World Nuclear Investment Guide



Developer and Investment Models: A Systematic Approach to Reaching Financial Close

A structured briefing for nuclear developers and sponsors, financial institutions, governments and other stakeholders offering a systematic, replicable approach and decision architecture for reaching FID more effectively.

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Contents

1. A Systematic Approach to Investment 2
2. The Developer Model 3
3. The Investment Model 5
4. Applying the Framework: Pathways by Market Type 11
5. Lessons From Practical Experience 14
6. Key Takeaways for Financial Institutions 16

References 17

Purpose

This module addresses how a project proposal can achieve investment readiness and reach financial close faster and more efficiently than current market practice. It proposes a decision architecture through a generic replicable framework that aligns stakeholders around a common structure and sequence of decisions.

The framework addresses reactor new build investment decisions for any design, capacity or supply chain in any market, independently of transaction-specific characteristics.

1 A Systematic Approach to Investment

The fundamental barrier to achieving final investment decision (FID) is a knowledge, coordination and structuring problem. The full value proposition to each project party must be known and agreeable to all the parties, but nuclear has a limited transactional track record at the project level, forcing developers and project sponsors to underwrite highly uncertain development-phase activities and risks, even though the technology itself is well-understood.

This lack of a nuclear transactional track record introduces unique new build developer risks: (i) parties do not know FID pre-conditions upfront; (ii) developers and host governments often pick a technology before assessing or agreeing to the investment case; (iii) weak, asymmetric information leads to decisions that cannot withstand review by independent external financiers; and (iv) governments and developers often lack the capacity or incentives to sustain confidence that FID is achievable. As a result, developers struggle to hit maturity milestones, financial backers lose confidence, and knowledge stays siloed while project financing is built sequentially, a slow, reworked and costly process. This is the pre-FID deadlock that a systematic decision architecture is designed to break.

The architecture described in this module is a generic, replicable framework for developers and their key commercial and financial stakeholders to consider.[1] It consists of two parts:

- Developer model: a structured discovery process that offers all stakeholders reciprocal lines of sight. Its form can vary by project, but it should give parties enough incentive to commit to the effort FID requires or, alternatively, a clear off-ramp for any stakeholder to exit early.
- Investment model: a development phase tool comprising seven sub-models which, as with heavy infrastructure generally, collectively underpin a project's competitiveness and financeability. It sets out generic transaction parameters to guide developers and key parties towards a timely FID.

The framework applies across all market types and financing models. Because it focuses on functions rather than actors, it does not prescribe whether a private or public entity performs a given function, only that the function is performed in a clearly defined way.

These tools and business logic are not unique to nuclear. Any infrastructure project requires clarity on how the asset will be built, who will own and operate it, how it will perform, how revenue will be generated and contracted, what role government support will play, and how the capital stack will be structured. For nuclear, the difficulty is not the questions themselves, but the lack of consistent, standardized, predictable and replicable answer to them, despite the high level of industry maturity and technological standardization. The framework provides that consistency, giving developers benchmarks for reaching FID by aligning multiple commercial and financial parties in a timely way.

Why a structured process matters

For developers, the framework converts an undifferentiated set of open questions into a defined sequence of information gathering and decision making, reducing the duplicated effort, restarts and renegotiations that have historically extended time to FID.

For governments, it provides a diagnostic tool to target support only where the market genuinely cannot close the gap, rather than defaulting to broad, open-ended commitments of operational capacity, policy attention, legislative support, public education, fiscal resources, financial and commercial guarantees or political capital.

For financiers, it creates a common reference point to assess how far a project has progressed towards financial close, and which conditions remain unresolved, before committing organizational resources to screening, relationship building, structuring, and pricing risk, ahead of what is usually a highly competitive process to negotiate and agree capital commitment terms.

Structured, iterative development does not remove risk from nuclear projects, but it enables methodical risk identification, reduction and mitigation. Identifying risks earlier raises confidence levels and creates a shared basis on which every party and stakeholder in the transaction can commit.

2 The Developer Model

The developer model describes the generic decision architecture rather than the specific journey a developer will traverse with its partners and counterparts.

This distinction matters because the industry's legacy developer model rests on non-competitive government procurement, where the host government or its agents absorb the project's full risk-reward profile, and carries its economics from inception to FID, often across the full asset lifecycle. Some governments instead take a competitive approach, via competitive dialogue or tendering. In either approach, the government developer operates in the same economic ecosystem as a private one, subject to the same discovery process of partner and stakeholder bounding conditions. No single model ensures economic equilibrium and FID, but some paths reach it faster and with greater certainty than current widespread market practice.

The developer model presented in the Guide offers tools and an approach that introduce efficiencies regardless of the specific identity, capacities or resources of the developer organization: it enables competitive pricing of value, cost and risk; allocates risk and reward through broader market participation; and protects value by enabling parallel rather than sequential decision-making.

Concretely, the developer model is a structured, multi-party process that enables the investment model, bringing all stakeholders together, before any commitments are made, to establish the conditions under which each could commit to the project. Rather than beginning with a target transaction structure and seeking counterparties' agreement to it, the developer model begins with each party's requirements as inputs and derives the viable transaction structure as an output. The result is an agreed set of conditions that each party has helped shape and can therefore commit to at FID. The developer model does not reduce the number of decisions that must be made before FID, but ensures they are made in the right order, by the right parties, with the right information.

