

Nuclear's Role in Meeting Future Energy Demand: Technology & Challenges

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September 15, 2026



Who Is NEI?

THE NUCLEAR ENERGY INSTITUTE

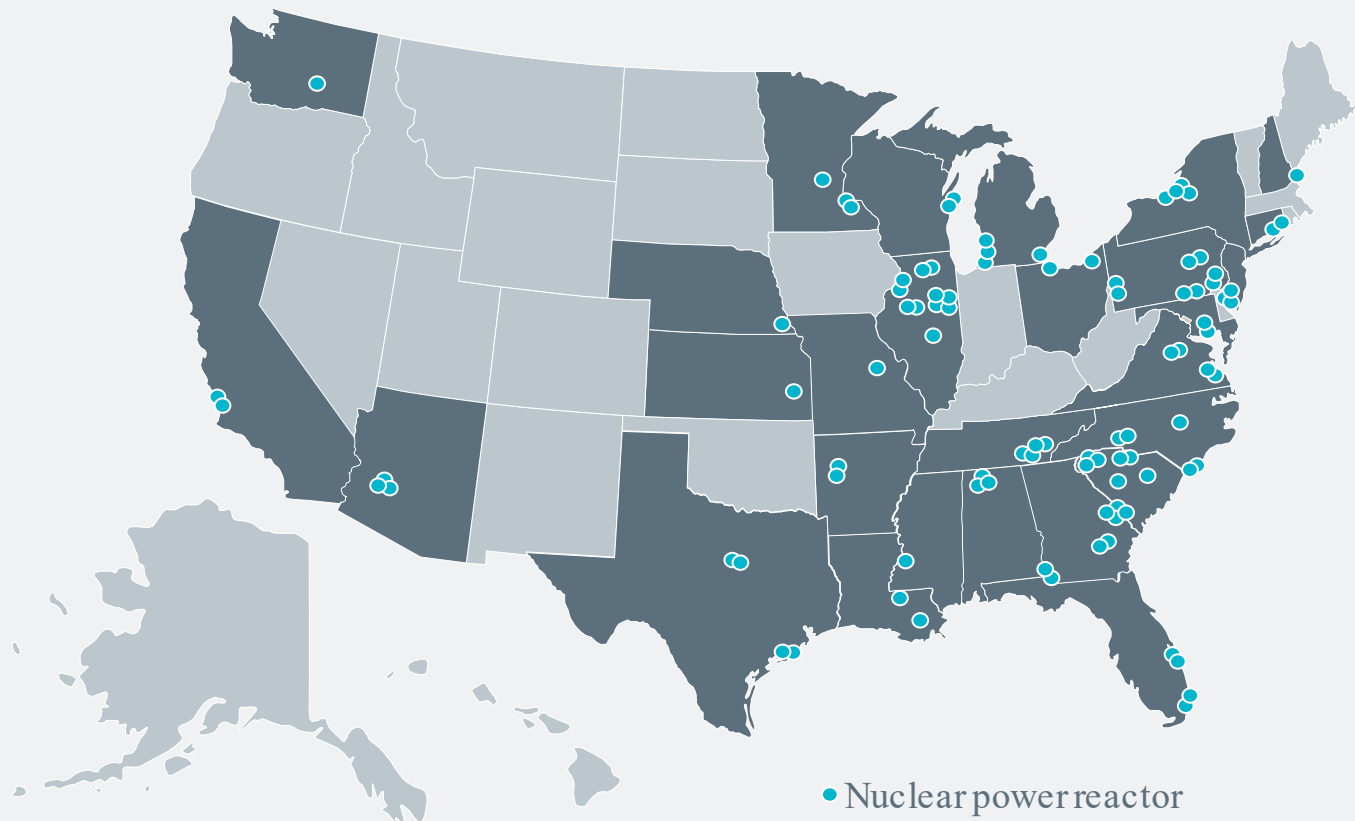
is the **policy organization** of the nuclear technologies industry, based in Washington, D.C.

