



**CLIMATE INSIDER**  
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## **Small Modular Reactors**

**Assessing The Commercial Readiness, Market Pathways  
and Implementation Opportunities For Industrial  
Stakeholders**

**April 2025**

# The SMR Market Opportunity



Small Modular Reactors are entering the commercial deployment phase in 2025, offering a reliable zero-carbon energy option for electricity generation and industrial heat applications. This report examines leading SMR technologies, their readiness for market, and provides practical guidance for organizations evaluating SMR adoption as part of their long-term energy strategy.

## Market Potential & Key Designs

**\$300B<sup>(1)</sup>**

Global Market Potential by 2040  
Representing a huge clean energy  
investment opportunity

**15Gt**

CO<sub>2</sub> Reduction by 2025  
If SMRs scale as envisioned  
(~21 GWe by 2035)<sup>(2)</sup>

**80+**

Design Options  
In various stages of development  
worldwide, with several nearing  
deployment readiness

## Target Segment Value Propositions

Industrial  
users

- **Decarbonization:** Substitute fossil fuels in hard-to-abate sectors, potentially reducing emissions by 50–80%
- **Energy security:** Secure reliable, high-temperature heat and electricity

Infrastructure  
developers

- **Versatility:** Integrate SMRs into smart grids, microgrids, and district heating systems
- **Urban Integration:** Ideal for data centres and transport hubs seeking stable, decarbonized baseload power with a limited spatial footprint

Utilities and  
power  
providers

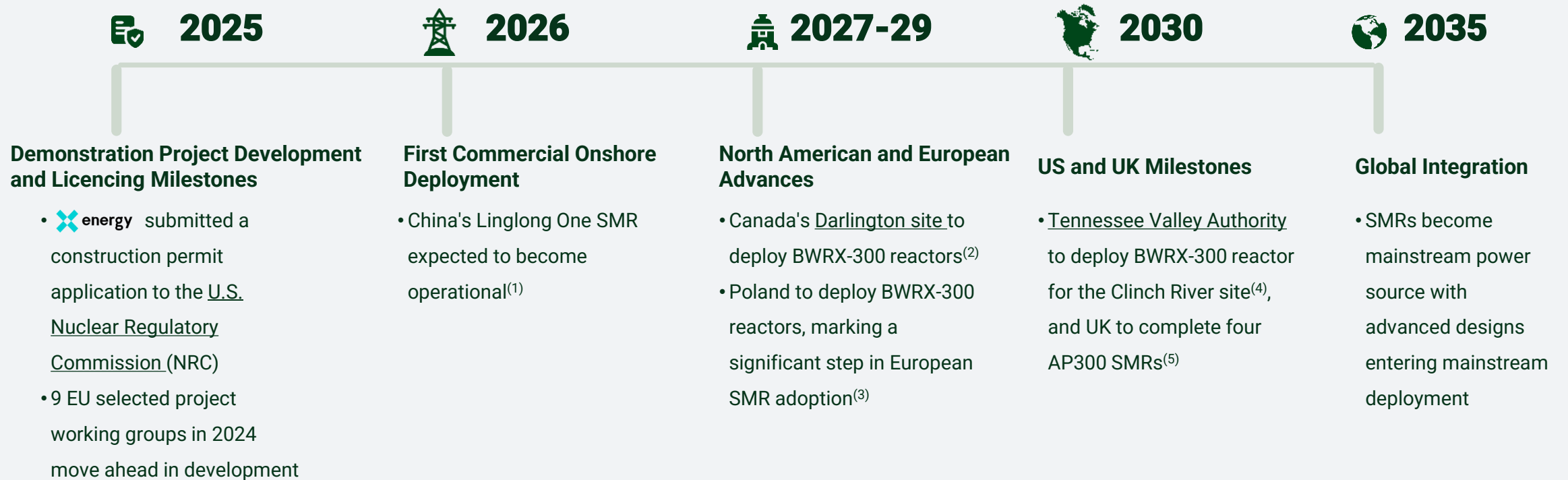
- **Grid stability:** Enable firm, dispatchable zero-carbon generation, complementing variable renewables and balancing grid volatility
- **Economic efficiency:** Potential for multi-SMR fleet efficiencies, reducing operational costs over time

(1) N. Katsiotis, "Small Modular Reactors: Redefining Global Energy Security for a Digitalized Future", Strategy international, February 2025. (2) "The NEA Small Modular Reactor (SMR) Strategy", Nuclear Energy Agent, 2025.

