International Energy Agency

Financing a new era for nuclear energy

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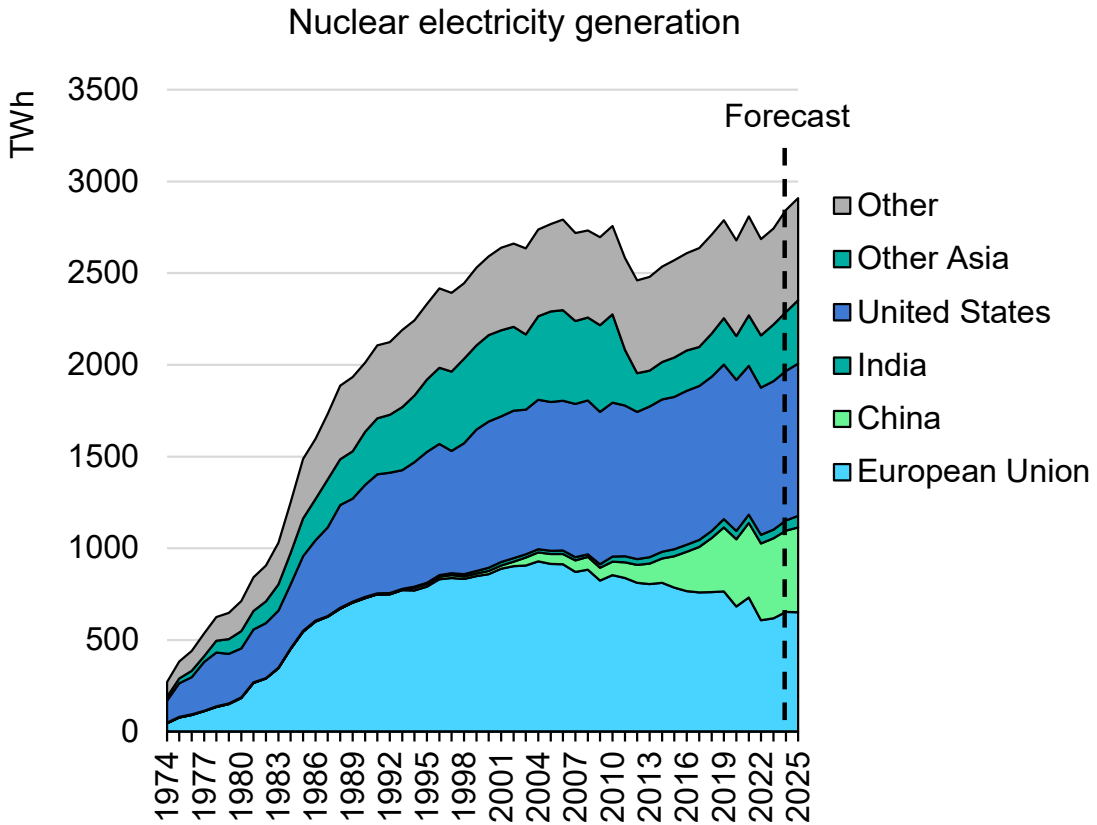
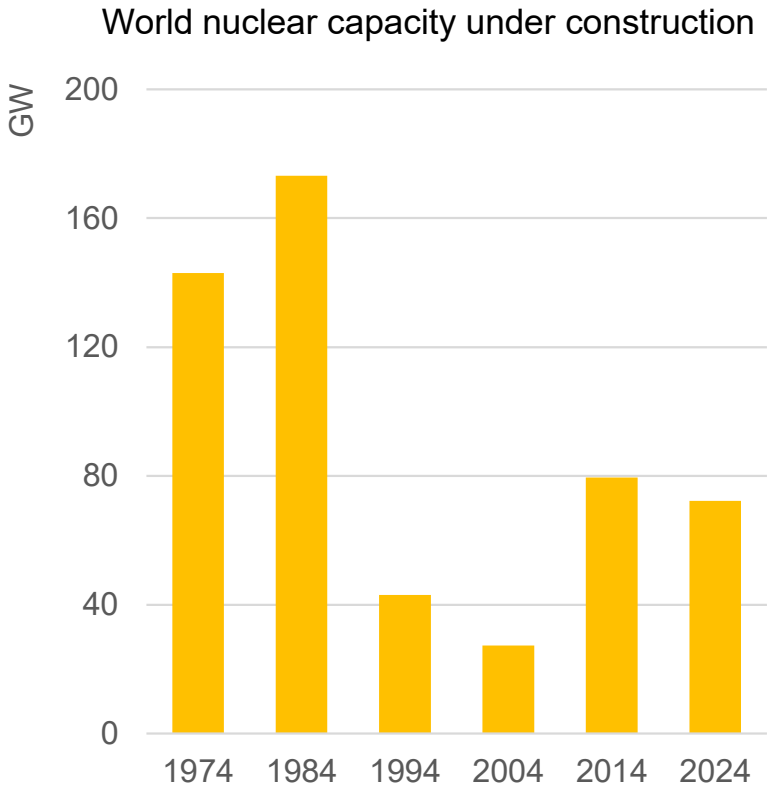
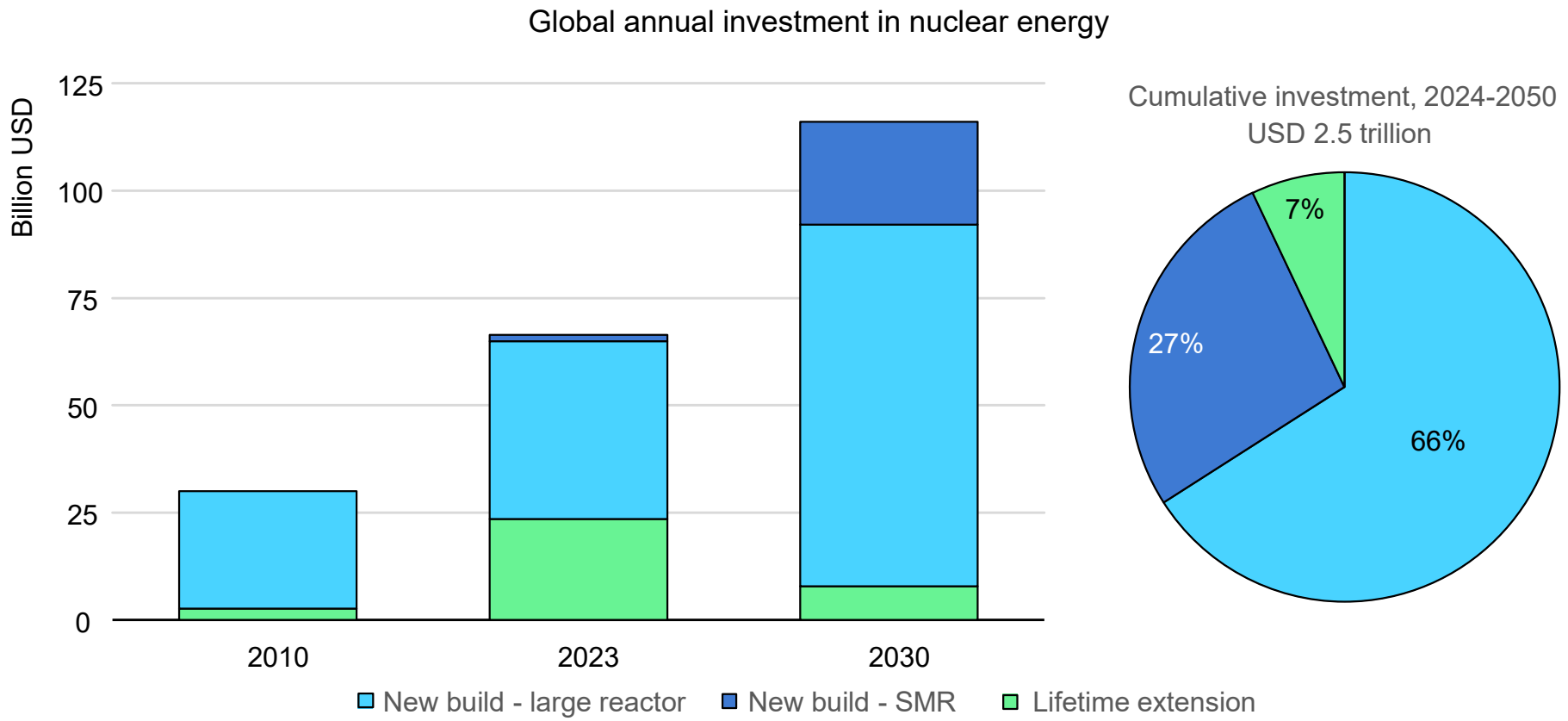
Nuclear energy is making a strong comeback





