Indian Green Ammonia Supply Chain: Production and International Trading

Partnership between GIZ and RWE Supply & Trading

The challenge

India aspires to reach net zero by 2070 and has committed to reduce the emission intensity of its GDP by 45 percent in 2030 compared to the 2005 level. The country already is the 3rd largest grey hydrogen producer globally (+6 Mio. t/a) and has officially declared to become a global export hub for green hydrogen and its derivatives. Around 5 Mio. t/a of green hydrogen exports until 2030 are foreseen by Govt. of India.

In this context, green ammonia (NH3) plays a key role, as it serves both as a feedstock for the national fertilizer industry - until now the main consumer of grey hydrogen - and as a promising green hydrogen carrier for seaborne exports to Europa. In addition, green ammonia may play an increasingly important role as a marine fuel. Due to favoring renewable energy resources, international ports, a well-developed energy infrastructure and the political support by its Government, India has the potential to become one of the globally largest producers, industrial users and exporters of green hydrogen and green ammonia. Since 2022, more than 40 large scale green hydrogen projects have been announced in India mainly for green ammonia production.

However, the realization of project announcements depends on the final investment decision (FID). Investment decisions will be driven primarily by the ability to identify an off-taker. As green ammonia is currently still more expensive compared to grey ammonia, many projects seem to rely on international off-takers who are willing to pay a premium for climate-neutral energy carriers which enables them to comply with regulations such as the European Renewable Energy Directive (RED) and national climate protection targets. The financial risks associated with investing into the production of a premium product without international off-takers seem to be high. Investment decisions based on domestic off-take of green ammonia are currently still awaited in India. Therefore, international off-takers willing to pay a premium for green ammonia would have to be considered to realize current project announcements and to support the ramp up of the Indian green ammonia market. It is expected that these first export oriented green ammonia projects will pave the way for further commercial viability of green ammonia projects for the domestic market.

The solution

To unlock the potential for investors in the Indian market, the economic viability of production, storage, and subsequent export of green ammonia by sea transport must be investigated as part of a comprehensive study. Results shall be made available to stakeholders from the private sector as well as the public sector to allow informed decisions which support the set-up of green ammonia projects in India.

Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) has formed a public-private partnership (PPP) with RWE Supply & Trading to investigate the viability and potential for the production, storage and subsequent export of green ammonia from India via seaborne transport along the entire value chain.

The study's results, conducted over several months, will then be summarised in a report. This will contain an assessment of present framework conditions and possible constraints for green ammonia production and trading. This includes requirements for the certification of green ammonia and the investigation of export infrastructure for seaborne transport.

The PPP combines RWE's technical expertise in international trading of energy commodities and GIZ's expertise in the renewable energy market of India as well as its stakeholder engagement.

giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

RWE

Our services

The PPP results in a comprehensive study of the viability and potential for the production and subsequent export of green ammonia from India via seaborne transport along the entire value chain. The study will include following chapters:

- Analysis of general framework conditions (especially renewable power and water supply)
- Analysis of the regulatory framework for green ammonia production and trade
- Techno-economic scoping of a green ammonia project in India Study on the required port infrastructure for exporting green ammonia and for usage as a bunker fuel
- Stakeholder engagement and final workshop

The study will be published and shared with other project developers and interested stakeholders through workshops.

Impact and results

The joint study will help to increase knowledge and expertise in India required to ramp up green hydrogen and green ammonia projects. National and international investors shall gain a highly relevant insight into the viability of green ammonia exports from India and will be better placed to make future investment decisions on the basis of this information.

The aim of this PPP is to have results of this joint study forming an important basis for further project activities by the private sector with focus on green ammonia production projects catering international and national demand as well as infrastructure projects such as terminals for export, as well as for the political partner with regard to the further development of national framework conditions. Once investment decisions have been made, the capital-intensive implementation phase will require a variety of suppliers and service providers (engineering consultants, contractors, equipment manufacturers, banks, etc.).

The International Hydrogen Ramp-Up has been agreed between the German Federal Ministry for Economic Affairs and Climate Action and the Indian Ministry for New and Renewable Energy to promote Indo-German Green Hydrogen projects and the international market upscale for green hydrogen. The ramp-up of green ammonia production in India with analysis of the potential for international exports and trading goes hand-in-hand with India's National Green Hydrogen Mission and Germany's National Hydrogen Strategy.

At a glance

Duration	07/2023-03/2024
Country	India
Objective	Comprehensive study which investigates the viability and potential for the production and subsequent export of green ammonia from India via seaborne transport along the entire value chain.
Partners	GIZ, RWE Supply & Trading GmbH
Expected results	• Analysis of general framework conditions (especially renewable power and water supply) • Analysis of the regulatory framework for green ammonia production and trade • Techno-economic scoping of a green ammonia project in India. Study the required port infrastructure for exporting green ammonia and for usage as a bunker fuel. Stakeholder engagement and final workshop

The International Hydrogen Ramp-up Program (H2Uppp) of the German Federal Ministry for Economic Affairs and Climate Action (BMWK) promotes projects and market development for green hydrogen in selected developing and emerging countries as part of the National Hydrogen Strategy.

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Registered office
Bonn and Eschborn, Germany

T +49 61 96 79-0
F +49 61 96 79-11 15
E info@giz.de
I www.giz.de

Authors/editor:
Alina Tetzlaff, New Delhi
Eva Meschede, Eschborn

Design/layout:
Pooja Bose, New Delhi

URL links:
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Contact:
GIZ India
N +91(0)11 4949 5353
E pooja.bose@giz.de
I www.giz.de

RWE Supply & Trading Germany
N +49(0)201 5179 0
E info@rwe.com
I https://www.rwe.com/

RWE Supply & Trading India
N +91(0)22 4208 2400
E info@rwe.com
I https://www.rwe.com/