Ammonia Build-Out: Recipe for Risks

OVERVIEW

Government agencies have been awarding financial incentives to private companies to build ammonia production plants that may fail to achieve robust economic benefits for host communities. IEEFA's five-part report shows why ammonia production would likely have a limited impact on jobs and high construction and operating costs, why energy markets for ammonia will not likely be robust, and why such projects should be heavily scrutinized given the potential risks to host communities. This factsheet focuses on uncertain global market.

INDUSTRY UNCERTAINTY

The International Energy Agency (IEA) reported in 2025 the volume of hydrogen in offtake agreements for new energy uses grew only slightly in 2024.[1] This is not surprising.

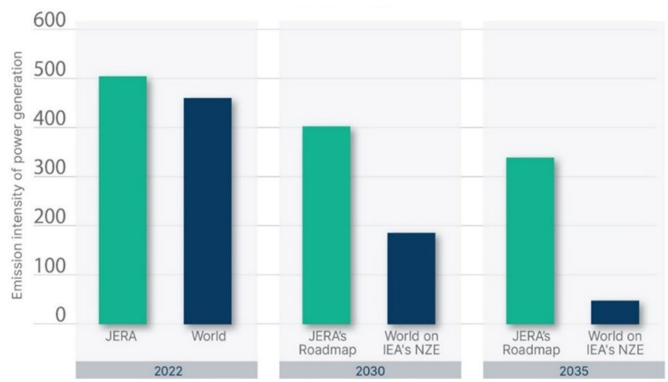
Interest in power plant co-firing may be waning. Efforts to co-fire ammonia with coal in power plants will face practical hurdles. Despite early enthusiasm in Japan, South Korea and Indonesia, the ammonia hype may falter. South Korea, in particular, recently pledged to phase out coal-fired power plants and cancelled a bidding program in 2025 that would have subsidized ammonia co-firing with natural gas.[2]

Rationale for ammonia use in power plants is flawed. Co-firing ammonia with coal is not likely to achieve robust carbon reductions. A BloombergNEF analysis found a 50% mix of ammonia (blue or green) and coal would emit more carbon dioxide than a natural gas-fired plant and also more nitrous oxide, a strong greenhouse gas and an ozone-depleting chemical.[3] And an IEEFA analysis concluded the co-firing plans of a large electricity company in Japan would fall far short of the IEA's net-zero path.[4]

Maritime market for ammonia appears stymied. The market for ammonia as a shipping fuel is almost nonexistent today. Only three ammonia-powered ships reportedly were on the water as of August 2025, with just 38 ships on order. In contrast, 70 methanol ships were already in use and 336 on order.[5] And a study found ammonia poses onboard safety risks at least 24 times that of natural gas or diesel oil.

Ammonia use as a "carrier" for hydrogen likely will be limited. Some ammonia may be exported growth as a "carrier" for hydrogen, since ammonia is more easily liquefied—but converting hydrogen to ammonia, shipping the ammonia to the buyer, then converting the ammonia ba back to hydrogen is energy inefficient.

Emission Intensity of Power Generation for JERA and the World on a Net Zero Pathway (gCO2 per kWh)



Source: IEA's Net Zero Emmisions by 2050 Scenario (NZE), IEEFA calculations

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FERTILIZER MARKET

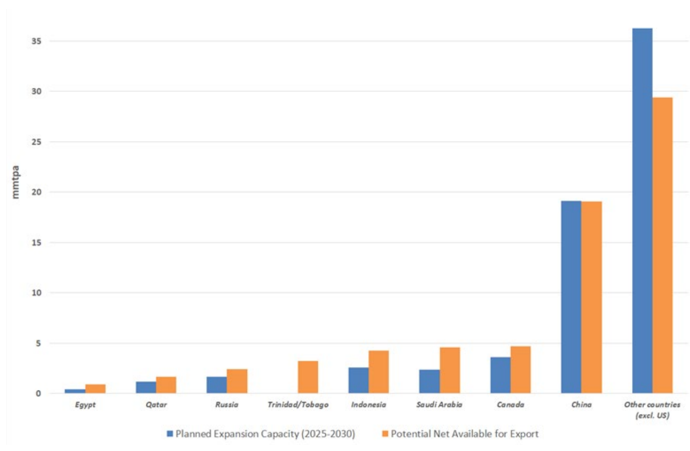
The international market for ammonia as fertilizer historically has grown steadily but slowly. Although expanded access to fertilizers Africa could quicken the pace by about roughly 5%, a McKinsey report finds key factors may slow the pace of fertilizer growth even as populations rise and countries boost agriculture.

These factors include use of nitrogen-fixing biologicals, beneficial bacteria and fungi; declining use rates in China and India as they seek to improve efficiency; and accelerated technology to boost application efficiency.[6]

COMPETITION

Many countries are in the ammonia export business, and planning expansions. Ammonia is produced from nitrogen and hydrogen, which are worldwide, and the technology is readily accessible. The USDA recently reported that global trade volumes in fertilizer rose by 18.8% between 2006 and 2022, but the U.S. share of global exports declined by 25% or more over the same period.[7]

Selected Countries Planning Imminent Ammonia Production Expansion (million metric tons per year)



Source: ICIS, IEEFA

CONCLUSION

Based on the concerns raised in the five parts of IEEFA's report, Ammonia Build-Out: Recipe for Risks, any plan to grant public monies and tax benefits to ammonia production projects should be subject to rigorous scrutiny and robust public discussion. See factsheets 1, 2, 3, and 5 on the [IEEFA website.]

[1] IEA. Global Hydrogen Review 2025. September 12, 2025, p. 34.
[2] S&P Global. COP30: South Korea commits to phase out majority of coal plants by 2040. November 18, 2025.
[3] BloombergNEF. Japan's Costly Ammonia Coal Co-Firing Strategy. September 28, 2022, pp. 11-12..
[4] IEEFA. JERA is putting Japan's decarbonization goals at risk. January 26, 2024.
[5] DNV. Energy Transition Outlook 2025: Maritime Forecast to 2050. 2025, p. 6.
[6] McKinsey. The 2040 fertilizer industry: how could industry trends affect demand? December 17, 2024.
[7] USDA. Drivers of Fertilizer Markets: Supply, demand, and prices. ERR Report No. 354. September 2025, p. iv.