On behalf of its members, NEI is the **unified voice** of the nuclear energy industry on various **policy, technical, and regulatory issues**.

- **390+ MEMBERS IN 17+ COUNTRIES**

Current State of Nuclear in the U.S.

Nuclear Energy in the U.S.



94 reactors across 54 sites and 28 states

784.8 million MWh of electricity generated (~1/5th of U.S. electricity)

92.5% capacity factor

447 million CO₂ emissions avoided

• Nuclear power reactor

NEI "Futures" 2026 Survey Summary

License Renewal

- **97%*** of fleet expects to operate to at least **80 years**
- **24*** additional LR/SLR applications expected 2026-2030

Increased Power

- **24** power uprate applications expected 2026-2030 (~5 GWe)
- **34*** Extended Fuel Cycle applications being considered or planned
- **>\$22B*** in other capital investments over next 10 years

Restarts

- **Palisades**
 - 800 MWe
- **Crane Clean Energy Center**
 - 835 MWe
- **Duane Arnold**
 - 615 MWe
- **Summer 2 & 3****
 - AP1000 Construction

New Nuclear

- **70%** of companies expressed interest in new nuclear
- **>33*** GWe of new nuclear by 2040
- Applications by 2040:

ESP	15
CP	8
COL	30
Total	53*

* Increase from prior survey. **Not included in survey.

Federal Legislation for Nuclear Energy

117th Congress (2021-2022)

Infrastructure Investment and Jobs Act

\$6 billion for the Civil Nuclear Credit Program

\$2.4 billion to fund ARDP awards from FY2022 through 2025

Inflation Reduction Act

Nuclear Production Tax Credit

New Clean Generation Investment and Production Tax Credits

\$700 million for domestic production of high-assay low-enriched uranium (“HALEU”)

118th Congress (2023-2024)

Nuclear Fuel Security Act

LEU/HALEU domestic production authorizing legislation contained in FY 2024 National Defense Authorization Act (NDAA)

FY2024 Appropriations Legislation

\$2.72 Billion for domestic fuel production (March 9, 2024) Additional

\$800 Million for Small Modular Reactors

40 Year Reauthorization of the Price-Anderson Indemnification Act

ADVANCE Act

119th Congress (2025-2026)

Budget Reconciliation

Retention of nuclear tax credits

NRC Commissioner Confirmation

Ongoing:

ARC Act

Updated Nuclear Tax Policies

Export-Import Bank Reauthorization

FY27 Appropriations

ADVANCE Act Implementation

Key Enablers from the Executive Orders on Nuclear Energy

National Security (14299), NRC Reform (14300), DOE Testing (14301), and Industrial Base (14302)



Add 300 Gigawatts of U.S. Nuclear Capacity by 2050

- Restarts and power uprates
- 10 large reactors in construction by 2030



Speed up Nuclear Reactor Licensing

1

- NRC licensing less than 18 months
- Faster for DOE/DoD tested designs



Lay the Ground-Work for Faster Reactor Testing

2

- Pilot 3 reactors outside of labs
- Expand DOE testing pathways



Deploy U.S. Reactors for AI and Military Bases

3

- Operate at DoD facilities in 3 years
- AI as critical defense facilities



Amp Up Domestic Nuclear Fuel Production

4

- Maximize domestic fuel production
- Mine, enrich, convert, de-convert



Assess Spent Fuel and Recycling

5

- Recommend a National policy
- Safe, Secure Long Term Fuel Cycle



Expand U.S. Nuclear Energy Exports

6

- Compete for civil nuclear globally
- Pursue new 123 Agreements



Bolster the American Nuclear Workforce

7

- Increase nuclear apprenticeships
- Prioritize nuclear energy careers

Reference: <https://www.energy.gov/ne/articles/9-key-takeaways-president-trumps-executive-orders-nuclear-energy>

