

AI

NUCLEAR
POWER
STATION



GEODYN
SOLUTIONS

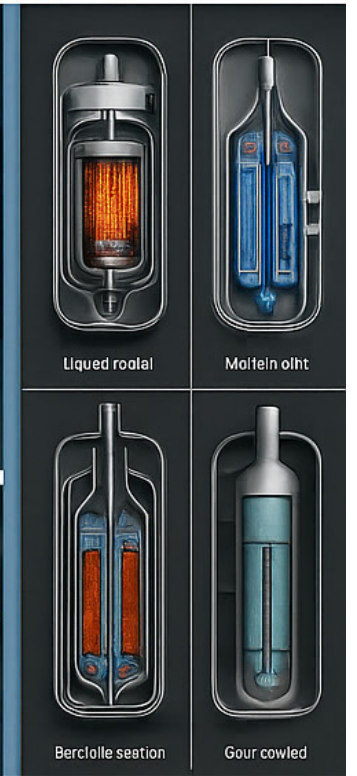
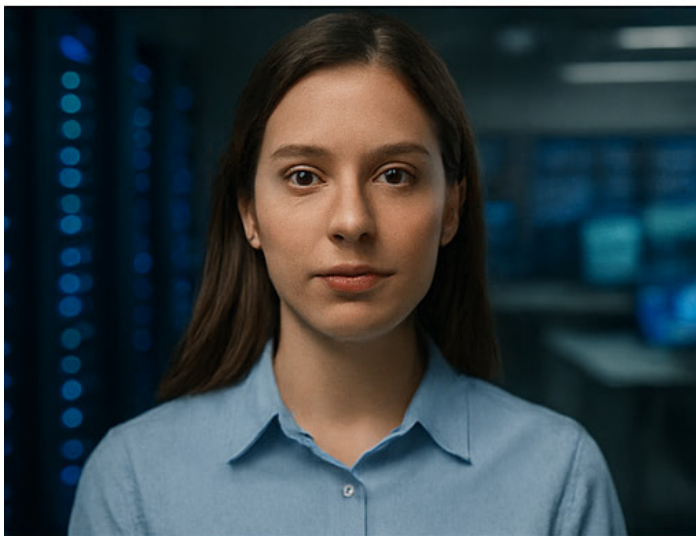
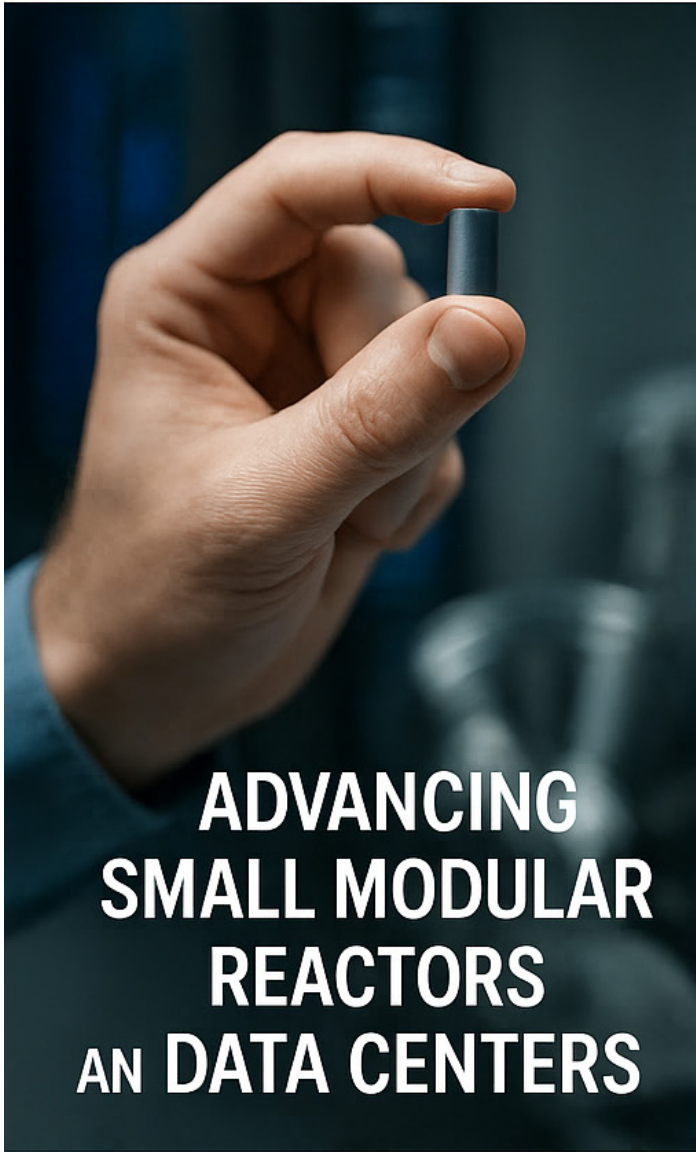


