



Fact sheet

Ammonia co-firing in Japan faces higher costs and constrained supply than renewables

Ammonia co-firing in coal-fired power plants (CFPPs) is a key component of Japan's power sector decarbonization strategy, with targets of 20% co-firing by 2030, rising to 50% or more after 2030, and reaching 100% by 2050.

Despite four subsidy programs promoting ammonia and hydrogen production and use, with a combined budget of JPY586 billion (USD3.7 billion) in fiscal year (FY) 2025, deployment falls short of targets.

To date, only one CFPP unit has achieved 20% co-firing at scale, while four others are expected to reach that level between FY2027 and FY2030. Japan's projected ammonia demand exceeds current global traded volumes, constraining future supply.

What is ammonia co-firing?



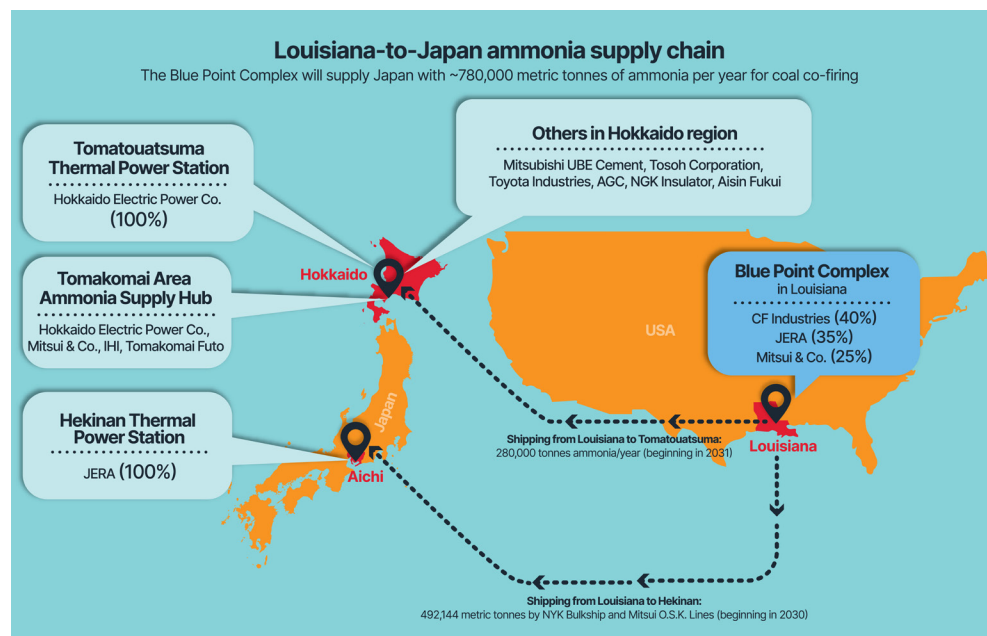
Ammonia co-firing is the process of blending ammonia with coal in modified CFPPs to reduce coal consumption and carbon emissions. Ammonia can account for different shares of the fuel mix, ranging from 20% co-firing to a potential 100% ammonia-based operation.



IEEFA's analysis, based on Japan's Ministry of Economy, Trade and Industry's (METI) projections, suggests that electricity from **20% ammonia co-firing** is expected to cost **145–220%** more than **onshore wind** and **240–464%** more than **commercial solar**.

Large-scale ammonia imports underpin Japan's co-firing plans

- Blue Point Complex in Louisiana, United States (US) — a major prospective supplier of blue ammonia to Japan — is a 1.4 million tonnes per annum (MTPA) ammonia production facility using natural gas and carbon capture and storage (CCS).
- Two Japanese companies hold stakes in the project — JERA (35%) and Mitsui & Co. (25%) — and reached final investment decision in April 2025, targeting production in 2029.



Source: CF Industries; Mitsui & Co.; Ammonia Energy Association.