# SMR Commercial Deployment Roadmap 2025-2035

## Commercialization timeline







Non-exhaustive



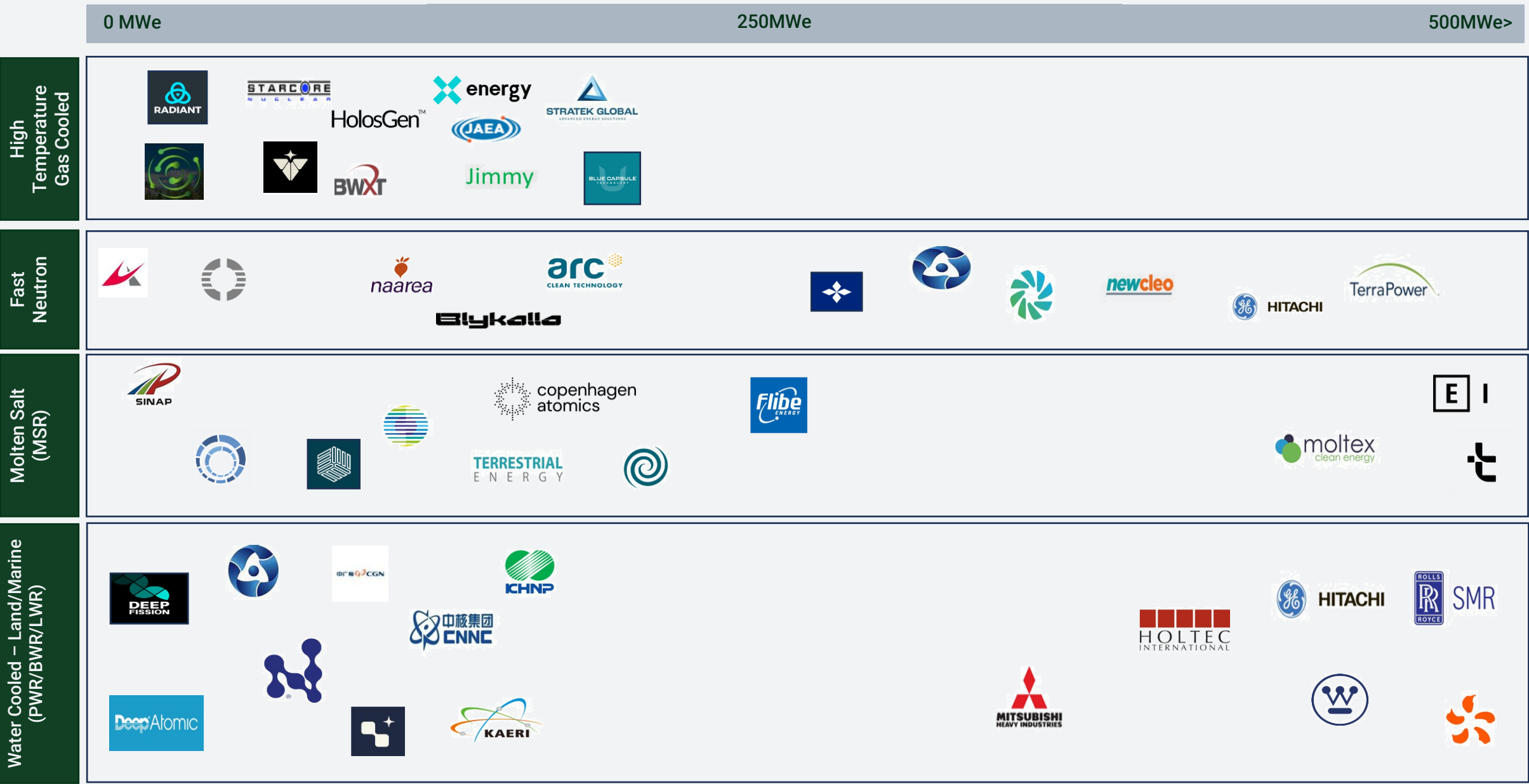
(1) "World's first commercial small modular reactor powers up 'brain' in China", CGTN, May 2024. (2) J. Adkins, "Darlington BWRX-300 To Receive Construction Permit 'By End 2024'", NUCNET, July 2023. (3) "OSGE initiates working group within the European Industrial Alliance on SMR", OSGE, July 2024. (4) S. Patel, "TVA Taps Bechtel, Sargent & Lundy, and GE Hitachi for Clinch River SMR Nuclear Project", Powermag, 2023. (5) "UK's First SMR Nuclear Project to Showcase Four Westinghouse AP300 Reactors", Powermag, 2024.