**\$100 BILLION COMMITMENT TO
ADVANCE U.S. AI AND DATA CENTER
CAPACITY THROUGH ADVANCED SMALL
MODULAR REACTOR TECHNOLOGIES**

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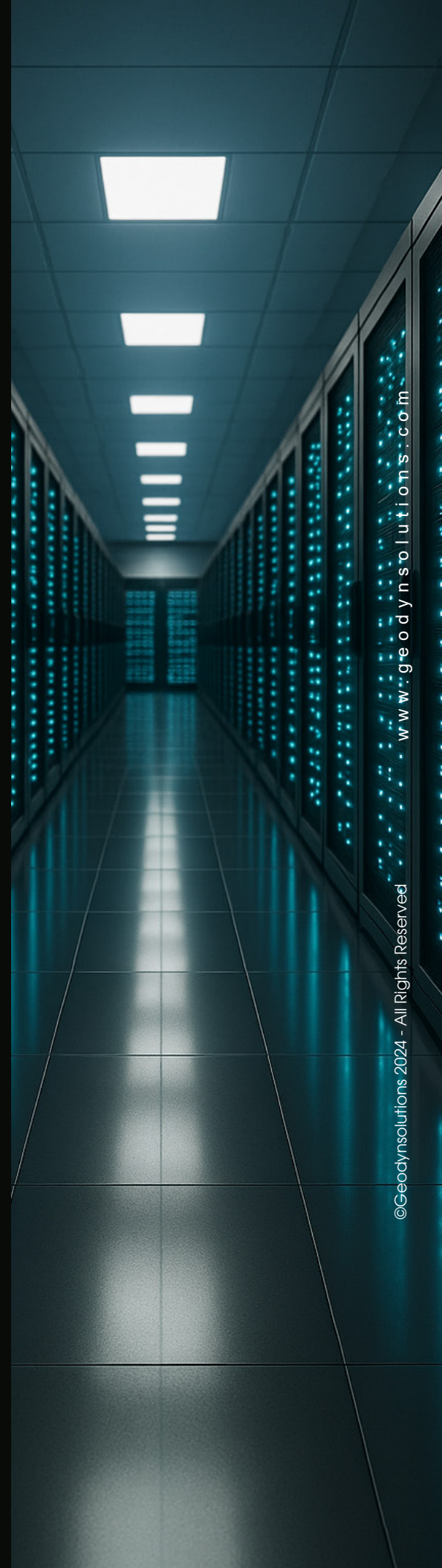
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EXECUTIVE SUMMARY

This proposal details a \$100 billion investment in advanced small modular reactor (SMR) technologies selected by the U.S. Department of Energy (DOE) for accelerated development under the New Reactor Pilot Program announced in June 2025 and updated with initial selections in August 2025. Encompassing 11 innovative projects, these technologies include liquid metal-cooled fast reactors, integral molten salt reactors, borehole pressurized water reactors, high-temperature gas-cooled reactors, and compact modular pressurized water reactors, among others. By integrating these complementary designs into hybrid systems, the investment maximizes efficiency, reduces costs through shared infrastructure and learning curves, and targets optimal return on investment (ROI). The budget allocates \$80 billion to core activities and \$20 billion (20%) as contingency for risks such as regulatory delays or supply chain disruptions. Leveraging enhanced federal grants, tax incentives, and streamlined approvals, the initiative projects an internal rate of return (IRR) of 15.0%, a payback period of 6.3 years, and substantial economic, environmental, and strategic benefits. This scaled effort addresses the projected 50-100 GW surge in U.S. data center power demand by 2030 driven by AI growth, while positioning the U.S. as a global leader in nuclear innovation.





