

From Demonstrations to a Fleet

A Quantitative Case for Coordinated SMR Deployment in the European Union

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Prepared by Politecnico di Milano with support from CATF

CLEAN AIR TASK FORCE

Executive Summary

The quantitative analysis presented in this brief shows that the economics of SMRs in the EU will be mostly determined by the scale and coordination of deployment across Member States.

The findings consistently show that moving from isolated, first-of-a-kind (FOAK) projects to a substantial orderbook delivers major reductions in electricity costs through learning, standardisation, co-siting, and more efficient financing. Importantly, the analysis finds that **many of these benefits can be achieved through a coordinated deployment of approximately 5–8 GWe, which is possible for a large country or, more likely, through collaboration among countries**. These results, of general validity, suggest that the EU's primary policy challenge is to create the industrial, regulatory, and financial conditions that enable coordinated fleet deployment and the replication of design and project delivery chain across countries.

The following delves further into the findings of the quantitative analysis and subsequent recommendations for the policy actions needed to translate these findings into a practical European deployment strategy.

- Deployment scenarios range from a total capacity of 0.1 GWe to 51.2 GWe, across sites of 100, 400, 800, and 1600 MWe with reactor sizes of 100 MWe and 400 MWe.
- Results are expressed in real 2026 €/MWh under optimistic and conservative cost assumptions.[1]

Key Findings:

Results indicate that the cost of electricity from SMRs in the EU will be significantly influenced by whether a coordinated, multi-country fleet approach is implemented. An orderbook of at least 5-8 GWe, deployed in multi-unit sites, and financial de-risking together capture a substantial share of the achievable cost reductions, i.e. it achieves a relevant share of the savings expected by the so-called "economies of replication" or "economies of multiples".

Five key insights include:

1. LCOE (Levelised Cost of Electricity) falls with increasing total installed capacity and larger site configurations. **Over 50% of the savings that would be achieved with a large fleet (50 GWe or more) due to learning and co-siting are already captured at 5-8 GWe.**
2. **Doubling the site capacity from 400 to 800 MWe leads to a cost saving of around 2-8 €/MWh through shared fixed costs;** the **value increases to 6-12 €/MWh as the site capacity is scaled from 400 to 1600 MWe.**
3. **The 100 MWe single unit reactor size diseconomy of scale,** relative to a 400 MWe single unit reactor size, shrinks from 20-34 €/MWh at the single-unit scale **to 5-11 €/MWh for large, coordinated fleets**.
4. **Financial parameters, overnight cost, and capacity factor are the drivers that most influence LCOE.** Policies should focus on financial de-risking, capital cost reduction through industrial policy, construction schedule management to avoid delays, and utilisation protection through offtake design.
5. **Nuclear plant's LCOE is highly sensitive to the cost of financing.** Innovative capital structures, which leverage innovative risk-sharing instruments (CfD, RAB, sovereign loans, public co-investment) to attract private investments with targeted public capital, can effectively lower LCOE of nuclear projects.

[1] Assumptions can be found in appendices.

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SECTION 1

LCOE Analysis: The Fleet Effect

The overnight construction cost (OCC)[2] and the way SMR projects are financed are the two variables with the largest impact on LCOE (confirmed by the sensitivity analysis reported in Section 2). This first section examines the first of these, showing how coordinated fleet reduces OCC through learning and co-siting. Across both optimistic and conservative assumptions,[3] and for both 400 MWe and 100 MWe SMRs, the same structural pattern is evident: LCOE declines as total deployed capacity increases, and further when units are grouped into larger sites. This indicates that the economics of SMRs depend less on isolated first projects and more on whether a repeat-build program of sufficient size can be created. **The key is to move from first-of-a-kind (FOAK) towards a fleet deployment strategy with standardised procurement, coordinated licensing, serial construction, supplier learning and shared operating experience.**

Acording to the analysis carried out by the authors, a coordinated multi-site and within EU, likely multi-country programme at the 5-8 GWe scale would be sufficient to capture a substantial share of the achievable cost reductions (roughly half to two-thirds, depending on reactor size and configuration). In policy terms, the priority is therefore to create a bankable pipeline large enough for industry to invest in factories, qualified labour, component standardisation and construction capacity with confidence to reach the minimum viable scale.

Site Size as Key Driver of SMR Orderbook Cost Savings

Larger sites systematically outperform smaller ones; doubling the capacity of the site from 400 to 800 MWe leads to a cost saving of around 2-8 €/MWh with respect to the 400 MWe site LCOE values through shared fixed costs. The cost reduction benefits increase to 6-12 €/MWh as the site is scaled from 400 to 1600 MWe. This effect is relevant for both reactor sizes of 100 and 400 MWe. Grid connection, security, emergency planning, control facilities, maintenance capability, local services and site management all contain fixed (or semi-fixed)-cost elements.

