The Lesson of St. Lucie

Teneo Insights | September 2025

On September 3, 1979, Hurricane David—a Category 5 hurricane that devastated the Dominican Republic—approached Hutchinson Island, a barrier island on the Atlantic Coast of Florida.

On that island, barely one mile wide, St. Lucie Nuclear Power Plant Unit #2 was under construction and only 26% complete. The high winds toppled a 150-ton construction derrick used to supply materials to both the reactor containment building and the reactor auxiliary building. The storm completely destroyed the derrick, which consisted of a 180-foot tower with a 256-foot mast resting on top and a 200-foot boom. More importantly, the falling derrick severely damaged the reactor auxiliary building under construction.

Initially, the time to repair the damage and replace equipment was estimated at 13 weeks. The project team immediately formulated recovery plans. A task force of construction and site engineering personnel pinpointed all of the damage on design drawings. Engineers assessed the damage, developed repair procedures and determined the extent of necessary nondestructive testing in adjoining areas. At the same time, engineers reviewed equipment damage with vendor representatives and expedited orders for replacement equipment. Construction plans included additional overtime for crafts and construction supervisors to recover the hours required for repairs. Meanwhile, site activity unaffected by the derrick collapse maintained its previous schedule.

The net result: By November 1980, the teamwork—so critical to St. Lucie 2's progress—had recovered the 13-week delay on the critical path schedule and the team achieved fuel load on schedule in November 1982. St. Lucie #2 was completed on time and on budget.[1]

How was the St. Lucie team able to achieve this, especially given the significant challenges they faced? With recent high-profile project failures, the nuclear power industry has struggled to establish a reputation for executing projects on time and on budget. Yet, there are lessons to be learned from successfully executed large capital projects, both nuclear and non-nuclear.

There is currently a resurgence of interest in nuclear power, both in the U.S. and internationally, driven by growing demand for clean, 24/7 power and renewed policy support in the U.S. and other countries. To capitalize on this momentum, the nuclear industry must find ways to operate faster, cheaper and more efficiently. This includes leveraging opportunities for standardization, modularization and digitization to reduce costs and stay within the range of competitive economics. The industry must also prove that it can deliver projects on budget and on schedule. Despite the technical complexity of these systems, the primary challenge is not technical—it is building an effective delivery model.

Today's Opportunity

Seven European countries have recently reversed their previous restrictions on nuclear development. The World Bank has lifted its decades-long ban on financing nuclear energy projects and will now support life extensions of existing reactors, grid upgrades and deployment of small modular reactors (SMRs), especially in developing nations.

In the U.S., the recently passed One Big Beautiful Bill (OB3) preserved tax credits for nuclear and introduced additional benefits. In 2024, 25 states passed legislation supporting advanced nuclear energy or broader nuclear policy initiatives. Even before the Trump administration, the Bipartisan Infrastructure Law (BIL) allocated $6 billion in funding for nuclear, financing the preservation of existing baseload (e.g., Diablo Canyon), and the Loan Programs Office provided a $1.52 guarantee to finance the first U.S. nuclear restart at Palisades. States are also clearing a path—Wyoming issued a state construction permit for TerraPower's Natrium demonstration—and private demand is rising as utilities and large offtakers (mostly AI Data centers) pursue 24/7 clean power. The U.S. power market will require over 100 GW of new baseload power in the coming decade.

Canada is also strengthening its already leading position in nuclear. Ontario Power Generation's Darlington refurbishment remains "on time and on budget," with Units 3 and 1 completed early. Bruce Power's Major Component Replacement delivered Unit 6 "on time and on budget"—evidence that disciplined delivery can be achieved at nuclear scale.

[1] Doing It Right In Nuclear Construction, L. Tsakiris – ASCE

Today's Challenge

Nuclear new construction still faces fundamental economic challenges: in the U.S., it is estimated to be 2-4 times more expensive than its primary competition—gas combined cycle gas turbines (CCGT). New nuclear costs are estimated at $141–$220/MWh, versus CCGT at $48–$109/MWh (before carbon or tax credits).[2] Additionally, the industry's track record makes it difficult to find customers, investors, regulators and ratepayers willing to take on the risk.