PROJECT OVERVIEW

The DOE's Reactor Pilot Program, launched via Executive Order 14301, selected 11 advanced reactor projects in August 2025 to achieve criticality by July 4, 2026, focusing on diverse SMR designs that emphasize modularity, inherent safety, and rapid deployment. These latest technologies enable a portfolio approach: fast reactors for efficient fuel utilization and waste minimization, molten salt systems for high-temperature operations and enhanced efficiency, borehole designs for reduced environmental footprint and faster siting, gas-cooled reactors for high reliability in industrial applications, and pressurized water variants for proven scalability. Combining them creates optimized hybrid solutions—such as coupling fast reactors with molten salt for integrated fuel cycles or borehole with microreactors for flexible, site-specific power delivery. This synergy lowers overall costs by 25-35% through shared components, standardized manufacturing, and multi-unit economies, while tailoring outputs to AI data centers' needs for baseload electricity, process heat, and cooling. The \$100 billion budget, with built-in contingency, amplifies deployment scale to 20-30 GW, doubling prior projections for greater ROI optimization.

RATIONALE FOR INVESTMENT: THE NEED FOR SMRS IN U.S. AI AND DATA CENTER EXPANSION



AI's rapid advancement is reshaping energy demands, with U.S. data centers projected to consume up to 130 GW (or 1,050 TWh annually) by 2030, representing nearly 12% of national electricity use—a doubling or tripling from current levels. AI-specific power capacity could escalate from 5 GW today to over 50 GW by 2030, driven by hyperscale facilities requiring uninterrupted, high-density energy. Intermittent sources like solar and wind fall short for 99.999% uptime, risking grid instability and fossil fuel dependency that could add billions in carbon costs. SMRs offer a carbon-free baseload alternative with 93%+ capacity factors, compact footprints for co-location, and versatility for on-site deployment. Hybridizing technologies enhances this: for example, integrating high-temperature gas-cooled reactors with molten salt systems enables cogeneration of electricity and heat for AI server cooling, cutting energy losses by 20-30% and overall LCOE to \$40/MWh. Without swift SMR scaling, the U.S. faces energy bottlenecks that could curtail AI economic contributions, estimated at trillions in GDP, while ceding ground to competitors in clean tech.

