

Ammonia

Ammonia – Could it be the energy source to unlock Hydrogen pathways?

The supply of ammonia is expected to grow between 2024 and 2038, from 1.0 million MT in 2024 to 92 million MT in 2038. Majority of ammonia produced in 2038 - approximately 78 million MT will likely be e-ammonia.

However, almost all existing ammonia production is "conventional", deriving from carbonemitting natural gas. To meet the increasing demand as a clean fuel, the industry needs to shift to green ammonia, derived from renewable energy sources, or to blue ammonia, derived from natural gas and combined with carbon capture, utilization and storage (CCUS).

Blue ammonia and hybrid green ammonia (ammonia produced in plants using fossil fuels and renewable electricity), are both necessary components of the journey to net zero, providing a cost-effective transition to green ammonia production.





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In the future, only green ammonia will be used as fuel for the shipping industry, power sector (co-fired power plants specifically in Japan & South Korea) as well as hydrogencarriers.



Global ammonia production is expected to rise by 19% between 2022 and 2030, driven by increasing agricultural demand. Green ammonia production capacity accounts for 12% of production capacity by 2030.



East Asia will become the largest market for low-carbon ammonia, primarily through imports from countries like Japan and South Korea. Europe will become the second-largest import region.



The announced green ammonia projects add up to a total production capacity 26.5Mmt by 2030

Green Ammonia movement in Asia Pacific portrays the region's push to a low carbon economy (hydrogen)





Net zero targets set Several companies in by countries drive Asia-Pacific have decarbonization many new initiatives/policies targets that push centered on low initiatives in the carbon economies hydrogen space. Graph shows and energy transition such as targeted end use of hydrogen for hydrogen. companies by 2030 Blue/Green Ammonia policies are not discussed specifically but are seen as enablers to unlock the low carbon Hydrogen economy. Hydrogen Focus Country Australia Production (export) China

AustraliaProduction (export)ChinaProduction (Export) & Consumption (Import)IndiaProduction (Export) & Consumption (Import)JapanConsumption (Import)South KoreaConsumption (Import)SingaporeConsumption (Import)

*CSP - Concentrated Solar Power

Asia as a Future Ammonia Hub likely with Singapore leading the way

A wave of new renewable electricity capacity could propel lower prices for sustainable, hydrogen-based 'e-fuels' in the transport sector, mitigating the price impact for end-consumers, the International Energy Agency said in its December report. 'E-fuels', or fuels made from electrolytic hydrogen, offer one of the few scalable solutions for the hard-to-abate aviation and maritime sectors, leaving both uniquely exposed to price dynamics as regulatory requirements tighten.

To date, 90% of announced e-fuels projects have focused on e-ammonia, while e-kerosene and e-methanol, which rely on CO2 feedstock to produce, have lagged. The IEA underscored the importance of government regulations to provide demand certainty for 200 e-fuels projects under development, while remaining optimistic that price shocks to end-consumers could be minimal as e-fuel uptake scales.



---Liquefied biogas/Synthetic methane

Thank You



moving energy