Japan–U.S. Strategic Investment: Overview

Background

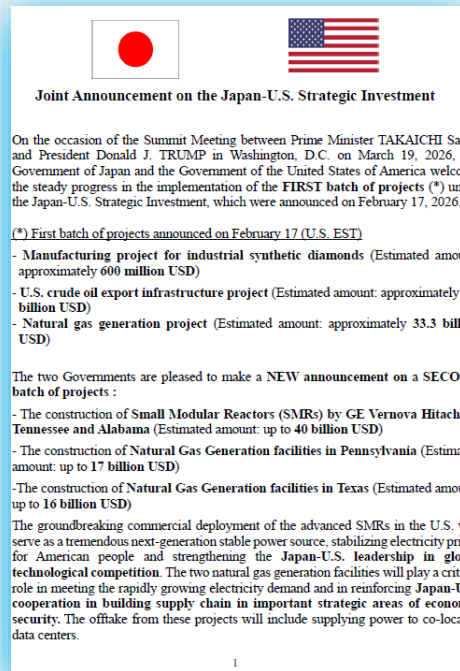
- Joint Announcement at Japan–U.S. Summit (March 19, 2026)
- Part of broader \$550 billion U.S.–Japan trade deal (Sep, 2025)

First Batch (Announced February 17, 2026)

- Industrial synthetic diamonds manufacturing —~\$0.6B
 - U.S. crude oil export infrastructure —~\$2.1B
 - Natural gas generation project —~\$33.3B
- ➡ **Total (First Batch): ~ \$36B**

Second Batch (Announced March 19, 2026)

- **SMR construction (Tennessee & Alabama) —up to \$40B**
 - Natural gas generation (Pennsylvania) —up to \$17B
 - Natural gas generation (Texas) —up to \$16B
- ➡ **Total (Second Batch): up to \$73B**



New Technology Creating New Opportunities

Types of Advanced Reactors

Range of sizes and features to meet diverse market needs*



Learn more about innovative technologies with the Nuclear Innovation Alliance.

Water Cooled

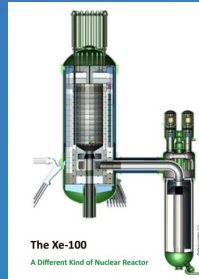


Westinghouse AP1000®
(shown)
GE ABWR
GE ESBWR



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

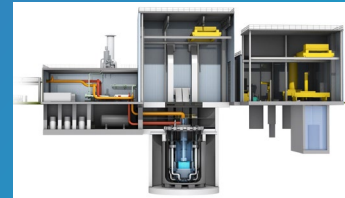
High Temp Gas Reactors



X-energy
(shown)
General Atomics

Non-Water Cooled

Liquid Metal Reactors



TerraPower Sodium™
(shown)
ARC Clean Energy

Molten Salt Reactors



Kairos Hermes
(shown)
Terrestrial
Natura Resources

Either



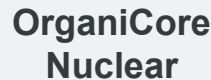
Aalo (shown)
BWXT
Oklo
Radiant
(many others)