INVESTMENT DETAILS AND OPTIMIZATION WITH GOVERNMENT SUPPORT

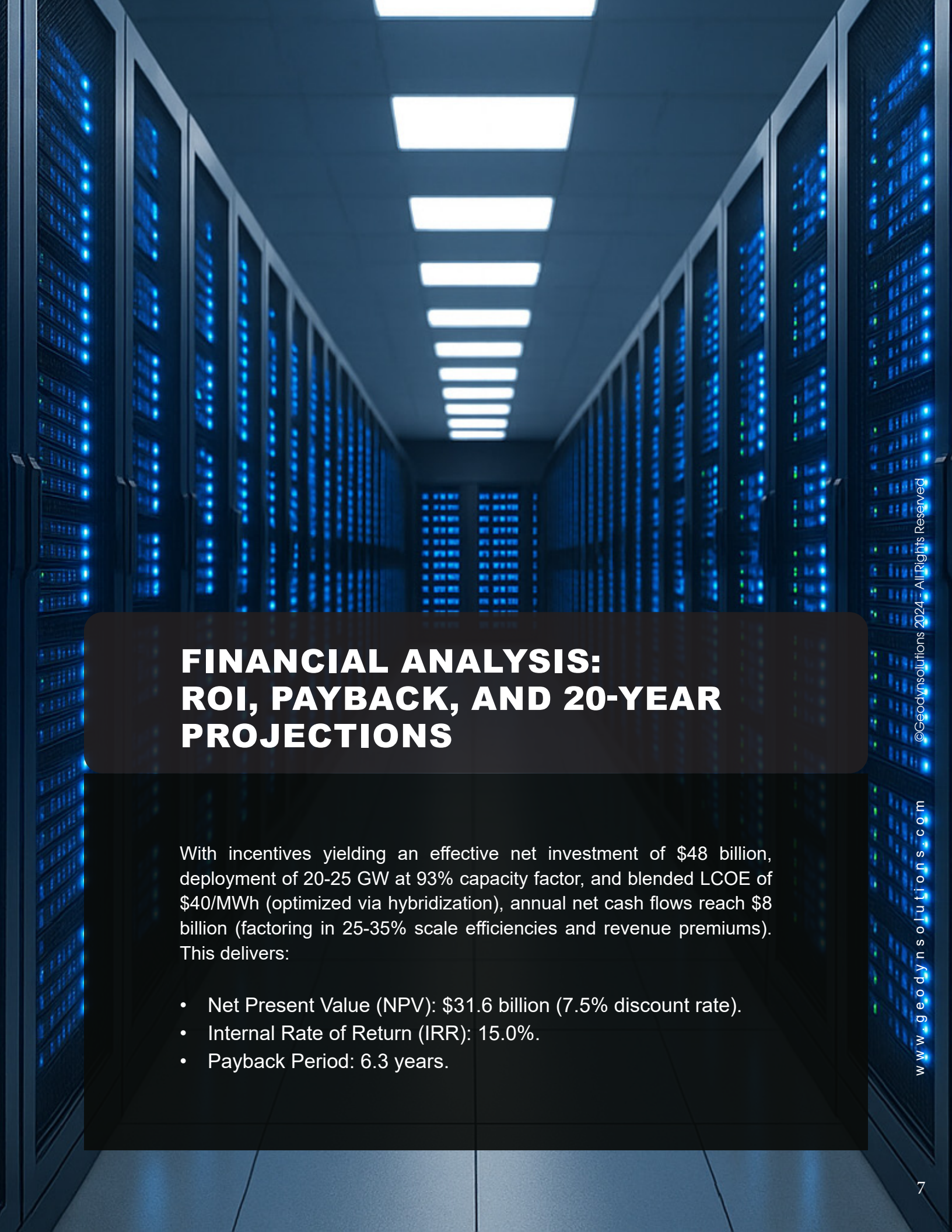


The \$100 billion budget allocates \$80 billion to core investments—60% for CapEx (reactor fabrication, hybrid integration facilities), 25% for site development, licensing, and multi-technology piloting, and 15% for OpEx startup—plus \$20 billion contingency to buffer against inflation, supply issues, or extended timelines. Portfolio integration optimizes ROI by leveraging complementarities: shared HALEU fuel supply for fast and gas-cooled designs, modular borehole siting for rapid multi-unit rollout, and AI-tailored configurations for premium PPAs. Federal support offsets 40-50% of costs:

- **Grants and Funding:** Tap into the DOE's Reactor Pilot Program and ARDP, securing \$10-20 billion in awards for the 11 projects' test reactors and scale-up.
- **Tax Incentives:** Utilize

the Inflation Reduction Act's 45U PTC (up to 2.6 cents/kWh for 10 years), 48E ITC (30-50% on investments), and accelerated depreciation, with hybrid eligibility boosting credits by 15-20% via advanced fuel and efficiency bonuses.

- **Other Benefits:** Executive orders expedite NRC reviews (targeting 18-24 months), bolster HALEU production, and unlock state R&D credits (up to 20%). These reduce effective CapEx to \$3,500-4,000/kW (from BOAK estimates of \$4,000-7,000/kW) and OpEx to \$15-20/MWh, with learning rates of 10-15% accelerating cost drops in nth-of-a-kind units. This framework supports revenue from \$60-80/MWh PPAs with data center operators, enhanced by ancillary services like hydrogen co-production.



