Yara Clean Ammonia

Enabling the hydrogen economy

The ongoing energy crisis has clearly demonstrated that Europe needs to reduce its dependency on Russian gas. Also, as a consequence of the Russian invasion of Ukraine, the fragility of the global food & fertilizer system has become visible, especially since Europe imports 60% of its fertilizers. Scaling up hydrogen projects is technically and economically challenging by itself. Transforming entire industrial sectors, as proposed in RePowerEU, requires an even more massive effort. And nowadays EU industries are facing high investment uncertainty due to the current geopolitical context with high energy prices and disrupted supply chains.

How to make the transition to the hydrogen economy happen?

Today Yara produces 1,3 million tons of conventional hydrogen annually for the manufacture of ammonia and fertilizers. Yara is also leading the way for decarbonizing agriculture, shipping and energy via clean hydrogen and clean ammonia (footnote 1). We are eager to collaborate with value chain partners and policy makers to drive demand for renewable and low-carbon goods and fuels, made with clean hydrogen, hereby accelerating the decarbonization of manufacturing, agriculture and transport in Europe.

What is needed to speed up the hydrogen economy towards 2030?

The EU's Fit for 55 proposals include a 50% renewable share for hydrogen used in industry. While percentage targets for renewable hydrogen uptake in industry are indeed useful to align all stakeholders, they are not enablers by themselves. The right mix of incentives and regulations must ensure clean hydrogen fulfills its potential. This includes:

- **Foster demand for low carbon and renewable products and fuels on the European market.**
  - The carbon price signal, being only based on the carbon footprint, is insufficient to make goods manufactured from clean hydrogen cost-competitive. Without differentiation versus conventional products, consumers may simply choose the lowest price product
  - Encourage authorities and sector associations to collaborate and develop the best suited incentive mechanism (footnote 2) for each value chain. Translate the production targets into distribution and value chain targets. Growing demand will give the investment signal necessary for the transformation of manufacturing, agriculture and transport in Europe.

- **Help industry & consumers overcome the cost difference between clean hydrogen and conventional fossil fuels.**
  - Innovation funding will reduce the first mover risk. Let subsidy schemes, based on contracts for difference, play an important role until all necessary infrastructure is in place and pricesfor renewable energy have dropped.
  - Level the playing field versus imports of conventional and non-renewable products

Footnote 1: The term clean ammonia comprises both blue and green ammonia. Blue ammonia is derived from a carbon capture and storage process (CCS), while green ammonia is produced carbon free by using hydrogen sourced from renewable energy as feedstock.

Footnote 2: Examples of sub-sector initiatives already taken to support the EU's desired systemic and transformative changes. FuelEUMaritime: creation of a market low-carbon fuels, including hydrogen & clean ammonia, by limiting the carbon intensity of energy used on board of ships ; H2Global: import of hydrogen and making it available at a competitive cost to different industries which then can offer competitively priced low-carbon goods to their customers ; Sector-specific regulatory frameworks to drive consumption towards recycled, plant-based or organics goods through regulatory frameworks ; Financial incentive schemes, such as those promoting organic nutrient use in farming.

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Yara is leading the way for the hydrogen economy

Yara is leading the way for decarbonizing agriculture, shipping and energy via clean hydrogen. Today Yara produces 1,3 million tons of hydrogen annually for the manufacture of ammonia and fertilizers. Having reduced our scope 1 & 2 emissions by 55% since 2005, Yara's ongoing shift to from fossil-fuel based to renewable based hydrogen is the next step to decarbonize fertilizer production. Clean ammonia is also a superior hydrogen carrier and important zero-emission fuel that may be used for power production and deep-sea shipping. Building on Yara's long experience and global footprint in fertilizer sales, our Yara Clean Ammonia business unit operates the largest global ammonia network with 12 ships and 18 terminals across the globe.

We are exploring and developing clean ammonia projects globally. Examples of our pioneering projects include electrification of large-scale ammonia production in Europe (Hegra), solar powered ammonia production in Australia together with Engie (Yara Pilbara) as well as capture and storage of carbon in the North Sea.

Project Hegra

large-scale green ammonia production in Europe

With project HEGRA (Herøya Green Ammonia), Yara aims to electrify and decarbonize the ammonia plant in Porsgrunn, Norway.
The ongoing pilot will deliver an operational 24MW electrolyzer in spring 2023. The full electrification of the plant will cut CO2-emissions by 800,000 tonnes per year.

Yara Pilbara & Project Yuri

solar powered ammonia production in Australia

In collaboration with Engie, Yara is working to build a renewable hydrogen plant in Western Australia, a region receiving abundant & predictable radiation from the sun. The first phase demonstrator, supported by the Australian government, includes a 10 MW electrolyzer, 18 MW of solar PV (Photovoltaic), and battery storage. The construction is scheduled to begin in October 2022 and be ready to supply feedstock for the Yara ammonia operations and energy exports in 2024.

Yara Sluiskil blue ammonia

a major milestone for Europe

Yara and Northern Lights have signed the first ever cross border CO2 transport and storage agreement. Yara's plant in Sluiskil, Netherlands, has already cut 5.2 million tonnes of CO2 emissions per year from its ammonia and fertilizer production since 1990, reducing total site emissions by 65%. An additional reduction is now made possible by capturing and permanently storing 800,000 tons of CO2 annually under the seabed off the coast of Norway.