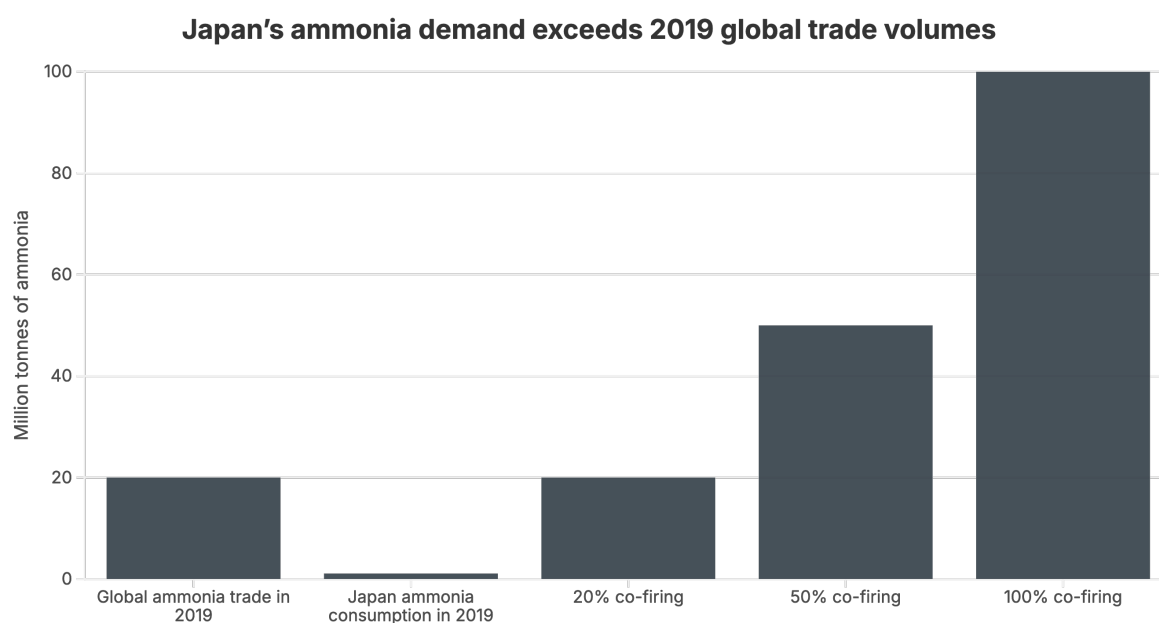
Renewables are already cheaper than ammonia co-firing

- Recent levelized cost of electricity (LCOE) projections show that 20% ammonia co-firing in 2040 remains substantially more expensive than commercial solar and onshore wind.
- High and rising production costs would increase downstream prices in Japan.

Technology	METI LCOE projections (JPY/kWh)	Difference vs 20% ammonia co-firing
 Commercial solar	10.9	240–464% lower
 Onshore wind	16.3	145–220% lower

- Even with subsidies, ammonia co-firing electricity remains more expensive than existing alternatives.
- METI projects that imported blue ammonia will be marginally cheaper than domestic green ammonia, but remains less cost-competitive than commercial solar, onshore and offshore wind, and geothermal power.

Japan's ammonia demand exceeds global supply



Source: Institute for Global Environmental Studies.

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- Achieving 20% co-firing at Hekinan's Unit 4 alone requires 500,000 tonnes of ammonia each year — nearly half of Japan's current annual ammonia consumption of 1.08MTPA.
- Full 20% co-firing rate across all CFPPs would require approximately 20MTPA of ammonia — equivalent to the global ammonia trade volume in 2019.

“Prioritizing investment in commercially proven technologies, including **renewable energy, battery energy storage systems, and grid infrastructure**, could provide a more **cost-effective pathway to decarbonization**, while strengthening energy security and lowering electricity costs for businesses and households.



Read more:

Japan's ammonia co-firing strategy constrained by cost, supply, and timing



Institute for Energy Economics
and Financial Analysis