The developer model serves four primary functions:

- Stakeholder coordination and confidence building: provides a structured forum in which all parties with a role in nuclear project delivery can contribute to the definition of the investment model, within a clear governance framework and with defined decision milestones.
- Risk allocation: creates the process through which risk is identified, assessed, and allocated to the parties best equipped to manage it, reducing uncertainty and information asymmetry and creating the basis for investable risk allocation frameworks.
- Option testing: allows available options across all seven investment model components to be systematically evaluated against market and counterparty thresholds, regulatory requirements, and investor criteria, for robust and fully informed commitments to be made at FID.
- Government support calibration: provides government with the diagnostic information needed to calibrate its support package, identifying where market gaps exist and what instruments are needed to sustainably address them.

These functions are designed to produce the following outputs:

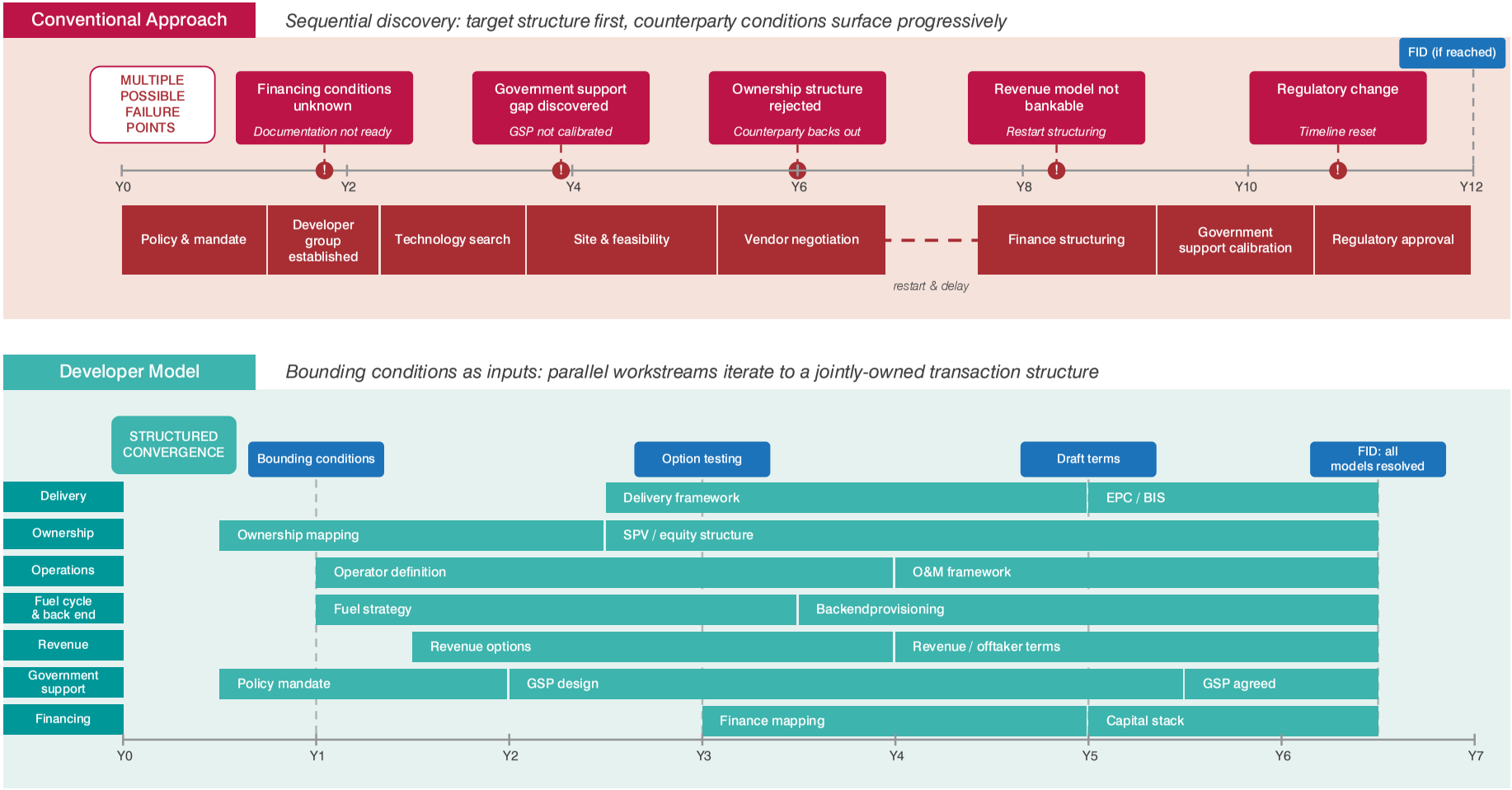
- Strategic alignment:
  - Validation of the investment thesis and transaction principles.
  - Agreed project scope and perimeter, and target investment model.
- Structure and risk allocation
  - Agreed project structure, key roles, and risk and reward allocation.
  - Government support parameters and developer incentives, resource, and limitations.
- Commercial and financial parameters
  - Key commercial term sheet and financial modelling assumptions.
  - Target base and downside case finance plan.
  - Identification of lead equity and debt arranger candidate banks and advisors.
- Path to FID
  - Detailed steps, accountabilities and timeline to FID.
  - Full suite of agreed project documents and agreements, plus any other specifications required for FID.

