



**AMMONIA ENERGY**  
ASSOCIATION

# **Low-Emission Ammonia Data (LEAD): Plants**

## **Executive Summary**

February 2025 Version  
Ammonia Energy Association

# Project intelligence database

The AEA's project intelligence database has been available to members of the AEA since April 2022, and contains details on all the low-emission (and transitional) ammonia production plants that have been announced.

The database is growing quickly:

- December 2022: 103 projects
- February 2025: 485 projects (596 phases of expansion), for a total of 451.2 million tons

Projects are categorized according to technology pathway:

- **Gas reforming** (CCS, CCU, EOR, biogas)
- **Water electrolysis** (renewable, grid, nuclear), and
- **Other** (pyrolysis, gasification, electrochemical, byproduct hydrogen, etc).

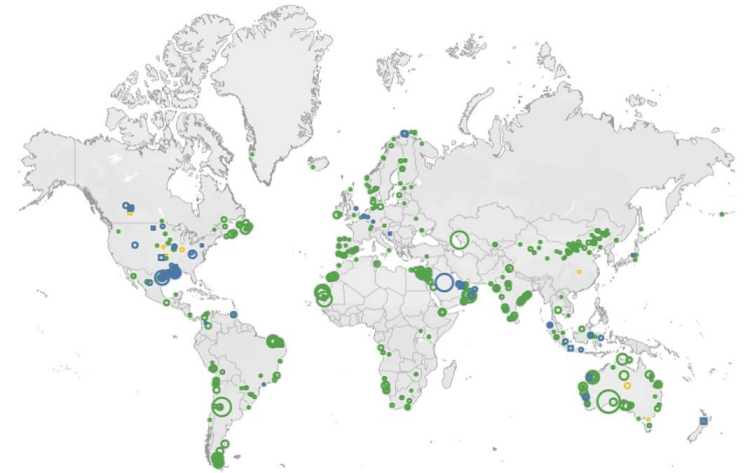


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## Low-emission and transitional ammonia plants

*Global announced capacity: 451.2 million tons of ammonia  
2025 Q1*

By Location (Operational, Firm, Mature, Developing, Announced)



- Gas reforming
- Water electrolysis
- Other
- Low-emission
- Transitional

*Low-Emission Ammonia Data, Ammonia Energy Association*

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# Project updates this quarter



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Since the last update in November 2024, the net capacity we are tracking has increased by 13.1 MT (million tons). This increase in capacity is noteworthy, given that numerous projects without active project development (17.5 MT) have been categorized as “Defunct” from the database in the last 3 months. Thus, 30.6 MT of capacity has been announced over the past 3 months.

The capacity in the category “Operational”, “Firm”, “Mature” has increased by 7.8 MT (from 35.7 MT to 43.MT), indicating numerous projects proceeding toward detailed engineering, with various projects signing licensing agreements in the last months.

In 2024 Q4, at least 5 ammonia plants have obtained Pre-Certification or Certification, bringing the total to at least 18 ammonia plants with Pre-Certification and Certification by the end of 2024. Certification allows for regulatory clarity in offtake agreements, driving projects toward FID.



*Top: Topsoe's Solid oxide factory in Denmark starts production, October 2024.*

*Bottom: CF Industries construction of CO<sub>2</sub> dehydration and compression unit in Donaldsonville (United States), December 2024.*

# Low-emission ammonia projects



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As of February 2025, 451.2 million tons (MT) of Low-emission and Transitional ammonia have been announced.

