Nuclear Indiana Coalition

12.11.2025

Welcoming Remarks

Secretary Jaworowski

Review & Vote
NIC
Annual Report

Jett Brownlee

Governor's Fellow

EO 25-48 Annual Report - Summary

Jett Brownlee, Governor's Fellow

Objectives

Governor Braun's EO 25-48

- This EO directs the Nuclear Indiana Coalition (NIC) to advance practical, affordable, and reliable pathways for nuclear development.
  - Coordinated stakeholder engagement, streamlined permitting, close coordination with the U.S. Nuclear Regulatory Commission (NRC)

- This report summarizes the progress made at both the federal and state levels towards achieving the objectives outlined in EO 25-48

Federal & National Achievements

The Trump Administration

EO-14302, EO-14299, and EO-14301

- Streamline permitting and regulatory processes, secure national supply chains (uranium production), emphasize nuclear's role in ensuring national security, and shift responsibility for certain test reactors and demonstration project towards the DOE.

The DOE

- Launched the Fuel Line Pilot Program to accelerate the buildout of domestic nuclear fuel production lines and the Reactor Pilot Program.

Federal & National Achievements Continued

Other

- Federal law and appropriations unlocked up to $2.72 billion to expand domestic HALEU uranium production → The U.S. is phasing out Russian uranium imports by 2028 following the Prohibiting Russian Uranium Imports Act.
- New pathways for funding and tax credits - $150 million in Title 17 credit subsidy dedicated to advance reactors and SMRs, DOE proposed Energy Dominance Loan Program framework, OBBB revised clean energy tax provisions.
- U.S. government partnership with Westinghouse Electric Company – Paves the way for the U.S. to support at least $80 billion of new reactor construction.

Statewide Achievements

Governor Braun's EO 25-48

- Identify federal programs that reduce deployment costs, identify and address regulatory constraints and improve coordination with the U.S. NRC, develop state level policies and assess feasibility of advance nuclear projects, prioritize streamlined permitting, provide education and outreach on modern nuclear energy for communities and all Hoosiers

National Association of State Energy Official (NASEO) First Movers co-chair

- Developing a multistate order book strategy for advance reactors and other market adoption policies for nuclear.

Statewide Achievements Continued

Indiana General Assembly – HEA 1007, SEA 423, and SEA 424

- **HEA 1007** – 20% state credit for expenses incurred in manufacturing SMRs in Indiana and requires large-load customers to reimburse the utility 80% of costs attributable of serving the large-load user → Defines SMR as having a nameplate capacity of not more than 470 MWs.
- **SEA 423** – develops a Partnership Pilot Program allowing for the development of up to two SMRs in Indiana.
- **SEA 424** – Outlines cost recovery for SMR project development costs.

Others

- Nuclear Planning Retreat
- IBJ Nuclear Energy Forum
- Purdue global Nuclear Energy Economic Summit
- FANCO Announced nuclear energy park
- AES SMR Feasibility Study
- I&M Power taking early steps toward the NRC Early Site Permit Process

Recommendations

1. Improve Indiana's Federal coordination by monitoring and leveraging federal funding opportunities → more closely coordinating with other federal agencies like the DOE and the NRC.

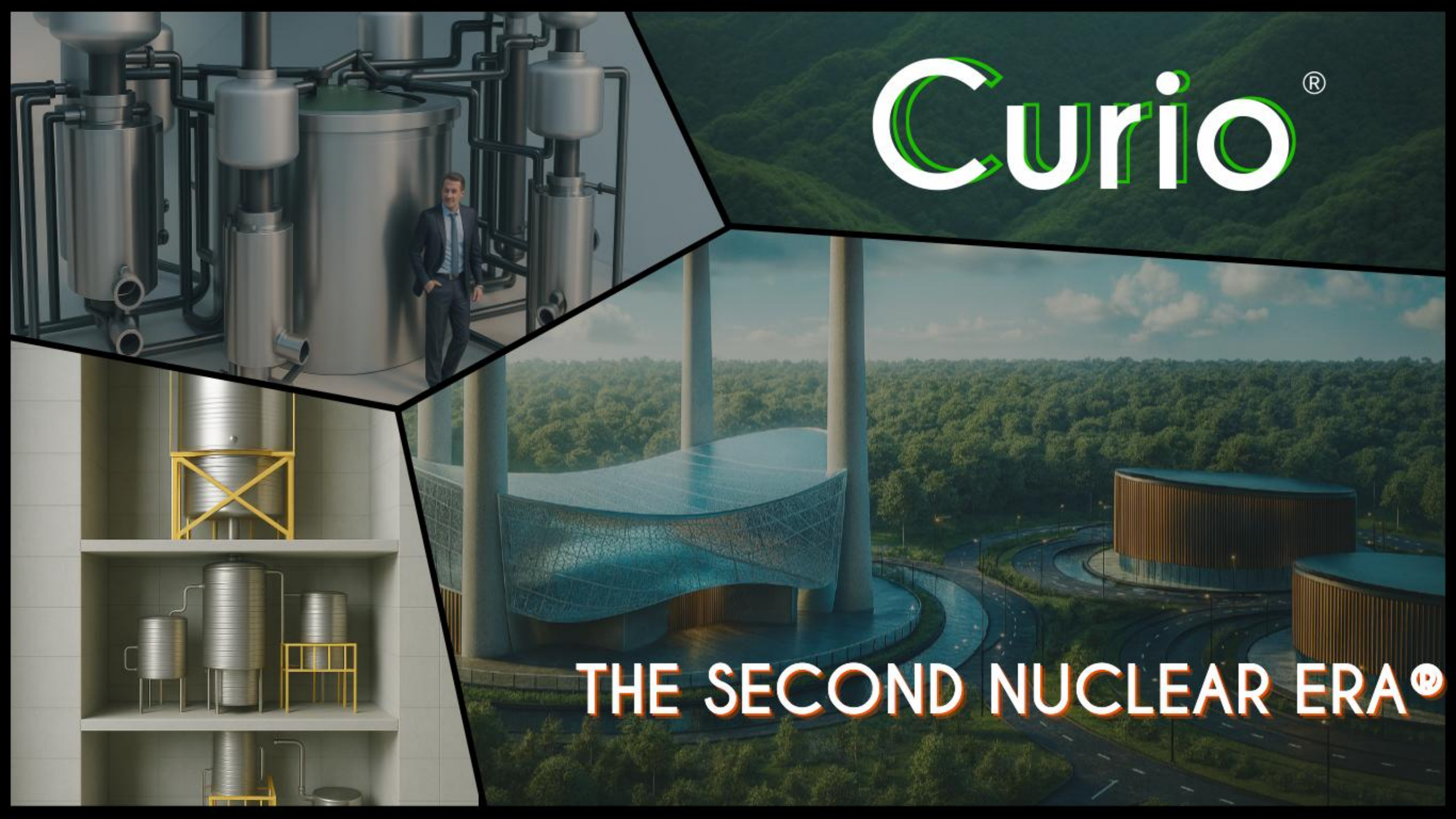
2. Streamline regulatory and permitting process by working with the NRC on efficient licensing process, pursuing state primacy on applicable permitting programs, and developing Indiana specific regulatory frameworks.

3. Explore relevant public-private partnerships that facilitate utility-developer-consumer collaboration and cost-sharing arrangements under SEA 423.

4. Continue education and outreach programs that address community concerns about nuclear safety and workforce development initiatives.

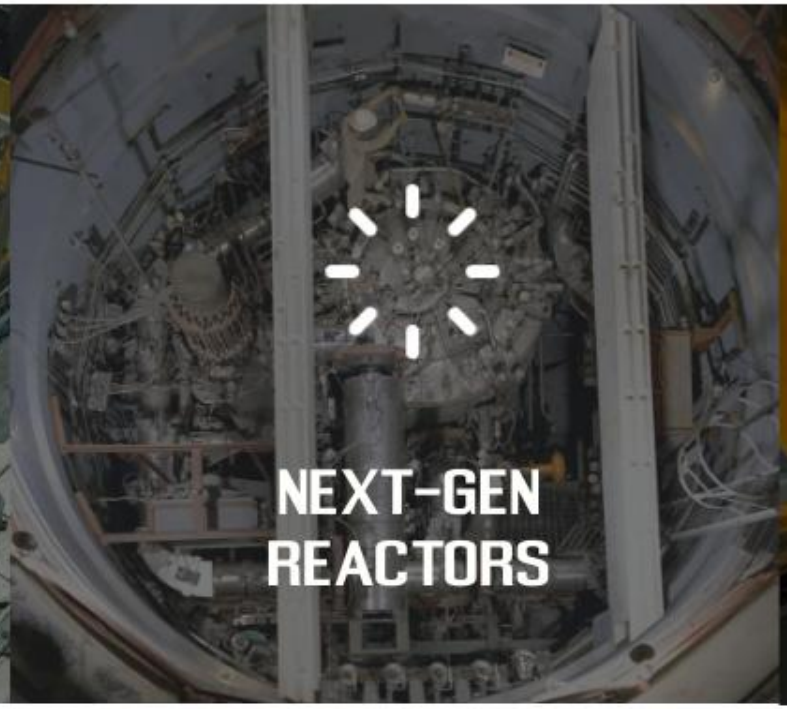
5. Evaluate opportunities to streamline and clarify state roles and responsibilities for environmental feasibility and permitting requirements, including addressing outdated provisions in IN Code § 13-15-9-2.

6. Leverage the Hoosier manufacturing base and secure national supply chains by attracting nuclear manufacturing to the state and leveraging HB 1007 tax credits.


Curio®
THE SECOND NUCLEAR ERA®

A Holistic Vision for Nuclear

With a perspective on that extends beyond energy applications, Curio's vision is to lead a Second Nuclear Era dedicated to fostering prosperity for humanity. Our innovative approach to nuclear technology development revolves around a closed fuel cycle solution, incorporating UNF recycling, Gen-IV reactors, and radioisotopes. We are creating a sustainable and comprehensive system that goes beyond traditional nuclear energy paradigms.



CLOSING THE CYCLE WITH NUCYCLE®

THE UNF INVENTORY & NUCLEAR'S PR PROBLEM

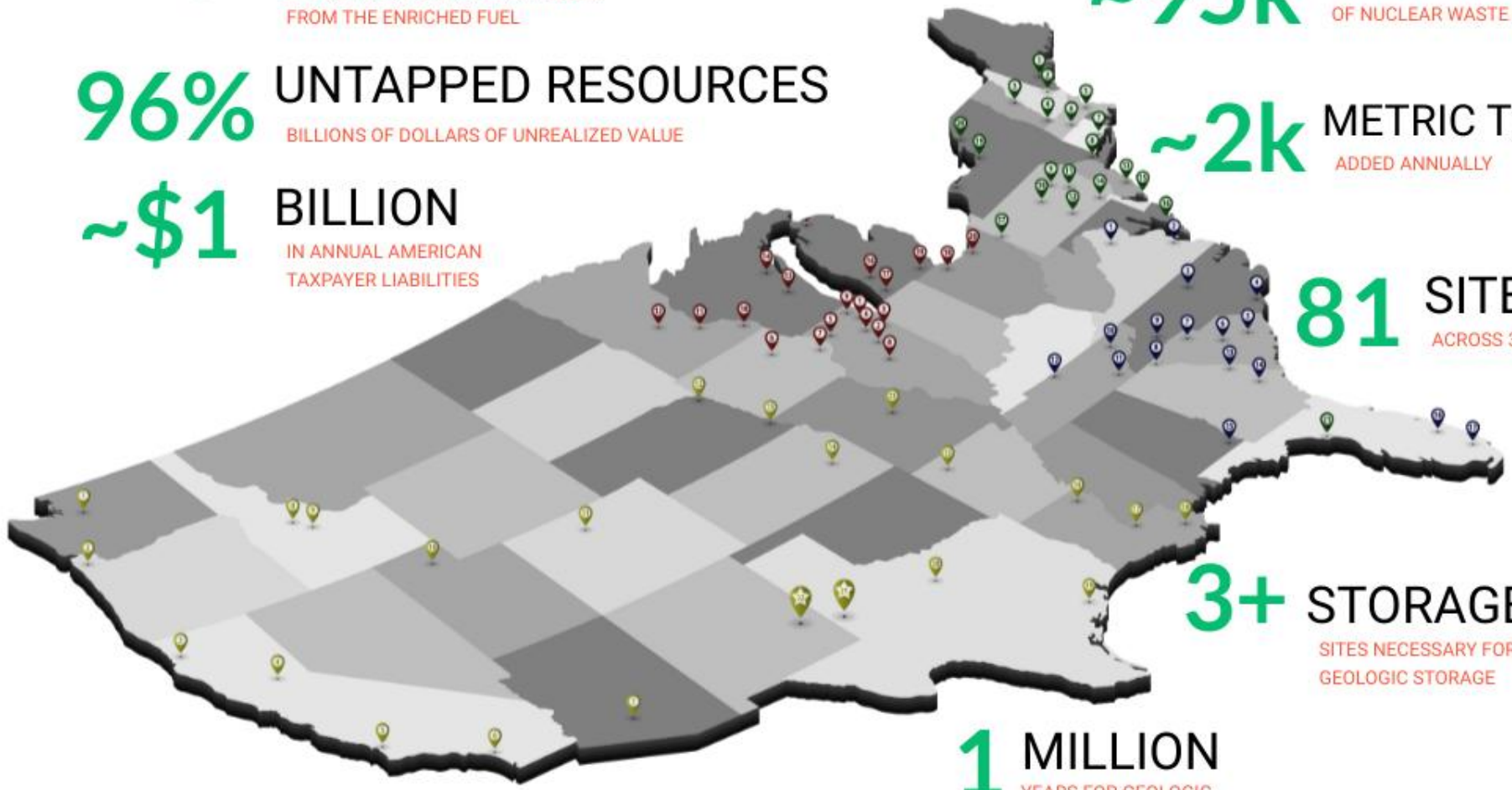
4% FUEL UTILIZATION
EFFICIENCY OF ENERGY HARNESSED FROM THE ENRICHED FUEL

96% UNTAPPED RESOURCES
BILLIONS OF DOLLARS OF UNREALIZED VALUE

~$1 BILLION
IN ANNUAL AMERICAN TAXPAYER LIABILITIES

~95k METRIC TONS
OF NUCLEAR WASTE IN THE U.S.

~2k METRIC TONS
ADDED ANNUALLY



81 SITES
ACROSS 38 STATES

3+ STORAGE
SITES NECESSARY FOR GEOLOGIC STORAGE

1 MILLION
YEARS FOR GEOLOGIC STORAGE

12 STATES
have moratoria on new nuclear power, with six tied directly to demonstration of UNF disposal or reprocessing

National Conference of State Legislatures: *States Restrictions on New Nuclear Power Facility Construction*, Sep 2023

CLOSING THE CYCLE WITH NUCYCLE®

THE CURIO SOLUTION

PROVEN TECHNOLOGIES

- OXIDATION
- FLUORIDE VOLATILITY
- ELECTROLYSIS

NuCycle™

- MODULAR
- INTEGRATED
- VERSATILE
- PROLIFERATION-HARDENED

4000 METRIC TONS
ANNUAL FACILITY THROUGHPUT

800 MT
URANIUM 3.5 WT% EQUIVALENT

40 MT
TRANSURANIC FUEL

10+ PRODUCTS
INDUSTRIAL & MEDICAL

40+ HOPE REACTORS

Curio's vision for a Second Nuclear Era demands a rethinking of nuclear technology to enable a groundbreaking leaps forward in safety, efficiency, and economics.