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[2] Defined as "The base construction cost plus applicable owner's cost, contingency, and first core costs. It is referred to as an overnight cost in the sense that time value costs (IDC) are not included (i.e., as if the plant were constructed "overnight" with no accrual of interest [OC = TCIC – IDC]). The total overnight cost is expressed as a constant dollar amount in reference year dollars" (so no cost escalation): https://www.gen-4.org/gif/upload/docs/application/pdf/2013-09/emwg_guidelines.pdf. Also consistent with IAEA glossary and IAEA Economic Evaluation Of Bids For Nuclear Power Plants 1999 Edition

[3] Analysis based on the assumption of a sufficient number of EU countries collectively deciding on a standard SMR design and sharing the supply chain, i.e. an EU orderbook. See methodological appendix for details.

Figure 1: 100 MWe – LCOE falls as fleet grows (learning curve)[4]

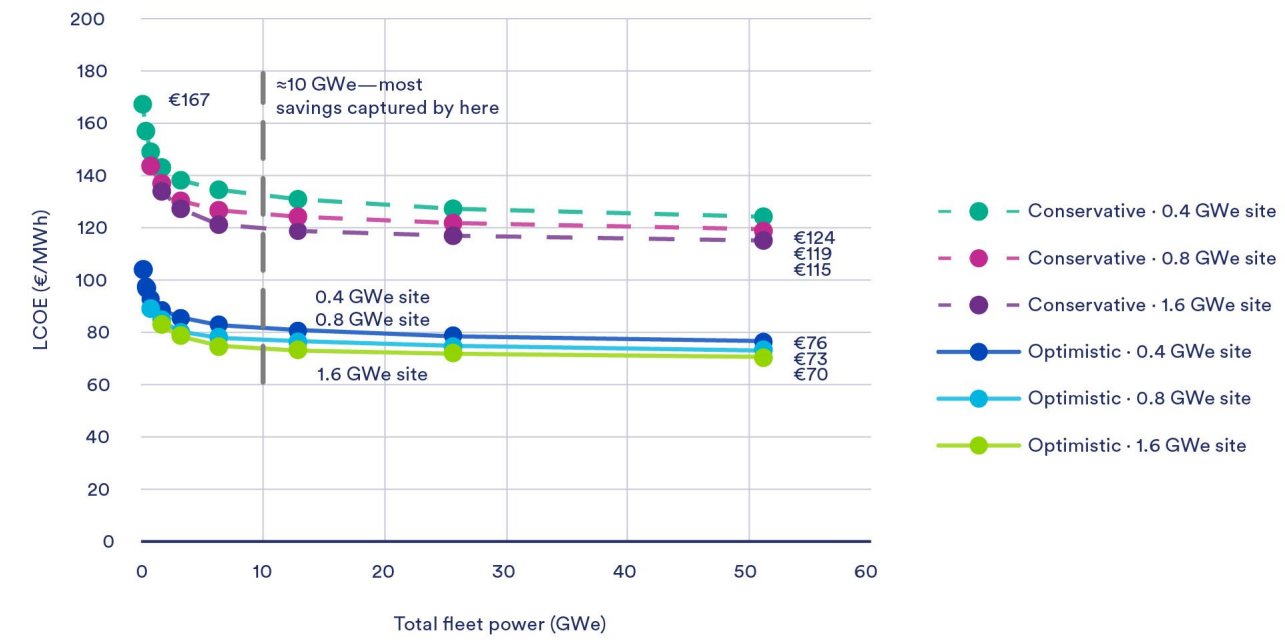
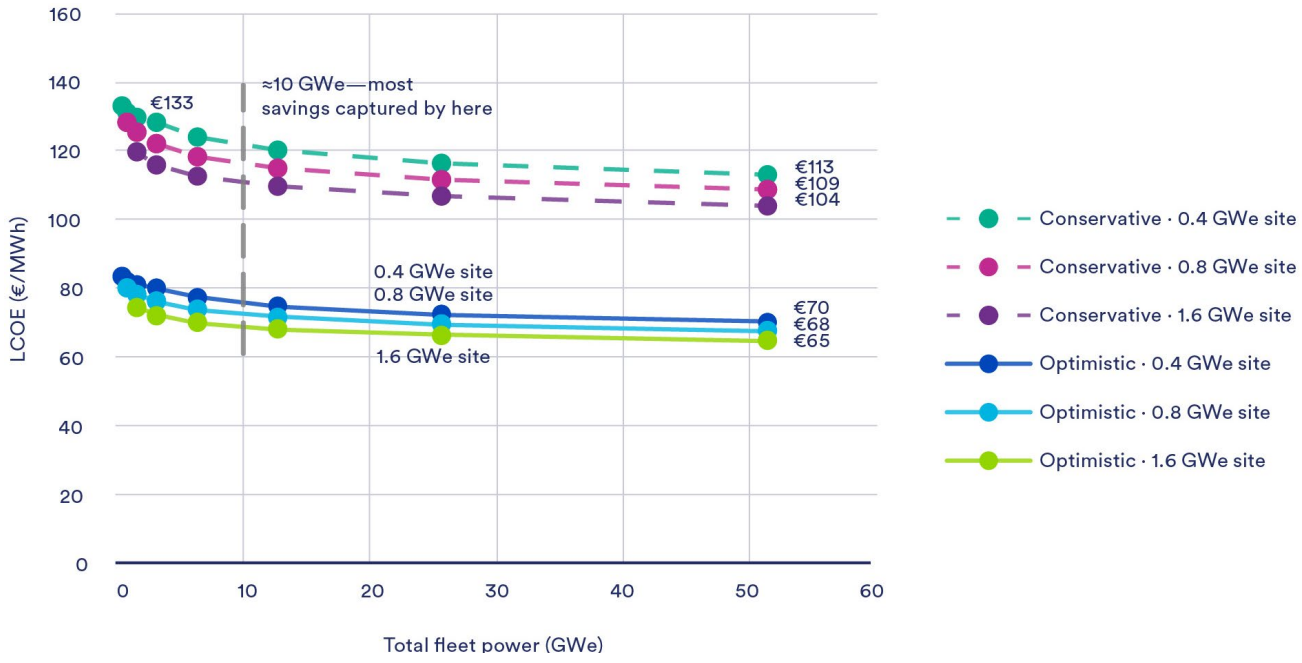