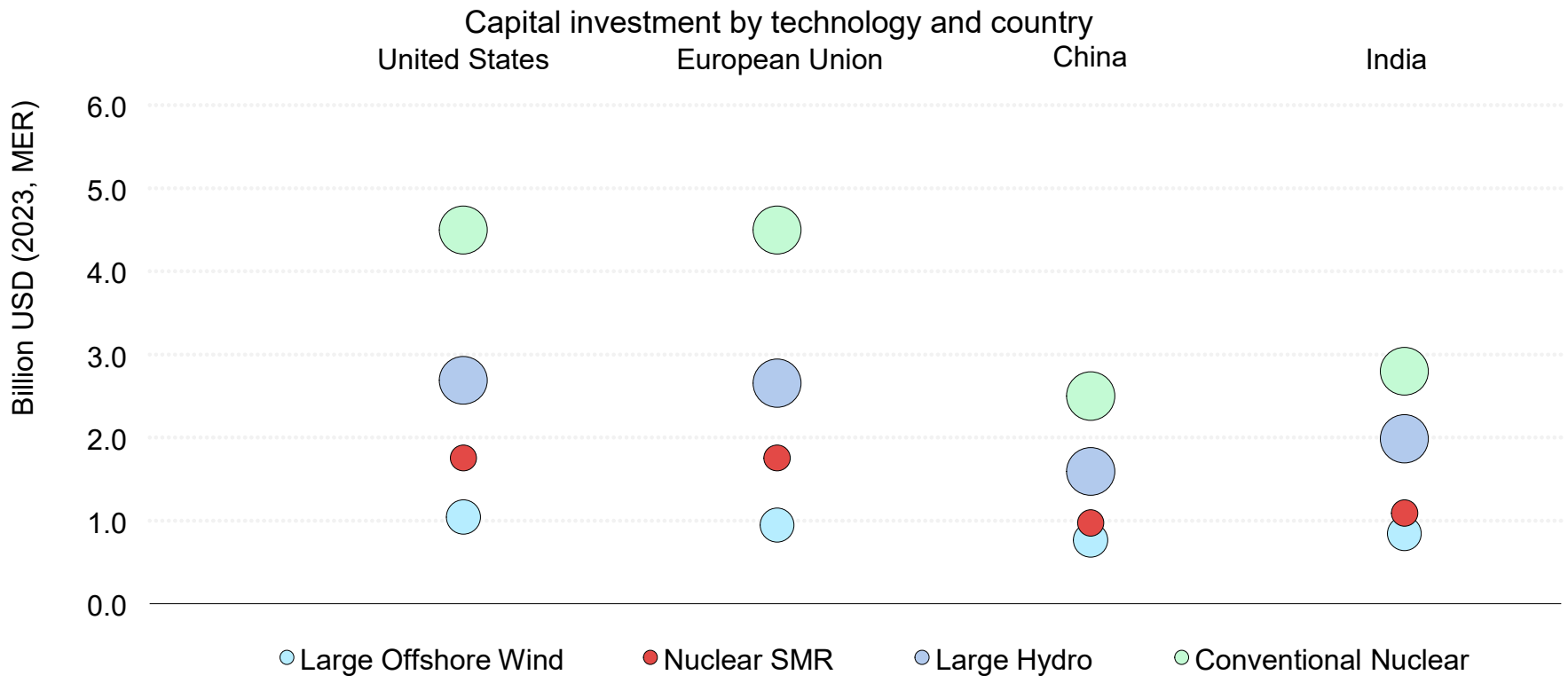
There are several reasons for optimism about the future of nuclear energy: record high output, robust construction in the industry, technology innovation for large and small reactors, and plans to expand its role in over 40 countries