96% REDUCTION
IN HIGH-LEVEL WASTE VOLUME

~300 YEAR
MAXIMUM STORAGE BURDEN

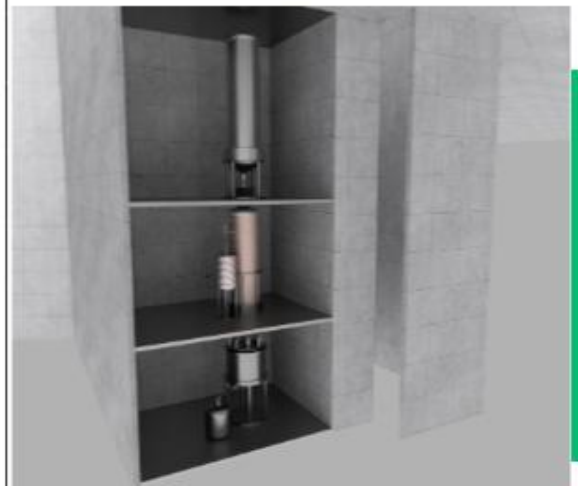
hope

CLOSING THE CYCLE WITH NUCYCLE®

NuCycle™ COMMERCIALIZATION CRITICAL PATHWAY

LAB-SCALE (2025)
Proof-of-concept at INL
Actual UNF, 100-g scale
TRL 4-5

PILOT-SCALE (2026-27)
50kg/batch, validate designs
Develop licensing basis
TRL 6-7



ENGR-SCALE (2029)
Scaled module >1MT/batch
Safeguards-by-design
>96% HLW reduction
TRL 8-9

COMMERCIAL (2035)
4000 MT/year scale
40% US uranium, 40MT TRU
Multiple revenue streams

WORKFORCE

Operators
$130k/yr

Administrative
$100k/yr

3,288 JOBS
Average pay: $125k/yr*
Typical education: A.S.**

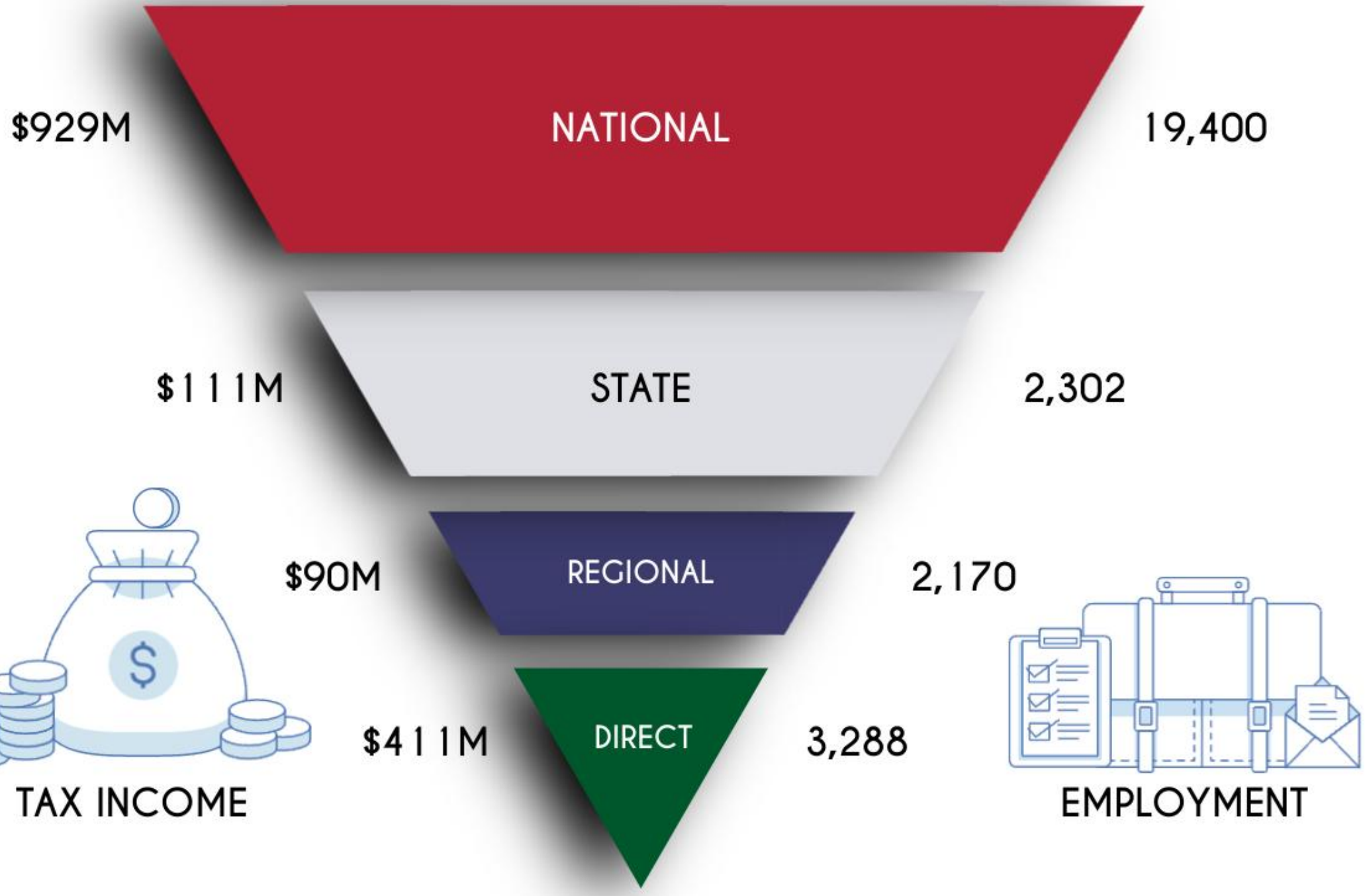
Laboratory
$185k/yr

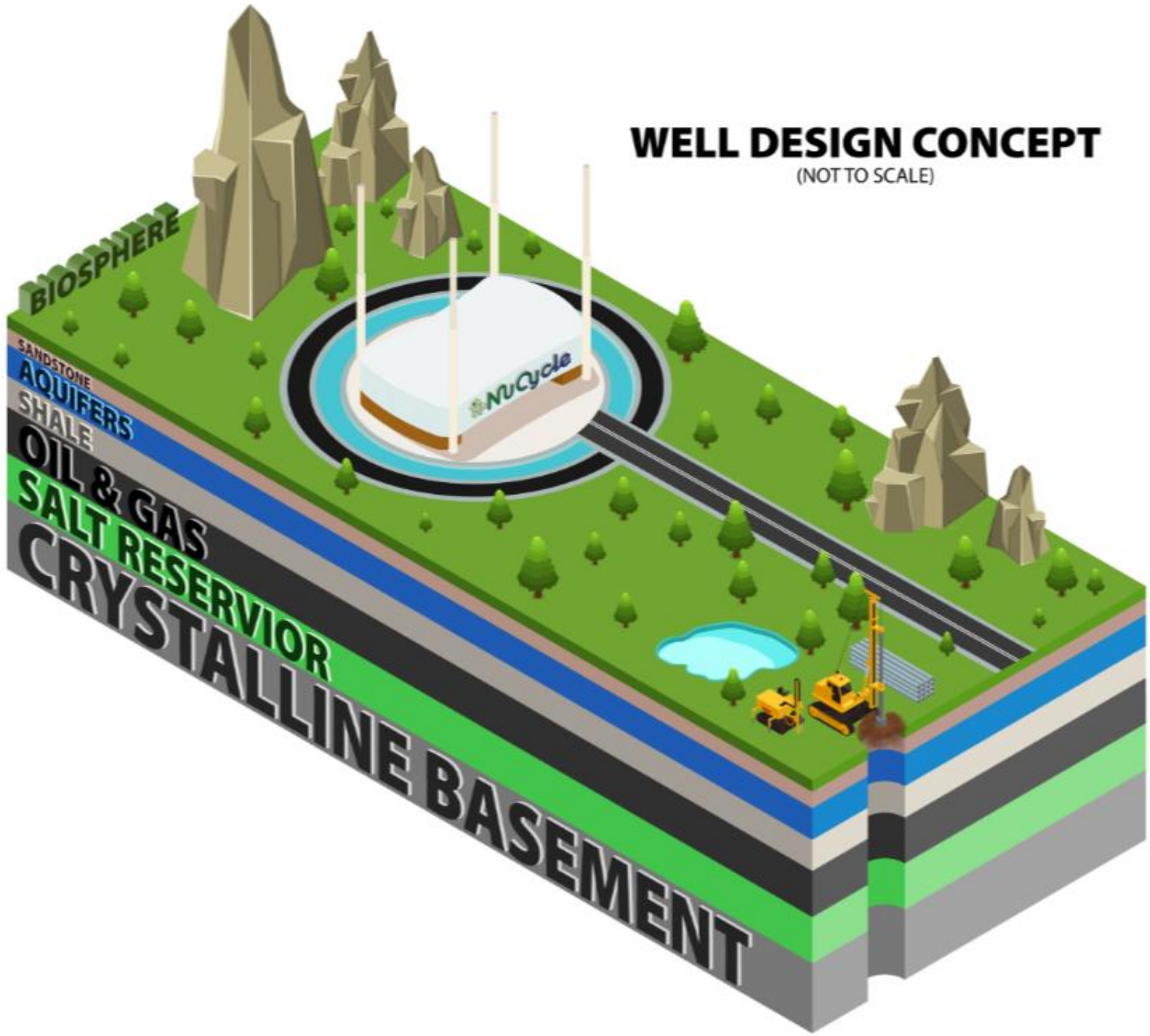
Technicians
$125k/yr

Security/Emergency Response
$100k/yr

*in 2024 US$
**https://www.bls.gov/ooh/life-physical-and-social-science/nuclear-technicians.htm

RECYCLING ECONOMY

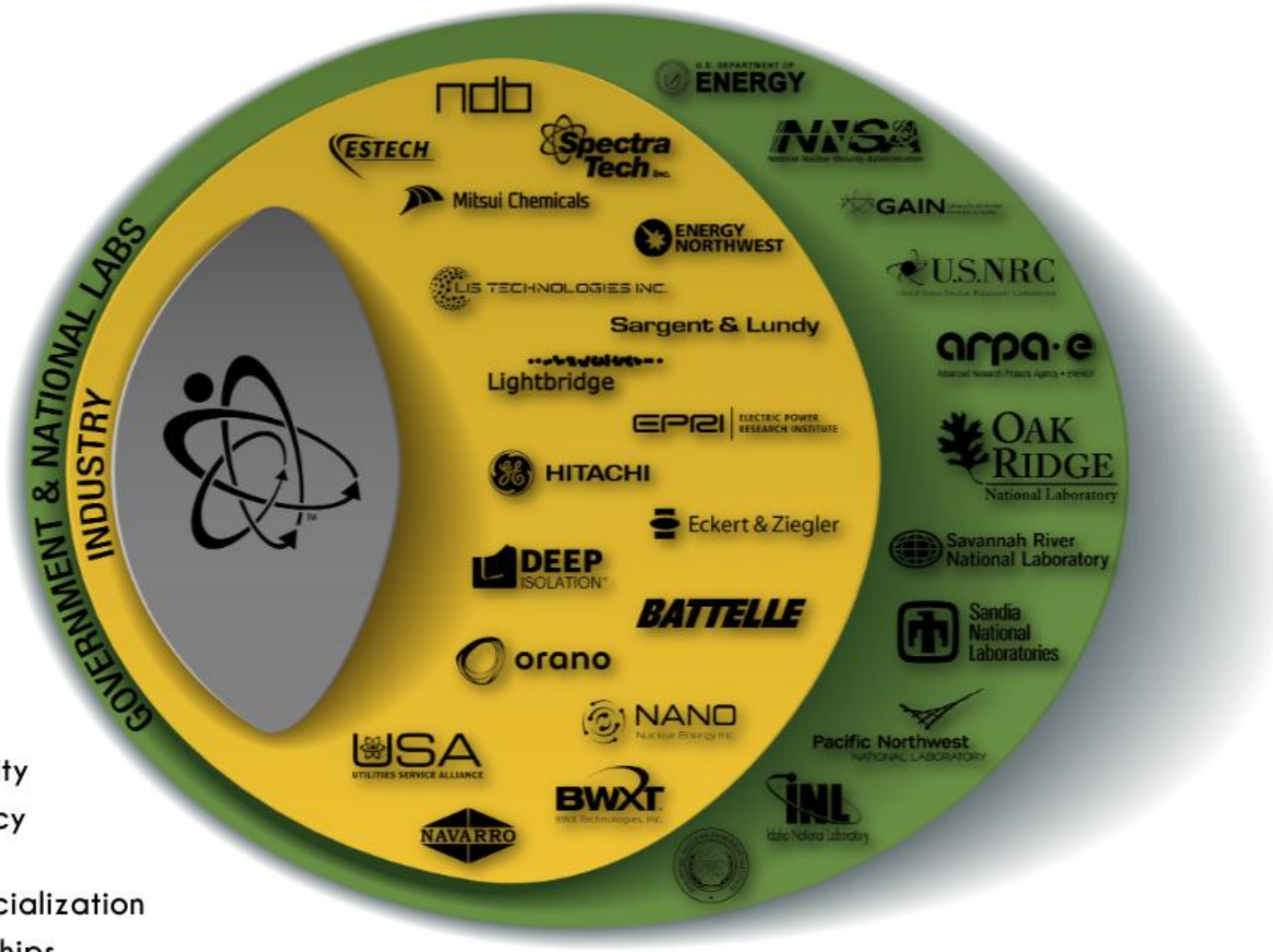




- **Option** applicable to any region of the continental United States
- Use of geologic barriers to isolate materials from the biosphere for geologic timescales
- Large economic advantages compared to mined repositories
- NuCycle® reduces high-level waste volumes to levels where only **FOUR boreholes** will be needed to dispose of all U.S. waste till ~2050
- 12-inch diameter boreholes drilled to depth of 18,000 ft
- Borehole thermal effect distance reduced from >100m to <10m
- Option to dispose of other waste streams locally without requiring transportation

STAKEHOLDER ENGAGEMENT

At Curio®, we believe that establishing strong partnerships early on is critical to achieving our goals. We are actively engaged in securing strategic MOUs and multiple revenue-based offtake agreements with public utilities and other key industrial partners in the private and public sectors. Working together with industry leaders, Curio is leading the charge on innovation and delivering cutting-edge solutions that will maximize outcomes for all stakeholders.