Figure 2: 400 MWe – LCOE falls as fleet grows (learning curve)



[4] In this report, LCOE is calculated using INCAS, an integrated discounted-cash-flow model, and reflects the full modelled lifetime cost of electricity generation: overnight construction cost (OCC), operation and maintenance, fuel-cycle and decommissioning costs, together with the cost of financing arising from the debt/equity structure and the respective costs of debt and equity. All assumptions can be found in Table 2 in Appendix 1.

The 100 MWe reactor size carries a clear diseconomy-of-scale penalty at single-unit scale, around 20-34 €/MWh on LCOE relative to the 400 MWe units. **However, this penalty can be reduced through fleet learning and co-siting, falling to around 5-11 €/MWh in the largest deployment scenarios. Smaller units, therefore, do not eliminate scale effects, but they can recover part of their initial disadvantage when deployed as part of a coordinated fleet rather than as isolated units. This distinction should guide the policy case for smaller SMRs.**

The 100 MWe SMR value proposition is different from the 400 MWe SMR value proposition. While the 100 MWe has a diseconomy of scale with respect to the 400 MWe, it might be an appropriate option where smaller capacity increments, heat integration, brownfield replacement of fossil assets, smaller grids, industrial demand centres or constrained sites make a 400 MWe unit less suitable. In those contexts, the system value of modularity and siting flexibility may justify a higher initial unit cost, provided that deployment is organised around common designs, coordinated licensing, and multi-module configurations reaching the minimum viable pipeline of projects to reduce the costs.

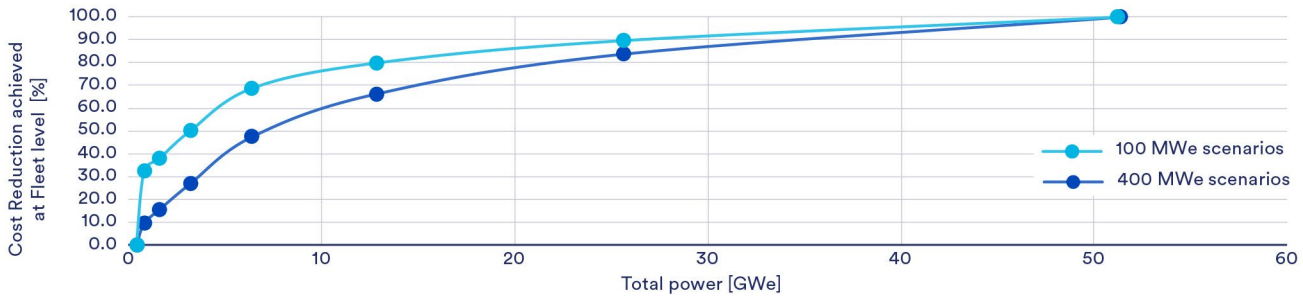
This distinction should guide the policy case for smaller sized SMRs. **The EU Member States should avoid treating early SMR projects as disconnected "national demonstrations". Cost reductions depend on overall size of the pipeline and pipeline certainty before projects are individually built.**

Where national programmes are individually too small to achieve viable SMR economics, countries should pool demand into cross-border orderbooks that reach the minimum scale required for an efficient deployment pipeline, around 5-8 GWe.[5] It implies common reference designs, aligned or mutually recognised licensing approach, joint procurement where feasible, qualified supply chains, predictable orderbooks and financing structures that reward serial delivery.

The choice between 400 MWe and 100 MWe designs should therefore be framed less as a binary technology preference and more as a portfolio strategy.

- Larger modules may deliver lower-cost bulk firm power where site and grid conditions are favourable.
- Smaller modules may extend nuclear options to industrial, regional or constrained applications.