But investment needs to scale up



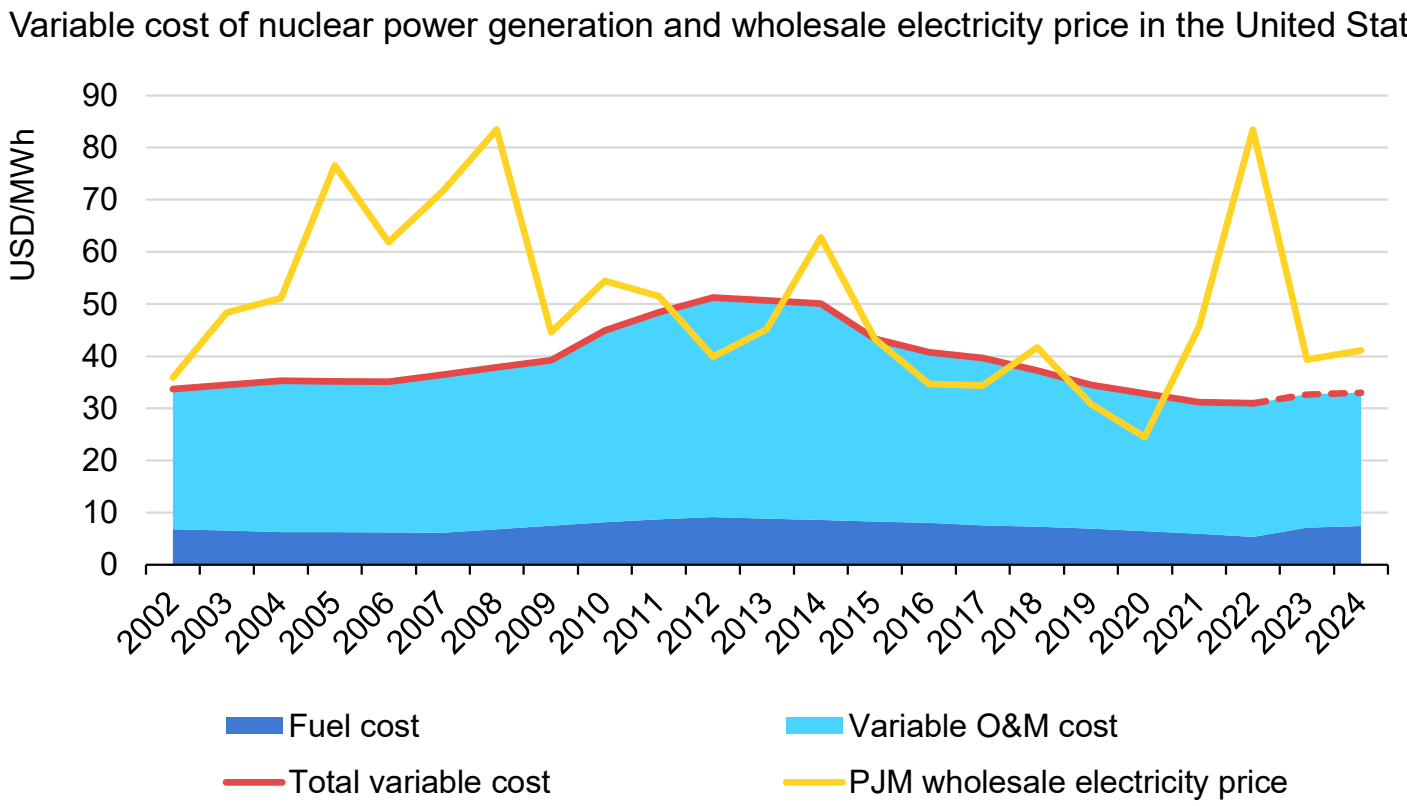
Nuclear investment has doubled from 2010 to 2023 and needs to double again to deliver country plans. Over the next 25 years, large reactors capture most investment while SMRs account for one-quarter of the total.

Nuclear plants are among the most expensive energy assets to build



The smaller scale of SMRs makes them potentially more attractive to commercial investors, opening a door to broader private sector participation in nuclear energy

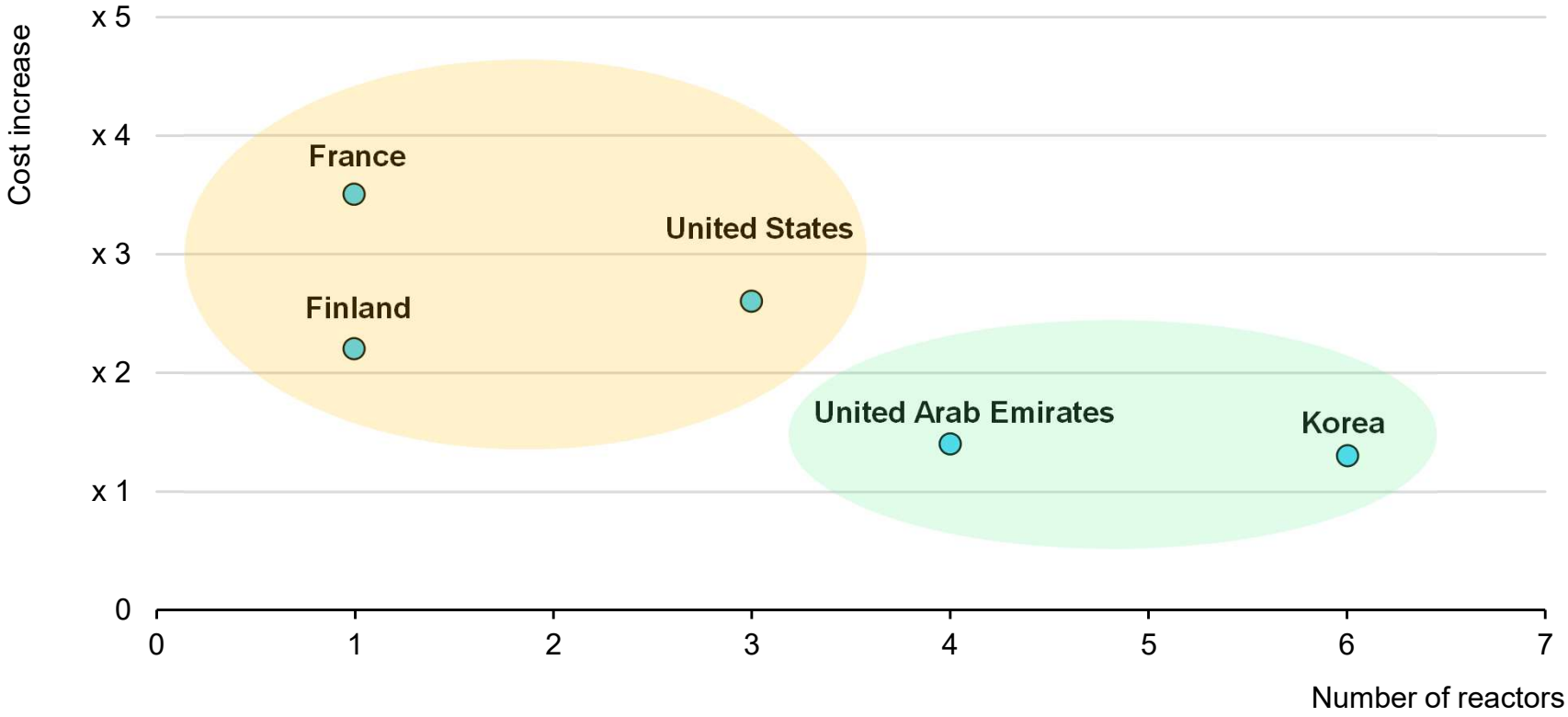
But variable fuel costs are typically low for nuclear power generation