Regulatory engagement

Community advocacy

R&D partnerships

Commercialization partnerships

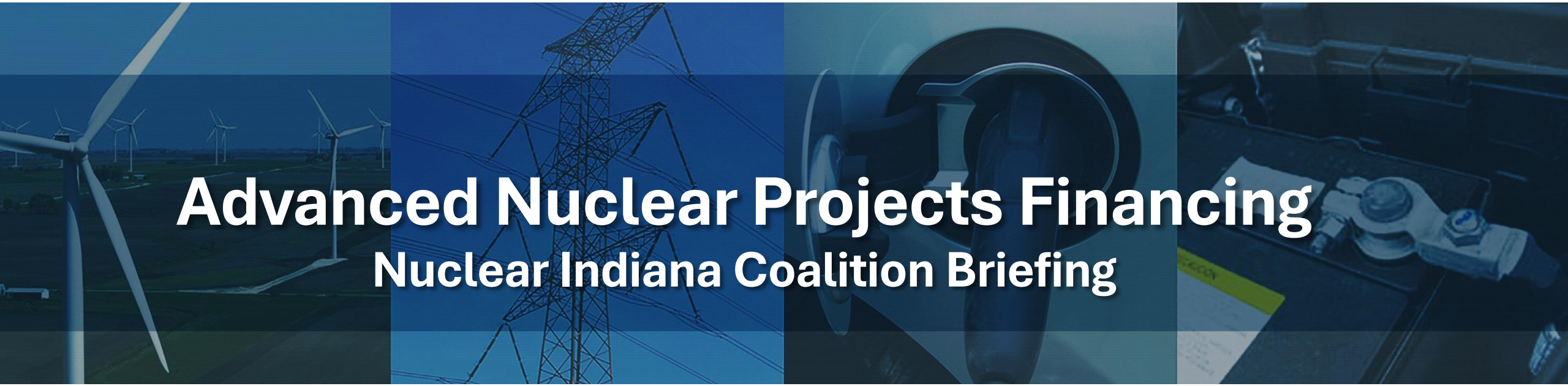
CLOSING THE CYCLE WITH NUCYCLE®

Nuclear Finance Report

Becca Gillespie

ESN
ENERGY SYSTEMS NETWORK

Building an Energy Ecosystem®



Advanced Nuclear Projects Financing

Nuclear Indiana Coalition Briefing

Becca Gillespie

December 11, 2025

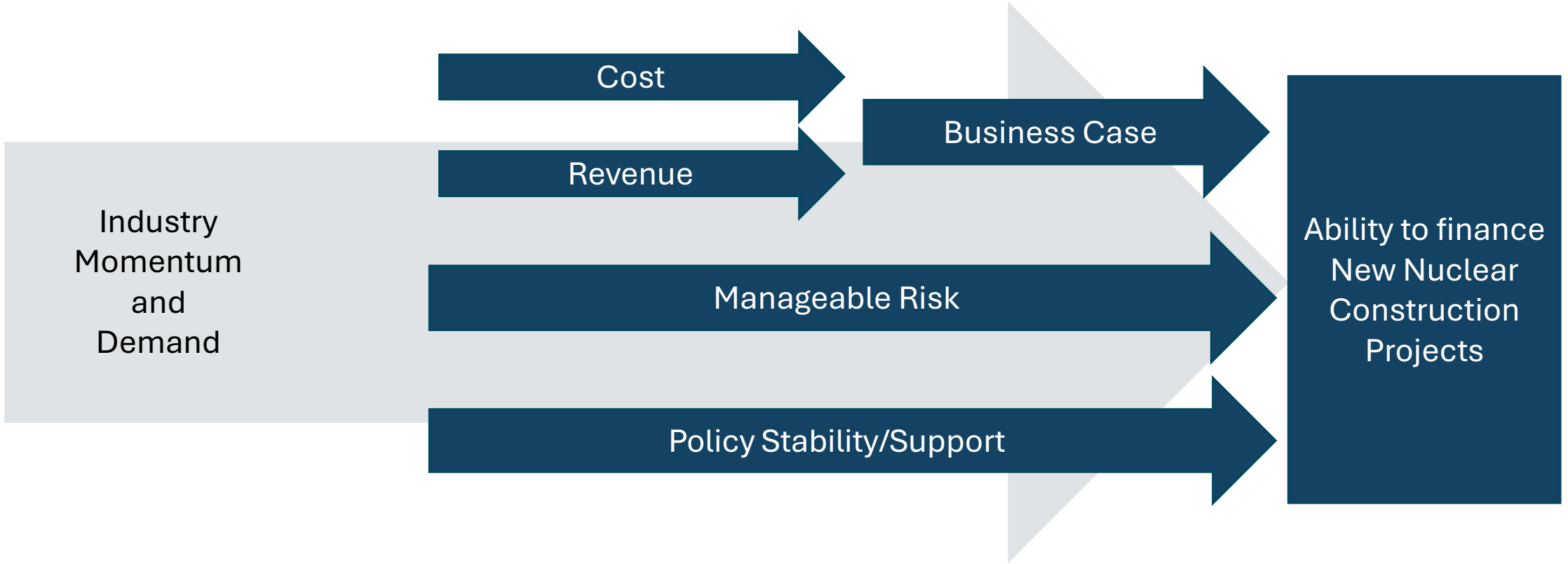
Advanced Nuclear Projects Finance Options

Overview of Project Objectives

ESN® ENERGY SYSTEMS NETWORK

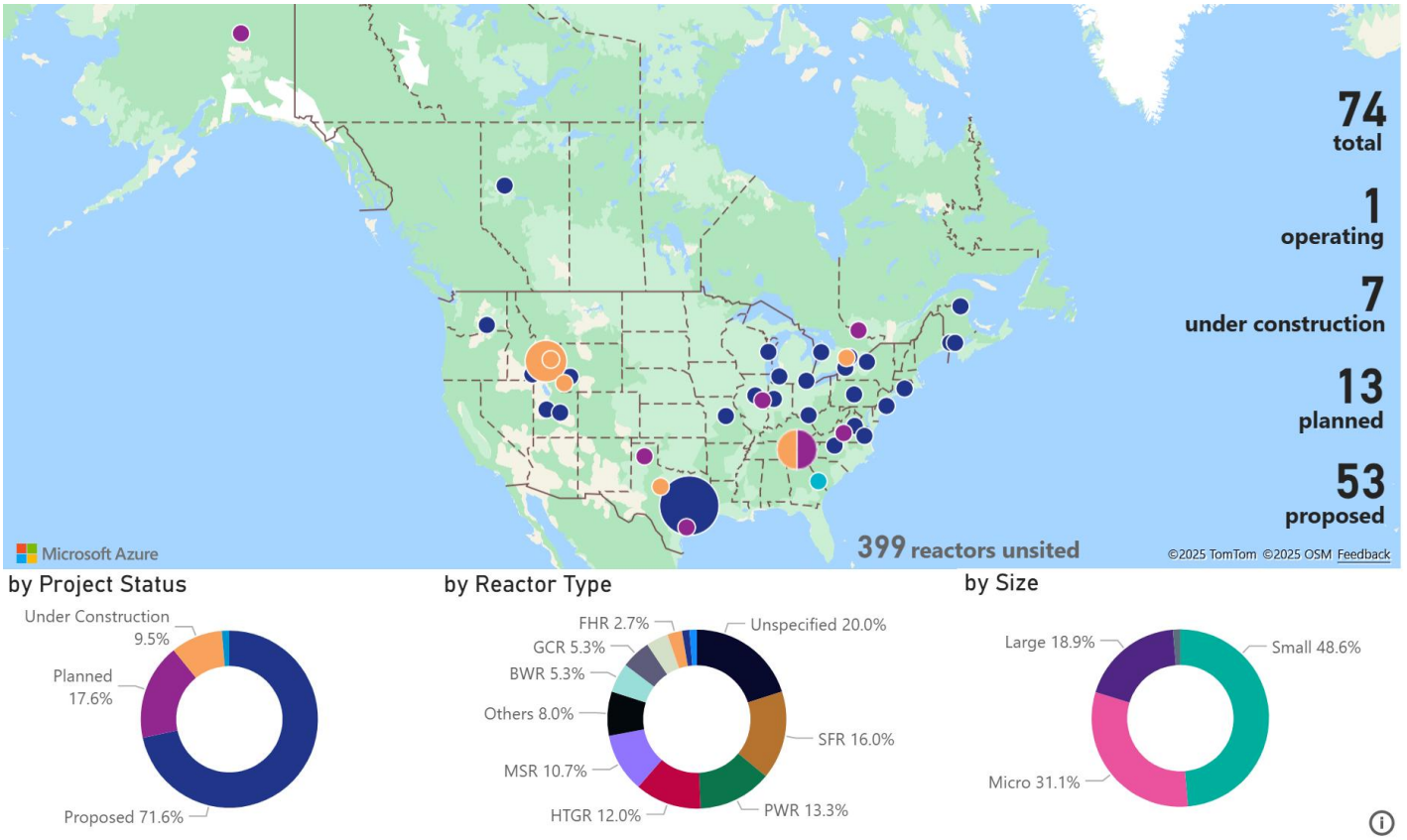
- Develop a comprehensive report that assesses the various **financing options** available for **advanced nuclear projects**. The objective is to provide clear, actionable insights and recommendations for the State of Indiana, the Indiana Office of Energy Development, the Nuclear Indiana Coalition, established by Indiana Executive Order 25-48, and stakeholders seeking to advance nuclear projects with a competitive financial framework.
- Objectives:
  - Define and Evaluate Financing Instruments
  - Analyze Off-Take Agreements
  - Provide Case Studies Illustrating the Possible Financial Models.
  - Develop Actionable Recommendations
- Approach:
  - Scant literature on nuclear financing models, general energy project models used instead. Used EDF heavily.
  - Interviews with industry groups and experts, including GAIN, NEI, Purdue and Roland Berger
  - Leverage team of industry stakeholders that are part of C2N+AI consortium
  - Events, including Atlantic Council Nuclear Summit, Nuclear Financing Webinars, Purdue Global Energy Summit, etc

What makes an advanced nuclear project financeable?



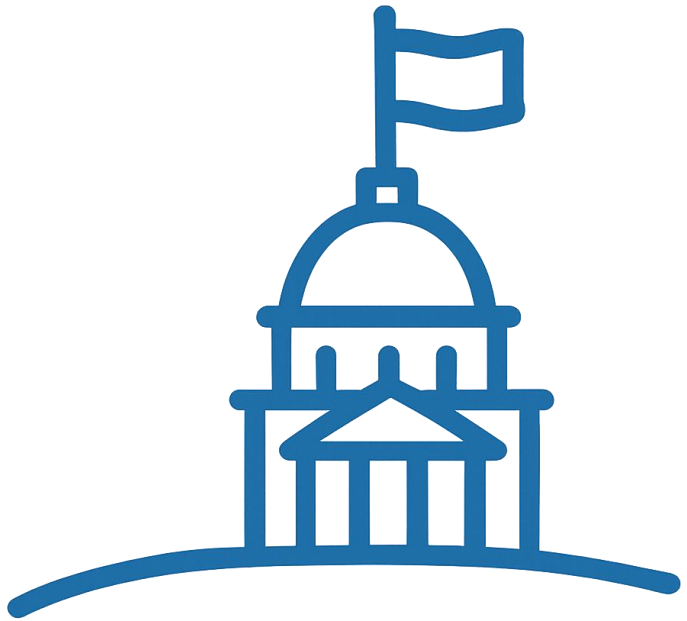
Industry momentum is strong

- Strong Demand
- Market signals
  - Nuclear PPA's at $77-$110/MWh
- Financing signals
  - Company Investments
  - Developer investments

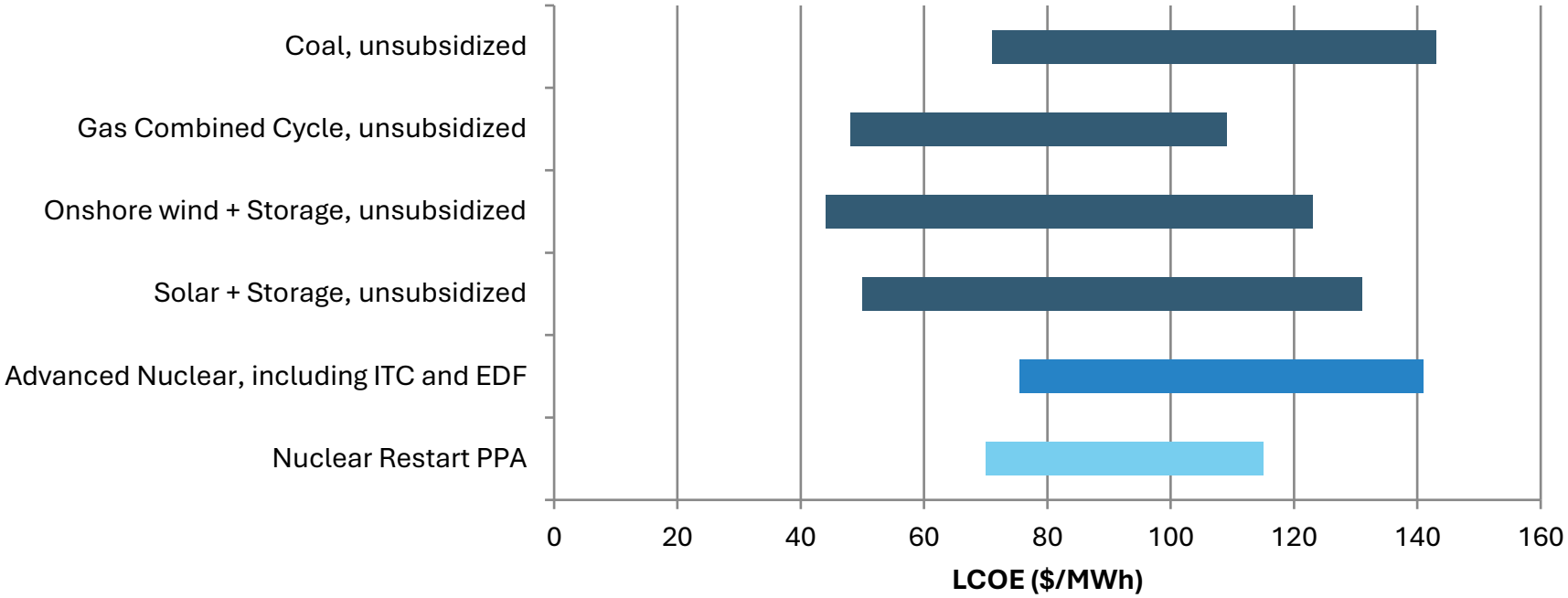


Government Support is strong

- Energy Dominance Funding, up to 80%
- Investment Tax Credit, up to 50%
- NRC reform, 18 months
- Indiana state support for site development



Business case appears compelling



And yet, risk precludes commercial lending

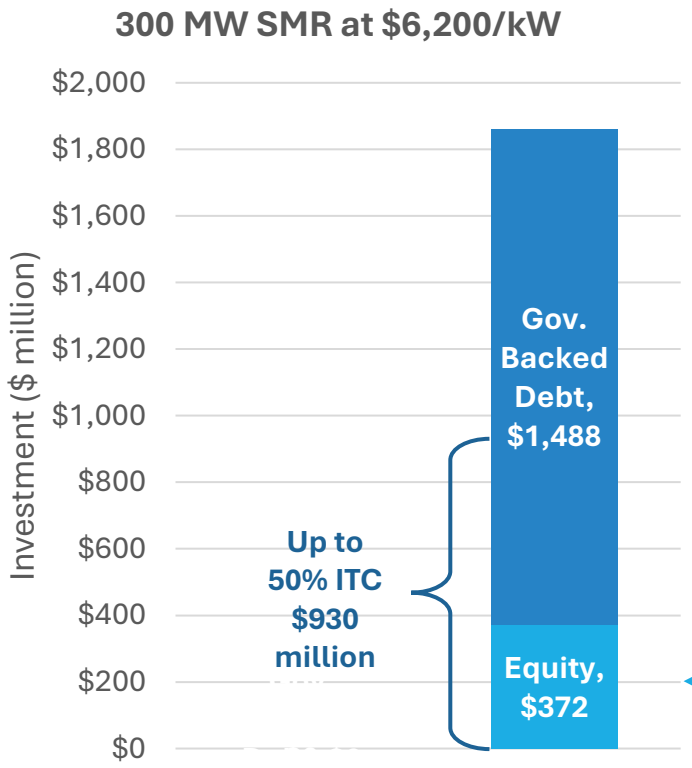
"...are there any nuclear projects that are investable for my mandate yet? And the answer was no, but hopefully soon....and that's kind of the key question."