From discovery to decision: the case for a structured process

The conventional approach to nuclear project development has tended to follow a sequential logic: a target transaction structure is defined early, often at the political ('top-down') level, and counterparty conditions are discovered progressively as the process advances ('bottom-up'). This sequencing has, in some cases, resulted in repeated restarts and restructuring, extending the path to FID and, in certain circumstances, contributed to projects not proceeding for lack of developer funding and confidence across the project counterparties.[2]

A developer model inverts this logic by ensuring that top-level, societal, objectives can be delivered consistently with bottom-up, commercial and financial discovery. It maps the requirements of each party in parallel from the outset, iterating across all seven investment model components simultaneously. Rather than promising a predictable reduction in project timelines, this parallel two-way approach has the potential to reduce the iterative delays and repeated restructuring that have characterized the sequential approach, helping projects move towards FID with fewer surprises and fewer points of failure. This structured engagement also determines whether a private finance route is viable for a given project, testing investor appetite, financing constraints and acceptable government support arrangements before a formal capital raising process begins. Reaching this point before, rather than during, a transaction reduces the risk of weak investor participation, unfavourable pricing, restructuring, or delays to FID once a project has already gone to market.

How the developer model can accelerate the path to FID



Note: Timeframes are illustrative. Figures indicate the scale of delay the developer model targets, not a predictable time saving.

3 The Investment Model

The investment model represents the complete commercial framework that must be balanced and resolved for a nuclear project to reach financial close. It comprises seven interdependent sub-models, each with defined outputs representing decisions that financiers, developers, and counterparties must settle as a pre-condition to financial close. None can be resolved in isolation.

Sub-Model	Definition and Purpose	Strategies
Government support model	Package of public policies and instruments enabling nuclear projects to reach financial close on commercial terms. Government also acts as the cross-cutting actor whose decisions on regulation, procurement, revenue mechanism, and liability regime condition every other sub-model. Key deliverables: • Government support package. • Government agency specific functions: nuclear, environmental and energy regulators; permitting bodies; public consultations and interfaces and support; various ministries.	Enabling framework: Provides legal, regulatory and policy certainty: stable licensing regime; nuclear liability law; treaty/ intergovernmental agreement (IGA) frameworks; regulatory capacity; change-in-law protections. Equity & balance sheet support Enables sufficient private equity at acceptable returns: direct government equity; state utility co-investment; development capital grants; equity guarantees. Debt & credit support Enables pricing of nuclear risk through credit enhancement: sovereign loan guarantees; government direct loans; export credit financing; multilateral development banks (MDBs) and/ or development finance institutions (DFIs) concessional debt; blended finance structures. Revenue & market certainty Promotes long-duration revenue certainty: contracts for difference (CfDs)/strike price; regulated asset base (RAB); power purchase agreements (PPAs) (government or corporate); clean energy standard; capacity markets. Fiscal & cost incentives Equalizes project economics against subsidized alternatives: production tax credits; investment tax credits; reduced corporation tax; accelerated depreciation; R&D incentives. Risk backstop Provides backstop for risks that markets cannot absorb: construction overrun indemnities; change-of-law compensation; nuclear liability cap/ indemnity; political risk insurance; insurer/funder of last resort.