Variable O&M costs make up a larger portion of the total variable costs. Despite this, higher fuel costs can undermine the profitability of nuclear power plants in the medium to long term as new long-term contracts are negotiated.

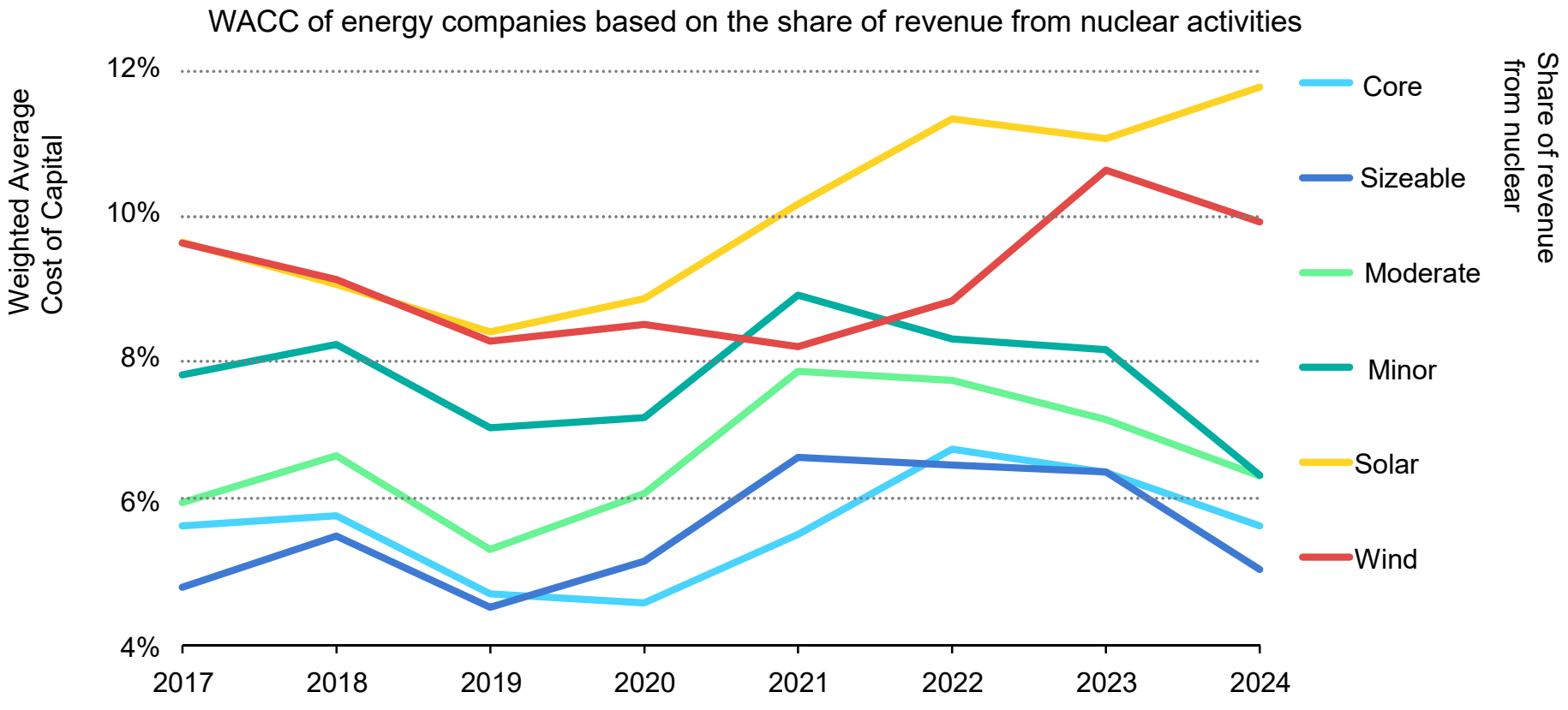
Construction risk remains a major hurdle to financing

Final cost compared to initial estimates and number of nuclear reactor projects started over the last 15 years



Without a strong industrial base, first-of-a-kind projects are prone to cost overruns and delays. Standardisation of designs, strong supply chains and skilled workforce are key to mitigate construction risks