Figure 3: The fleet effect: LCOE variation [%] against varying total deployed capacity [GWe] under different unit and site configurations



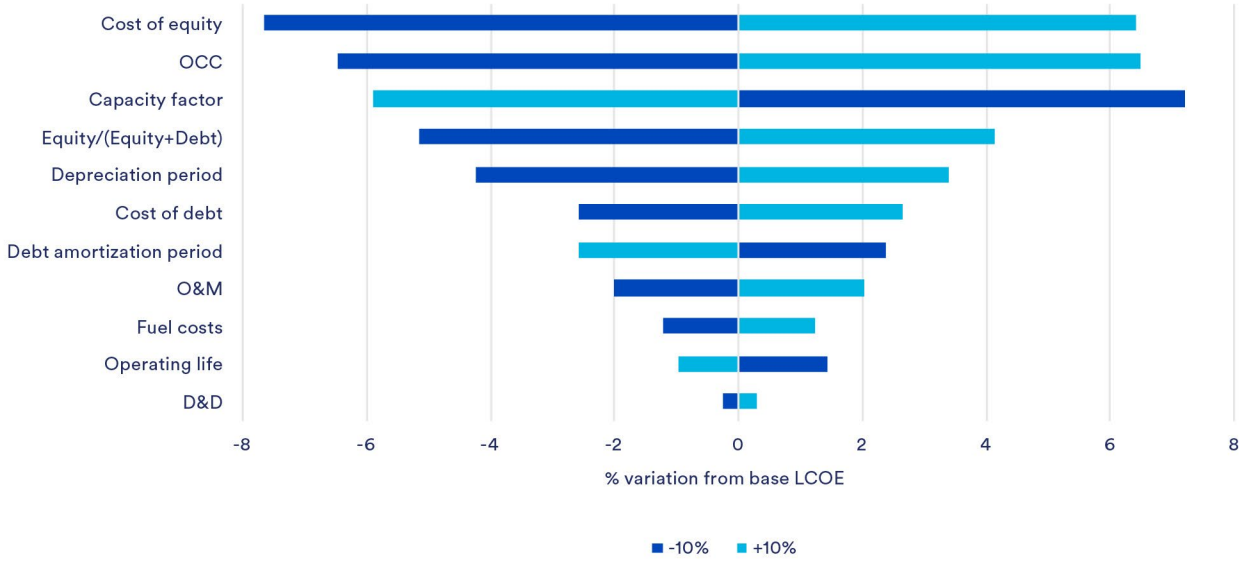
[5] This has broader implications in terms of licensing, local content, fit to the environment/context, which are relevant, but outside the scope of this document.

SECTION 2

Sensitivity Analysis: What Moves LCOE the Most?

Figure 4: Sensitivity Analysis of Input Parameters on LCOE

The cost of equity and the OCC have the largest impact on LCOE. As per Figure 4, variables such as operation and maintenance (O&M) costs, fuel costs, and decommissioning and decontamination (D&D) show a much more limited impact. Therefore, lowering SMR electricity costs implies reducing the risk premium, reducing capital costs and ensuring reliable construction delivery and capacity factor. SMRs, like other nuclear assets, are capital-intensive. A large share of the lifetime cost is committed before power generation actually starts. As a result, any factor that changes the cost of capital or the construction cost base has a magnified effect on LCOE.



CLOSER LOOK:

Cost of Equity

The cost of equity is particularly important because it reflects the risks that private investors perceive: construction delays, licensing uncertainty, political risk, market price exposure, supply chain immaturity, and first-of-a-kind delivery risk. If those risks remain uncovered, investors require a higher premium to compensate for the risks and the technology becomes more expensive to finance.

The implication is that financial de-risking is essential. Contracts for difference (CfD), regulated asset base (RAB) models, sovereign-backed loans, public co-investment, and other credit-enhancement instruments can significantly lower LCOE by allocating risk more effectively, to the actors best able to manage them.

Capacity Factor

Capacity factor is also essential to go:[6] if SMRs are financed and built as firm low-carbon assets but are then exposed to market conditions that lead to low utilisation or frequent curtailment, their LCOE rises. **This calls for a policy design that connects deployment decisions to the offtake strategy.** Elements such as long-term electricity contracts, industrial heat agreements, district heating integration, or other stable demand channels can protect utilisation. **The plant's economics require both an efficient construction programme and stable market-access conditions.**

Overnight Construction Cost (OCC)

Overnight construction cost (OCC) is one of the strongest determinants of nuclear LCOE. It captures the capital cost required to deliver the plant including construction, applicable owner's costs, contingency and first-core costs, but excludes financing costs and interest during construction. For a FOAK unit, this analysis assumes OCC ranges of €9,000–14,000/kWe for a 400 MWe SMR and €15,200–23,700/kWe for a 100 MWe SMR. These values are deliberately tested as scenarios rather than treated as forecasts. The key policy issue is therefore not only the starting cost of the first reactor, but how quickly that cost can fall across a programme. In the simulations, reductions in OCC arise from repeated construction and co-siting: suppliers and project teams learn across successive units, while multi-unit sites share fixed and semi-fixed infrastructure and project costs. **Lowering OCC requires a credible pipeline of repeat orders, standardised designs and multi-unit deployment, not isolated FOAK projects.**

