International Energy Agency

Electricity Market Design:

Building on Strengths, Addressing Gaps

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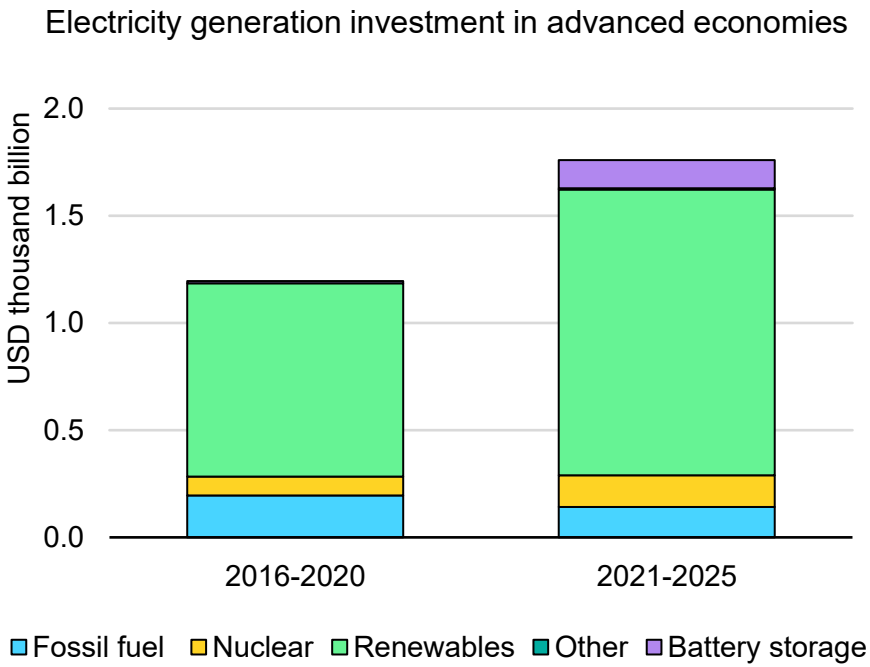
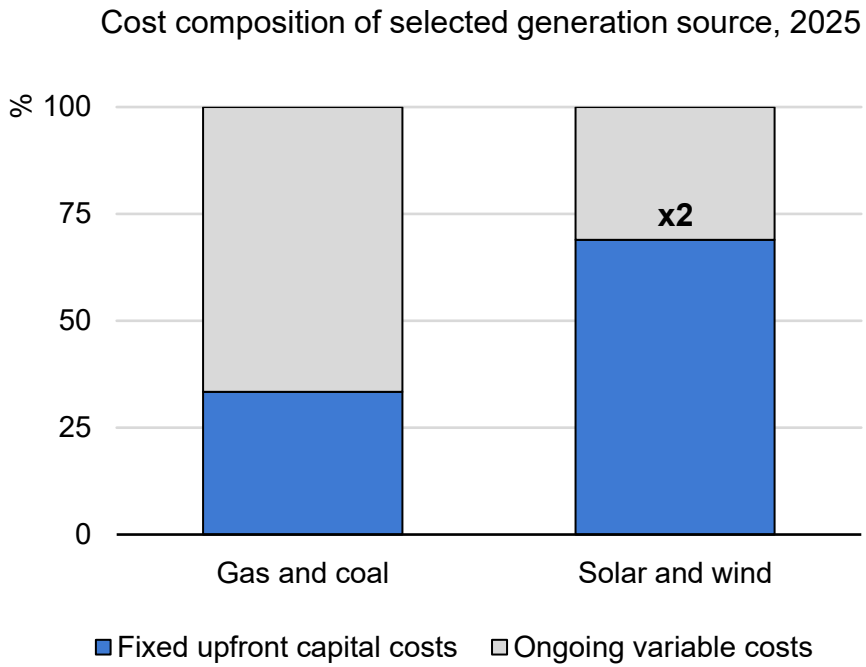
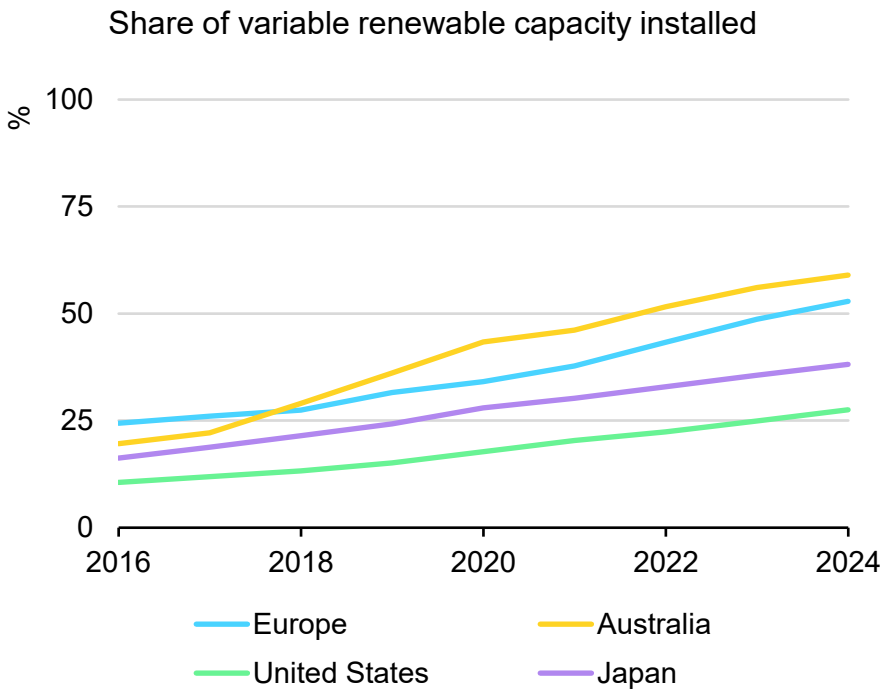
New technologies are transforming the investment landscape