# Market Drivers & Strategic Value Propositions

SMRs address critical challenges across various sectors. Their strategic value varies by customer segment, from utilities seeking scalable deployment and enhanced grid integration to energy-intensive industries requiring reliable process heat and on-site power generation.

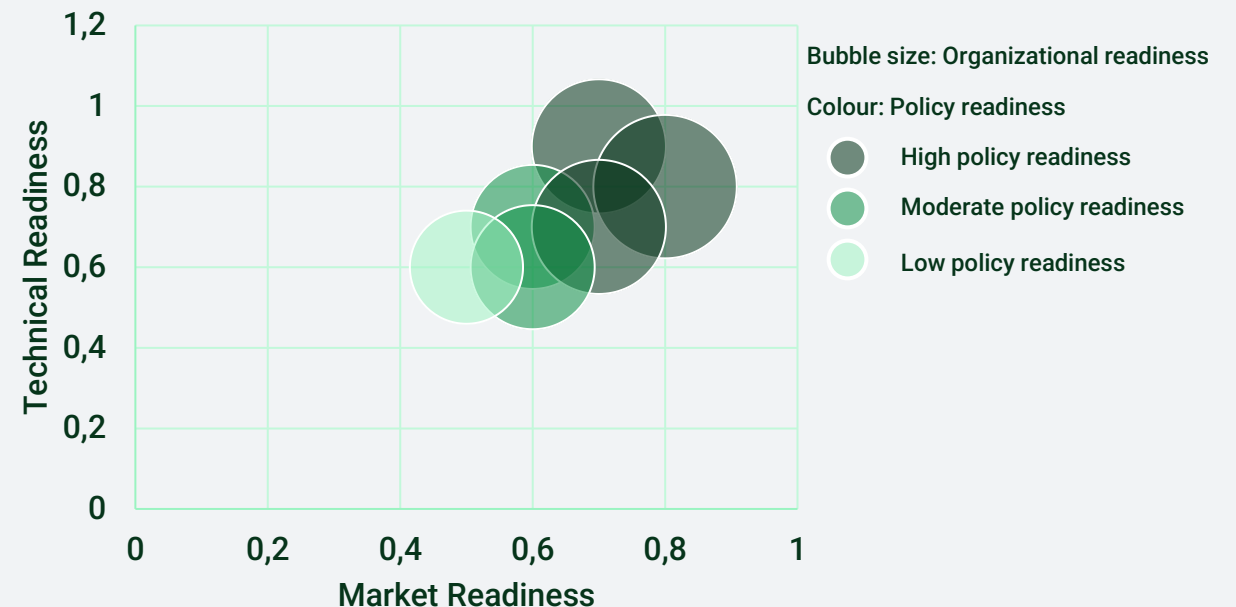
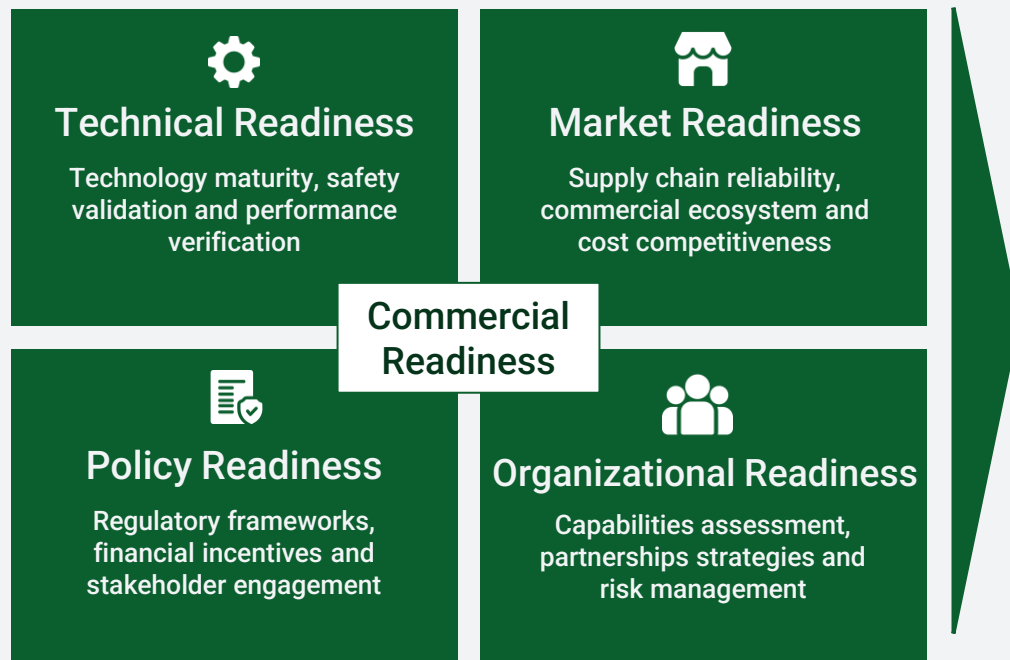
Market Drivers		Strategic Value Propositions	
	<b>Decarbonization Imperatives:</b> Governments and industries pursuing net-zero goals need stable, clean electricity sources. SMRs offer reliable, low-carbon alternatives to fossil fuels.		<b>Energy Security Concerns:</b> Fluctuating fuel prices and geopolitical tensions drive interest in domestically deployable energy sources that reduce reliance on imports.
	<b>Industrial Heat Demand:</b> Many industrial processes require high-temperature heat (300-850°C). SMRs efficiently provide this heat as a cleaner alternative to fossil fuels.		<b>Grid Reliability and Capacity Replacement:</b> Aging infrastructure and intermittent renewables create demand for dependable power generation. SMRs can replace retiring plants and ensure grid stability.
	<b>Economic Development:</b> SMR projects can stimulate local economies through job creation in manufacturing, construction, and operations.		<b>Cost Stability:</b> SMRs can provide more predictable energy costs, aiding long-term financial planning for businesses and utilities.

