Nuclear Economics in 2025

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LCOE of New AP1000 (Vogtle 3 & 4 OCC)

LCOE (2024 USD per MWh) versus Construction Duration (Years)

LCOE Status Quo (2024 USD) LCOE Without ITC (2024 USD) LCOE Without ITC or LPO (2024 USD)

New Nuclear is Economical Today, But **Dependent on Policy** Support

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Source: Alva LCOE calculator (v1.1) Model input available on request

Learning does not compensate for lost economies of scale



Stewart, W. R., & Shirvan, K. (2022). Capital cost estimation for advanced nuclear power plants. *Renewable and Sustainable Energy Reviews*, *155*, 111880.

Accumulated costs over sequential SMR deployments are higher than larger builds



Cumulative cost vs. cumulative capacity



llva Stewart, W. R., & Shirvan, K. (2022). Capital cost estimation for advanced nuclear power plants. Renewable and Sustainable Energy Reviews, 155, 111880.

US Fleet Wide Capacity Factor (1975-2023)

Nuclear Power's High Capacity Factor is not Guaranteed

The 90%+ capacity factor in the US LWR fleet was the products of *thousands* of reactor-**years** of real world operational experience

Non-LWR technology should not be assumed to automatically have a 90%+ capacity factor

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Non-LWR Technology Will Initially Struggle With Capacity Factor

Historical experience is clear: initial deployment of reactor technology faces significant operational challenge

Given the relative lack of experience with non-LWR technology, especially recently, one should <u>not</u> assume that non-LWRs will immediately reach LWR like capacity factor Historical Capacity Factor (%) of Select "Advanced" (non-LWR) Reactors





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Nuclear power's economic viability is dependent on high capacity factors

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LCOE (2024 USD per MWh) vs Capacity Factors 857.29 800 -Fort St. Vrain (HTGR) Capacity Factor 700 -600 -578.26 500 -THTR-300 Capacity Factor 400 -438.76 300 -299.26 167.41 200 -159.76 139.83 209.26 124.88 LCOE 100 -(\$ per MWh) 110.25 20 30 60 70 10 40 50 80 90

Assumes \$15,000 per kWe OCC, 30% ITC and LPO Loan Guarantee

Source: Alva LCOE calculator (v1.1) Model input available on request

Capacity Factor Profoundly Impacts Project Economics