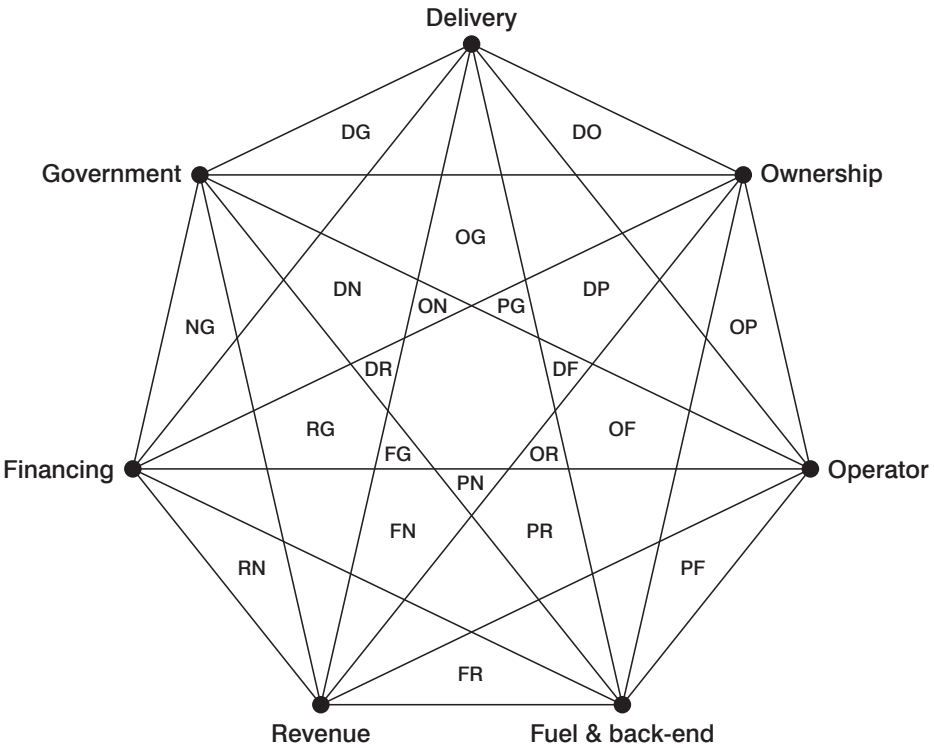
Sub-Model	Definition and Purpose	Strategies
Delivery model	Contractual framework between the owner and its technology and construction partners defining plant's engineering and design, licensing, consenting, procurement, construction and commissioning, project management and reporting, oversight, incentives/penalties, financing, cost, contingency and risk. Key deliverables: • EPC/delivery contract arrangements and structure. • Partner selection. • First of a kind (FOAK) / Nth of a kind (NOAK) incentives and transition plan.	EPC turnkey model: Single contractor/consortium assumes full responsibility with price guarantees. Split package: Responsibility shared among various contractors. Multi-contract: Owner manages overall interface with multiple contracts for distinct categories. Delivery consortia: Owners and contractors share ownership, operational, or financing structures based on capabilities and risk appetite, such as BOO (build-own-operate), BOOT (build-own-operate-transfer), BTO (build-transfer-operate), and other traditional IPP (independent power producer), and concessionary templates. Collaborative/Integrated Project Delivery: Owner, designer and constructor(s) enter a single multi-party alliance agreement that shares risk and reward and aligns incentives across the project team.
Ownership model	Legal and governance structure defining project equity ownership, decision-making, functional responsibilities, financing and financial risk allocation. Key deliverables: • Ownership structure. • Equity co-investment terms. • Governance arrangements.	Sovereign ownership: Reliance on governments directly owning either the plant, or through SPV. Corporate ownership: Reliance on private sector to own the plant or SPV. SPV ownership: Plant's capacity to raise external finance with limited-recourse facilities, project intrinsic cashflow generation, and risk profile. Consortium: Multiple investors share equity (industrial, financial, sovereign wealth). Cooperative (Mankala): Owner-offtakers jointly finance the project and receive project energy at cost, in proportion to their equity share.
Operator model	Organizational and contractual arrangement defining the plant's safety and reliably standards as well as performance terms backing revenue projections. Key deliverables: • O&M contract structure. • Performance benchmarks. • WANO/IAEA compliance framework. • Operator organization.	Integrated owner and operator: Full operational control of the plant by existing owner. Separated owner and operator: Emerging model enables plant ownership and financial structures separate from operator ownership. Vendor partner-supported operation: Technology vendor or delivery partner provides operational support from development through start-up, with a regulator-approved transition plan to train and qualify domestic owner/operator teams (particularly relevant for newcomer countries).

Sub-Model	Definition and Purpose	Strategies
Fuel cycle & back end model	Framework governing the supply, costs, and liabilities for the entire nuclear fuel cycle, from uranium procurement to spent fuel management, decommissioning and long-term obligations. Key deliverables: • Fuel supply strategy and contractual arrangements. • Spent fuel and decommissioning licensing and regulatory requirements. • Used fuel management and disposal licensing, operations and funding. • Decommissioning framework, assumptions and risks, financial structuring and funding.	**Fuel supply strategy:** Bundled or unbundled delivery of uranium ore and fuel services. Technology partner-sourced services versus owner-tendered competition. Long-term uranium contracts; diversified sourcing. **State-managed decommissioning fund:** Dedicated fund managed by the government, which collects payments from the plant. **Owner-based liabilities management:** Investments by the owner of the nuclear plant as a share of its revenue to face long-term decommissioning obligations. **Existing nuclear waste fund:** The fees paid by nuclear plants to finance the future costs of managing and disposing spent fuel and waste products.
Revenue & cost recovery model	Mechanism determining the value-added services, route to market, basis for cost recovery and cashflow generation, and resulting cashflow quality across the lifecycle of the project. Key deliverables: • Route to market. • Revenue mechanism features, incentives and penalties, longevity and durability. • Lifecycle net operating cashflow profile and quality assessment. • Revenue enhancements (as necessary: uplift, bonuses, subsidies). • Revenue counterparty identity, and financial strength.	**Power purchase agreement (PPA):** Private contract between the owner and offtakers. **Cost recovery:** Regulated utility system or RAB model, economic regulatory framework letting operators recover efficiently incurred costs, depreciation and a regulator-set return on a defined asset base through customer charges, with the regulator periodically setting the cost of capital and balancing consumer affordability against the need to attract long-term investment **Fixed price for power (*e.g.* CfDs):** Contract between government (or a government-backed offtaker) and the owner setting a fixed strike price for power, which may be indexed and include caps, floors or carve-outs reflecting agreed risk allocation. **Guaranteed demand (clean energy standards):** Government programme mandating the purchase of a certain amount of clean energy. **Cooperative (Mankala):** Offtakers are also owners, so power is delivered at cost reducing revenue volatility and, ideally, passing owners' lower corporate cost of capital through to the project SPV. **Emissions-avoidance certificates:** Premium paid to generators of low-emissions power.