Mark Sowinski, Morgan Staley Sept 23, 2025

Big Banks are not relevant to this space at all from a lending point of view. The regulatory lending requirements do not allow for project lending especially in this country... So in the end it's the structured private debt markets that would step in above and beyond the LPO, or in place of.

James Shaefer, Gugenheim Securities Sept 24, 2024

Projects must leverage government support and partner creatively



Owners may be led by:

- Traditional Utility
- Large Publicly traded developer
- Start-up developer (PE or VC backed exist now)
- Consortium of multiple entities

Minority shareholders may include:

- Strategic Investors
- EPC partner
- Off-taker
- Technology Developer

...and still projects must manage risk, states can help

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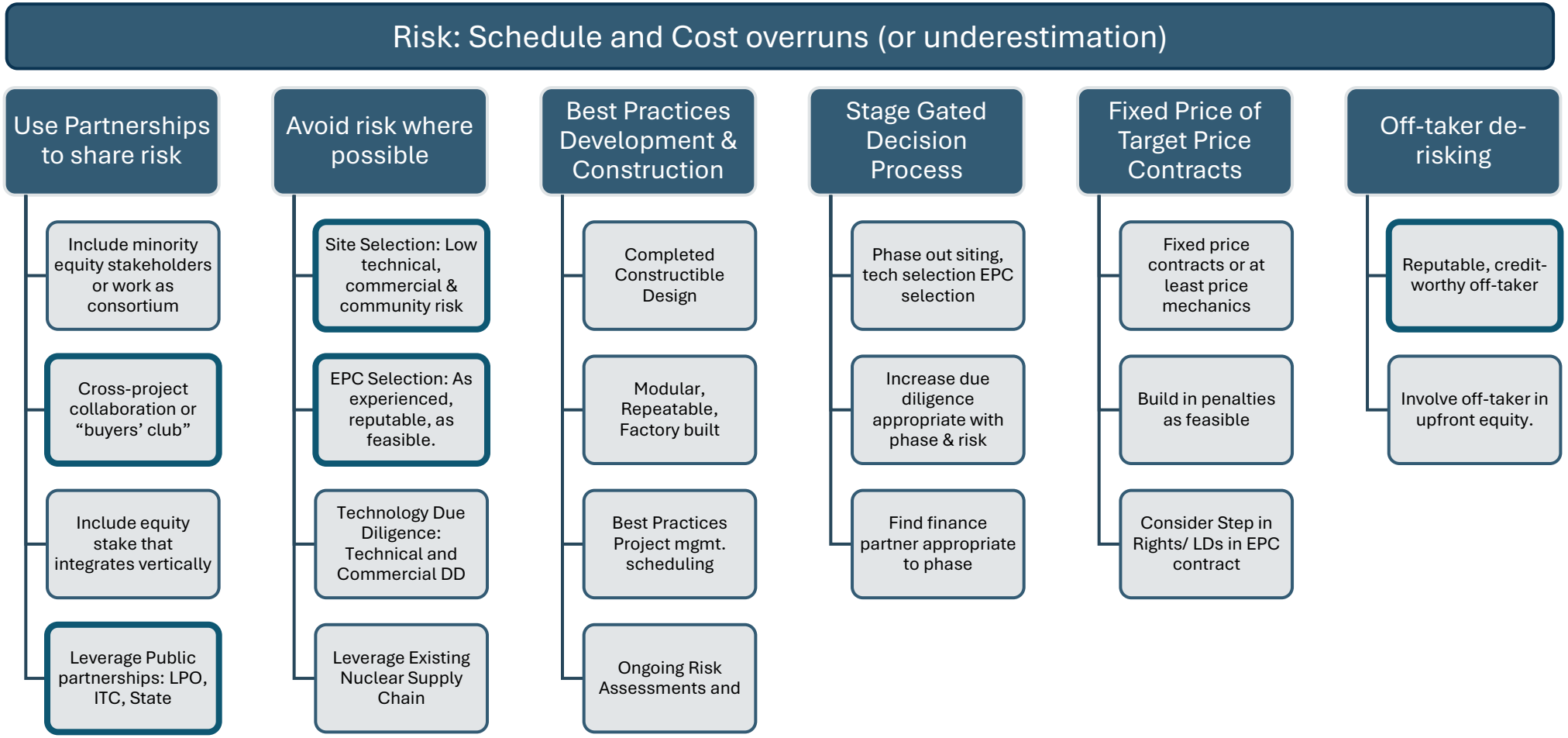
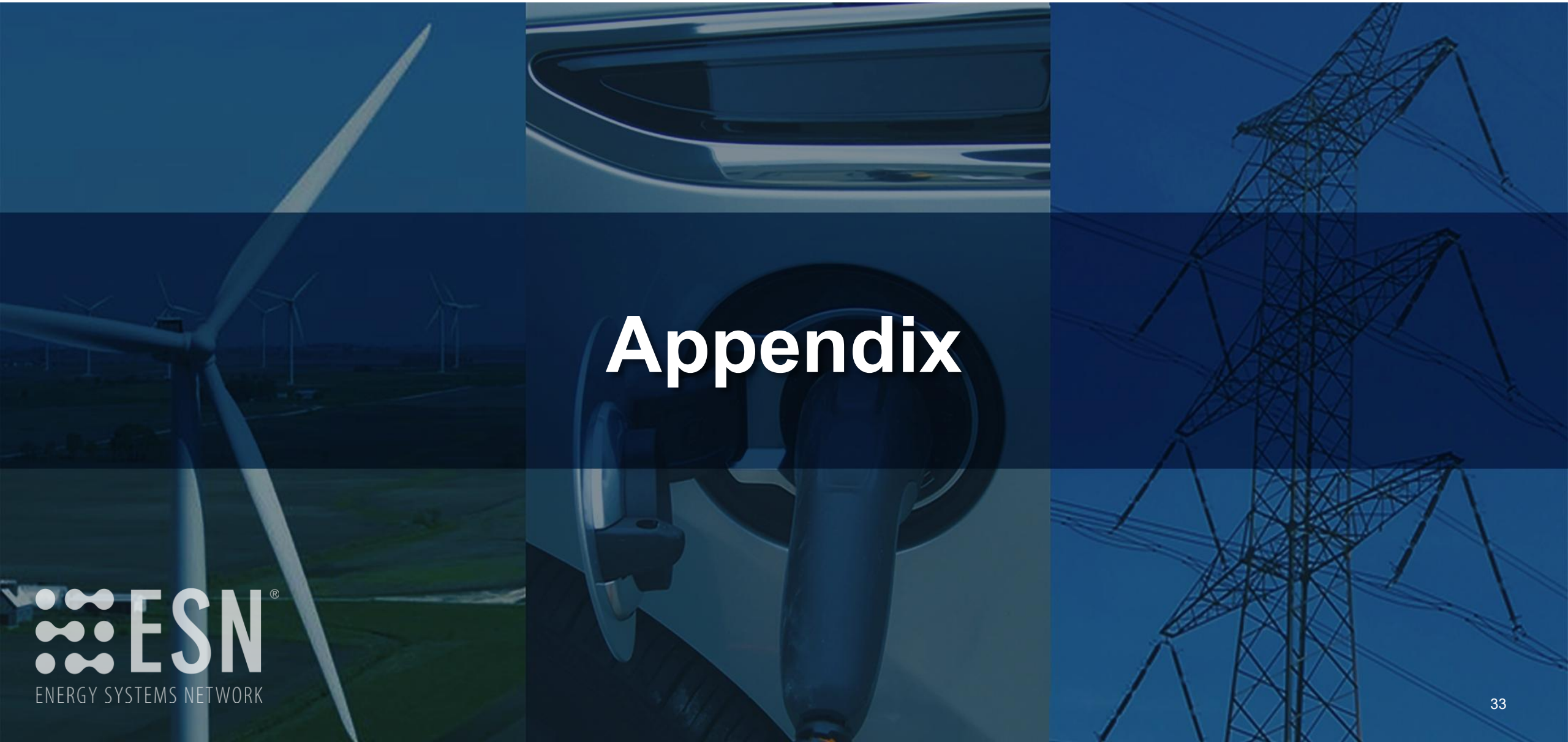


Takeaway for Indiana Stakeholders

- States can continue to foster collaboration:
  - Already, IOED is part of NASEO “First Movers”
  - Continued engagement on joint actions (RFP’s, teaming agreements etc) is essential.
  - Engage with national labs which coordinate many interstate efforts
- Policy stability, at federal and state level is essential to spur investment
- Leverage grants loans and incentives from the federal government
- State support is helpful to kick-start early development, as in Kentucky, Utah and Texas.
- Weigh the upsides on moving quickly with the downsides
  - If taking technology risk of FOAK risk, negotiate for supply chain benefits, workforce upskilling, partnership risk-sharing etc., as feasible.

Full Report available online

https://energysystemsnetwork.com/projects/advanced-nuclear-energy-project-financing-options-report/



Appendix

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State of the Nuclear Industry

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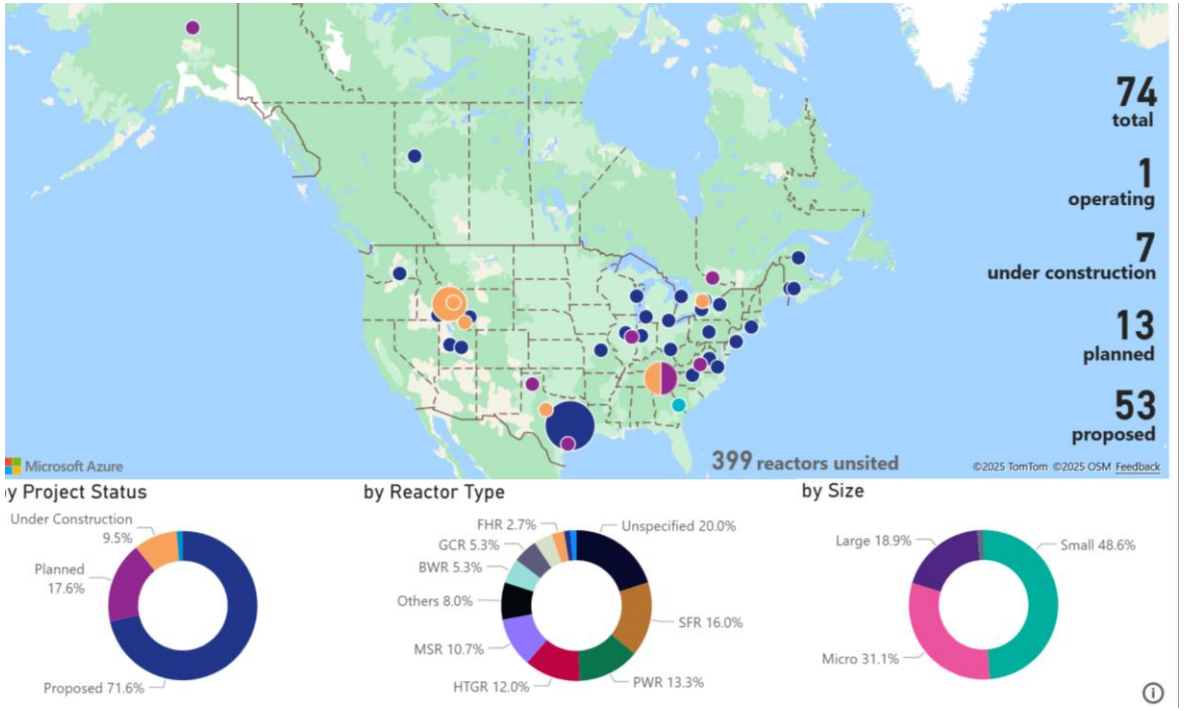
Signals the Nuclear Renaissance Underway

Market Indicators

- New nuclear reactor builds for early-of-a-kind or best-practices first-of-a-kind are projected to be cost-competitive at $73-148/MWh, including subsidies.
- One restart project nearly-completed and two underway: Palisades 800 MW plant in Michigan, Crane Energy Center (f.k.a. Three Mile Island Unit 1) 835 MW in Pennsylvania, Duane Arnold 600 MW plant in Iowa.
- Nuclear PPA's being negotiated with data center off-takers at ~$77-110/MWh today
- Multiple projects underway with various technologies Notably: Kairos, X-Energy, GE Hitachi, Terra Power
- North American nuclear deal flow up to $25 Billion in 2024 compared to $1B in 2022.
- Increased interest from utilities; increased acceptance from the public (See appendix)

Market Indicator: 74 Projects Tracked by NEI

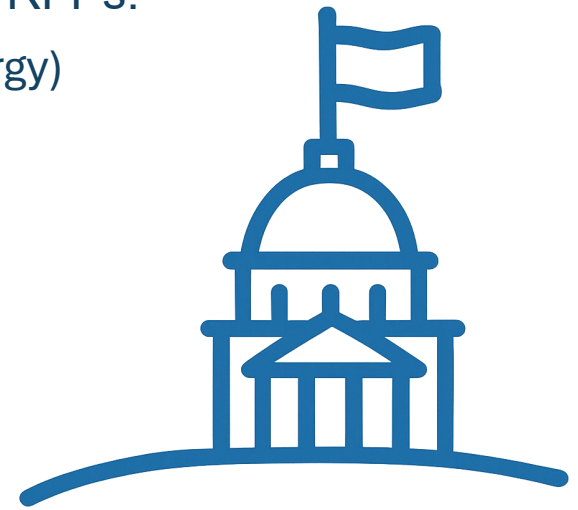


Source: Nuclear Energy Institute. Project Dashboard. https://www.nei.org/advanced-nuclear-energy/advanced-nuclear-project-map Accessed 17 Sept 2025

Signals the Nuclear Renaissance Underway
Government Indicators

ESN ENERGY SYSTEMS NETWORK

- Investment tax credits of 30-50% for construction started by 2033 persisted through OBBBA
- Energy Dominance Fund (f.k.a. LPO) continues to issue loans for nuclear projects/restarts.
- Four nuclear-friendly Executive Orders issued by Trump administration. Three other Executive orders generally supporting nuclear energy. Notably:
  - Target of 400 GW of Nuclear Power Plants online by 2050
  - NRC regulation efficiency improvements and license timeline caps
- DOE awarded $800 mm to TVA and Holtec for Gen III+ reactors. DOW active in RFPs.
- DOE is funding two Advanced Reactor Demonstrations Projects (TerraPower, X-Energy)
- Indiana support
  - Legislature passed 4 pro-nuclear acts in 2025: HB 1007, SB 423, SB 424, SB 4245
  - Governor Braun's Policy statement is pro-nuclear; EO-48 established Nuclear Indiana Coalition
  - The General Assembly, via the IOED commissioned a study on SMRs in '23-'24;
- 4+ Other States investing in Nuclear Development Grant Funds