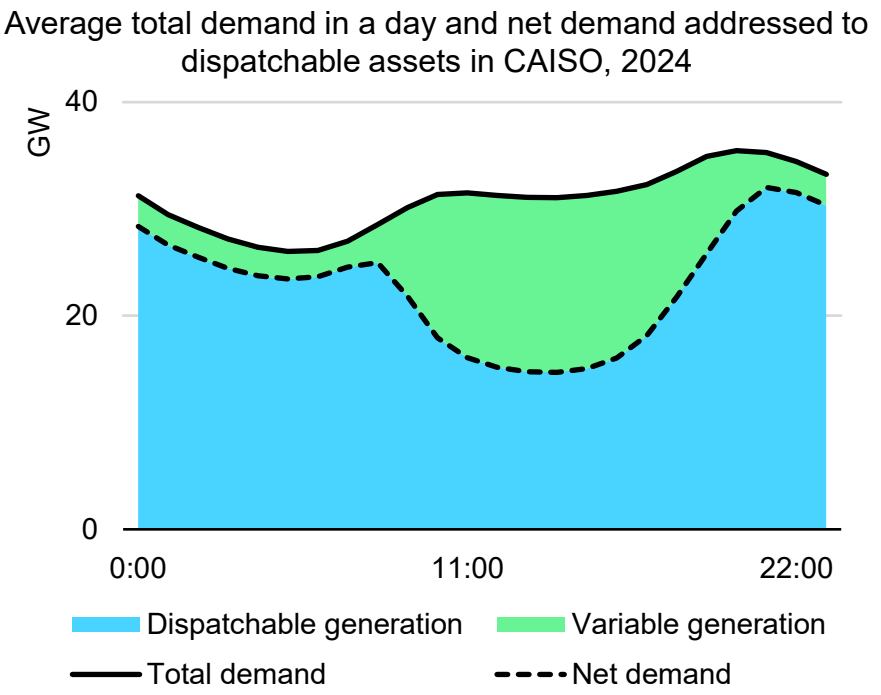




As battery, nuclear, solar PV and wind capture growing investment shares and are highly capital-intensive, securing predictable revenue streams becomes essential to unlock new capacity