# Market Map for SMRs by Climate Insider



# Commercial Readiness Framework

Climate Insider's Four-Dimensional Readiness Framework provides a comprehensive methodology for assessing SMR commercial viability. These dimensions are interconnected, creating feedback loops that impact overall readiness, e.g., technical advancements enhance market confidence, while market demand informs R&D priorities and design choices.



# SMR Deployment Pathways to 2050

Scenario analysis: deployment pathways to 2050

Scenario		Drivers	Outcome	Leading Indicators
1	<b>High Deployment (&gt;100 GW)</b>	<ul style="list-style-type: none"> <li>Fleet procurement models adopted</li> <li>Broad industrial uptake across sectors</li> <li>Harmonized international regulations</li> <li>Successful FOAK projects within budget</li> </ul>	<ul style="list-style-type: none"> <li>Global cost parity with renewables by 2030</li> <li>SMRs become standard component in energy mix</li> <li>Multiple vendors with standardized designs</li> </ul>	<ul style="list-style-type: none"> <li>10 successful FOAK projects by 2030</li> <li>Multiple countries adopting first government by 2030</li> <li>LCOE reduction of ~10% below first and third units</li> <li>Cross-border regulatory harmonization agreements signed</li> <li>Industrial users forming buying consortia</li> <li>Supply chain investment exceeding \$10B by 2030</li> </ul>
2	<b>Base Case (50-75 GW)</b>	<ul style="list-style-type: none"> <li>Regional adoption with gradual policy support</li> <li>Limited fuel constraints resolved by 2030</li> <li>Selective industrial applications</li> <li>Mixed FOAK project performance</li> </ul>	<ul style="list-style-type: none"> <li>Steady rollout in 10-15 countries</li> <li>Selective competitiveness in specific markets</li> <li>Consolidation around 2-3 leading designs</li> </ul>	<ul style="list-style-type: none"> <li>5-10 successful FOAK projects by 2030</li> <li>SMRs supply meeting 10-20% of demand by 2050</li> <li>LCOE declining but remaining 10-20% above alternatives</li> <li>5-7 countries with active construction by 2030</li> <li>Industrial fuel applications limited to 2-3 sectors</li> <li>Selective policy support in key markets</li> </ul>
3	<b>Limited Deployment (&lt;25 GW)</b>	<ul style="list-style-type: none"> <li>Policy delays and inconsistent support</li> <li>Low public acceptance</li> <li>FOAK cost overruns &gt;30%</li> <li>Cheaper alternatives dominate</li> <li>Fuel supply constraints persist</li> </ul>	<ul style="list-style-type: none"> <li>Niche applications only</li> <li>Minimal private sector interest</li> <li>Limited to countries with strong nuclear legacy</li> </ul>	<ul style="list-style-type: none"> <li>Major FOAK projects delayed 10 years</li> <li>Cost overruns exceeding 50% on initial projects</li> <li>Limited progress on regulatory harmonization</li> <li>SMRs supply meeting &lt;10% of demand by 2050</li> <li>Declining investor interest after 2030</li> <li>Policy support fragmented or reversed</li> </ul>