Large

Small Modular Reactors

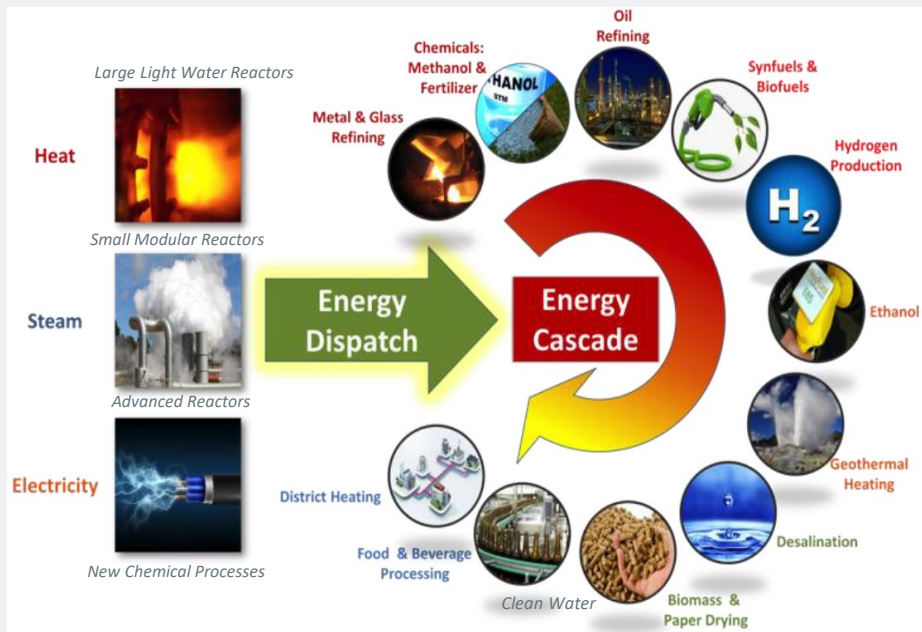
Micro

Advanced Nuclear Designer Members

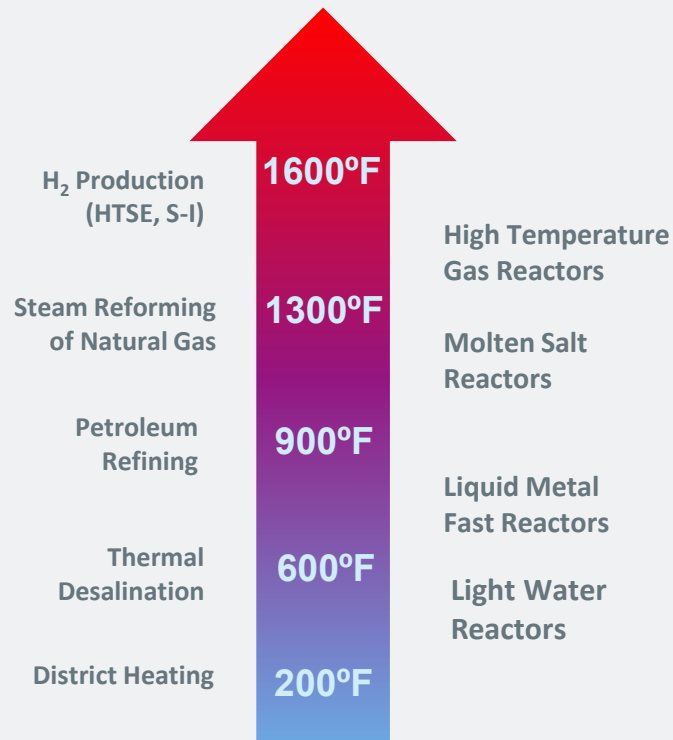


POWERING CLEAN AND RELIABLE ENERGY

Versatility – New Applications



Source: Idaho National Laboratory



O&G and Nuclear Evolution

- Project Gasbuggy- 1967
 - Atomic Energy Commission, Bureau of Mines, and El Paso Natural Gas
- Industrial Advanced Nuclear Consortium- 2025
 - Chevron, ConocoPhillips, ExxonMobil, Freeport Minerals Corporation, MODEC, Nucor, Rio Tinto, and Shell