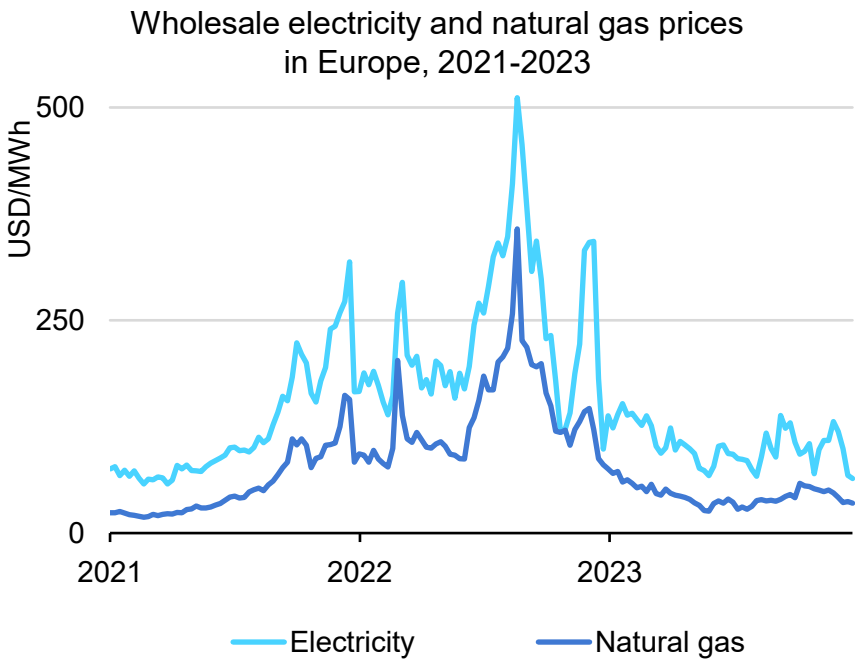
Changing electricity systems are reshaping operations

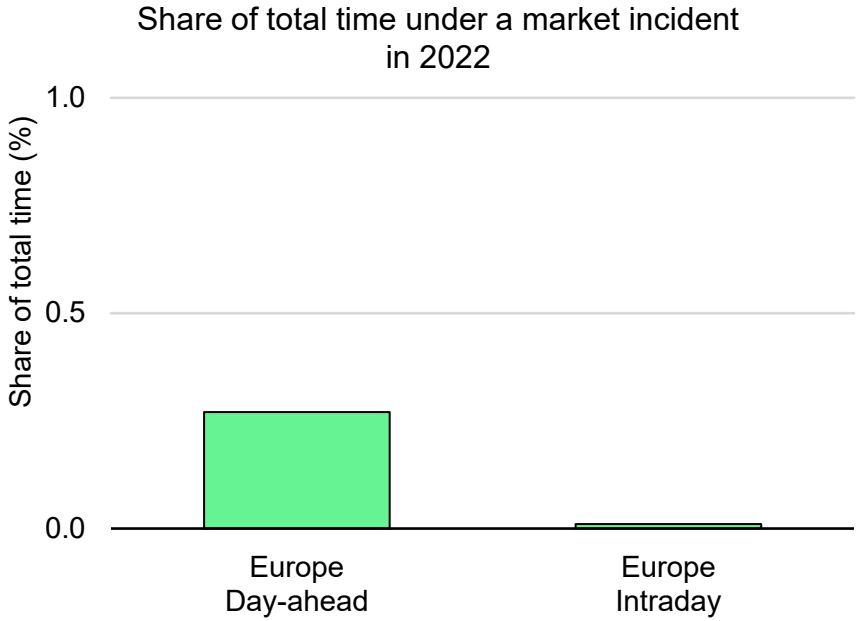




As variable renewables reach significant shares of installed capacity and storage expands, markets need to unlock flexibility from all available resources