Scope of this Report: New Gen III+ and Gen IV Technology

Overview and Key Technology Players

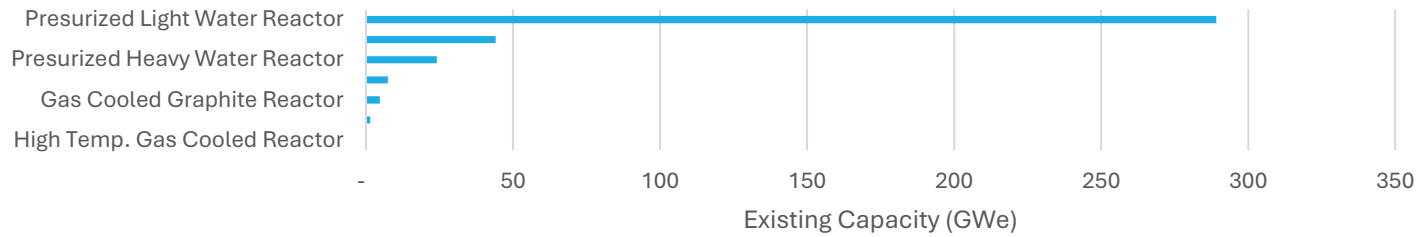
ESN ENERGY SYSTEMS NETWORK®

- Gen III+ Light Water Reactors (LWR)
  - Standard-sized (500-2000 MW)
  - SMR sized (77-400 MW)
  - LWR include pressurized light water reactors (PWR) and boiling light water reactors (BWR)
  - Use Low-Enriched Uranium (LEU) fuels. (<5% 235U)
- Gen IV/Advanced Reactors
  - SMR or Micro sized reactors possible
  - Use graphite moderators, molten salt moderators, or no moderators (fast neutron)
  - Gas, Molten Salt, Water, or Liquid metal cooled.
  - 2 commercial builds & 1 demo underway
  - Often require High Assay Low-Enriched Uranium (HALEU) or other specialized fuels. (HALEU is 5-20% 235U)

Leading Gen III+ and Gen IV Technologies in USA & Canada

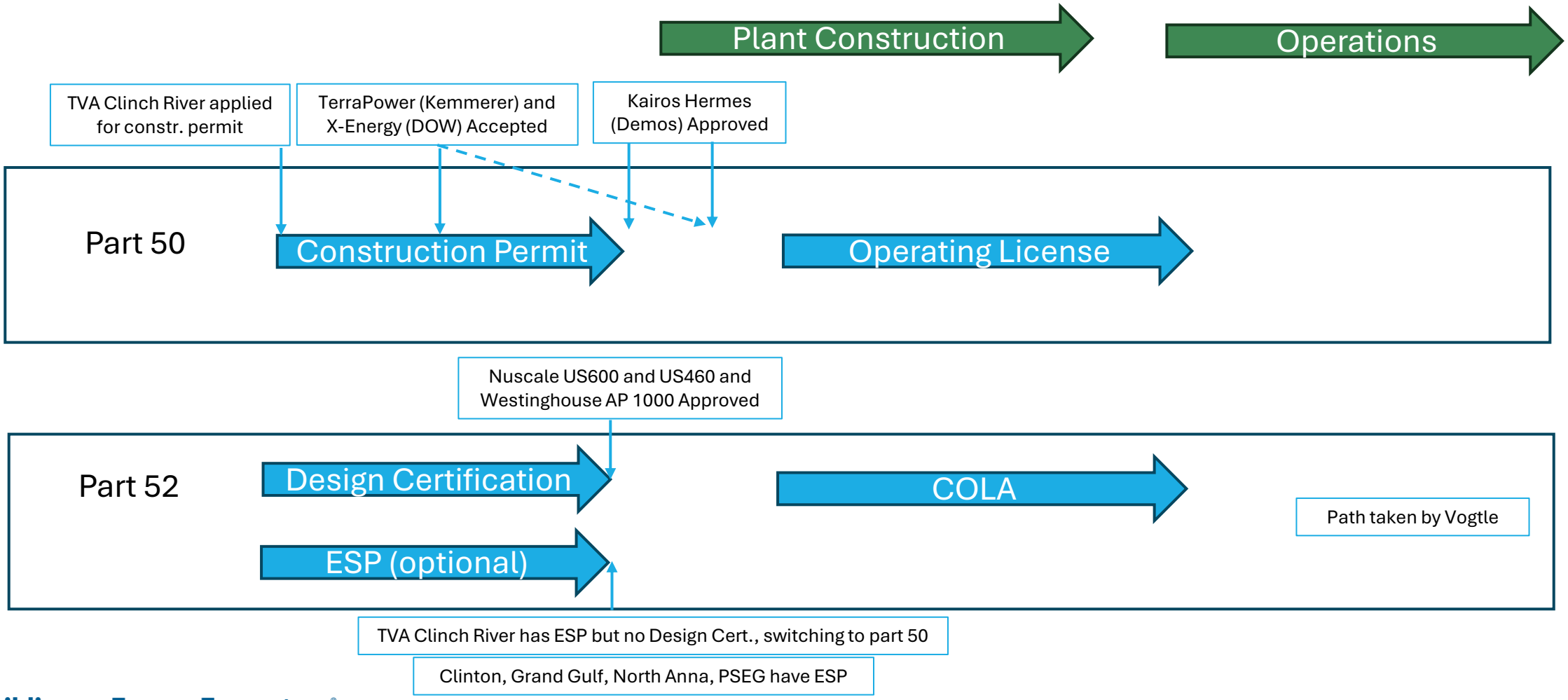
Gen./Type	Name	Power	Projects	Mod.	Cool.	Status
III+ PWR	Westinghouse AP 1000	1 GW	GA	Light Water		2 MW In Operation
III+ PWR	Westinghouse AP 300	1 GW	TBD	Light Water		Pre App for DL underway
III+ PWR	Holtec SMR 300	1 GW	MI	Light Water		Planned for MI
III+ BWR	GE Hitachi BWRX-300	300 MW	TN, NC, ON	Light Water		Early Site Permit obtained
III+ PWR	Rolls Royce SMR	470 MW	TBD (UK)	Light Water		Pre App beginning soon
III+ PWR	NuScale Voygr	77 MW+	TVA	Light Water		Design License July 2025
IV VHTR	X Energy XE-100	100 MW	TX	Graphite	Sodium	DOE Demo Proj. (plan)
IV FHR	Kairos KP-FHR	75 MW+	TN, PNW	Graphite	Flouride	2 Demos have CP
IV SFR	Terra Power Natrium	345 MW	WY	Fast	Sodium	DOE Demo Proj. (plan)

Distribution of Existing Reactors, Globally: 90% are LWR



Source: International Atomic Energy Agency and Supplier Press Releases

Projects are progressing, but most are still pre-construction



Momentum in the financing community around new nuclear

ESN® ENERGY SYSTEMS NETWORK

"14 Major Global Banks and Financial Institutions express support to Triple Nuclear Energy by 2050" Includes Bank of America, Barclays, Citi, Morgan Stanley, and Goldman Sachs World Nuclear Association Sept 23, 2024

"The stakes are different now and it's translating to momentum across the nuclear ecosystem.... If you look at private raises, we're seeing record levels of private equity and venture capital investments in advanced nuclear companies. Last year this was about $800 million, up 13 times relative to the prior year. invested... and long equity investors."
Kara Malone, Goldman Sachs, Sept 23, 2024

Morgan Stanley Research estimates 586 GW in new global nuclear capacity by 2050, or 53% more than its initial forecast last year, when analysts reported that a "renaissance" was coming for the industry. They are now estimating that potential investments in the nuclear value chain through 2050 will increase to $2.2 trillion. August 28, 2025

"Energy costs and PPAs are just going to go up over time"
Karen Fang, BoA Sept 23, 2024

None of them (the big banks) will be doing financing in the foreseeable future, but the LPO will be doing financing for the next few years.
Julie Kozeracki, LPO Sept 24, 2024

Big Banks are not relevant to this space at all from a lending point of view. The regulatory lending requirements do not allow for project lending especially in this country... So in the end it's the structured private debt markets that would step in above and beyond the LPO, or in place of.
James Shaefer, Gugenheim Securities Sept 24, 2024

"...are there any nuclear projects that are investable for my mandate yet? And the answer was no, but hopefully soon....and that's kind of the key question."
Mark Sowinski, Morgan Staley Sept 23, 2025

The major concerns of a panel of banking executives interested in eventually financing new nuclear projects:

- Continued safe operations of the existing fleet
- On budget and on time delivery of the first projects.
- Policy stability
- Cost of Energy

Panel Responses Sept 23, 2025 Morgan Stanley, JP Morgan, Citi, Band of America and Goldman Sachs

"So the real risk that we [the LPO] is mitigating around is project abandonment.... We need a reasonable expectation of repayment and that comes with balance sheet support for FOAK builds"
Julie Kozeracki, LPO Sept 24, 2024

Source: Quotes from Sept 23-24, 2025 were made at the Nuclear Energy Summit hosted by the Atlantic Council in NYC (recording)

Cost of New Nuclear
Cost Contributors and Control

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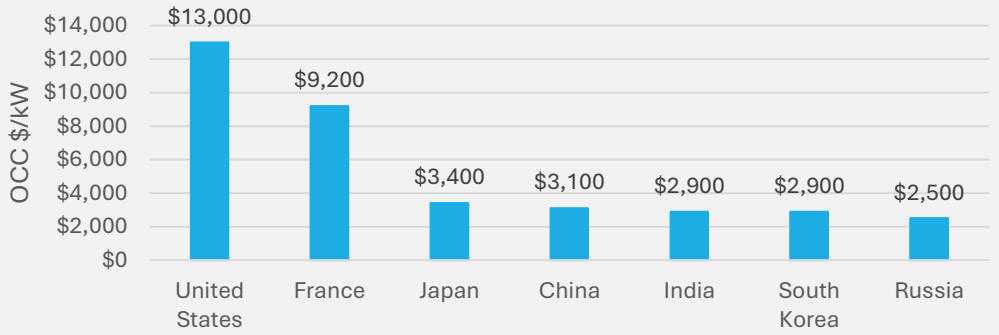
Capital Cost Estimates for Advanced Nuclear

ESN ENERGY SYSTEMS NETWORK

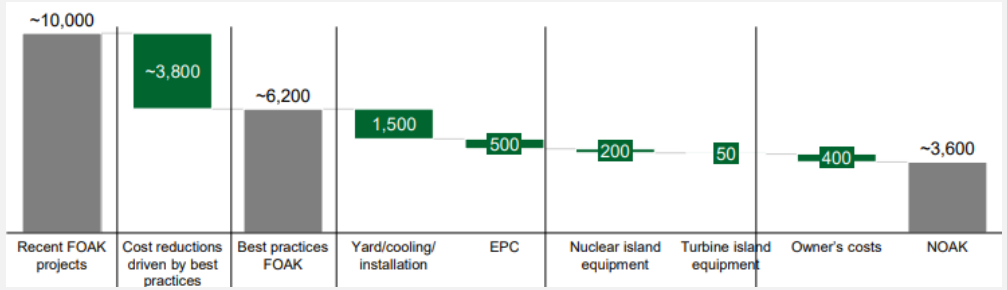
- DOE 2022 LPO reports estimates that the Overnight Capital Cost (OCC) for "early of a kind" reactor expected to be $3,600-$6,200/kW (See Fig).
  - 300 MW SMR would cost $1.0-$1.9 B
  - 470 MW SMR would be $1.7-$2.9B
  - 1 GW Reactor would cost $3.6-$6.2 B
- 2022 MIT study estimates a higher cost for a new AP1000, $8,300/kW (in 2022 dollars), or $8.3 Billion per 1.1 GW unit.
- Updated LPO Liftoff report presents more uncertainty around cost and estimates 300 MW SMR median cost of $4 B
- Rolls Royce Estimates their 470 SMR to be about $3 B, in line with LPO rate of $6,200/kW. Most others shy away from stated estimates.

Historic Capital Costs (2000-2024)



Source: Bloomberg New Energy Finance (Mar 2024)

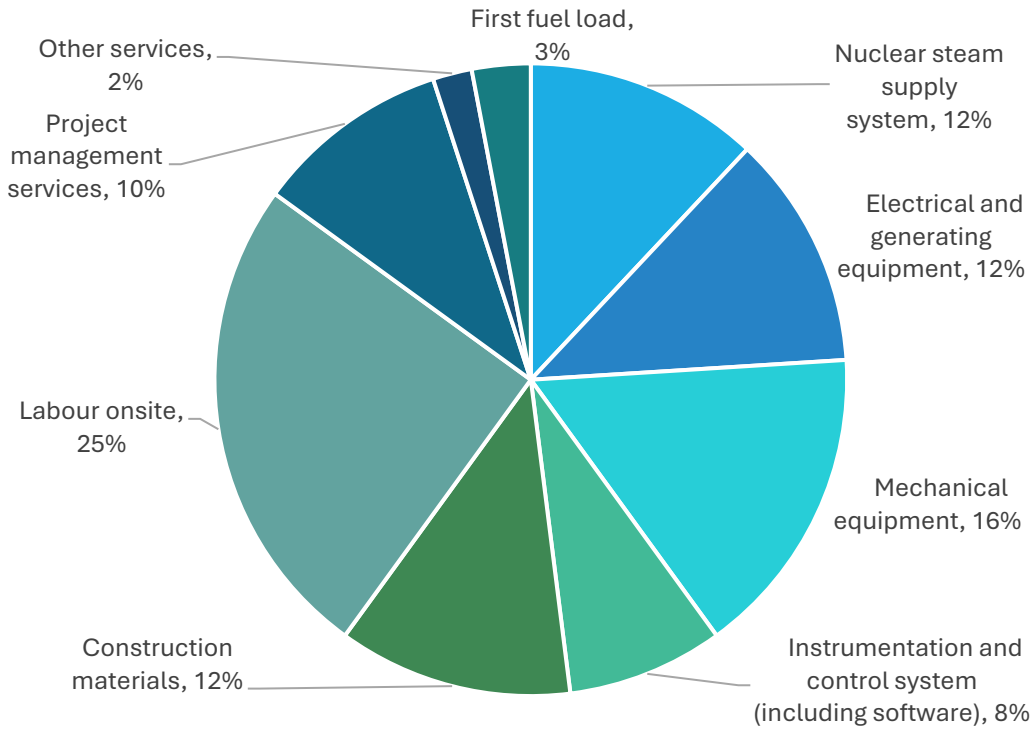
DOE (Loan Program Office) Cost Expectations



Source: DOE Loan Program Office, Nuclear Liftoff Report 2022

Cost drivers for Nuclear Power Plants' Capital Costs

- World Nuclear Association estimates that the Nuclear steam supply system, including the reactor, is 12% of the total costs.
- EPRI: "…the direct cost of the nuclear island was found to be less than 20% of all direct costs (i.e., 80% of on-site labor, on-site materials, and offsite manufacturing are for components in the balance of plant). Therefore, the perception that only the NSSS reactor hardware cost that must come down to make nuclear competitive, is not correct; significant savings should also be pursued in the balance of plant."