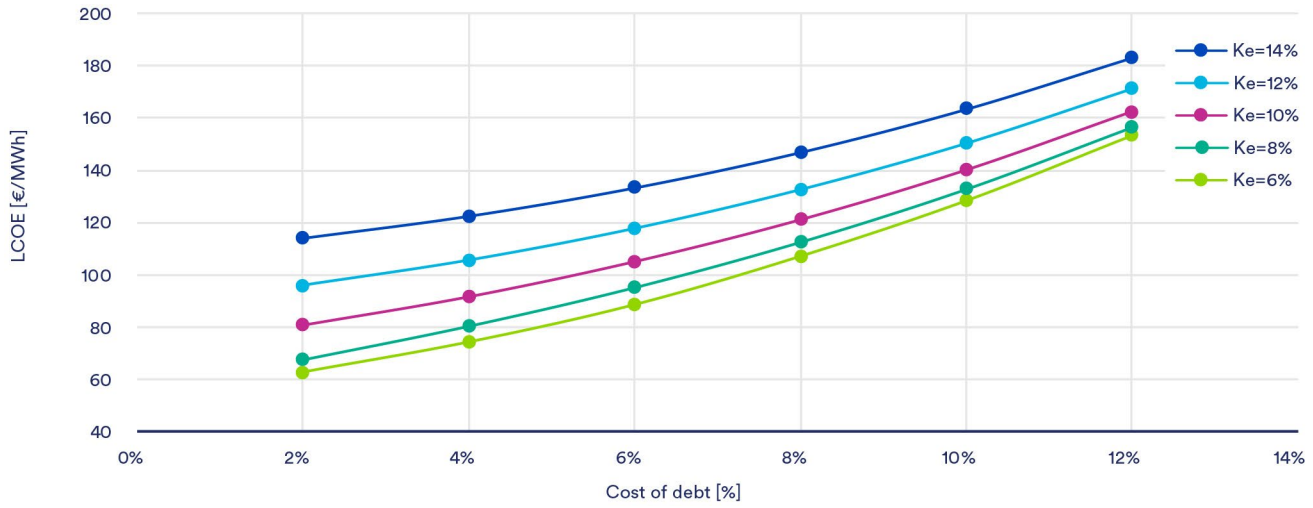
[6] In this work, a 90% capacity factor is considered in the simulations. In the sensitivity analysis it is decreased and increased by 10% of its value, becoming 81% and 99%, respectively.

SECTION 3

Financing Leverage

Financing leverage: LCOE variation under varying cost of debt and cost of equity values. The cost of financing for typical EU and USA projects is in the region of 3-6% for Kd and 8-12% for Ke, considering nominal values. Values at 4% or below are hardly representative for merchant scenarios. However, they could represent scenarios with consistent state intervention, e.g., through money lent to the project at a very low discount rate or through various forms of risk offsetting. This table presents the results for real values of cash flows per scenario E2, as found in Table 3 in Appendix 1.

Figure 5: Financing leverage: LCOE variation under varying cost of debt and cost of equity values



Cost of Equity						
14%	114,2	122,7	133,5	147,0	163,5	183,1
12%	96,0	105,7	117,8	132,7	150,4	171,3
10%	81,0	91,9	105,2	121,2	140,2	162,4
8%	67,6	80,5	95,3	112,6	132,9	156,6
6%	62,8	74,3	88,6	107,2	128,5	153,5
LCOE [€/MWh]	2%	4%	6%	8%	10%	12%
	Cost of Debt					

Figure 5 shows that **SMR economics are highly dependent on the cost and structure of capital.** At minimum financing costs, which could imply a substantial state intervention, LCOE could be as low as 62.8 €/MWh. LCOE rises rapidly as the costs of debt and equity increase. The same SMR technology can therefore appear economically viable or not, depending on how construction, market, and policy risks are mitigated.

If SMR projects are financed as merchant or quasi-merchant assets, investors will price in uncertainty over build time, licensing, future power prices, political durability, and supply-chain performance. For instance, in the case of a 6% cost of debt and 8% cost of equity, the LCOE would be in the region of 95.3 €/MWh, i.e. 52% more than LCOE of a project with a minimal cost of capital. That premium is then embedded in the electricity cost paid by consumers. Conversely, **if policy creates credible long-term revenue stability and reduces risks that private investors cannot control, the financing curve moves closer to the cost floor**.

- Public instruments should target risks that the market cannot efficiently manage, such as regulatory uncertainty, revenue instability, and partial construction risk in early builds.
- Developer-controlled risks – such as construction management, quality control, and schedule discipline – should remain subject to performance incentives, milestone payments, and transparent cost scrutiny.