Short-term markets remained effective even in extreme conditions

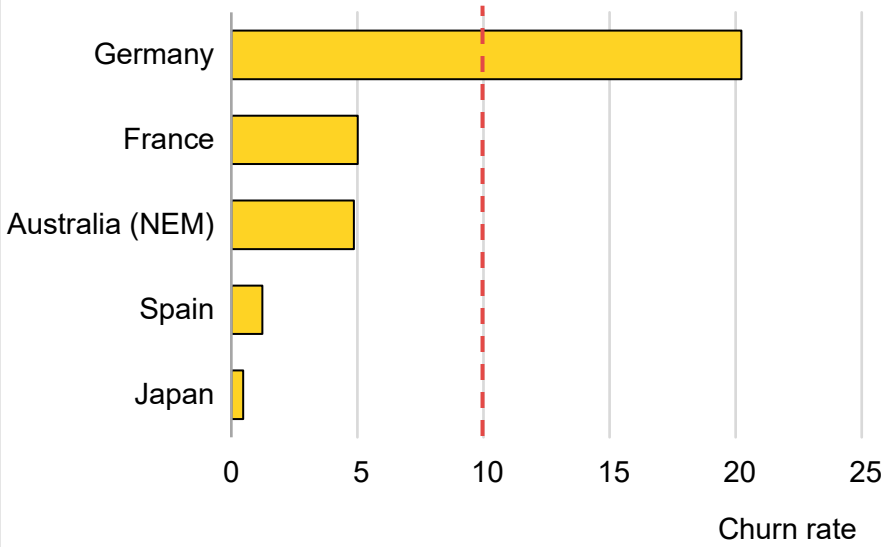




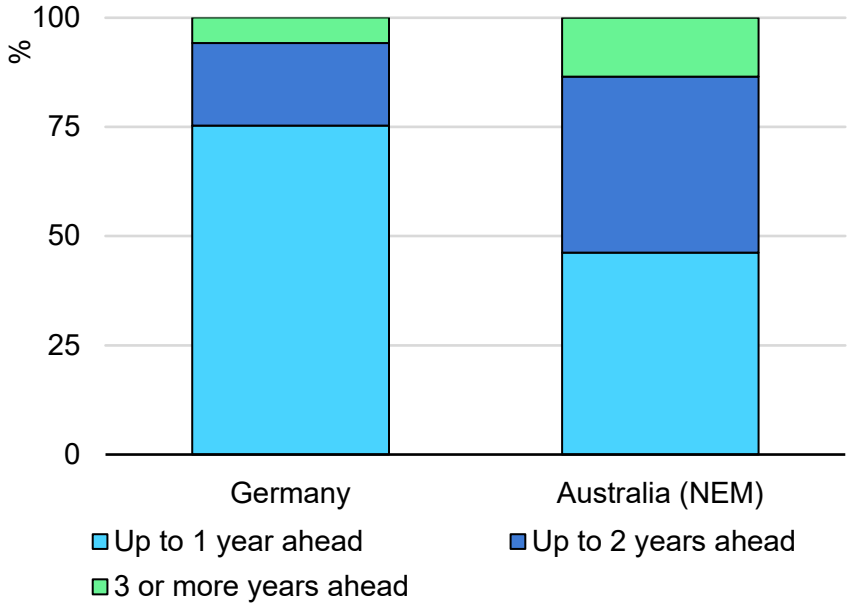
During the 2022 energy crisis, European short-term markets managed to co-ordinate assets thanks to price signals reflecting the state of the system and delivered electricity securely to over 500 million consumers