Large Customers are Taking Action to Enable New Nuclear

- More than 45 GWe of Tech/Data Center Commitments with Nuclear Companies

Customers



Advanced Nuclear Designers



Versatility of Deployment Models

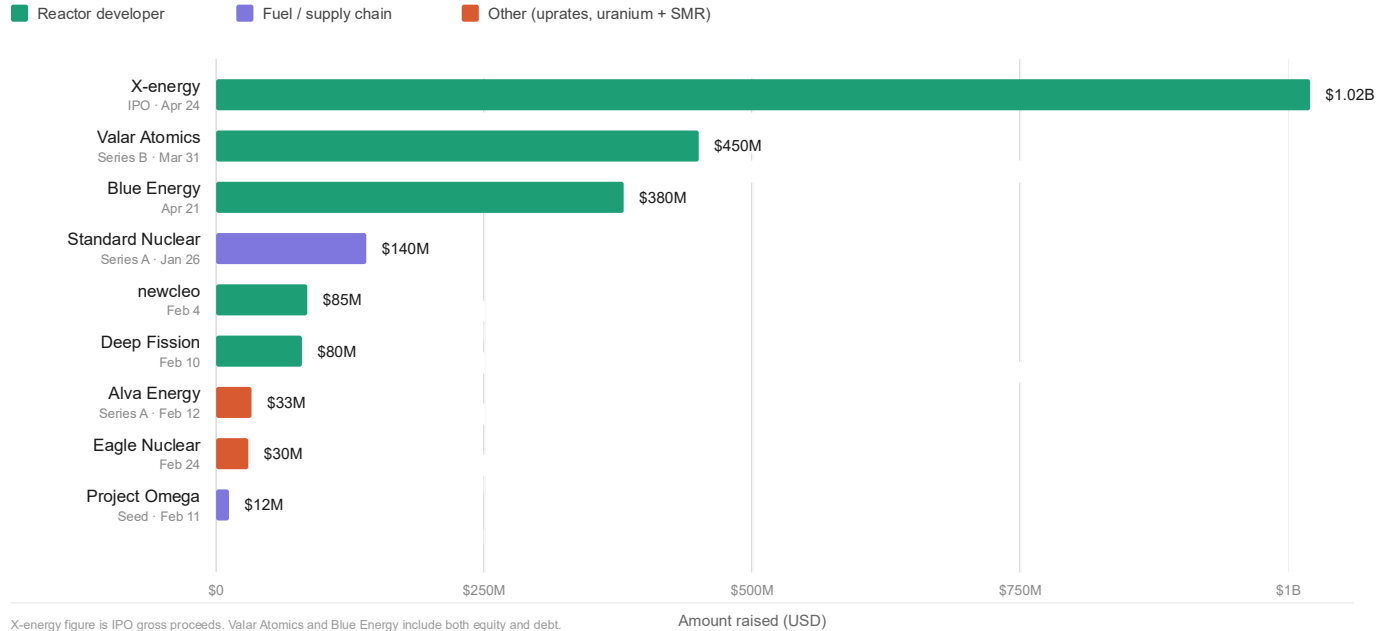
DOE Liftoff Report

	Reactor design	Project management				Own (and/or invest equity)	Operate	Offtake
		Licensing and site dev	Project management	Construction	Multi project integration			
Multi-utility	Reactor designer	Utility	Utility	Constructor	Potential for new role	Utility	Utility	Utility ratepayers, large offtaker
Aggregated tech offtake	Reactor designer	Utility	Utility	Constructor		Utility or tech offtaker	Utility	Tech offtaker
Developer model	Reactor designer	Developer	Developer	Constructor		Utility or infrastructure fund	Utility	Utility ratepayers, large offtaker
Industrial offtaker	Reactor designer	Industrial offtaker	Industrial offtaker	Constructor		Utility or industrial offtaker	Utility	Industrial offtaker

☐ Roles that differ from multi-utility

Nuclear energy company fundraises in 2026

Announced and closed January–April 2026, excluding fusion · Total: ~\$2.23B across 9 companies



X-energy figure is IPO gross proceeds. Valar Atomics and Blue Energy include both equity and debt.
Excludes government grants, contract awards, and rounds reported but not yet closed.