Moving from a low-risk financing structure to an unguaranteed equity model can add tens of euros per MWh without changing the reactor design or any other factors. For instance, considering a fixed cost of debt of 4%, the expected LCOE is 74.3 €/MWh at 6% cost of equity, but it rises to 105.7 €/MWh when the cost of equity increases to 12%, this is a 42% increase in LCOE. **This difference could be large enough to determine whether SMRs are seen as a competitive low-carbon option or an expensive niche technology.**

This shifts the focus of the SMR financing debate. **The question to be answered is not only "How much will the deployment of SMRs cost?" but primarily "under what regulatory, financing, and contractual models might investors or Member States decide to develop an SMR programme, and how much of an early investment in de-risking is acceptable to decrease long term energy costs from SMRs?"** The answer changes the LCOE dramatically. Once financing has been de-risked, remaining cost reductions must come from construction learning, supply-chain maturity, site standardisation, and high utilisation.

The policy conclusion is therefore two-sided:

- ☑ **Without financial de-risking, even a technically sound and large enough SMR programme may be priced out of the market.**
- ☑ **Financial de-risking must be tied to an industrial delivery strategy so that lower capital costs translate into real cost reductions rather than public funds protecting against delivery inefficiency.**

SECTION 4

Concluding Remarks

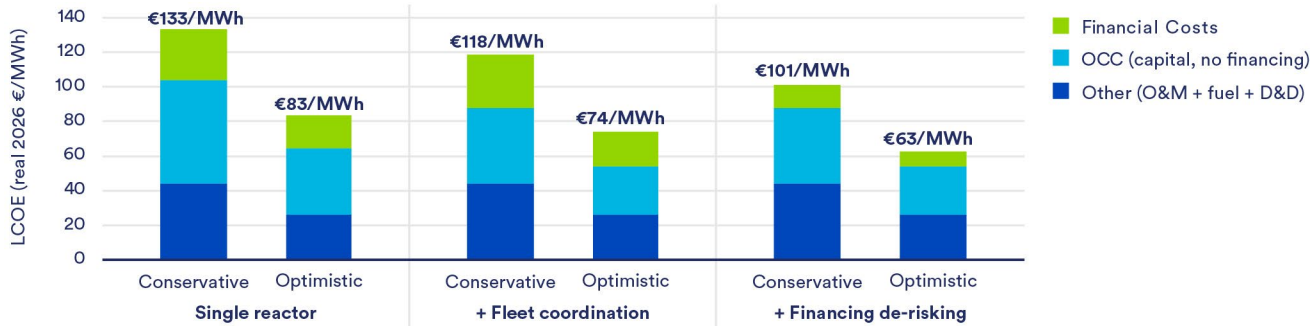
Whether SMRs emerge as a competitive low-carbon option or remain an expensive niche technology will depend less on the reactors themselves than on how their deployment is planned, coordinated and financed, and it is policymakers at the national and EU levels who can unlock that potential.

For the EU, these findings demonstrate that the opportunity is not simply to commercialise SMRs, but to build a coordinated market capable of delivering them at scale. To achieve a fleet of SMRs, there should be alignment around common reactor designs where appropriate, a pursuit of greater regulatory cooperation, coordination on procurement and supply chains, and implementation of financing frameworks that reduce investment risk while maintaining incentives for efficient and cost-effective project delivery. With such conditions, the EU has the opportunity to move beyond first-of-a-kind projects towards a self-sustaining deployment pipeline that strengthens energy security, enhances industrial competitiveness, and delivers affordable firm clean power for Europe.

Figure 6: LCOE comparison of an individual SMR project with poor financing compared to a fleet of well-financed SMRs

Fleet scale and financing materially improve SMR economics: a 6.4 GWe fleet reduces LCOE from €83–133/MWh for a standalone 400 MWe SMR to €74–118/MWh, falling further to €63–101/MWh with modest financing support (2% Kd, 4% Ke). Importantly, these are fleet-level costs including FOAK units, demonstrating that a credible fleet commitment can bring SMRs into a competitive cost range.

For an isolated 400 MWe SMR, the model gives an LCOE of about €83–133/MWh, with the wide range driven mainly by uncertainty over overnight construction cost. Committing instead to a 6.4 GWe fleet allows learning and co-siting effects to reduce the fleet-average LCOE to about €74–118/MWh; adding de-risked financing reduces it further to roughly €63–101/MWh. The key point is that under reasonable assumptions, a coordinated 6.4 GWe programme can bring the average cost of the entire fleet, including the first-of-a-kind units, towards roughly €80/MWh, making the programme economically credible.