By 2030, we expect 43.5 MT to be operational

- 3.7 MT is Operational (up to Q1 2025)
- 13.5 MT is Firm (eg, under construction / FID)
- 26.3 MT is Mature (eg, offtake / EPC selected / FEED)

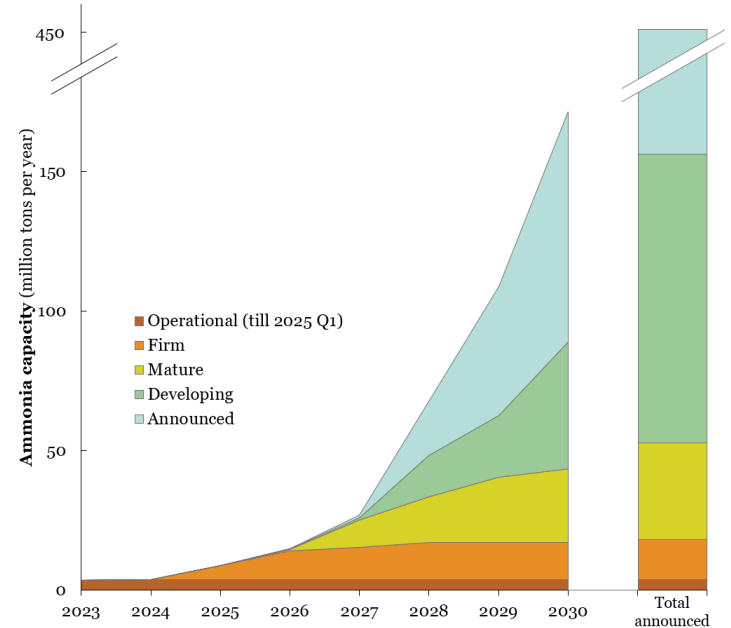
In total, 294.7 MT is classified as Announced with few public details. Another 103.5 0 MT is Developing (eg, making clear progress to FID), of which 45.6 MT targets to start this decade.

## Key conclusions:

- Within the large funnel of projects, a significant number of projects are maturing to meet the low-emission ammonia demand.
- Clear demand signals and regulatory certainty will be required to move more of these projects towards FID.

## Low-emission and transitional ammonia plants

*Global announced capacity: 451.2 million tons of ammonia  
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# Availability this decade



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Looking only at Operational, Firm, and Mature projects, 43.5 million tons (MT) of Low-emission and Transitional ammonia capacity is expected to be Operational in 2030.

- 3.6 MT Transitional is already operational. We expect this to increase to 5.9 MT Transitional in 2030.
- 0.2 MT Low-emission is already operational. We expect this to increase to 37.7 MT Low-emission in 2030.
- About half of Low-emission capacity this decade comes from Gas reformation projects, totalling 23.0 MT in 2030.
- Water electrolysis projects begin operating at scale in 2025-2026, and reach 17.5 MT capacity in 2030.

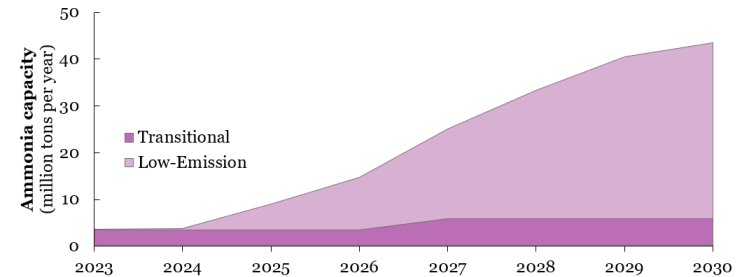
## Key conclusions:

- Transitional ammonia plants serve existing markets (fertilizers, chemicals), but are not expanding long-term.
- Gas reformation projects are developing at large-scale, especially at existing sites, while Water electrolysis projects are scaling toward the size of Gas reformation projects in the late 2020s.

