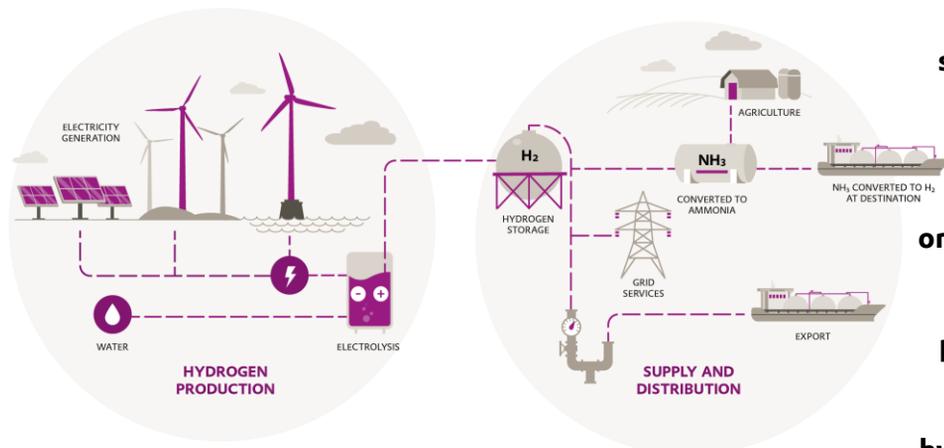


Cracking the GREEN ENERGY POTENTIAL of AMMONIA



Having been stored, handled and moved for more than a century, this is where ammonia offers a solution, being a store of hydrogen itself. Synthesized ammonia – e.g. using renewable hydrogen and nitrogen (via air separation) – is easier to liquefy and, tellingly, can use the existing global infrastructure for storage and shipping, largely developed for the fertilizer industry.

Once delivered to its point of use, an ammonia cracking process is required to release its green credentials, allowing the hydrogen to be used as a feedstock or carbon-free energy

source for ‘hard-to-abate’ industries like steel, cement or chemical production, or supplied to energy and power companies or the transport sector for the ongoing development of fuel cell technologies.

Evonik Catalysts is a specialist in this field, working across a range of industries and bringing cross-functional expertise in catalytic reactions to develop solutions for today’s sustainability and green energy challenges.

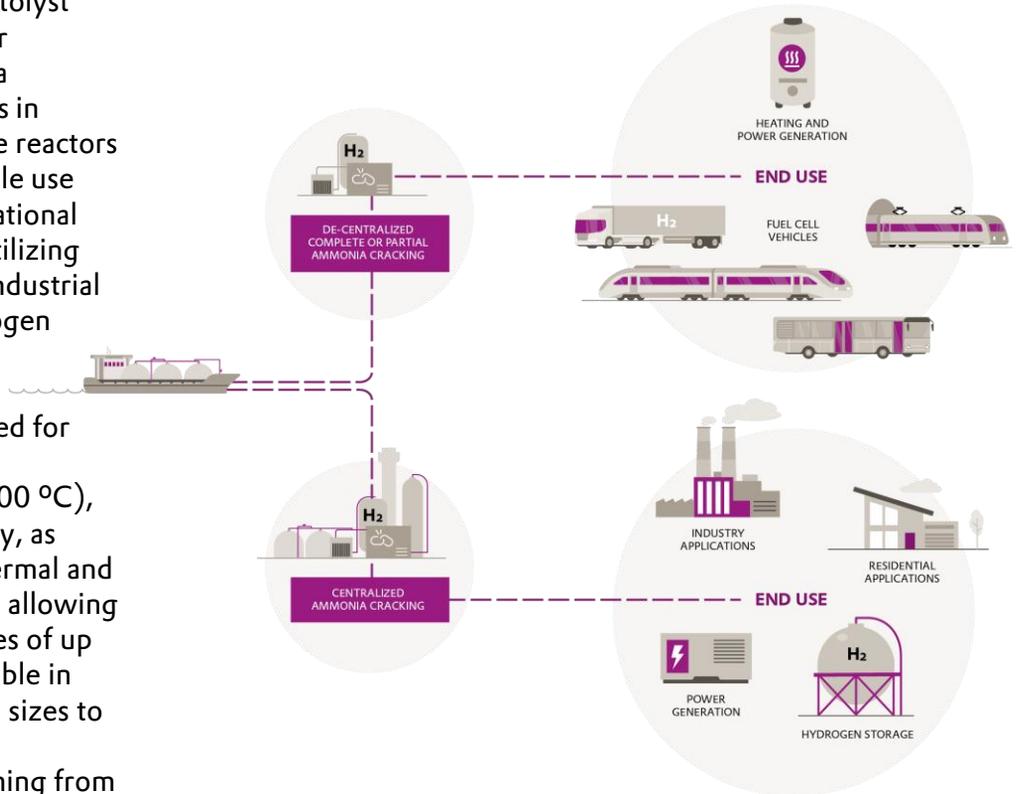
Despite its potential as a clean energy driver, hydrogen presents significant logistical and economic challenges. For storage it requires high-pressure compression or cryogenic liquefaction, while transportation – for example via pipelines, liquid organic hydrogen carriers (LOHCs) or through hydrogen derivatives like methanol – is often energy-intensive, costly or suffers from range limitations.

To support the ammonia cracking process, Evonik currently offers two types of catalysts – nickel-based Octolyst® 1700 and ruthenium-based Noblyst® 3900.

A highly active nickel on alumina catalyst, Octolyst® 1700 is designed for centralized ammonia cracking applications in classic reformer type reactors – often for large-scale use across regional or national distribution grids, utilizing reactors built near industrial hubs, ports or hydrogen import terminals.

Octolyst® is optimized for higher temperature applications (500-700 °C), boasting high activity, as well as excellent thermal and mechanical stability, allowing for delivery pressures of up to 50 bar. It is available in different shapes and sizes to meet specialized requirements stemming from novel reactor design, different reactor concepts (such as adiabatic cracking reactors) or for application in pre-reactors and partial cracking.

On the opposite side of the application spectrum is the Noblyst® 3900 ruthenium catalyst, engineered for low-temperature operations (400-650 °C) seen in decentralized or partial cracking processes.



These processes support local hydrogen generation, primarily for use in direct combustion or as a fuel source.

Noblyst® 3900 allows sufficient delivery pressure of up to 25 bar. Offering high thermal stability and resistance to water, it can be activated on-site with either hydrogen or ammonia – allowing greater operational freedom in decentralized application scenarios.

Both catalysts unlock high performance, ultra-efficient cracking potential and can be customized depending on requirements.

Despite the possibilities of ammonia cracking, Evonik understands that transitioning to renewable energy sources isn't a task that one person, or one company, can achieve alone.

To enable the global clean energy trade, partnerships are crucial. This is why Evonik continues to support the research and development of alternative options, working closely with process developers worldwide to provide high performance catalysts for the next generation of low-carbon hydrogen production.

Evonik Catalysts support both centralized and de-centralized cracking technologies

To discover more about how Evonik Catalysts is driving a broad green agenda, click [here](#).

Now working with process technology companies at both pilot and lab stage

With research at both lab and pilot stage, we're also qualified for upcoming partner demonstrations, all helping to demonstrate the full potential of low-carbon ammonia across industrial, mobility, and energy systems worldwide.

Qualified for partner demonstration phase

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