Disclaimer: This brief is an interim deliverable produced under a Research Agreement between the Department of Management, Economics and Industrial Engineering of Politecnico di Milano University and the Clean Air Task Force, Inc. (CATF), Boston, MA, U.S.A. Results are based on scenario modelling using INCAS (INtegrated model for the Competitiveness Assessment of Small and medium-sized reactors), a proprietary discounted-cash-flow model developed at Politecnico di Milano. All quantitative outputs are scenario-based and expressed in real 2026 €/MWh; they are not forecasts, investment projections, or recommendations for specific projects or technologies. The findings do not constitute investment, financial, or legal advice, and neither the authors, Politecnico di Milano nor CATF accepts liability for decisions taken on the basis of this document. The conclusions reflect the state of the analysis at the time of this interim release and may be revised in the final report. This document is published under the terms of Art. 6 of the Research Agreement between Politecnico di Milano and CATF, and may be used and cited for policy, scientific, and educational purposes with appropriate attribution to both institutions.

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APPENDIX 1

Methodological Notes

- The EU is treated as a fully integrated energy market (common financing, supply chain, electricity price). Smaller scenarios are broadly representative of single-country programmes; larger ones reflect coordinated multi-country action. This is a simplified set-up, intentionally provided to estimate the ideal case with full collaboration and shared deployment.
- Calculations have been performed using INCAS, a MATLAB-based discounted cash flow model developed at Politecnico di Milano.
- All calculations use real 2026 € to isolate fleet effects from monetary dynamics. Moreover, the simulations are performed using real cash flow values, i.e., adjusted for inflation to express them in constant purchasing power terms.
- Each INCAS simulation is performed with optimistic and conservative inputs regarding the overnight capital costs (OCC), the operation and maintenance costs (O&M), and the fuel cycle costs. The full inputs to the simulations are found in Table 2 and Table 3. Each input is based on values found in literature, technical report, and actual data of nuclear projects.
- Sensitivity analysis (Figure 4) and financing leverage (Kd/Ke; Figure 5) results are based on the E2 scenario (Table 3): 6.4 GWe total, 800 MWe sites, 400 MWe SMRs, and optimistic assumptions.
- The sensitivity analysis is carried out by changing one input variable at a time by ±10% while keeping all the other constant. Applying a uniform perturbation to every variable makes the resulting LCOE impacts directly comparable. It ranks cost drivers by marginal influence on a standardised basis rather than probability of occurrence.
- The scenarios represent possible deployment schedules ranging from a single SMR in one site, to large-scale deployment at the EU level over 50 GWe (Table 3). The sites can be of three possible sizes: 400, 800, and 1600 MWe per site (100 MWe only in A0). Each deployment scenario could be implemented with two reactor sizes: SMR small of 100 MWe, and SMR big of 400 MWe.

Table 2: Input to simulations: optimistic and conservative scenarios

Common Input Parameter	Units	Optimistic Value	Conservative Value
Power output	MWe	100 - 400	
CAPEX – OCC (FOAK 400 MWe)	€/kWe	8069	12551
CAPEX – OCC (FOAK 100 MWe)	€/kWe	10397	16211
O&M unit cost (FOAK 400 MWe)	€/MWh	15	30
O&M unit cost (FOAK 100 MWe)	€/MWh	18.75	37.5
Fuel cycle unit cost	€/MWh	9	12
D&D unit cost	€/MWh	2	
Expected construction duration	years	7 Year FOAK, 6 years BOAK, 4.5 years NOAK	
Operating life	years	60	
Capacity factor	%	90	
Debt amortization period	years	30	
Depreciation period	years	20	
Dividend share during amortization	%	0	
Dividend share after amortization	%	0	
Equity / (Equity + Debt)	%	25	
Cost of debt (real value of money)	%	3	
Cost of equity (real value of money)	%	8	
Annual escalation rate for construction	%	0	
Electricity price	€/MWh	95	
Electricity price annual increase rate	%	0	
Nominal risk-free rate	%	0	
Annual inflation rate	%	0	
Corporate tax rate	%	0	

Table 3: Input to the INCAS simulations: site size and total deployment

SMR Size	Scenario	Total Power	Number of Sites (400 MWe per site)	Number of Sites (800 MWe per site)	Number of Sites (1600 MWe per site)
SMR big 400 MWe or SMR small 100 MWe	A	100 MWe	1 (A0 – 1 × 100 MWe)		
		400 MWe	1 (A1 – 1 × 400 MWe or 4 × 100 MWe)		
	B	800 MWe	2 (B1)	1 (B2)	
	C	1.6 GWe	4 (C1)	2 (C2)	1 (C3)
	D	3.2 GWe	8 (D1)	4 (D2)	2 (D3)
	E	6.4 GWe	16 (E1)	8 (E2)	4 (E3)
	F	12.8 GWe	32 (F1)	16 (F2)	8 (F3)
	G	25.6 GWe	64 (G1)	32 (G2)	16 (G3)
	H	51.2 GWe	128 (H1)	64 (H2)	32 (H3)

APPENDIX 2

The INCAS model

Purpose and Scope
INCAS (Integrated model for the Competitiveness Assessment of SMRs) is a proprietary MATLAB model developed at Politecnico di Milano, to assess the economic competitiveness of small and medium-sized reactors.