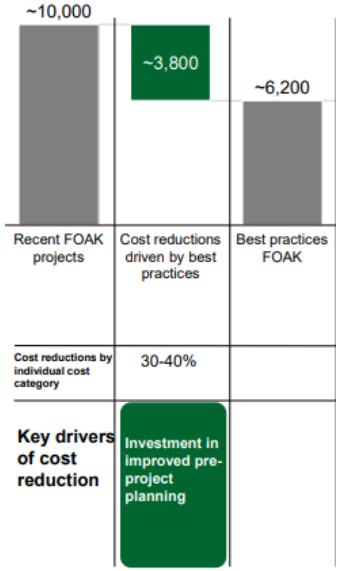


(1) https://world-nuclear.org/information-library/economic-aspects/economics-of-nuclear-power

(2) https://www.epri.com/research/products/000000003002015935 Advanced Nuclear Technology: Economic-Based Research and Development Roadmap for Nuclear Power Plant Construction. EPRI. June 2019

Keeping First of a Kind (FOAK) costs and cost risk low,

- EPRI Report (2019)
  "The most significant cost reduction strategies found were those that were able to reduce construction duration, in addition to the savings in labor and to a lesser extent, the savings in materials. These savings are further amplified when accounting for reduced interest costs."
- LPO lists key learnings from Vogtle, important to making a lower FOAK cost in future projects
  - Complete Design
  - Constructability Review
  - Detailed Schedule Planning
  - Clear and Consistent QA/QC standards
  - Ongoing risk assessments
  - Invest in intensive workforce training
- LPO emphasized that there were cost overruns and underestimations at play.
- DOE, NASEO, NSI, among others, tout orderbook partnerships to share costs of licensing and cost risk associated with the first build across multiple projects
  - GE Hitachi formed a partnership with OPG, TVA and Synthos Green Energy to share licensing risk
- NSI, among other stakeholders, proposed cost overrun insurance, backed by the DOE, to support first-of-a-kind projects



Reducing cost by waiting for EOAK or NOAK costs to prevail

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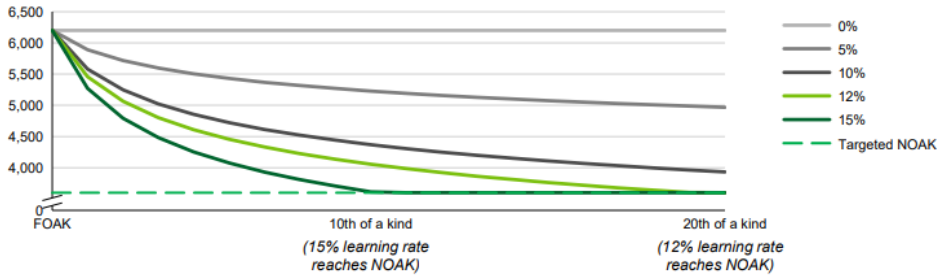
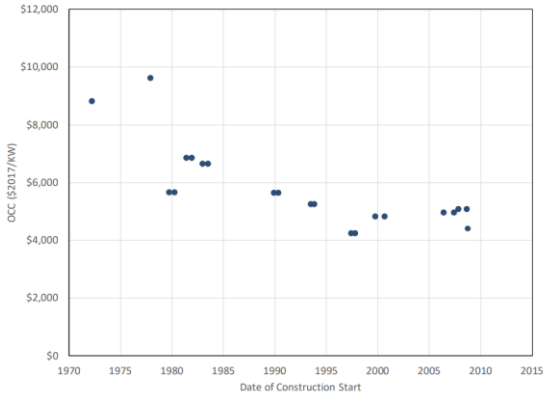
- Learning curve exemplified by Vogtle 4, versus 3
  - Vogtle 4 was 20% less expensive than Vogtle 3.
  - Testing Milestones (days) reduced by 38-78%
- LPO identifies the key "levers" to steepen the learning curve of efficiency from FOAK to NOAK
  - Downselect and standardize reactor designs
  - Invest heavily in project schedule
  - Maintain sufficient orders and minimize lag between builds
  - Co-locate as many reactors as is feasible
  - Move construction to the factory, modularize, mass-produce and standardize components.
- Many of the cost reduction methods from FOAK are simply more effective on EOAK or NOAK.

Project NOAK OCC by Learning Rate ($/kW)



Source: Kozeracki, J. et al. Pathways to Commercial Liftoff: Advanced Nuclear. DOE Loan Program Office. March 2023

OCC as a Function of Construction Start Date for Korean Reactors

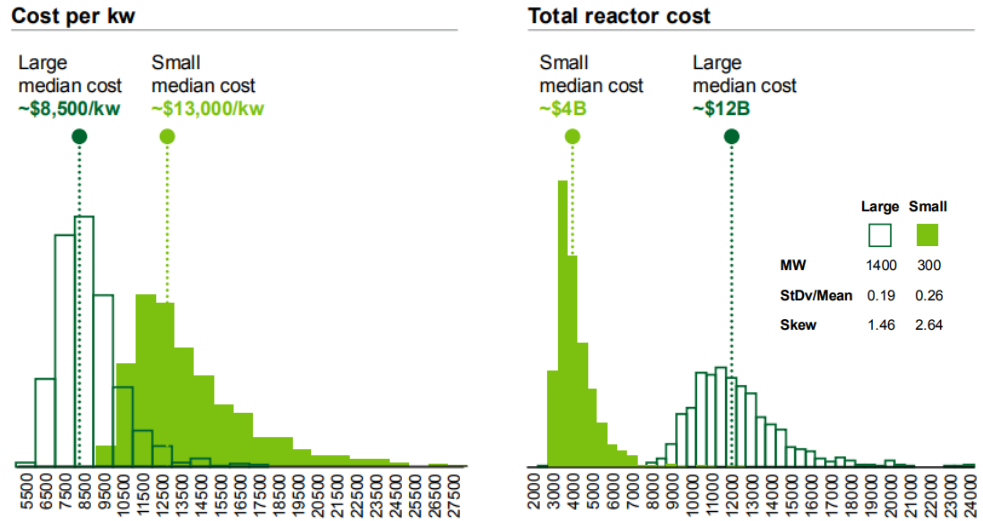


Advanced Nuclear Technology: Economic-Based Research and Development Roadmap for Nuclear Power Plant Construction. EPRI. June 2019

Keeping costs low by building smaller reactors

- SMR's are less expensive to build because they are smaller.
- The jury is out on whether the p.u. costs of SMR $/kW will be higher or lower compared with GW-scale reactors
  - EDF, see figures, shows SMR's having high p.u. costs.
  - From EPRI, on historical builds: There is a slight positive correlation between plant capacity and OCC. A 25% increase in capacity leads to an 18% increase in construction duration, which results in a 22% increase in OCC (U.S. EIA 2016)."
- Economies of scale: The reactors have significant economies of scale as the power output doesn't linearly relate to reactor size.
- Reverse economies of scale: schedule, factory build, modularity, transportability, repeatability, faster to NOAK, etc.

Probability Distribution of Project Costs



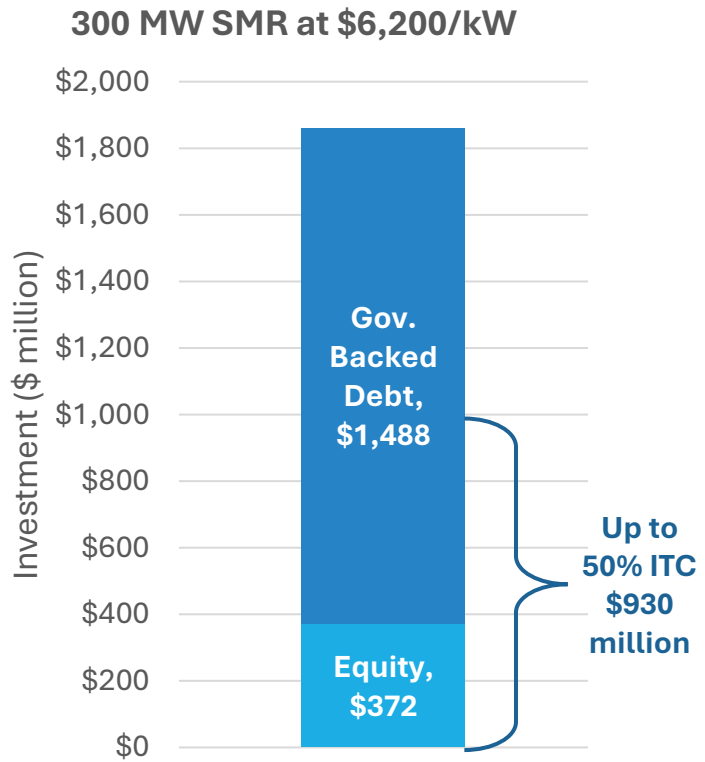
Note: these are modeled costs for large and small boiling water reactors; specific designs will have their own cost profiles that will vary

Source: Kozeracki, J. et al. Pathways to Commercial Liftoff: Advanced Nuclear. DOE Loan Program Office. March 2023

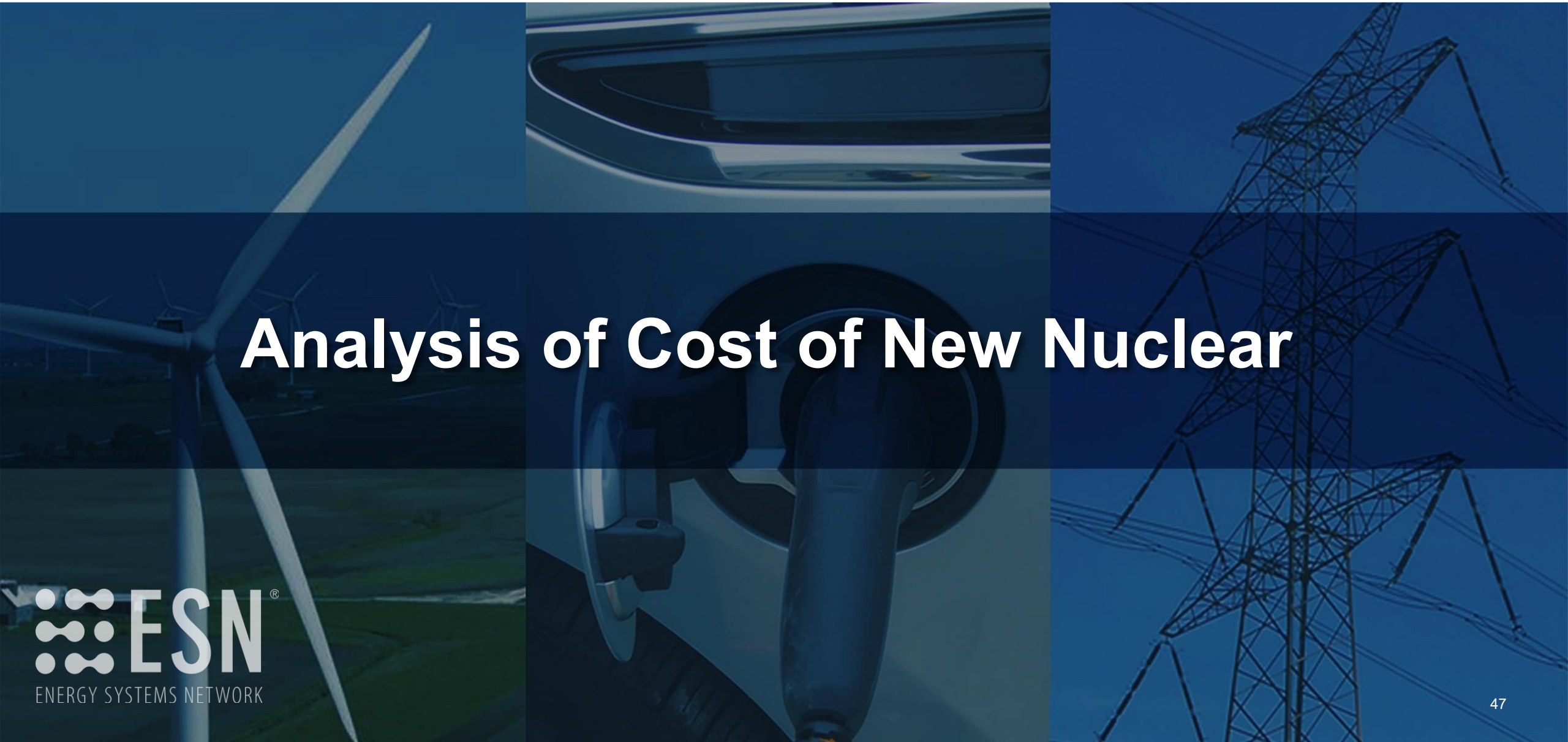
Source: https://www.epri.com/research/products/000000003002015935 Advanced Nuclear Technology: Economic-Based Research and Development Roadmap for Nuclear Power Plant Construction. EPRI. June 2019

Keeping costs low by using Federal Incentives

- EDF (formerly, LPO) can issue loan guarantees at a low, ~5% rate up to 80% of all project costs, including accrued interest.
- Investment Tax Credits
  - Investment Tax credits allow tax equity to receive 30-50% of project costs as a tax credit upon COD
    - 10% is contingent upon sourcing 55% of the project domestically
    - 10% is contingent upon being in an Energy Community
  - Project must be under construction by Dec. 31, 2033 to be eligible for 100% of the ITC according to post OBBBA language in section 48E
- Federal Awards: Awards from the government may provide funding throughout the project development and construction timeframes
  - DOE's SMR Gen III+ awards funded TVA's GE Hitachi Reactor and Holtec's SMR-300 reactors at $400 MM each.
  - DOE's ARDP funded multiple technologies, but primarily Terra Power (up to $2 billion) and X-Energy (up to $1.2 billion) with cost-share



Sources: US Code Ch 25 45.Y



Analysis of Cost of New Nuclear

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Nuclear Power Plant LCOE – Updated Draft

- Levelized cost of energy (LCOE) for new nuclear is $76-$141/MWh for First-of-a-kind and Early-Of-A-Kind builds
- LCOE is a limited tool:
  - Does not account for the value of firm dispatchable power over non-firm renewables.
  - Discounts the value of energy produced in the future according to financial terms, which may not reflect actual value of long- term energy produced.
- This LCOE analysis uses Lazard's LCOE as a starting point for the analysis:
  - Added the effect of a 30-50% ITC (Though 30% is unlikely)
  - Lowered the OCC, which was based solely on Vogtle
  - Used 8 year development and construction timeline (shown later) with embedded assumptions to convert OCC to CapEx
  - Gave debt financing rates and percentages in line with EDF offering for new nuclear today (FOAK and EOAK)
  - Like Lazard, did not include effects of MACRS

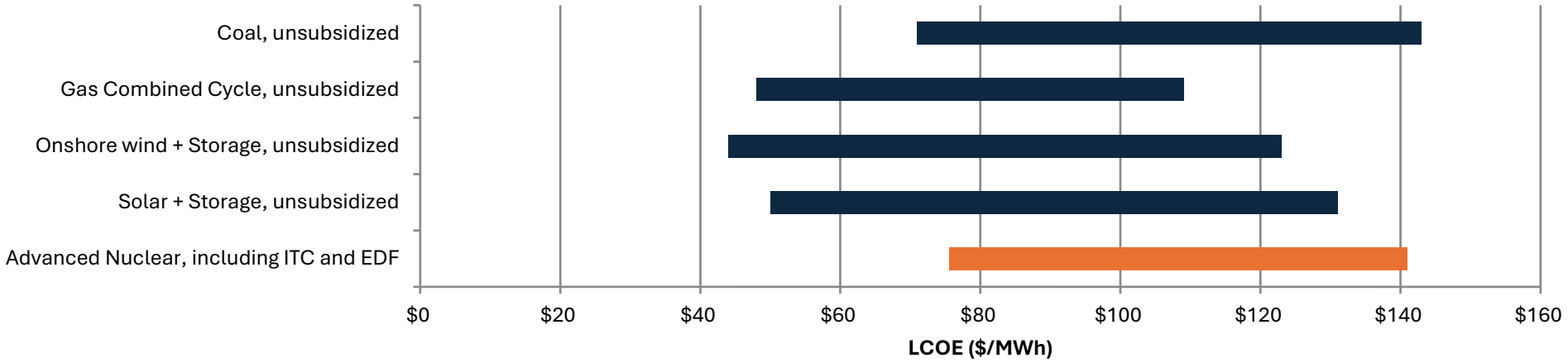
Levelized Cost of Energy Analysis: New Nuclear

	Low	Medium (per App. A)	Medium (Per LPO)	High
Capacity Factor	92%	92%	92%	92%
OCC rate ($/kW)	$6,200	$7,000	$8,300	$11,000
Cap Ex Rate ($/kW)	$8,110	$9,156	$10,857	$14,388
Investment Tax Credit	30-50%	30-50%	30-50%	30-50%
ITC monetization cost	10%	10%	10%	10%
Equity %	20%	20%	20%	20%
Equity IRR	14%	15%	15%	16%
Lifetime	30	30	30	30
Debt Interest Rate	5.0%	5.0%	5.0%	5.0%
Variable O&M Rate ($/MWh)	$5.15	$5.15	$5.15	$5.15
Fixed O&M ($/MW-yr)	$136	$136	$136	$136
Fuel cost ($/MWh)	$8.88	$8.88	$8.88	$8.88
LCOE at 30% ITC	**$76**	**$82**	**$92**	**$114**
LCOE at 40% ITC	**$83**	**$91**	**$102**	**$127**
LCOE at 50% ITC	**$90**	**$99**	**$112**	**$141**

Source: Lazards LCOE+ 2025

Nuclear Power Plant LCOE may be competitive

- LCOE for Nuclear plants is competitive, particularly in the lower end of the range
  - While still above non-dispatchable energy like utility scale wind and solar, the comparison is not fair
  - Compared to gas combined cycle and solar + storage, nuclear may be a competitive offering
  - Compared to solar + storage, it appears competitive, but it is worth noting that the storage would also be eligible for subsidies that are not shown herein.