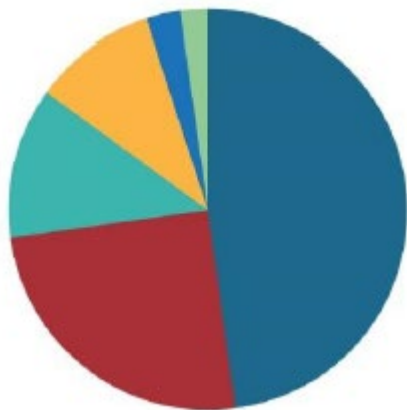
Project Economics

Capital at Risk

Nuclear Power Plant	Cost in 2022 Dollars	Status
Shoreham Long Island, NY	\$14.9B	Completed (including startup), but never operated commercially
Seabrook New Hampshire	\$16.6B	Unit 1 completed with cost overruns Unit 2 abandoned
Washington Nuclear Projects Nos. 1, 3, 4 and 5 (WPPSS) Washington	\$6.14B	Never completed. Only Unit 2 operational
Marble Hill Indiana	\$6.48B	Canceled at 50% completion
V.C. Summer 2 & 3 South Carolina	\$11.17B	Canceled at 40% completion
Vogtle 3 & 4 Georgia	\$30+B	Both in operations

Source: Alva

Cost Breakdown

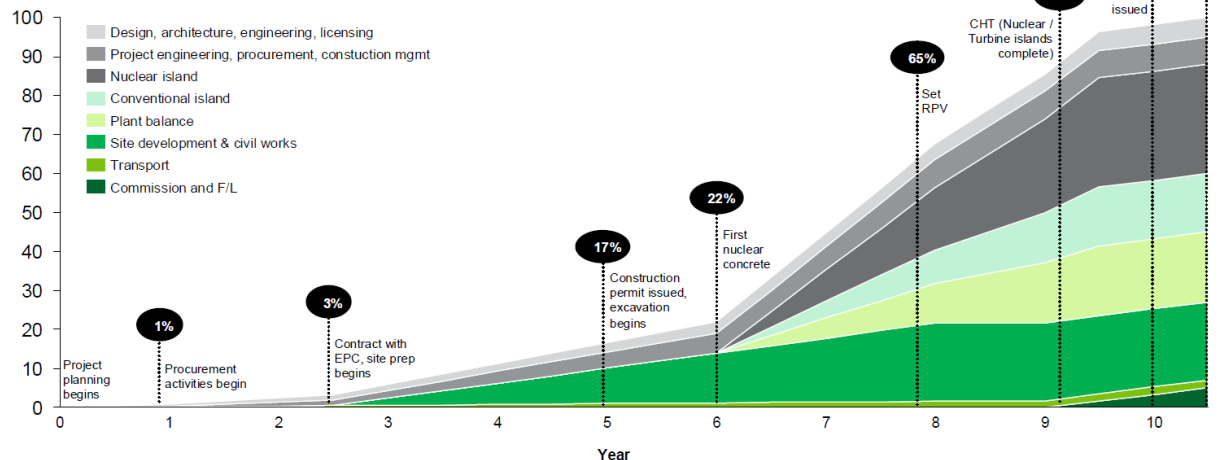


- 48% Equipment
- 25% Onsite labour
- 12% Construction materials
- 10% Project management services
- 3% First fuel load
- 2% Other services