FINANCIAL ANALYSIS: ROI, PAYBACK, AND 20-YEAR PROJECTIONS

With incentives yielding an effective net investment of \$48 billion, deployment of 20-25 GW at 93% capacity factor, and blended LCOE of \$40/MWh (optimized via hybridization), annual net cash flows reach \$8 billion (factoring in 25-35% scale efficiencies and revenue premiums). This delivers:

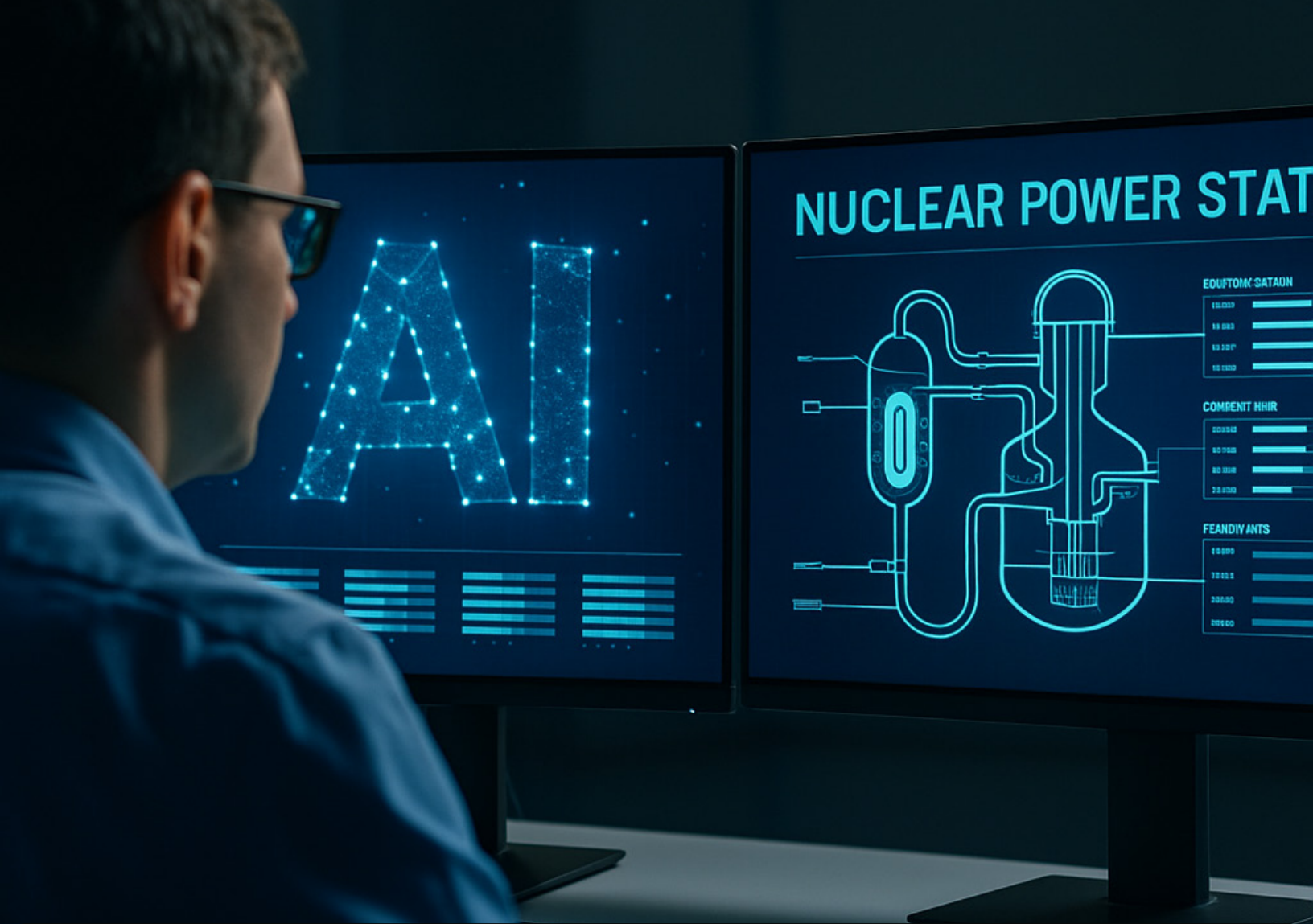
- Net Present Value (NPV): \$31.6 billion (7.5% discount rate).
- Internal Rate of Return (IRR): 15.0%.
- Payback Period: 6.3 years.