Sub-Model	Definition and Purpose	Strategies
Financing model	Framework structuring project funding to turn the investment model into a bankable asset and secure liquidity across its entire lifecycle. Key deliverables: • Lifecycle financing strategy. • Finance plan (development phase) • Finance plan (construction/completion phase). • Target end-state financial structure. • High confidence levels in funding support for project development, delivery, operations and end-of-life. • Cost-of-capital targets. • Investable and bankable insurance arrangements and contracts.	**Government led:** Support for financing as part of the ownership structure through an equity stake or public loans or loan guarantees. Export credit financing. **Vendor led:** Funding by the vendor through direct equity stake in the projects or by mobilizing export credit agencies (ECAs) to provide a part of debt financing. **Owner led:** Sufficient resources at disposal of the owner of the plant, ability to provide a joint debt and equity support. **Blended finance:** Maturity transformation by DFI and MDBs to accommodate market time preferences (enabling more efficient value transmission without introducing moral hazard), refinancing support taking an agreed level of roll-over risk, and first-loss tranches that absorb tail risk and catalyze commercial capital. **Offtaker-led:** Reduces revenue risk through equity stake, advance payment facilities, long-term PPA.

For how risks are allocated and mitigated, see *Common Nuclear Project Risks: A Reference Table*, which provides additional detail on risks, mitigation strategies, and case studies for each investment model component.

How the sub-models interface



Interface	What it informs
Delivery ↔ Financing (DN)	Funding runway to FID, cost/schedule of completion strategy including contingency funding, risk allocation, incentives/disincentives across delivery partners
Delivery ↔ Fuel (DF)	Target delivery cost and schedule, target unit operating profile and performance, commercial and technical support arrangements, financing
Delivery ↔ Government (DG)	EPC/delivery programme specifications and risk allocation acceptable to delivery partners and owner, permitting and consenting, nuclear safety and licensing, environment, sites, grid, codes and standards, industrial supply chains and localization, technology transfer, human capacity building, financing supply chain
Delivery ↔ Operator (DP)	Owner/operator and nuclear regulator coordination, operational readiness programme
Delivery ↔ Ownership (DO)	Development runway to FID, target cost, schedule, unit performance, definition & achievement of financing milestones, FID, lifecycle operations, capital recovery/refinancing and exit
Delivery ↔ Revenue (DR)	Delivery cost and schedule, unit-level costs and performance, availability, vendor/contractor guarantees and incentives, insurance programme, lifecycle costs and performance
Financing ↔ Government (NG)	Equity support, debt guarantees, base case and backstop liquidity, multilateral bank engagement, third-party investor and creditor rights, financial incentives and penalties, legal enforcement, interest/lending rates, country risk premia, value-for-money specifications/ limitations, state aid (EU), scoping of overall government support package and effectiveness in plugging market gaps
Fuel & back end ↔ Government (FG)	Nuclear safety and licensing, fuel lifecycle management arrangements, costs and liabilities, treaty interfaces, supply chains and financing
Fuel ↔ Financing (FN)	Validation of financing-related assumptions for initial core, commissioning programme, early-stage operations, refuelling assumptions, unit operational performances, insurance, and lifecycle operations (operating profile, costs, risks)
Fuel ↔ Revenue (FR)	Fuel availability, cost and performance risk allocation
Operator ↔ Financing (PN)	Validation of pre-operating and operating-phase assumptions, including operational readiness programme
Operator ↔ Fuel (PF)	Plant operations, availability management, fuel supply strategy
Operator ↔ Government (PG)	Nuclear operator licensing, human capacity building, relevant treaties and legislation
Operator ↔ Revenue (PR)	Availability & dispatch profile, outage management, lifecycle maintenance/operations, operator/offtaker incentives and disincentives
Ownership ↔ Financing (ON)	Financing parties, equity and debt support, contingent funding support, capital drawdown and recovery ordering and rates, incentives/penalties, risk allocation
Ownership ↔ Fuel (OF)	Technical, commercial and financial arrangements
Ownership ↔ Government (OG)	Ownership rights and restrictions, equity incentives and support, strategic partnerships, investor political risk protection and indemnities
Ownership ↔ Operator (OP)	Regulatory interface, incentives and penalties, operational readiness programme
Ownership ↔ Revenue (OR)	Route to market, market remuneration, subsidies, equity/offtake risk sharing and upside/ downside allocation
Revenue ↔ Financing (RN)	Revenue requirements/adequacy of forecasts and offtake specifications inform equity, debt and capital recovery requirements and rates
Revenue ↔ Government (RG)	Site availability, grid access and compliance, power/heat market design, route to market, revenue subsidies and fiscal incentives

The strategic role of government

Government's role operates on two levels and is currently key to coordinate and catalyse private investment in most markets. As instrument provider, government supplies the direct instruments that make up the government support package (GSP). As an enabling authority, government's decisions on regulatory framework, procurement process, revenue mechanism, and legislative liability framework also condition how every other sub-model can be structured and how every other stakeholder can act.

This cross-cutting role operates at two levels:

- At the project level, government influences the terms on which private capital can engage: the revenue mechanism, the risk allocation backstop, the regulatory framework, and the availability of public debt or equity.
- At the programme level, government determines whether a pipeline of comparable projects would add value to the economy and support national policy and can calibrate its support to be fit for purpose and cost-effective.