WNA World Nuclear Supply Chain
Report 2023 Edition

Nuclear project cost vs. potential 10-year timeline & milestones¹

% of total overnight capital cost

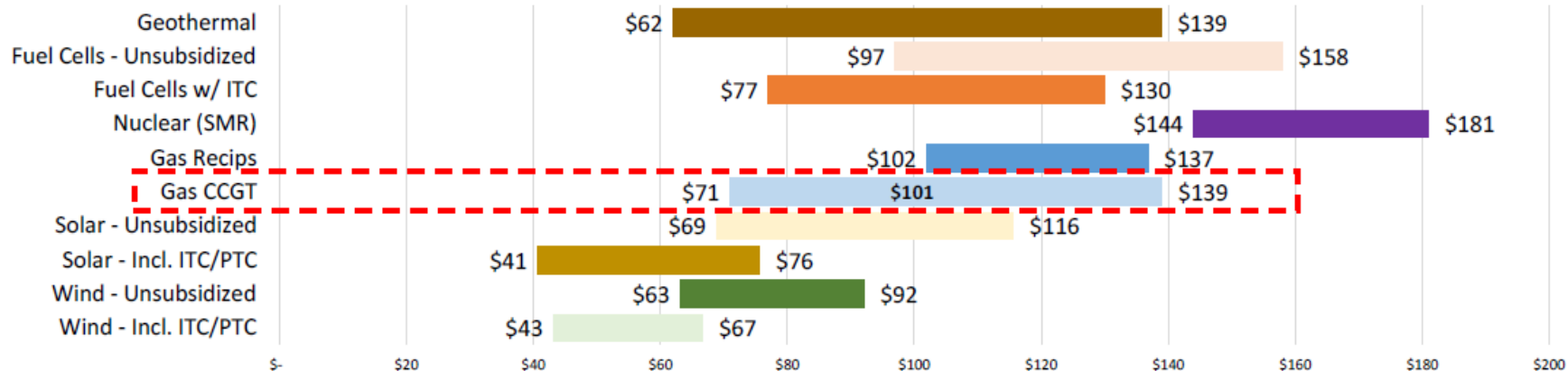


¹ Cost curve is estimated using the IAEA's project activity schedule & milestone timeline and World Nuclear Association's breakdown of percentages of total costs allocated to activities. Costs for each activity are assumed to have even spend across each activity's time duration.

DOE LPO Liftoff Report

The Evolving Cost Picture for Energy

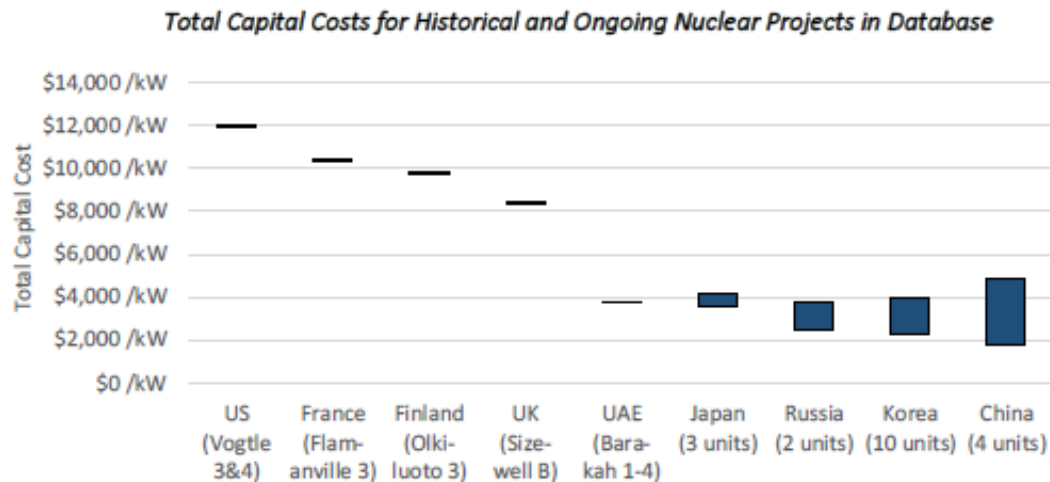
JEF Consolidated LCOE



Source: JEF Research, Company Filings

Your Deployment Experience May Vary

Why Projects Don't Use Best Practices and Lessons Learned?



The ETI Nuclear Cost Drivers Project: Summary Report

- Hubris
- External Pressures
- Lack of Design Maturity
- Weak Leadership
- Operations is not Construction
- Focus on Tactical > Strategic Planning

Moving Dirt and Forging Steel



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



TerraPower Natrium – site
preparations underway in Wyoming



Kairos Hermes – first concrete pour in Tennessee



ACU molten salt reactor – reactor
building complete in Texas



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