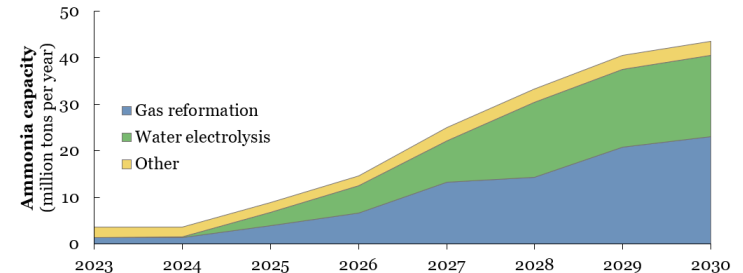
## Low-emission and transitional ammonia plants

*43.5 million tons of ammonia by 2030 (Operational, Firm, Mature)  
2025 Q1*

By Category (Operational, Firm, Mature)



By Technology pathway (Operational, Firm, Mature)



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# Plants by Project Type



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About 75% of the Operational, Firm, and Mature projects is Newbuild capacity by 2030 (33.4 MT), with only 25% representing revamps (10.1 MT). This aligns with the continued growth of ammonia production, combined with a shift of ammonia production to locations with abundant natural gas and the best renewable potential.

## Newbuild projects:

- Gas reformation via autothermal reforming with full CCS, focused on long-term low-emission ammonia markets.
- Water electrolysis projects ranging from small-scale to world-scale.

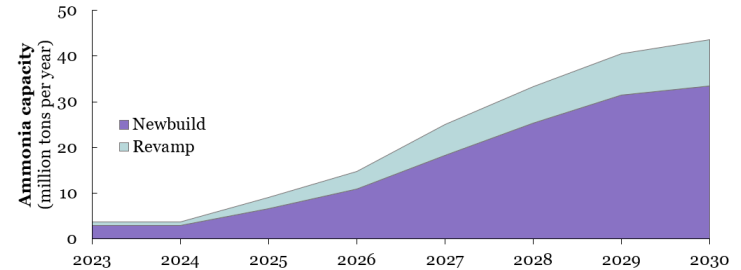
## Revamp projects:

- Gas reformation projects typically have partial CCS to comply with near-term markets in East Asia and Europe.
- Water electrolysis projects have 20-240 MW capacity to decarbonize 5-20% of the hydrogen supply. The exception is India, with various full revamp projects with grid-connection.

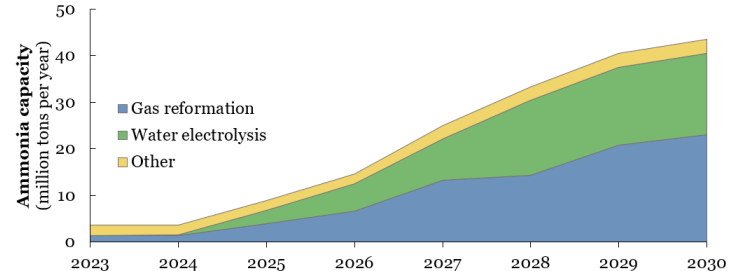
## Low-emission and transitional ammonia plants

*43.5 million tons of ammonia by 2030 (Operational, Firm, Mature)  
2025 Q1*

By Project Type (Newbuild, Revamp)



By Technology pathway (Operational, Firm, Mature)



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# Plants by Region: North America



Newbuild Gas reformation projects are typically located in regions with abundant natural gas, such as the US Gulf Coast, the Middle East, and Indonesia.

Projects in the US Gulf Coast mostly focus on Gas reformation with CCS:

- Sometimes at existing plants serving existing markets (fertilizers, chemicals), with some notable first-mover offtakes into energy markets.
- East Asia and Europe are set to become a key offtake market for newbuild Low-emission Ammonia capacity.

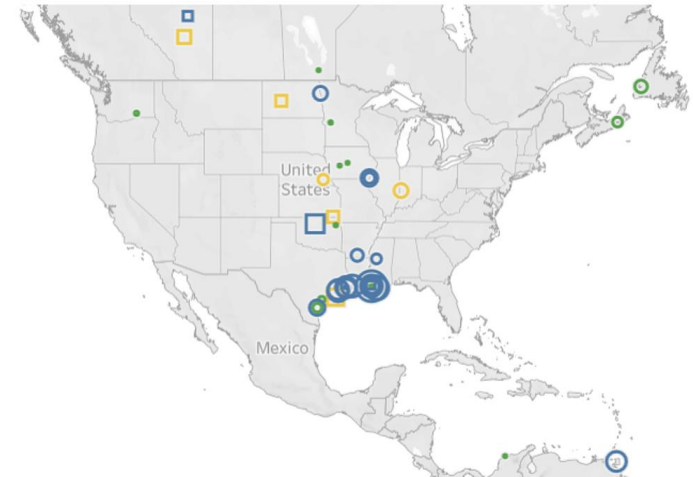
Projects in Eastern Canada focus Water electrolysis, coupled to wind electricity:

- Initial offtake is focused on Europe, with RFNBO-compliant ammonia production. Also, the ammonia plants may provide grid services.

## Low-emission and transitional ammonia plants

43.5 million tons of ammonia by 2030 (Operational, Firm, Mature)  
2025 Q1

Canada and the United States (Operational, Firm, Mature)



- Gas reformation
- Water electrolysis
- Other
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# Plants by Region: China and India



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Newbuild Water electrolysis projects have various narratives:

- Optimal regions for solar and wind such as Australia, Chile, Eastern Canada, Egypt, India, Morocco, Namibia, etc.
- A highly renewable grid with substantial hydropower in Brazil and Norway, and in parts of India.
- Replacing of coal-based production in China.

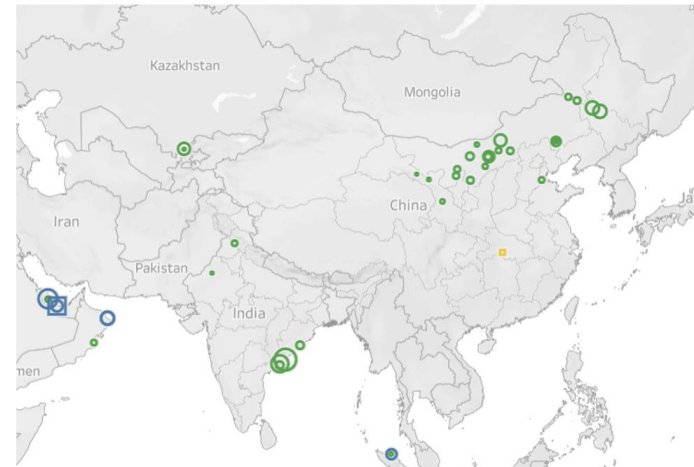
Various Water electrolysis projects are maturing globally, with an emphasis on China and India:

- In China and India, initial offtake of RFNBO-compliant ammonia will be focused on Europe.
- The cost gap between ammonia via Coal gasification and Water electrolysis is closing in China, implying local offtake may also become significant.
- Noting that India is a net ammonia importer, potential future offtake can serve local markets.

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China and India (Operational, Firm, Mature)



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# Evaluation of project maturity



The AEA tracks project development indicators using nine criteria:

- FEED ongoing/completed
- existing ammonia complex
- existing operator (ammonia, chemicals, energy)
- existing infrastructure
- hydrogen technology vendor selected
- ammonia licensor selected
- plant operator selected
- offtaker selected
- financing / funding (pre-FID)

Using nine criteria, every project is assigned an objective status:

- **Operational:** the plant is operational
- **Firm:** the plant has reached FID or is under construction
- **Mature:** 5+ out of 9 criteria have been met
- **Developing:** 3+ out of 9 criteria met
- **Announced:** 2 or less out of 9 criteria met
- **Defunct:** the plant has closed, or the project is on hold, or not ongoing

# Evaluation of project category



The database include both Low-emission and “Transitional” plants.

Low-emission plants include a variety of technology pathways, including water electrolysis, gas reformation with permanent CCS, and methane pyrolysis.

Transitional plants includes projects with reduced emissions, but via pathways that may not be consistent with net-zero (for example, byproduct fossil hydrogen or enhanced oil recovery pathways).

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The original data upon which this material is based is available to the members of the Ammonia Energy Association. If you are interested in joining the AEA, please visit [ammoniaenergy.org/members](https://ammoniaenergy.org/members) for more information.