In practical terms, the government decisions constrain or enable each of the other six sub-models in sequence. Across sub-models, government frequently functions as a risk backstop, absorbing exposures beyond the level markets are willing or able to price on their own.

- The delivery model depends on government's willingness to commit to a procurement process, provide permitting, siting and licensing pathways, and backstop construction risk.
- The ownership model reflects who government permits or incentivizes to hold equity, including through strategic partnership requirements.
- The operator model depends on government-issued nuclear operator licensing, treaty frameworks, and the capacity-building support needed to sustain a qualified operator base.
- The revenue model is in most markets a public contract (CfD, or offtake agreement) or license (RAB) that determines route to market and is required to structure debt.
- The fuel cycle and back end model rests on legislative frameworks for waste liabilities and treaty interfaces that only government can define.
- The financing model is anchored by the GSP, which determines the cost of capital for every tranche above it.

None of this implies that governments must procure, own, operate or incentivize nuclear reactor projects. It implies that government should decide and articulate early and clearly what it will and will not provide, based on an informed consultation with the market. The developer model's primary function is to give government the diagnostic information it needs to make those decisions well, to calibrate its support to the actual conditions of the market. Delayed, ambiguous or reversible government decisions increases the risk of an unresolved investment model and delays to FID even where other components are well developed.

See Roadmap to Mainstream Finance for additional information on the evolving role of government in nuclear financing.

4 Applying the Framework: Pathways by Market Type

The investment model framework applies across all nuclear market contexts, but it varies materially by market type. The three pathways below illustrate how the framework could be applied.

Dimension	Large Reactor (competitive energy markets)	First-of-Fleet SMR	Newcomer Country
Delivery model	Split package or multi-contract with experienced national owner, licensee and contractor base.	EPC turnkey (factory-build model) with high certainty on cost, schedule and unit performance. FOAK risk retained by vendor/ government.	Government procurement-led and NEPIO-enabled, via IGA with technology vendor country; choice of technology and delivery partner determines the other model elements. Tendering approaches vary (sole source, competitive dialogue, competitive tendering) with mixed results to date. Where vendors or developers pursue commercial or private-led approaches instead, visibility on the government position and broader developer framework remains essential for market confidence.
Ownership model	Corporate or consortium. SPV drawing on sponsors' balance sheet capacity, supplemented by government support as needed, subject to standard value for money and competition requirements.	SPV with sovereign co-equity. Government FOAK backstop support may be required. Where available, balance sheet is ring-fenced and returns are enhanced through government agency support.	State-owned utility or SPV with sovereign guarantee (direct or implied). Limited 3rd party private equity. Ownership and revenue models vary.
Revenue model	Route-to-market options include long-term PPA, regulated revenue mechanisms and government-backed structures, all with strong offtaker quality, often complemented by market premia and tax credits or other fiscal advantages. Cooperative models, such as the Finnish Mankala and French Exeltium structures, transfer value efficiently between owners and offtakers.	Revenue relies on dedicated commercial offtake from end-user groups, typically structured as a corporate PPA combined with other revenue mechanisms.	Government offtake agreement (PPA with state-owned nuclear utility assimilated to sovereign or quasi-sovereign credit). No merchant exposure.

Dimension	Large Reactor (competitive energy markets)	First-of-Fleet SMR	Newcomer Country
Government support model	Government support covers 5 key market gaps: (i) Equity backstop through state-owned utilities and/or a ProjectCo SPV, (ii) Debt backstop through ECA guarantees, funding, or national infrastructure or public development banks, (iii) Revenue backstop through various frameworks (*e.g.* PPAs, tax credits, government-backed payor, regulated-return remuneration models), (iv) Project risk allocation through commercial contracts or regulations that relieve project partners from damaging financial loss, and (v) Investor/lender select indemnities on specific threshold risks.	Government support has varied across developers. It includes: (i) visibility on licensing, permitting and siting; (ii) revenue certainty and support; (iii) government incentives or funding for FOAK deployment; and (iv) in some cases, fleet-level visibility from government (*i.e.* multiple orders).	Financing is sovereign backed, secured through IGA, Ministry of Finance guarantees. International banks may participate, typically in tranches backed by ECAs from vendor country.
Financing model	Vendor and owner-led with government support at FOAK; shifts progressively to market balance sheets (commercial banks, ECAs, strategic and institutional investors) between first-few-of-a-kind units and NOAK units. Government-led at FOAK; shifts to commercial banks, ECAs and institutional investors at NOAK.	Vendor and owner-led at FOAK with meaningful government support and visibility on fleet build out; shifts to blended and commercial finance at NOAK. DFI/MDBs may deploy maturity transformation capacity to smooth risk/return variance and accommodate participants' time preferences over long-dated fleet deployment.	Host and export government support anchor the finance plan as required. ECA financing offers risk-sharing with the market through covered loans, direct funding and creditor support. DFI/MDBs can provide credit support at the ProjectCo or key party level: commercial A/B loans, commercial and political risk insurance (including for equity), tailored risk allocation (currency convertibility, change in law, breach of contract), and concessional tranches, Commercial investors and banks typically require meaningful levels of ECA or MDB support.