The cost of capital is key for the viability of nuclear investments

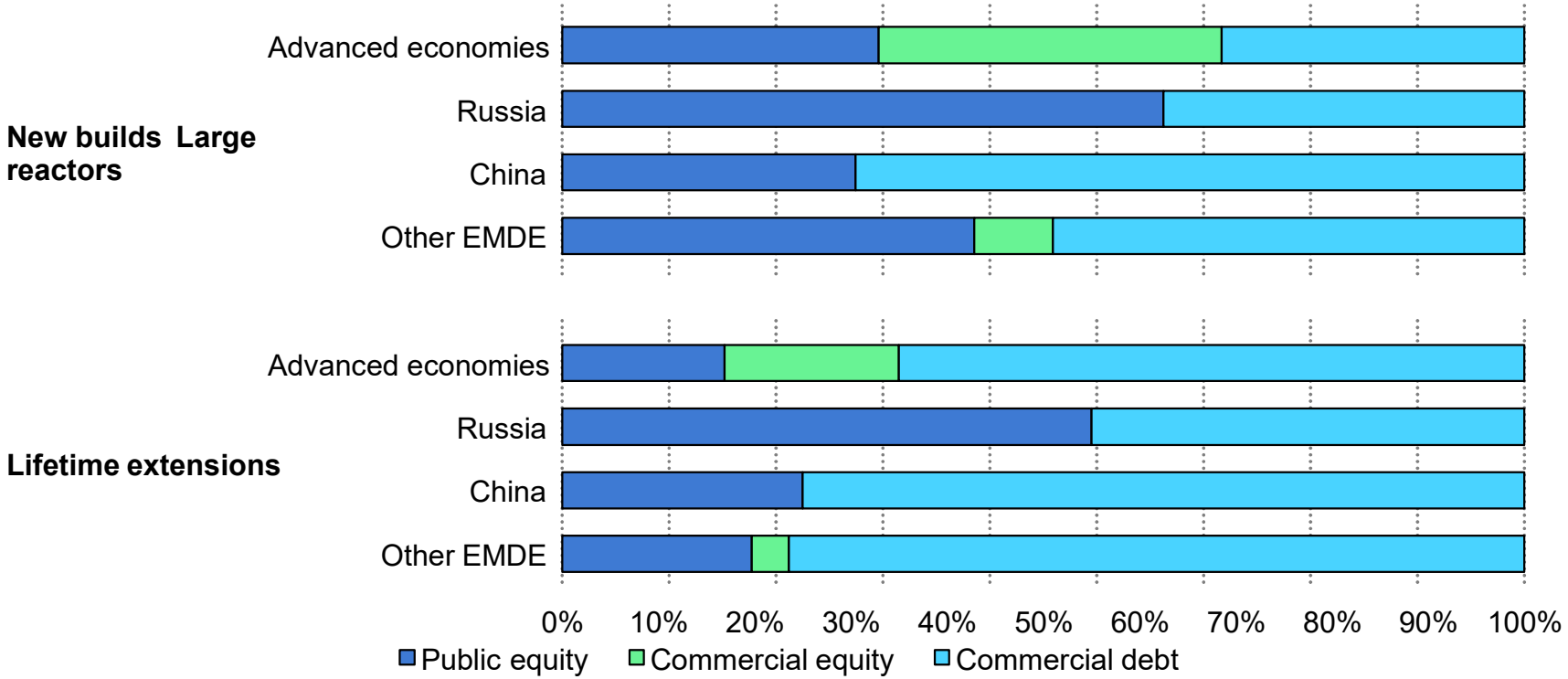


State-owned utilities benefit from a lower cost of financing than their private sector peers

Who invests in nuclear? How is it financed?

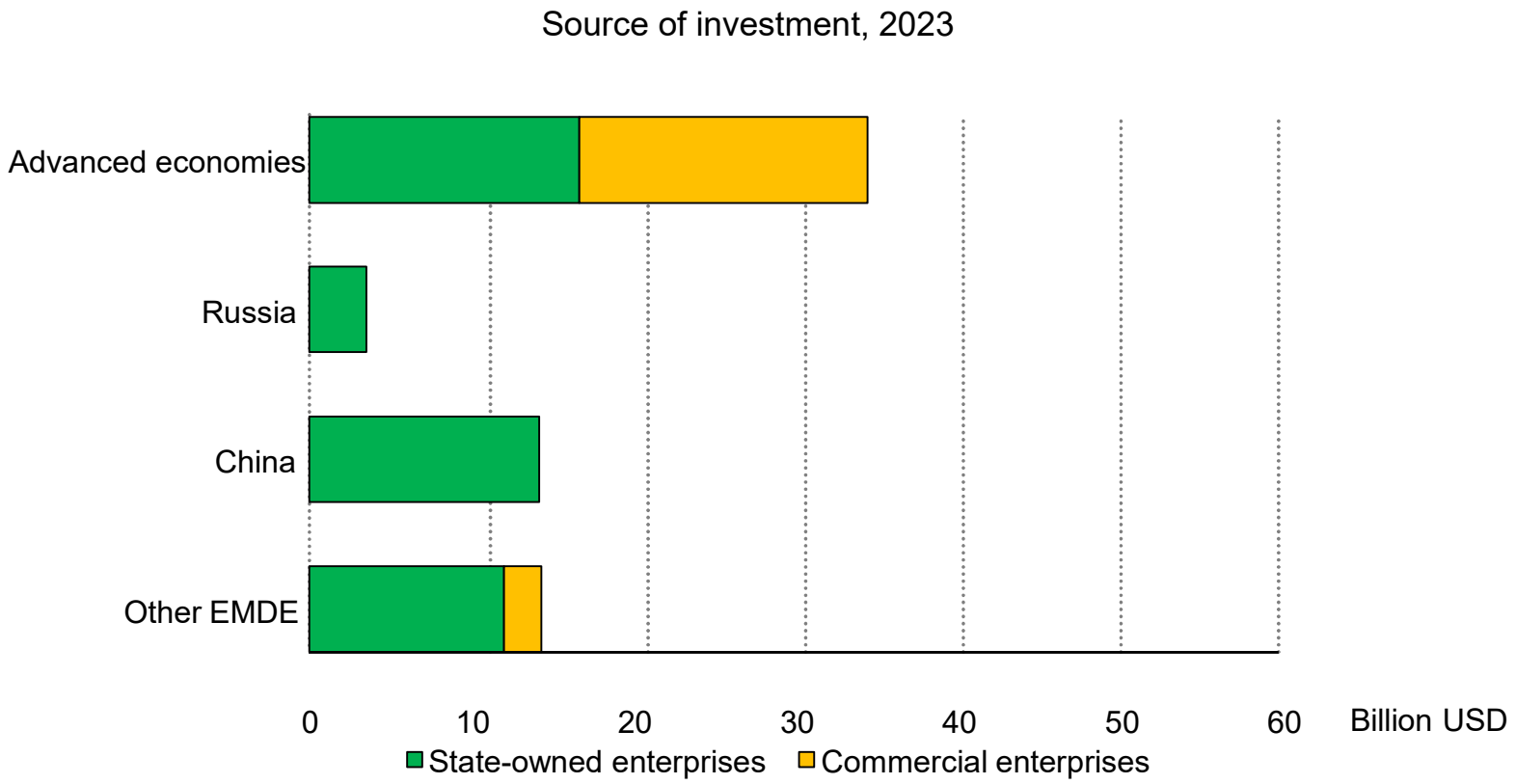
Public equity and commercial debt are the main sources of finance