Source: Lazards LCOE 2025

Off-take Trends in New Nuclear

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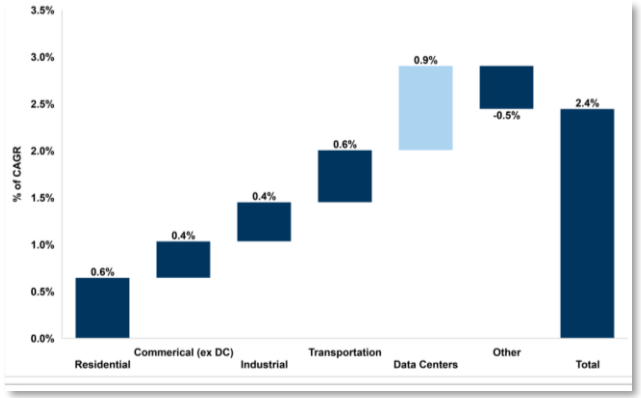
Load Growth and Power Plant Retirement Trends

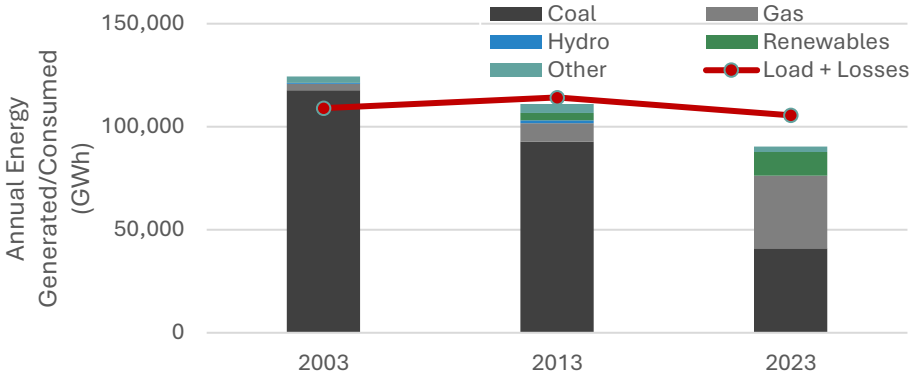
- Demand signals are a major driving factor in renewed, urgent interest in new nuclear.
- Four Key Drivers of Load Growth
  - Consumer Electrification
  - Industrial Electrification
  - Manufacturing Reshoring
  - Data centers
- MISO predicts annual load growth of 1.7%/yr from 2023 through 2030, up from 0.2%/yr from 2013-2023.
  - Zone 6 (IN, KY) is predicted to have 2.1%/yr load growth
- In the past decade, Indiana has retired 6.5 GW of power plants.
- In 2023, Indiana imported about 14% of its energy from neighboring states.

Datacenter Relative Growth from 2022 to 2030, U.S.



Source: Goldman Sachs April 2024

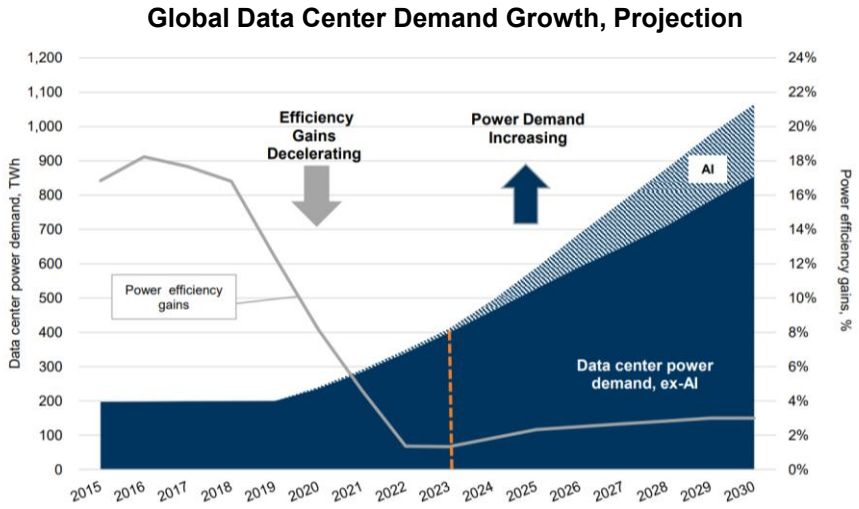
Indiana's energy generation mix through recent decades



Source: EIA generation and consumption data

Data center alignment with nuclear

- US datacenters will consume 60 TWh by 2026, or 6% of US total load
- Data centers' needs align with new nuclear
  - Decarbonization requirements
  - Large point-source loads (60 MW to GW scale)
  - Difficulty interconnecting
  - Access to capital
- However, some challenges include
  - No private off-taker (or IPP) has ever built nuclear before.
  - Timescale may not align with need for data centers
  - Risk for nuclear is lumpier than renewable risk.



Source: IEA (2024), Electricity 2024, IEA, Paris

- Technology companies are the major off-takers of all PPA's. 43% of clean PPAs in 2024 from Google, Amazon, Meta, Microsoft.
- Difficulty getting load agreements from traditional utilities, or getting them with high risk required.

Nuclear Power Plant PPA's are valued at a premium, but all power prices are rising.

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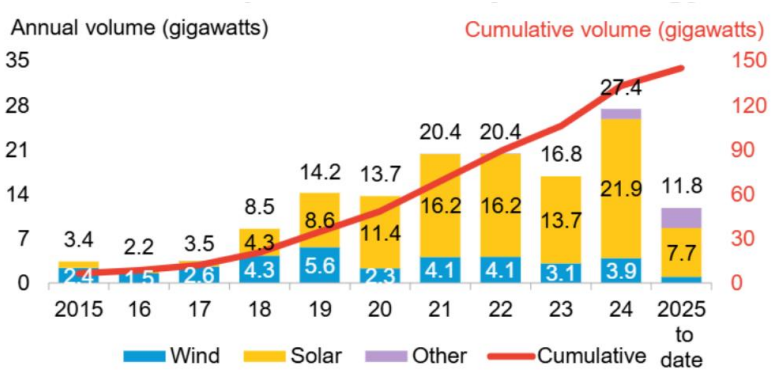
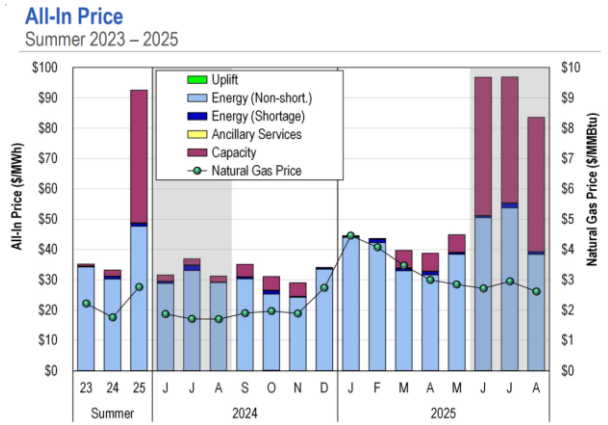
- PPA's are privately negotiated contract, but estimates of their value for restart projects show a premium over wholesale or renewable PPAs.
  - ~$70/MWh Meta-Constellation PPA for Clinton (1)
  - ~88/MWh Talen-AWS PPA for power from Susquehanna (2)
  - ~$110-$115 Crane-Microsoft PPA at Crane Center (3)
- Interviewees discussed PPA amounts in the $100/MWh range being discussed in negotiations, with creative solutions such as:
  - Off-takers taking an equity stake during construction
  - Investments in technology company equity, e.g. support of license application development
- MISO wholesale prices are also rising. Typically, wholesale markets are too volatile to back the financing of a long-term project like nuclear, it is a valuable indicator of price trends.
  - In 2023 all-in prices were about $36/MWh; in 2024 they were about $31/MWh (4)
  - In 2025 all in prices rose to $40-$46/MWH Jan-May, and $82-$96/MWh in the summer months. Annual average will likely be about $52/MWh

Annual U.S. Corporate PPA's by Technology



Note: Other is 91% nuclear in the U.S. in 2024/25

Source: BNEF. Corporate PPA Deal Tracker, June 2025, Going Nuclear.



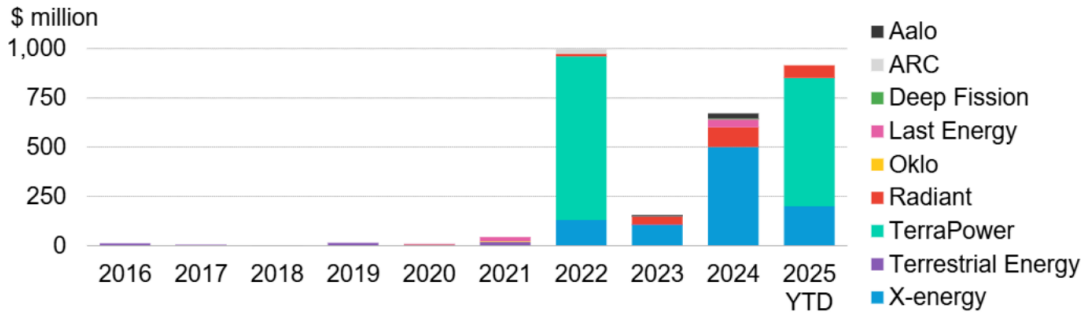
Source: Patton, David. MISO IMM Quarterly Report Summer 2025, Sept 16 2025, Potomac Economics

Source 1: Martucci, Brian. *Meta-Constellation virtual PPA could be first of many deals for existing reactor output: experts*. Utility Dive. 12 June 2025
Source 2: Patel, Sonal. *Talen, Amazon Launch $18B Nuclear PPA—A Grid-Connected IPP Model for the Data Center Era*. Power Magazine. 12 June 2025
Source 3: *Microsoft may pay Constellation premium in Three Mile Island power agreement, Jefferies says*. Reuters. 24 Sept 2024.
Source 4: Potomac Economics. *2024 State of the Market Report for MISO Electricity Markets*. June 2025

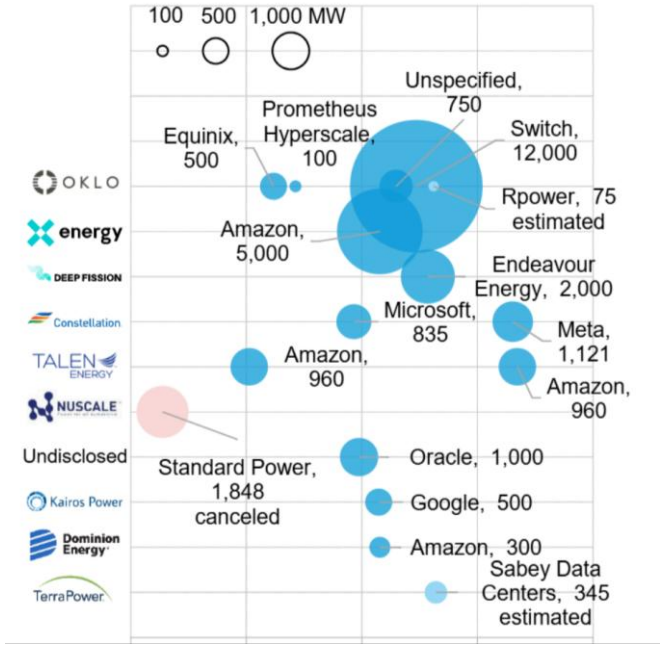
PPAs and Equity investments are flowing from AI companies to nuclear

- New nuclear project announcements and restarts are overwhelmingly tied to data center off-takers
- Equity Investments from Large Hyperscale players into nuclear power plant technology developers: AWS, Google, Bill Gates and Meta.
  - $2.8 Billion raised by companies engaged with the NRC from venture capital and private equity in 2022-2025

Venture Capital and Private Equity Investments into Nuclear Fission Startups



US nuclear power announcements tied to data centers and AI, by announcement date



Source: Diaz, Stephanie et. al. Developments in US Advanced Reactor Industry. Bloomberg New Energy Finance. June 23, 2025

Financing New Nuclear Throughout the Development Timeline

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Example Paths of development

- Utility Build Own and Operate
  - Vogtle and all historical plants (utility)
- Developer Build Own and Operate
  - Possible path for Constellation, NextEra, and Vistra.
  - Considered by the “turn-key” technology developers
- Fully developer owned, BTA to IPP or utility
  - Entra1 and Elementl plan to offer such projects
  - Still require debt financing and off-taker upfront agreements to derisk
- Partnership model with multiple equity and debt partners
  - Combination of developer (majority) and a variety of minority partners
  - Structured Private Debt aligning risk in customized way.
  - Ownership will likely still consolidate to 1-2 parties on COD

Key Risk Mitigation Strategies for Schedule/Cost Overrun

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Risk: Schedule and Cost overruns (or underestimation)

Use Partnerships to share risk	Avoid risk where possible	Best Practices Development & Construction	Stage Gated Decision Process	Fixed Price of Target Price Contracts	Off-taker de-risking
Vogtle has multiple owners	Site Selection: Low technical, commercial & community risk	Completed Constructible Design	Phase out siting, tech selection EPC selection	Fixed price contracts or at least price mechanics	Reputable, credit-worthy off-taker
TVA, OPD partnership for FOAK info sharing	EPC Selection: As experienced, reputable, as feasible.	Modular, Repeatable, Factory built	Increase due diligence appropriate with phase & risk	Build in penalties as feasible	Involve off-taker in upfront equity.
Discussions around Vertical Integration (Vendors, EPC's Offtakers)	Technology Due Diligence: Technical and Commercial DD	Best Practices Project mgmt. scheduling	Find finance partner appropriate to phase	Consider Step in Rights/ LDs in EPC contract	
Leverage Public partnerships: LPO, ITC, State	Leverage Existing Nuclear Supply Chain	Ongoing Risk Assessments and			

Utilities in Indiana
Investor-Owned Utilities and Generation Cooperatives

- **Indiana Michigan Power:** Indiana Michigan owns and operates a nuclear power plant in Michigan which it plans to keep open, according to their IRP. In January they announced interest in evaluating their Rockport coal plant site for nuclear power plant feasibility, through a partnership with TVA, and with backing from the federal government
- **Duke Energy:** Duke has included new nuclear reactors in its North Carolina and South Carolina IRP's. It also includes nuclear in out years for some scenarios in its Indiana IRP. Duke also plans to deploy 2 GE Hitachi SMRs at its Belews Creek site in North Carolina by 2035.
- **AES:** While the AES 2023 IRP does not mention nuclear power, recent meetings for the next IRP do include SMR's in many of the future generation scenarios. AES recently began nuclear power plant siting studies on their existing coal power plant sites.
- **NIPSCO:** NIPSCO announced their interest in pursuing nuclear power in August of 2024.
- **CenterPoint Energy:** CenterPoint Energy included nuclear for consideration in their 2025 IRP. They considered 2035 as the possible in-service date for new nuclear and costs of $15,812/kW.
- **Hoosier Energy:** Hoosier Energy is an off-taker for a restart project for the Pallisades Plant in Michigan. Work is underway and the restart is scheduled for late 2025, or early 2026.
- **Wabash Power Alliance:** 2023 IRP did not include nuclear for consideration.