Blended finance stack for newcomer markets

Blended finance is the strategic use of concessional or public funds to mobilize commercial capital on terms that would not otherwise be achievable.[3] It is the standard financing architecture for infrastructure projects in emerging and newcomer markets. It is not a single instrument but a layered capital structure in which each tranche serves the distinct purpose to absorb a risk that the tranche below it cannot bear at acceptable returns.

The table below describes a generic capital structure for a newcomer country nuclear newbuild project at FID. Terms apply equally to large reactor and SMR designs, unless specified otherwise. Removing any tranche without substituting an equivalent risk-transfer mechanism would make the layer below it infeasible.

Instrument	Primary providers	Indicative share of total project investment cost
1. Government equity/sovereign balance sheet	Host government; state-owned utility; sovereign wealth fund; strategic partner government	10-25%[4] with majority host country ownership. SMR ProjectCo may be majority or fully private, typically alongside ECA/MDB and host/export government participation in risk allocation and capital structuring.
2. Intergovernmental agreements (IGA)/ vendor country bilateral loan	Vendor country (Export-Import banks, state banks); G2G bilateral loan	30-80%[5] Joint government underwriting can anchor the finance plan and support market confidence, whether market participation occurs at FID or later.
3. MDB/DFI concessional or uncovered financing	World Bank Group, regional multilateral development banks, national development banks	10-20%[6] (extrapolated - not yet established) MDB capital deployment can reduce the cost of capital when MDB engagement includes (i) pre-FID policy dialogue, (ii) development phase engagement to identify and assure market gaps and (iii) unfunded commitments and risk allocation such as rollover or refinancing risk, alongside standard MDB instruments.
4. Political risk guarantees/partial credit guarantees	MIGA, bilateral ECAs	(no capital tranche) Existing MDB partial risk guarantees, and political risk insurance can be deployed to accommodate market time preferences, which are currently shorter and more restrictive for nuclear than for conventional energy infrastructure. Extensions of these products for nuclear-specific risks may be needed to cover state commitments on nuclear infrastructure build-out, including implementation of specific nuclear-enabling laws and treaties, regulatory capacity, spent fuel storage, treatment and disposal, decommissioning regime, nuclear liability and broader commitments on workforce development, localisation, community participation, and public education.
5. Commercial bank debt (with credit enhancement)	International commercial banks	10-25%[7] International commercial banks are often treated as the benchmark for mainstream finance, alongside ECAs and MDBs, but this may set an unnecessarily high bar where regional or domestic banks and investors can deliver the target finance plan at FID.
6. Revenue support	Host government, sovereign-backed utility, international PPA buyer, often with counterparty risk protection to the project (via MDBs, sovereign and/or ECAs)	(no capital tranche)

5 Lessons From Practical Experience

The developer model and investment framework presented in this Guide reflect an aggregated, composite view of best practices from around the world, from expansion markets to newcomers, and greenfield water-cooled large reactor projects to plant uprates and expansion projects.

SMR and/or advanced reactor projects remain largely in the pilot demonstration phase, relying essentially on strategic owner, venture capital and government funding. For these reactors, achieving FID on a commercial basis likely remains multiple units and several years away. Nonetheless, numerous project organizations are deploying developer models with target investment frameworks congruently with many of the practices presented in this Guide.

Standardized decision frameworks with developer and investment models are not new. The first known initiative to publicize a systematic approach to investment was presented by EY pursuant to an extensive market sounding process for Swedish industry in 2024.[8] The Swedish government, with support from advisors, subsequently developed and published a competitive framework for developers to apply for state support, designed to deliver government energy policy with maximum transparency, proportionality and a minimum level of market disruption. Other nuclear new build developer models have been initiated and are being-tested with government endorsement in the US, UK, Finland, Netherlands, Czechia, Romania, Poland, Türkiye, Saudi Arabia, Norway and Estonia.

Although there are no clear examples of a country running the full framework as defined in this module, there are countries that effectively performed the developer function informally or through state structures, and that outline the benefits of a structured approach.

Historical analogues where the developer function was effectively performed include:

- China. State-owned enterprises (CNNC, CGN, SPIC) have performed the developer function under a continuous government mandate, using standardized designs and integrated supply chains. As in France and South Korea, a single vertically-integrated and fully resourced owner/developer entity with a clear mandate removes the multi-party convergence problem that the developer model is designed to solve.[9]
- France (1970s-80s). EDF, as a vertically-integrated state utility, performed all developer model functions internally, defining ownership, delivery, revenue, financing and operator structures simultaneously, with government as counterparty and backstop, and Framatome (as a then-separate vendor/designer body) as the delivery partner and contractor under EDF's architect-engineer control. Commercial negotiations were limited, because the discovery problem was substantially reduced: France built 56 reactors in roughly 15 years, at costs still referenced for NOAK economics in Western markets.[10]
- South Korea. KEPCO, as a single vertically integrated state utility, performed comprehensive developer-model function for the standardised APR1400 programme under continuous government ownership.[11] Similarly to EDF in the 1970/80s, KEPCO has acted continuously as the owner and client organization to KHNP, the technology vendor, and key party in the delivery model for construction, fuel and financing.
- UAE (Barakah). ENEC was established in 2009 as a dedicated and fully resourced owner/developer entity with a government mandate and the authority to engage counterparties across the full investment sub-model set.[12] As a nuclear newcomer, ENEC experienced a very steep learning curve, much of which was front-ended and ownership, operations, revenue, financing, delivery, and fuel arrangements for start-up were largely resolved in parallel before construction began rather than sequentially.