The initial industry response has been to focus on small or micro modular reactors (SMRs or MMRs). The hope is that these technologies can reduce the capital required and allow for manufacturing in controlled environments rather than in the field. While these technologies offer many advantages and applications, two core problems remain. First, economies of scale heavily apply in nuclear—reducing scale worsens the already significant economic challenges. Second, as Admiral Hyman G. Rickover—the "Father of the U.S. Nuclear Navy"—famously noted, there is a difference between real reactors that can be built and operated and "paper reactors" that remain theoretical and require years of engineering to realize. Unfortunately, many new designs are closer to the latter.

That said, there are advanced nuclear technologies with little to no "first of a kind" (FOAK) challenges that can be constructed. If lessons from past successes and failures are applied, and the industry adopts a better delivery model, these technologies can be delivered on time and on budget.

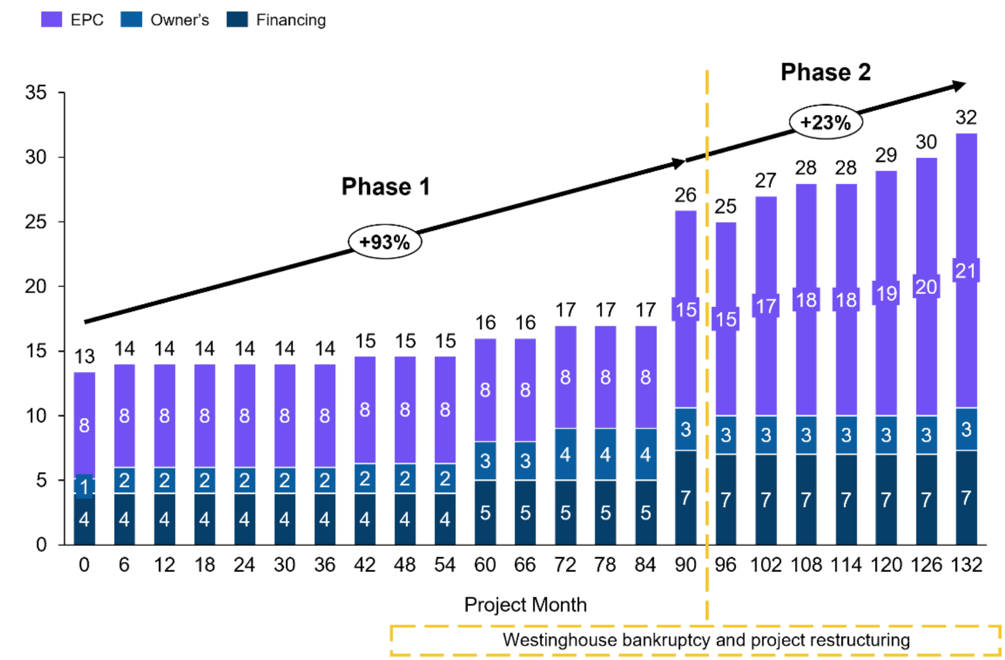
The Lesson of St. Lucie: A New Delivery Model

Most large, complex capital projects exceed budget and overrun schedules. Nuclear projects are especially prone to this. Megaprojects typically involve complex commercial and legal arrangement across multiple parties—owners, vendors, engineers, constructors and subcontractors. Each party works hard to manage its scope, preserve profitability and mitigate risk. Each also pads its estimates with contingencies, which accumulate and inflate total costs. Many owners also mistakenly attempt to mitigate risk through fixed-price contracts.

Contracts do not mitigate risk—they often worsen it. No contract, regardless of complexity, can eliminate the risks of executing a megaproject. Fixed-price contracts are particularly problematic: they increase initial costs through risk premiums and contingencies, and change orders often begin before the ink on the original contract is dry. Figure 1 shows the cost progression for Vogtle Units 3 and 4, where the owner believed their risk was fully mitigated by a fixed price contract.