Sample of Nuclear Power Plant Development Co.'s

The developer funding model may inform risk and decision-making

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Category	Example Companies	Technology	U.S. NN Projects	Notes
Large Publicly Traded Developers	Constellation	Agnostic	2 SMRs @ Existing NPP	All three also have operating Nuclear Reactors and significant energy infrastructure development experience.
	NextEra	Agnostic		
	Vistra	Agnostic		
Startup, publically traded	Fermi America	Westinghouse	4 GW in Texas	Data center and NPP co-development
Startup, VC-Backed Developers	Elementl	Agnostic	3 proj. with Google	
	The Nuclear Company	Agnostic		
Startup, PE-Backed Developers	Entra1	NuScale	6 GW with TVA	Did not confirm PE backing.
	Nvision Power	TerraPower		
	Others e.g. ANA, Solestiss	Agnostic		Various other small, PE-backed Developers
Tech Developers, self-developing projects, VC-Backed	Blue Energy	Self-developed		Also provide EPC services. Eg.. "Turn key"
	Last Energy	Self-developed	600 MW in Texas	
Mid-size Solar Developers, PE backed	TBD	Agnostic		Some interest from mid-size solar developers, but none have made public announcements yet.

ELEMENTL THE NUCLEAR COMPANY LAST ENERGY

Sources: Elementl, Last Energy, Entra1, NextEra, Vistra, ANA, Solestiss: Email confirmation. Constellation NY project, IL Project. Nvision Power, TerraPower partnership, Fermi America, Texas Project. The Nuclear company, About Page, Tech Crunch Article

Generic development timeline, and where nuclear differs

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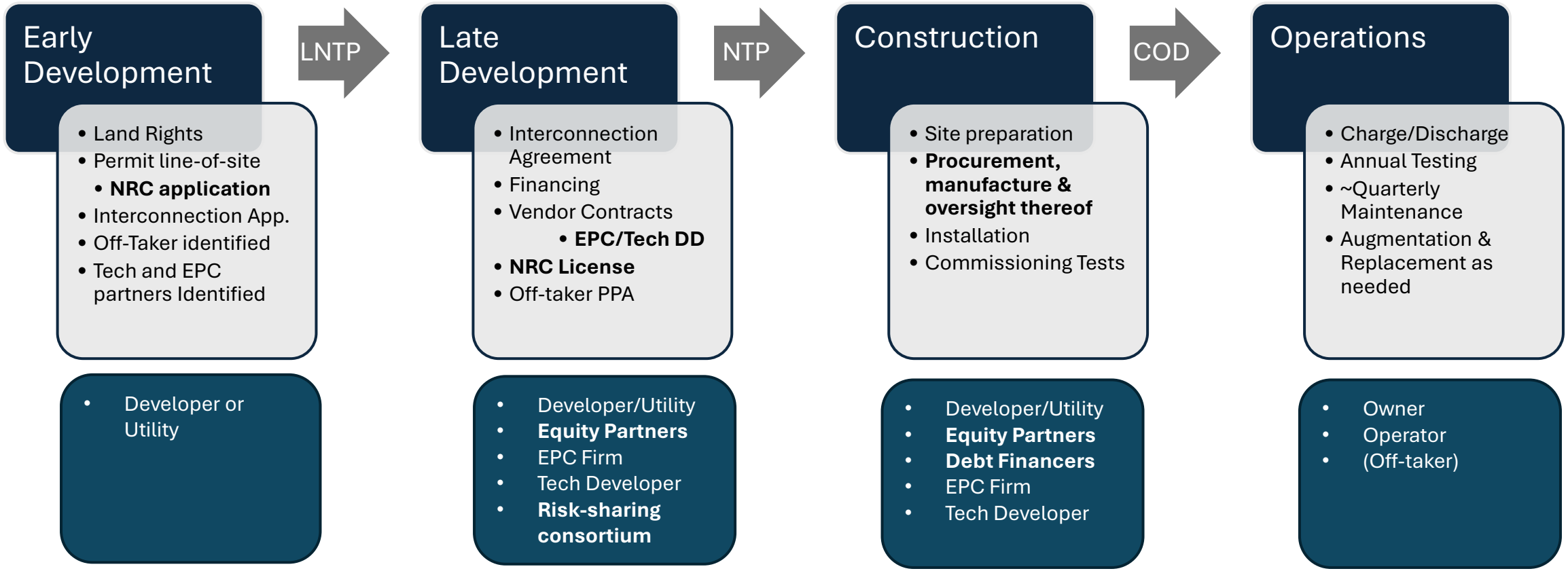

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Indicative Development Timeline & Budget
300 MW System, "Early-of-a-Kind"

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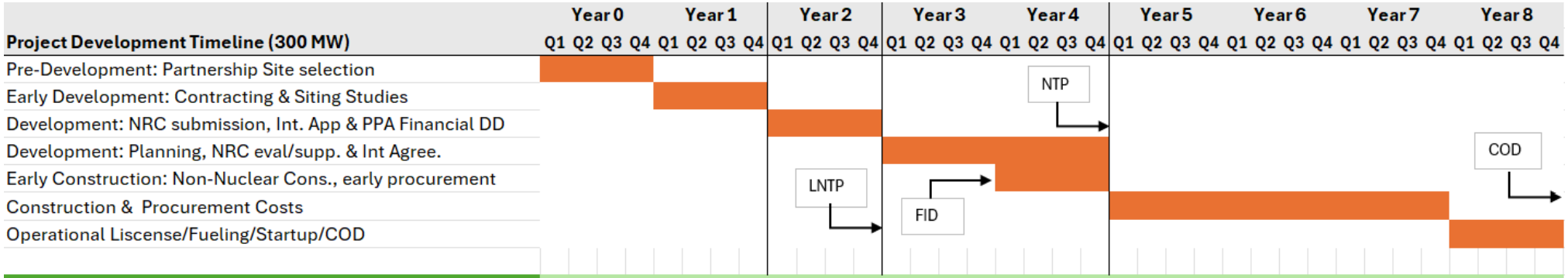
Assumptions	
Size:	300 MW
OCC ($/kW)	$7,000
Equity Early Development RO	20%
Equity Construction ROI	14%
Debt Interest Rate	5.0%



	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
Annual Investment	$0.9	$11.1	$103.0	$30.0	$355.0	$465.0	$465.0	$465.0	$205.0
Cummulative Investment (Cash Basis, EOY)	$0.9	$12	$115	$145	$500	$965	$1,430	$1,895	$2,100
Equity	100%	100%	100%	100%	20%	20%	20%	20%	20%
Debt	0%	0%	0%	0%	80%	80%	80%	80%	80%

Early Development | Development | Construction | Operations

Increasing Costs, Decreasing Risk

Conclusion

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New Nuclear Financing

- Nuclear power plants have been most reliable source of energy in recent years, providing 20% of grid's totale energy in recent years
- Price projections for new nuclear project competitiveness with existing technologies and recent nuclear PPA's
- New nuclear is still not fully commercial, however, due to risk of cost overruns, delays and project abandonment.
- Financing industry has demonstrated interest in new nuclear, by investing in technology startups and fuels.
- Government support is in place to account for those risks
- Over past 20 years, an additional model for financing energy generation has emerged, using private capital with efforts led by private developers
- For nuclear, there is an opportunity to consider a mix of financing options, both traditional utility models and private funding models

Takeaway for Indiana Stakeholders

- State support is helpful to kick-start early development
  - Prioritize working with credible partners
- State and utilities should be working to collaborate with other parties to share and reduce risk:
  - Already, IOED is part of NASEO “First Movers”
  - Continued engagement on joint actions (RFP’s, teaming agreements etc) is essential.
  - Engage with national labs
- Minimize all risks besides the unavoidable risks of deploying a new technology
  - Complete thorough due diligence with tech vendors and EPC firms
  - Pick sites, partners, off-takers, communities etc. that don’t raise risks any higher.
- Leverage all the help and incentives from the federal government
- Weigh the upsides on moving quickly with the downsides
  - If taking technology risk of FOAK risk, negotiate for supply chain benefits, workforce upskilling, partnership risk-sharing etc, as feasible.

Supporting Material

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Citation – Utility support for SMRs

Recent Survey of NEI's U.S. Utilities

Nuclear power's potential role in meeting their company's decarbonization goals:

SLR

>90% of fleet expects to operate to at least **80 years**

GW

100 GW of new nuclear opportunity by **2050s**

SMRs

Translates to roughly **300 SMR-scale plants**

NEI utility member companies produce nearly half of all US electricity.

- More than half have more interest than in 2022 (prior survey year)
- Interest in 23 Early Site Permits, 18-19 Construction Permits, and 8 Combined Operating Licenses (by 2034)

NEI

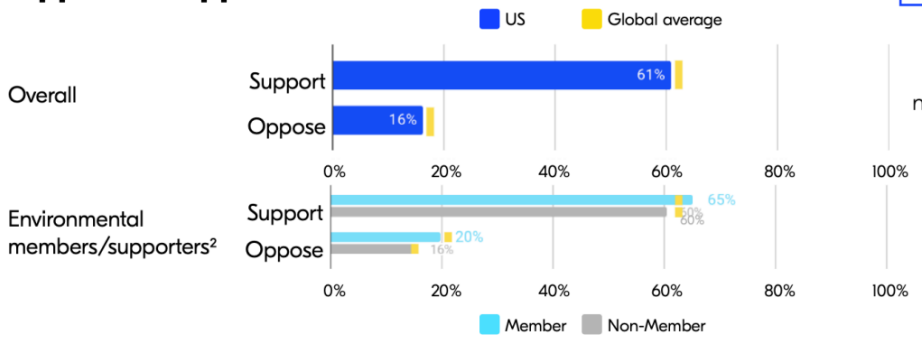
Source: Nuclear Energy Insititute

Citation – Public Support for SMRs

Strong Public Support for Nuclear Energy

US

Support vs. opposition[1]



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Support by...

Gender	
Men	73%
Women	50%

Age	
18-34	58%
35-54	62%
55+	62%

Income	
Low income (under 50k USD)	52%
Medium income (50k-100k USD)	60%
High income (100k+ USD)	70%

Political Affiliation	
Democrat	61%
Independent	60%
Republican	66%

Top 5 nuclear sentiments[3]
(% agree)

We need a way to produce more and more energy for our economy to keep growing	76%
We need to be building capacity for more energy, not just trying to use less	63%
We need nuclear energy in the mix, along with renewables, if we are to meet our climate goals	60%
Leaving nuclear waste behind is just wrong, however safe it is	59%
We should use advanced nuclear energy to reduce our dependence on other countries	58%

Source: Potential Energy, 2023, https://potentialenergycoalition.org/wp-content/uploads/NewNuclear_Report_May2023.pdf

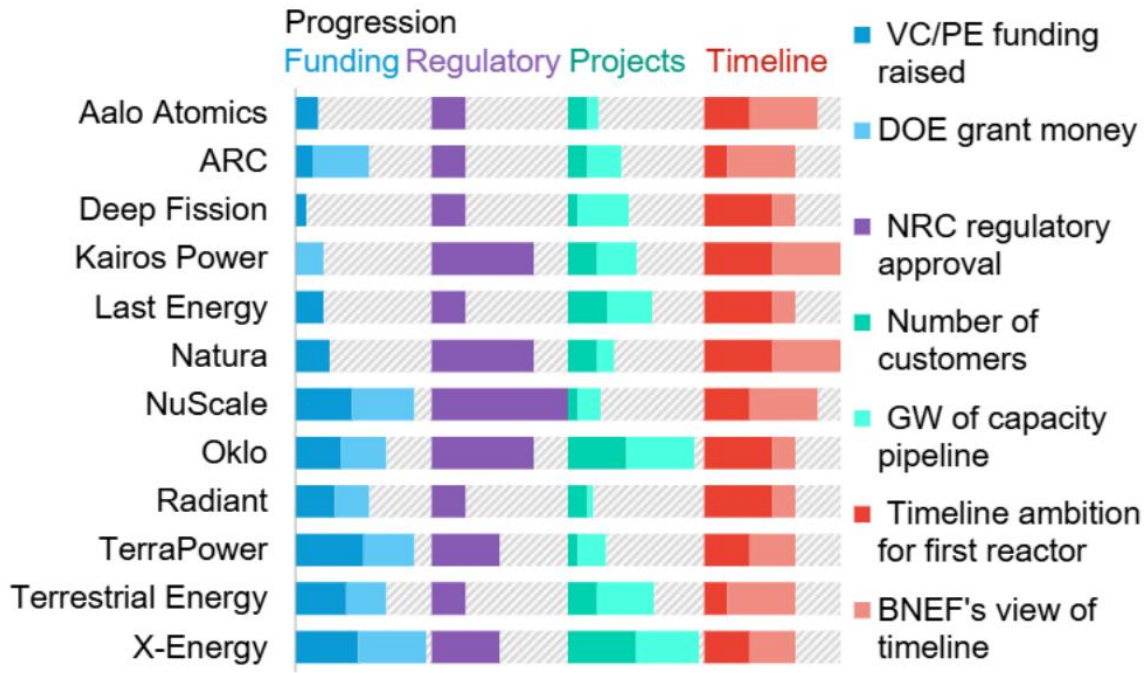
 35

Source: Nuclear Energy Insititute

Alternative: Progress by company according to BNEF

ESN ENERGY SYSTEMS NETWORK

Relative progress of advanced nuclear fission companies working in the US



Source: Diaz, Stephanie et al. Developments in the US advanced Reactor Industry, Energy Communities Alliance, Bloomberg New Energy Finance. 6/63/2025

Next Steps

- Next Agenda
- Working Groups
- 2026 Meeting Cadence

Secretary Jaworowski