FINANCIAL ANALYSIS

The 20-year ROI projection table below assumes constant annual net cash flows of \$8 billion, cumulative flows, and ROI percentage (*cumulative net returns over effective investment*):

YEAR	ANNUAL NET CASH FLOW (\$)	CUMULATIVE CASH FLOW (\$)	ROI (%)
1	8,000,000,000	8,000,000,000	-83.33
2	8,000,000,000	16,000,000,000	-66.67
3	8,000,000,000	24,000,000,000	-50.00
4	8,000,000,000	32,000,000,000	-33.33
5	8,000,000,000	40,000,000,000	-16.67
6	8,000,000,000	48,000,000,000	0.00
7	8,000,000,000	56,000,000,000	16.67
8	8,000,000,000	64,000,000,000	33.33
9	8,000,000,000	72,000,000,000	50.00
10	8,000,000,000	80,000,000,000	66.67
11	8,000,000,000	88,000,000,000	83.33
12	8,000,000,000	96,000,000,000	100.00
13	8,000,000,000	104,000,000,000	116.67
14	8,000,000,000	112,000,000,000	133.33
15	8,000,000,000	120,000,000,000	150.00
16	8,000,000,000	128,000,000,000	166.67
17	8,000,000,000	136,000,000,000	183.33
18	8,000,000,000	144,000,000,000	200.00
19	8,000,000,000	152,000,000,000	216.67
20	8,000,000,000	160,000,000,000	233.33

Projections incorporate 10-15% learning rates from integrated deployments, with costs falling 30% post-FOAK due to hybridization and manufacturing synergies.



ECONOMIC AND ENVIRONMENTAL BENEFITS

ECONOMIC: Generates 150,000-300,000 jobs in advanced manufacturing, engineering, and operations, adding \$500-800 billion to GDP over 20 years through supply chains, AI-enabled innovation, and energy exports. Hybrid systems unlock additional revenue streams like industrial heat, boosting ROI by 10-15%.

ENVIRONMENTAL: Avoids 120-180 million tons of CO₂ annually, equivalent to planting 3 billion trees, with advanced cycles reducing nuclear waste by 90%. Optimized designs minimize water use and land impact, supporting carbon-neutral AI ecosystems.



COMPARATIVE EDGE TO CHINA AND THE WORLD

China dominates with over 30 reactors under construction and faster deployment in Gen IV technologies, eyeing a \$1.5-2 trillion global market share. Russia leads exports with 10+ international builds. The U.S. leverages innovation in modular safety and hybridization, with the 11 DOE projects offering superior flexibility and lower LCOE (\$40-60/MWh vs. competitors' \$60-100/MWh). This investment scales U.S. exports to 30-50% of the SMR market by 2035, enhancing energy independence, securing critical supply chains, and maintaining AI technological superiority amid rivalries.

A close-up photograph of a person's hand holding a small, black, cylindrical object between the thumb and index finger. The background is blurred, showing a person in a white lab coat. The lighting is soft, highlighting the texture of the skin and the matte finish of the cylinder.

RISKS AND MITIGATION

REGULATORY HURDLES AND FUEL SHORTAGES ARE ADDRESSED VIA PILOT PROGRAM FAST-TRACKS AND CONTINGENCY RESERVES. DIVERSIFIED HYBRIDS AND PHASED ROLLOUTS (STARTING WITH 5 GW PILOTS) LIMIT EXPOSURE, WITH INSURANCE COVERING 10-15% OF POTENTIAL OVERRUNS.

DATA CENTER

A photograph of four young adults (two men and two women) standing in a row in front of a large, modern building with a grid of windows. The building has the words "DATA CENTER" written in large, dark letters above the entrance. The group consists of a young man with curly brown hair on the left, a young woman with dark curly hair, a young man with glasses and dark hair, and a young woman with long brown hair on the right. They are all looking directly at the camera. The scene is brightly lit, suggesting daytime.

THIS \$100 BILLION COMMITMENT, OPTIMIZED THROUGH TECHNOLOGY INTEGRATION AND INCENTIVES, DELIVERS EXCEPTIONAL ROI WHILE FUELING THE U.S. NUCLEAR RENAISSANCE AND AI DOMINANCE. PROMPT FEDERAL COLLABORATION IS URGED TO LOCK IN SUPPORT AND LAUNCH HYBRID FEASIBILITY STUDIES.



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