Sources of finance for investment in new-build large-scale reactors and lifetime extensions by country/region, in 2023



New reactors are generally financed by a mix of debt and equity, while lifetime extensions are debt-financed

State-owned enterprises dominate investment in nuclear



State-owned enterprises dominate investment in nuclear today and remain a key player in the future with an increased role for commercial and private finance.

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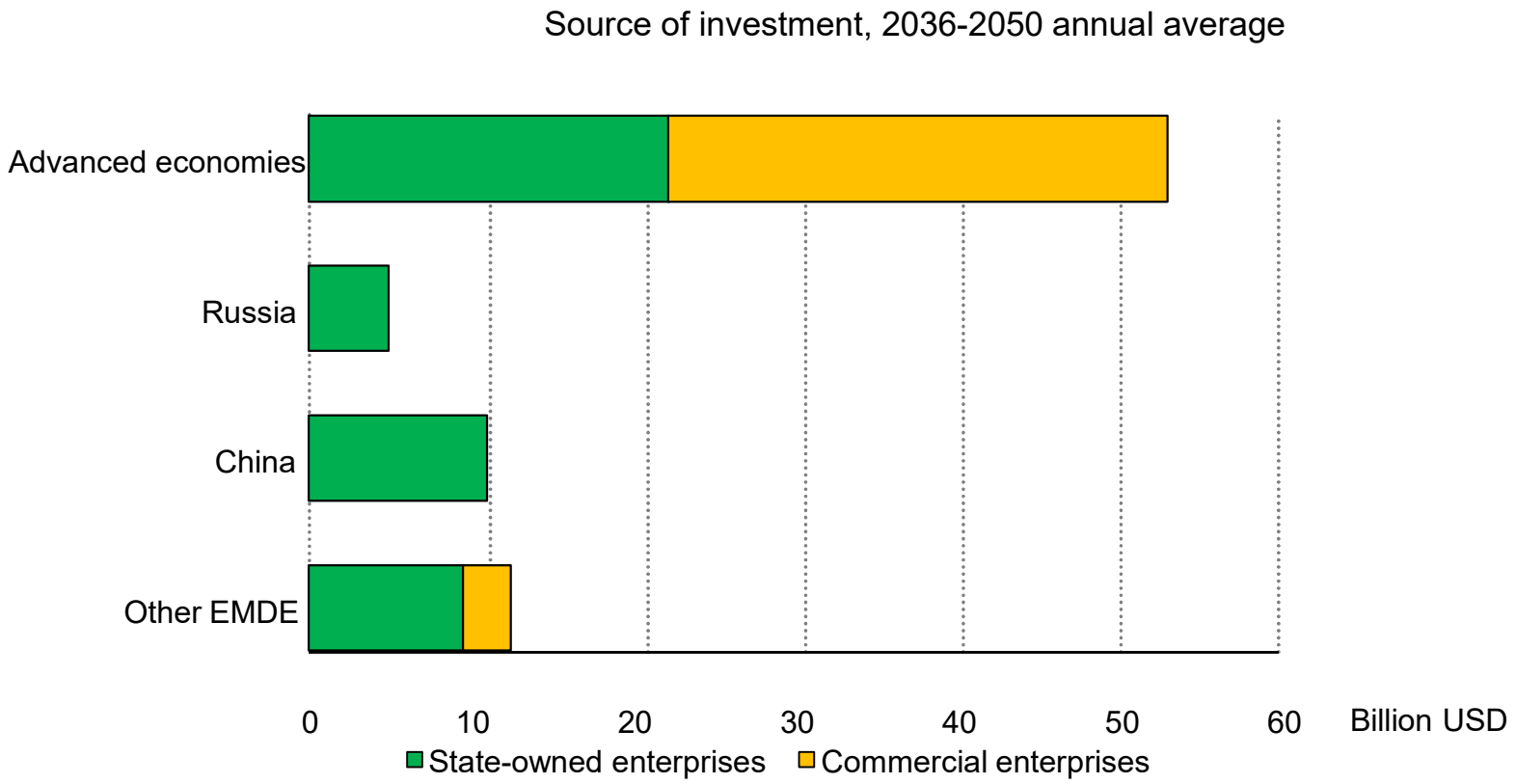