Low liquidity in forward markets is a bottleneck for long-term hedging

Ratio of forwards and futures volumes traded over consumption (churn), 2024



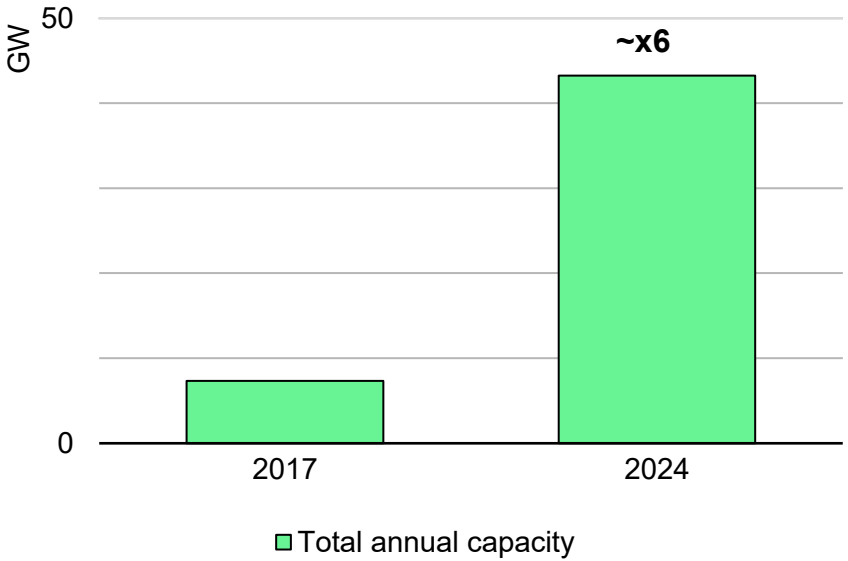
Forwards and futures share of volume by delivery time horizons, 2021-2023 average



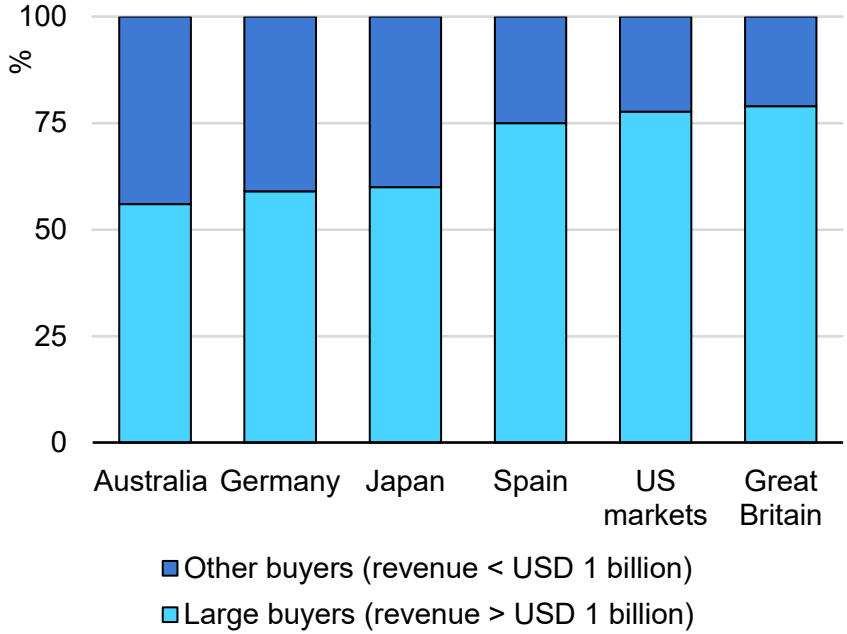
Limited liquidity restricts long-term hedging, creating barriers for both generation investment and electrification as market participants struggle to manage price risks over the timeframes needed

PPAs are expanding, but access is uneven across participants

Annual renewable utility and corporate PPAs capacity signed in Australia, Europe, US markets and Japan, 2017 and 2024



Average share of renewable corporate PPAs by buyer company size and market, 2017-2024