The DCF Model
INCAS runs a bottom-up discounted-cash-flow (DCF) model that returns the full capital structure over time, which is what reveals the financial sustainability of a multi-decade build programme. In this way, costs, learning, co-siting and the construction schedule are resolved period by period, so staggered, overlapping multi-unit builds are modelled explicitly. The user can specify how much of the free cash flow generated by early-deployed units is redirected into the construction of later ones, reducing the upfront external capital requirement (self-financing). Moreover, debt-stock evolution and debt-coverage ratio are reported over time, so financial risk could be evaluated alongside profitability. A stochastic approach extends this into a full risk picture. The investment model produces the headline financial indices: levelized cost of electricity (LCOE), net present value (NPV), internal rate of return (IRR), and payback time (PBT). The investment model is divided into four sub-models: generation cost, revenue, financial cost and the integrating investment model.

Generation Cost Model
The total cost is split into investment and operation and maintenance, and a scale elasticity is defined for each so on large reactors hold an advantage. SMRs offset this through four mechanisms that produce an overnight construction cost in which the N-th unit of a series costs less than its predecessors:

- **Learning.** Unit cost falls steeply over the first few units and then approaches an asymptote. INCAS distinguishes learning on a site from transfer across sites and worldwide, with on-site learning fastest because the supplier, utility and contractor curves all act at once.
- **Modularization.** The shift from stick-built to factory-fabricated modules installed in parallel. The achievable reduction grows as plant size falls which is why smaller units benefit more. (not considered in this simulation)
- **Co-siting economies.** Fixed, site-related costs shared across units. The first SMR bears the full fixed-cost burden; each subsequent unit on the same site receives a corrective discount.
- **Design savings.** Concept-specific reductions from layout simplification, enhanced passive safety, primary-loop integration and the elimination of active components. (not considered in this simulation)

Revenue Model
INCAS forecasts annual cash inflows over plant lifetime as a function of electricity consumption, plant size, reactor technology, and other variables (e.g., load factors and electricity demand trends). INCAS does not simulate the electricity market. It is interfaced with appropriate external market models and interprets their long-term price and demand forecasts as inputs.

Financial Cost Model
This model evaluates the cost of investment capital. The weighted average cost of capital (WACC) is built from the debt:equity gearing, cost of equity, cost of debt and tax rate. INCAS adopts also the shareholders' perspective: lenders' capital is treated as debt, cash flows are taken net of interest and principal repayment (free cash flows), and these are discounted at the cost of equity. Therefore, INCAS also provides financial indices from the equity owners' perspective.

Investment Model
The integrating layer combines costs, revenues and financing to return the programme-level indicators including NPV, IRR, PBT, and LCOE. The rationale for going beyond LCOE is that a project proven cost-effective on generation cost alone may still not be undertaken by a private investor unless the financial return adequately covers market and regulatory risk.

Uncertainty Treatment

Input uncertainty is handled by Monte Carlo simulation within the investment risk model. Probability distributions (uniform, normal, beta, log-normal or triangular) are assigned to input variables and sampled over a user-set number of runs. Outputs are returned as distributions, and the computed variance analysis characterises how robust the programme is to changed or adverse scenario conditions.

Inputs and Workflow

Inputs are organised in four layers. An existing scenario can be cloned and modified without redefining every field; each scenario can be run deterministically or stochastically.

- **Reactor library:** each design with its specific/overnight construction cost, the number of units of that type already built worldwide, and delay-driven cost escalation.
- **Investment-specific inputs:** an unbounded number of reactors and sites; financing mix and interest rates; specific construction cost scaled from a reference standard reactor via economy-of-scale rules; site-level co-siting and learning.
- **Country-specific inputs:** the macro and fiscal environment; in stochastic mode, the electricity-market model.
- **Construction schedule:** per reactor, design, site, construction start, and duration (deterministic) or delay probability/distribution (stochastic); staggered, overlapping builds; importable from CSV.

Outputs

Deterministic runs return time-series and cross-sectional results:

- Single-period and cumulative free cash flow.
- Total debt in each period; cost of debt and WACC in each period.
- Capital-investment sources per period and per reactor (debt, equity, self-financing).
- NPV computed at different financing mixes; LUEC, IRR and PBT.

Stochastic runs add the full output distribution for each variable, in addition to every graph available in deterministic mode.

Additional Documents

Presentation and Explanation of the INCAS MODEL

- IAEA Nuclear Energy Series No. NP-T-3.7. Approaches for Assessing the Economic Competitiveness of Small and Medium Sized Reactors. 2013. https://www-pub.iaea.org/MTCD/Publications/PDF/Pub1619_web.pdf
- Boarin, M. Massone, and M. E. Ricotti. INCAS User Manual. 2012. https://ia903104.us.archive.org/11/items/manualzilla-id-6881012/6881012.pdf

Peer-reviewed journal published scientific papers based on the INCAS Model

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