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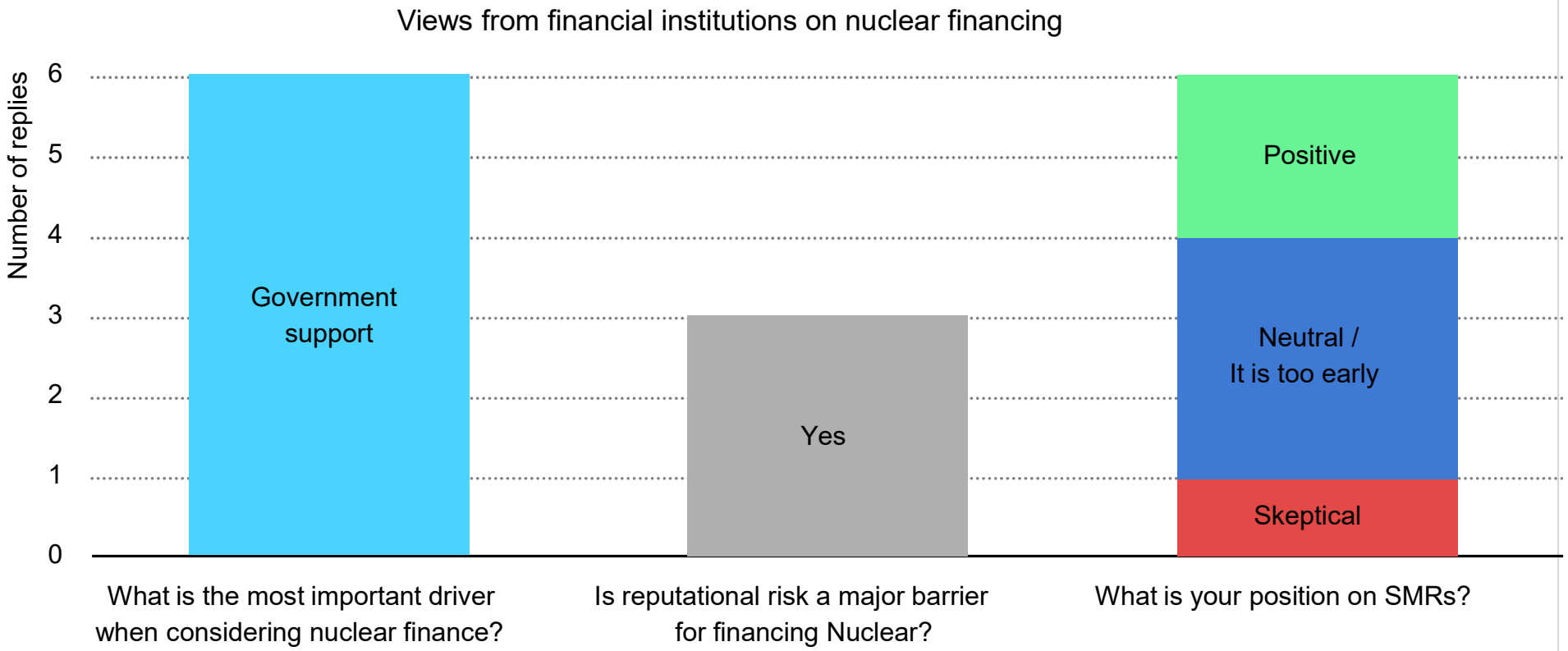
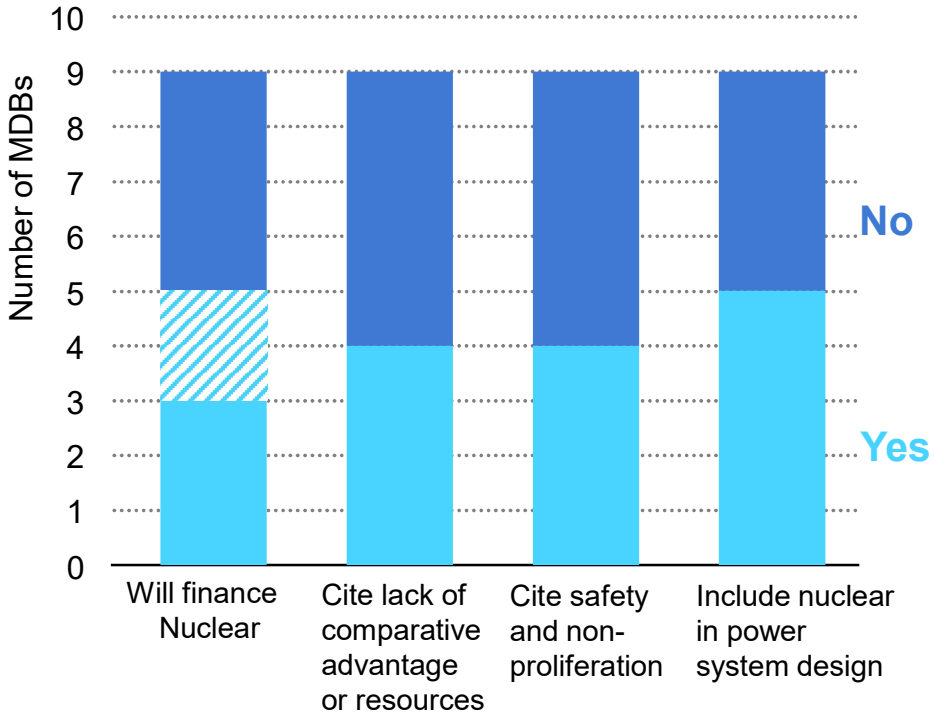
Private finance institutions hold positive views on nuclear financing



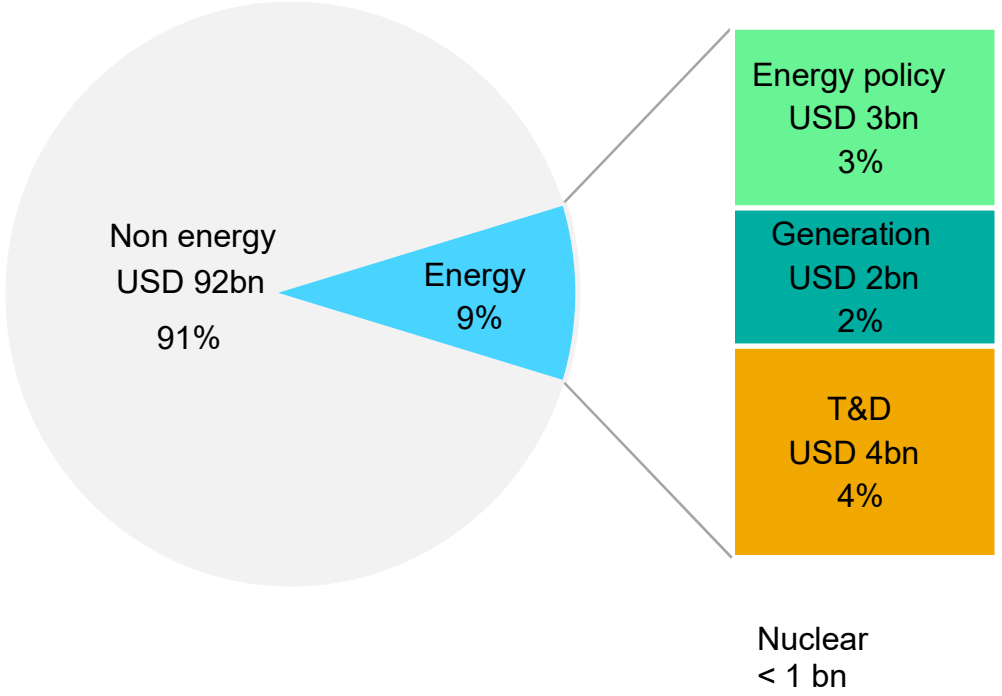
Financing nuclear is viewed positively by many financial actors, but the investment sizes and construction risks remain high barriers to funding at scale