[2] Lazard LCOE+

Figure 1: Total cost progression of Vogtle Units 3 and 4 by month, $B.[3]



Origin of Cost Category Increases

EPC – 68%

Original agreement assigned most construction risk to the contractor through a fixed price agreement, poor risk assessment and budgeting led to the eventual bankruptcy of the initial contractor. New contractor takes over and re-benchmarks in 2017, after which, costs have continued to rise

Owners – 11%

Various costs have been re-shuffled into and out of owner's costs over the years making it difficult to track contributions to cost change

Financing – 21%

Have primarily risen to due constriction schedule delays, leading to increased interest accruals

[3] Pathways to Commercial Liftoff: Advanced Nuclear Update

When issues inevitably arise, the best-equipped teams to resolve— field engineers and construction crews—are often sidelined while commercial and legal teams debate liability. Construction halts while attorneys argue over negligence, force majeure clauses, liquidated damages and change orders. Schedule slips and costs escalate.

However, successfully executed megaprojects—both nuclear and non-nuclear—have one thing in common: alignment across owners, EPC, vendors and subcontractors.

The St. Lucie team faced a hurricane, but they operated as one team. They focused on solving the problem, not assigning blame or allocating cost.

Ultimately, the owner of the asset—regardless of the contract—bears the project risk. That risk will return to the owner in one form or another because it is in their interest to see the project completed.

Successful megaprojects place all parties under the same tent, with the owner carrying the risk. Cost estimates are transparent and free of hidden contingencies. The schedule is fully integrated. Responsibilities are clearly defined and agreed upon by the execution teams, not lawyers. This arrangement actually improves vendor profitability by explicitly including profit in cost estimates.

Simultaneously, digitization, predictive tools, early coordination, standardization and modularization are improving foresight and repeatability—when embedded in an integrated model. A fully integrated team is best positioned to take advantage of these efficiencies, as they are not constrained by adversarial contract structures.

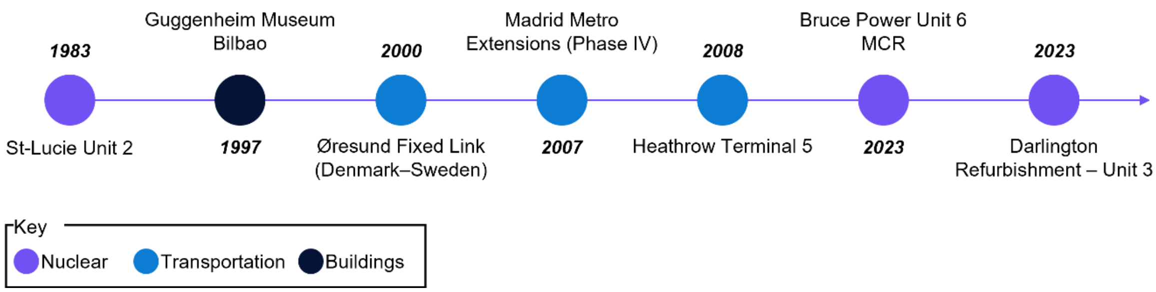
Lessons learned from Past Megaprojects

Bent Flyvbjerg, the world's leading researcher on megaprojects, has shown through numerous studies that most projects fail on cost and schedule—but the rare successes share common traits. His book How Big Things Get Done reveals that successful projects rely on deliberate front-end planning, not optimism or speed. Leaders who "think slow, act fast" define scope and lock designs early, then execute with discipline. He also emphasizes benchmarking forecasts against real-world outcomes, not wishful thinking. Projects that are modular, repeatable and led by unified teams are far more likely to succeed.

Flyvbjerg's research also highlights that projects exaggerate benefits on paper. Successful projects, in contrast deliver actual economic value and customer satisfaction because they are aligned with real demand. His analysis of transport and energy infrastructure shows conservatively scoped, demand-driven projects create lasting value for both investors and the public. In short, the goal is not only cost control—but delivering real value.[4]

[4] Flyvbjerg, B., & Gardner, D. (2023). *How big things get done: The surprising factors that determine the fate of every project—from home renovations to space exploration and everything in between.*