- **UK (Sizewell C).** The UK Department for Energy Security and Net Zero (DESNZ) performed the developer function explicitly, mapping counterparty conditions, designing the RAB revenue mechanism, negotiating the ownership consortium, and coordinating the export-credit debt package. Reaching FID in July 2025 and financial close in November 2025,[13] Sizewell C can be seen as the first completed real-world test of the structured developer model in a liberalized, private capital market.
- **Russia (Rosatom).** Rosatom State Atomic Energy Corporation has performed the developer function through a vertically integrated model. The corporation has delivered multiple series build programmes domestically and executed export contracts through IGAs (Akkuyu in Turkey, El Dabaa in Egypt, Rooppur in Bangladesh). The Russian model demonstrates series-build learning curve effects, integrated supply chain management, and export financing.

Where the structured developer model is now being tested:

- **Sweden.** This country has gone very far in formalizing the developer model as a replicable standard, drawing on the EY-documented framework designed for use by any developer, not a single state actor. No project has reached FID yet, but the framework is reported to surface real conditions faster than vendor-led, ad hoc or unstructured processes. The government has since appointed a national nuclear coordinator and financing-model investigator and announced SEK 400 billion in credit guarantees.[14]
- **Czech Republic.** The EDU II project illustrates early-stage partnership between government and utility. State utility ČEZ initially identified its financial/commercial bounding conditions (financing capacity, risk appetite and operational parameters) following standard financial and commercial practices, for a nuclear new build unit at Dukovany. Following a competitive tender, KHNP was selected as preferred contractor. The government worked closely with CEZ and the KHNP-led consortium to identify commercial and financial gaps to achieve FID, resulting in an extensive government support package (equity support, high leverage and full funding of debt by government, long term CfD) with strong risk allocation giving ČEZ a defined route to market and capital recovery.[15]
- **Canada.** OPG ran a highly disciplined and successful development process across multiple vendors, designs, sites and business plans, to ultimately secure a positive FID on its Darlington New Nuclear Project in May 2025. This milestone informed the federal government's June 2026 Nuclear Energy Strategy[16], signalling the start of what is likely to be a formal developer and investment model process. The strategy targets construction starts on two large-scale reactors by 2035 and five more planned or under development by 2040, alongside efforts to attract private capital, including pension and sovereign wealth funds, for successive projects. A draft policy on federal financing of new nuclear power projects, due by April 2027, is expected to set out the preconditions for federal support and define the government support and investment sub-models (including green bonds, Canada Infrastructure Bank participation, and loan guarantees), explicitly drawing on recent risk-sharing structures, such as in Sizewell C in the UK, and defining ownership, and financing arrangements between federal, provincial governments, and private partners.
- **US, Poland, Finland, Estonia, Slovenia, Türkiye, Saudi Arabia and Norway.** These countries are earlier-stage examples where elements of the developer function are underway (nuclear energy programme implementing organizations (NEPIOs) or equivalent, technology selection, GSP design), but no government has yet formalized or announced a full developer model on a nuclear newbuild project process through to FID.

6 Key Takeaways for Financial Institutions

- Nuclear projects can fail because the parties who must each commit cannot agree, in time, on who bears which risk for which rewards and on what terms. The investment model presented in this module reflects the complexity and variability of financial outcomes across the multiple parties to a nuclear reactor project.
- The framework applies project finance discipline to identify the conditions for a project's economic equilibrium, and the basis on which it can or should proceed. Nuclear needs answers to the same questions as any other asset (how it will be built, who will own and operate it, how revenue will flow and for how long, what the incentives and penalties are, and how the capital stack will be structured). What has historically been missing is a replicable framework for reaching those answers efficiently.
- No component can be resolved in isolation. The seven sub-models of the investment model are mutually reinforcing, and best practice indicates they must be worked in parallel.
- Government is a counterparty in every sub-model, not only in the government support model. The government has a key role in facilitating the entry of private capital in nuclear projects by orchestrating cross-government programme and project level enablers and providing long-term signals that investors can assess.
- FOAK and NOAK are different investment propositions. FOAK projects require well-capitalized investors (including government) with venture capital, equity and grant-led development phase financing. Financiers must tolerate binary risks around licensing and approvals, and high uncertainty on cost, schedule and unit performance that determine whether scale is ultimately achieved. NOAK projects, backed by a series construction track record, can attract commercial banks, infrastructure funds, and institutional capital on terms comparable to other large-scale energy infrastructure.
- Much of the capital to be deployed sits between FOAK and NOAK, in first-in-a-while, first-few-of-a-kind and first-of-a-fleet projects. These projects carry materially reduced binary risks but retain variance-type risk, such as regulatory timelines, construction interfaces, labour productivity and cost of materials and cost of debt, which can be in principle be priced.
- The practical implication for financial institutions is diagnostic, not prescriptive. This module does not recommend a project structure or a capital stack. It provides the analytical architecture for a financier or any project stakeholder to identify, at any stage of a project's development, which components of the investment model are resolved, which are not, and what conditions would need to be met before a credible financing proposition exists. That diagnostic capacity is the foundation of any informed capital allocation decision in this sector.

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