MDBs are considering updates to their nuclear policies, but funding is limited

Survey of MDBs nuclear policies



Annual MDB financing – USD 100bn



The World Bank and ADB are adjusting their stance on nuclear, but their capacity to finance large scale projects competes with other development priorities

New financial models for nuclear plants

Financial models in building new nuclear plants

Barakah (UAE)	Long-term PPA Fixed-price agreement with EWEC
Akkuyu (Türkiye)	Intergovernmental agreement guarantees fixed-price PPA for 15 years Government commitment to purchase a significant portion of the output
Hinkley Point C (UK)	Contract for difference provides guaranteed strike price for electricity
Olkiluoto 3 (Finland)	Mankala principle ensures cost-based PPA with over 60 stakeholders Financial stability achieved through shareholder commitment to purchase electricity at cost
Sizewell C (UK)	Regulated asset base model allows operators to start recovering investments during the construction phase

What role for ECAs?

ECAs can help manage construction-phase risks through loans, guarantees, and insurance that lower risk for private investors and lenders.

Barakah (UAE) used KEXIM backing and government loans to reduce project risk.

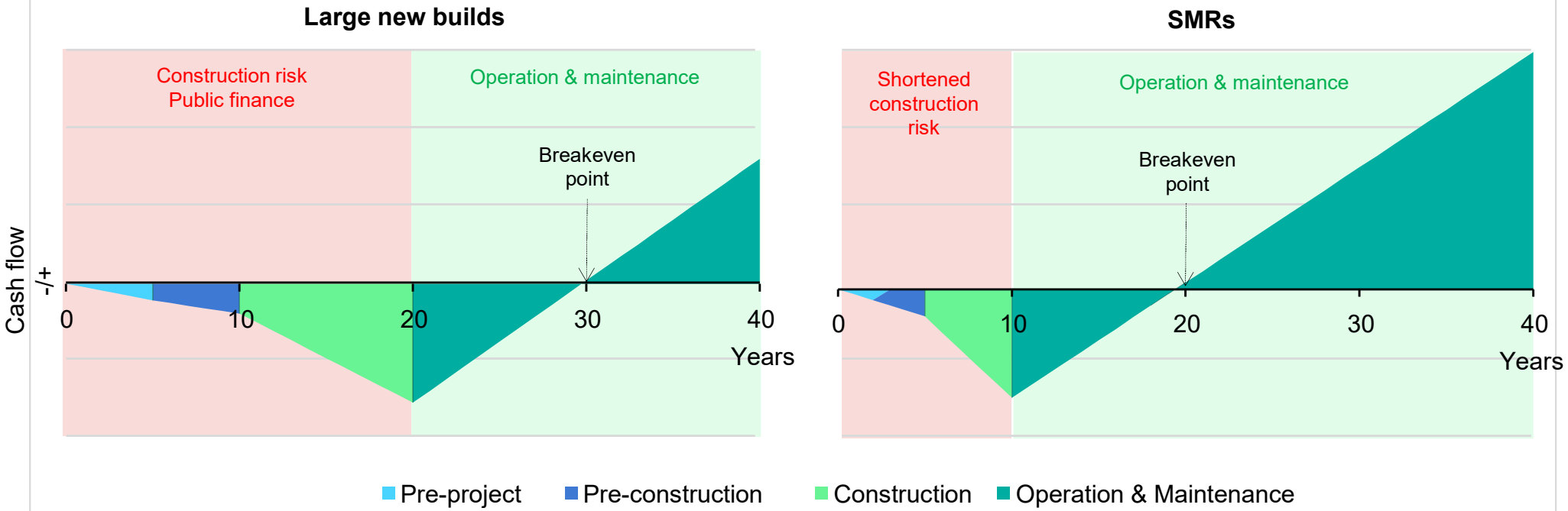
Akkuyu (Türkiye) relied on Russian ECAs and an intergovernmental agreement, allowing Rosatom to assume a major financial risk.

ECAs can partner with MDBs to add credibility and stability, especially in emerging markets

Business models to de-risk nuclear investments vary depending on country profile and preference, but rely on proper risk allocations

Investment in SMRs could lead to faster profitability

Illustrative cumulative cash flow profile of nuclear plants



The cash flow profile of large new builds means it is challenging for the private sector to finance construction. The investment case for SMRs is more optimistic.

Conclusions

- Nuclear projects are difficult to finance due to high capital costs, long construction timelines, and frequent delays, making government support essential.
- Governments can reduce investor risk by ensuring predictable cash flows, taking on construction risk, and enabling cheaper financing through quasi-sovereign risk profiles.
- Stable future revenues are key for debt financing; tools like PPAs, contracts for difference, and regulated asset base models help de-risk projects in volatile markets.
- New large reactors face high early-stage risks and attract limited bank financing, while lifetime extensions are easier to fund because the assets already operate.
- SMRs could draw more private investment thanks to their lower costs, shorter construction periods, and faster payback.
- ECAs and MDBs involvement can support nuclear financing, though MDBs face scale limitations. Sustainable finance use has so far focused on extensions or refinancing.