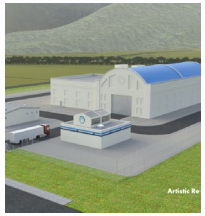
X-energy (shown)
General Atomics

Liquid Metal Reactors



TerraPower Natrium™ (shown)
ARC Clean Energy

Molten Salt Reactors



Kairos Hermes (shown)
Terrestrial
Natura Resources

Aalo (shown)
Oklo
Radiant
Westinghouse eVinci
(Many others)

Large | Small Modular Reactors | Micro

Learn more about innovative technologies with the Nuclear Innovation Alliance.

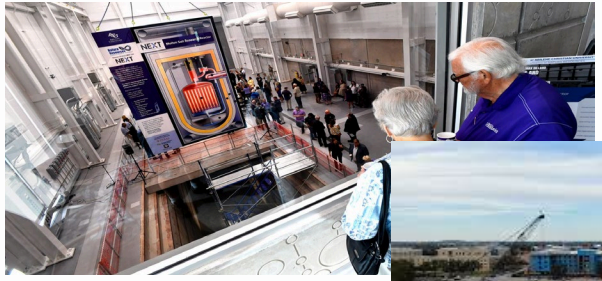
*Does not represent all designs, but only a short list of examples.

Moving Dirt and Forging Steel

OPG/Darlington GE-H BWR X-300 early site works completed in Ontario

Terrapower Natrium – site preparations, sodium facility construction underway in Wyoming

Kairos Hermes – drilled piers installed in Tennessee



ACU molten salt reactor – reactor building complete in Texas

MARVEL prototype shipped for testing, large components in production for Idaho demonstration

QUESTIONS?

By Third Way, GENSLER