Figure 2: Time series of reference megaprojects completed on-time and on-budget



Extending the Concept: The Nuclear DevCo

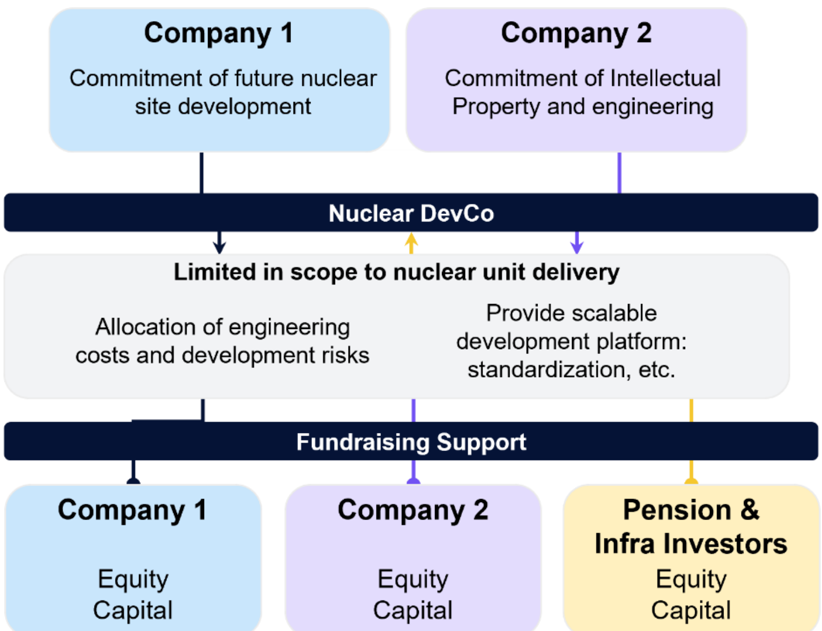
An important evolution of the integrated delivery model—and a critical step toward addressing new nuclear's economic challenges—is the concept of a Nuclear DevCo. The first few units will bear the brunt of engineering, regulatory and construction costs. Lessons learned and economies of repetition need to be spread across multiple projects to bring costs into a competitive range.

A Nuclear DevCo would be a strategic partnership among multiple owners, nuclear technology vendors, EPC firms and investors to commercialize multiple units of a given technology. It centralizes risk (open-book, pooled contingency), standardizes design, mobilizes a supply chain and sequences a 5–10-unit orderbook to ensure learning compounds. Done correctly, nuclear can reduce its LCOE by 35–45%, becoming cost-competitive without subsidies—and even more so with policies like IRA 45Y/48E and DOE LPO.

The message is clear: unless the delivery model changes, nothing significant gets built. But with an integrated model and a Nuclear DevCo, nuclear becomes bankable, repeatable infrastructure.

Figure 3: Sample Nuclear DevCo Consortium—partners, investors and requirements

Example Structure of a Nuclear DevCo



Key Stakeholders and Strategic Involvement

Company 1

- Committing the existing site and infrastructure for future reactor deployment
- Providing operational expertise and regulatory engagement
- Co-funding initial technology upgrades and life-extension R&D program

Company 2

- Contributing IP and engineering standards for reactor designs
- Leading permitting strategy under federal and state/provincial guidance
- Investing in digital construction automation to optimize schedules and margins

Pension & Infrastructure Investors

- Pledging equity capital to anchor DevCo's balance sheet and support scale-up
- Advocating governance frameworks that balance risk with long-term returns
- Leveraging federal and state/provincial support to enable project IRRs

Nuclear DevCo

- Focusing on the delivery of nuclear units and the completion of detailed design engineering (to construction readiness)
- Building a unified consortium (supply chain, contractors, labor) for delivery of project

Author

Christopher Dann
Senior Managing Director

The Global CEO Advisory Firm

Teneo is the global CEO advisory firm.

We partner with our clients globally to do great things for a better future.

Drawing upon our global team and expansive network of senior advisors, we provide advisory services across our five business segments on a stand-alone or fully integrated basis to help our clients solve complex business challenges. Our clients include a significant number of the Fortune 100 and FTSE 100, as well as other corporations, financial institutions and organizations.

Our full range of advisory services includes strategic communications, investor relations, financial transactions and restructuring, management consulting, physical and cyber risk, organizational design, board and executive search, geopolitics and government affairs, corporate governance and ESG.

The firm has more than 1,700 employees located in 45+ offices around the world.

teneo.com