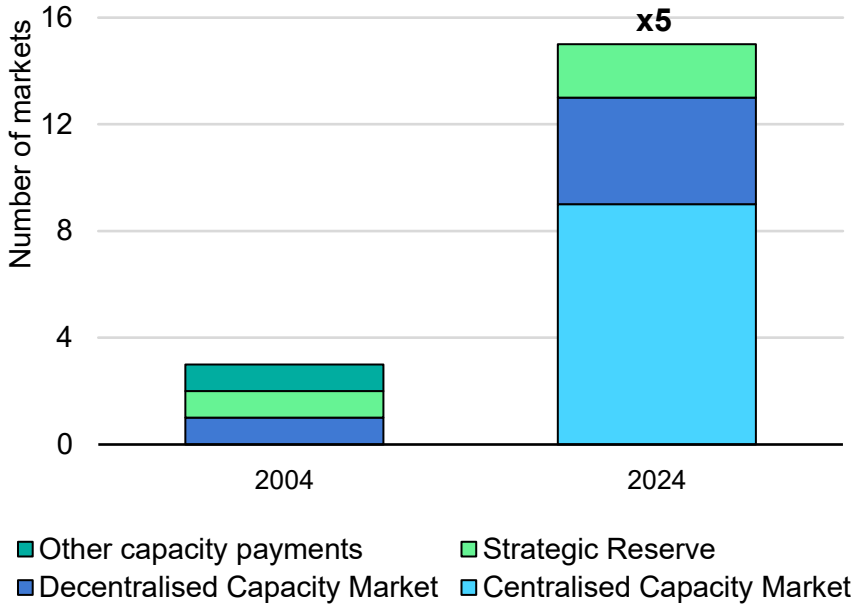


While PPAs are becoming important tools to provide tailored risk-management options, they cannot substitute for deep and liquid long-term markets accessible to all participants

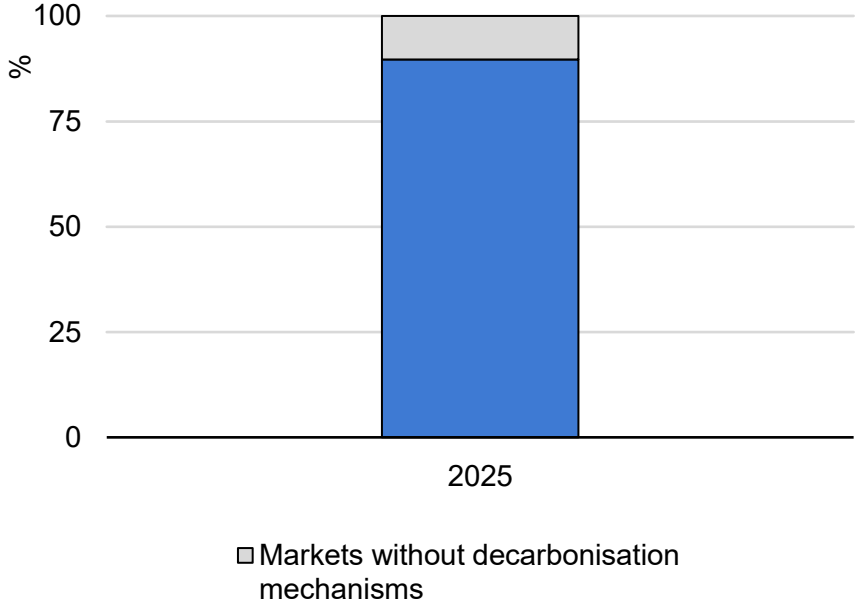
 Sources: IEA analysis based on S&P Global Energy (2025), S&P Global Market Intelligence (2025), and Pexapark (2025).

Complementary mechanisms must align with market signals

Number of electricity markets with capacity remuneration mechanisms across Europe, Japan, Australia and US markets



Share of electricity markets with decarbonisation mechanisms across Europe, Japan, Australia and US markets



As capacity mechanisms increase fivefold and decarbonisation policies expand, poor coordination between mechanisms and markets risks distorting price signals and increasing system costs

Market design reforms should build on strengths and address gaps

Short-term markets

Refine how short-term markets capture system conditions over locations and time, and enable broader participation across all resource types while preserving markets' effectiveness

Long-term markets

Strengthen long-term market liquidity and address the mismatch in hedging timeframes between buyers and sellers, to allow market participants to manage risks effectively and support investments

Complementary mechanisms

Ensure complementary mechanism are carefully coordinated with short- and long-term markets to avoid unintended consequences

Market evolution is an iterative process. Effective market design reforms should consider the entire market and policy framework, underpinned by clear objectives, transparent consultation and stable implementation timelines