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GREEN AMMONIA POTENTIAL

A Strategic Overview of Egypt's Targets

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A Strategic Overview of Egypt's Targets

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Key Takeaways

Egypt Exported the World's 1st Green Ammonia Shipment

Destination
Tuticorin Chemicals and Fertilizers Limited (TFL) in India

Project's Location
SCZONE

Project's Green Ammonia Production Capacity (NH_3) **90,000** t/y

Green Ammonia Fertilizer Project

Partners
Abu Qir Fertilizers Company, ABB International Group, MPS Infrastructure Company, & Petrojet

Capacity **2,400** t/d

Egypt's 1st Digital Company for Green Ammonia Production

Company
Damietta Green Ammonia Production Co.

Establishment Date
August 2023

Digital Platform
GAFI

ReNew Power Project in the SCZONE

Investment **$8** billion

Targeted Green Ammonia Production

1st Phase (2023-2025)	**100,000** t/y
2nd Phase (2025-2029)	**1** mmt/y

Egypt has recognized the green ammonia and green hydrogen potential role in propelling Egypt's energy sector targets toward decarbonization. This came in line with Egypt's commitment to intensify its efforts to promote development, enhance investments, and transition towards a sustainable and clean economy.

Green ammonia is increasingly receiving attention because of its role in decarbonizing various sectors. Green ammonia has a wide array of uses across numerous industries, such as the fertilizers and energy industries, where it reduces carbon footprints.

This report sheds light on the advantages of using green ammonia and its industrial applications. Furthermore, it highlights Egypt's synergies with countries and major international companies in the field of green ammonia. This is in addition to the green ammonia industry's future targets and goals.

ADVANTAGES OF GREEN AMMONIA

Green Ammonia Cycle: Production & Usage

Egypt leverages its abundance of renewable sources, which are used to produce low-carbon fuels, thus making Egypt a pioneer in the clean energy industry. Green ammonia production offers promising options for transitioning to net-zero carbon dioxide emissions.

Its production process involves several key stages. First, the production of hydrogen. Then, the hydrogen and nitrogen mixture is separated from water and associated carbon oxides. Following this separation, carbon dioxide gas is separated. Finally, the hydrogen and nitrogen mixture is converted into ammonia through a catalytic reaction under specific conditions. It is produced in gaseous form and gradually cooled to turn into liquid ammonia at atmospheric pressure.

On the other hand, the usage of green ammonia has outstanding advantages regarding energy storage, affordability as well as being a zero-carbon fuel.

Incomparable Usage of Green Ammonia

Energy Storage
- Green ammonia offers an attractive energy storage system due to its well-established infrastructure.
- It is produced from wasted energies and is then used as fuel at any time such as batteries.

Hydrogen Carrier
- Green ammonia facilitates hydrogen transportation and distribution as an energy carrier over long distances.
- Compared to hydrogen, green ammonia offers a cheaper and easier alternative for storage and transport.
- Liquid hydrogen should be stored at up to -253° C, while ammonia can be stored at only -30° C

Zero-carbon Fuel
- Burning ammonia instead of fossil and conventional fuels in turbines.
- Using it in a fuel cell to produce electricity, or in an electric vehicle after breaking hydrogen back out of it.

Prominent Industrial Usage

Marine Industry

International shipping accounts for nearly 2% of global energy-related CO2 emissions in 2022. The International Maritime Organization (IMO) recently revised its emissions reduction targets to reach net-zero emissions by 2050, which requires an almost 15% reduction in emissions from 2022 to 2030, according to the International Energy Authority (IEA).

In this regard, many countries are exploring green ammonia as a clean source of energy for shipping. Egypt took a significant step towards fueling ships with green ammonia by exporting the world's first green ammonia shipment, produced at facilities within the country, according to the Egyptian Cabinet.

Egypt Exported the World's 1st Green Ammonia Shipment

Date	November 2023
Destination	Tuticorin Chemicals and Fertilizers Limited (TFL) in India
Project's Location	SCZONE
Company	Fertiglobe

Project Production Capacity (t/y)

15,000
Green Hydrogen

To Produce

90,000
Green Ammonia

Agricultural Industries

The demand for fertilizers is increasing due to rising global agriculture production, particularly in Asia and Africa. To support the global trend towards reducing carbon emissions, the demand for eco-friendly fertilizers produced from sustainable and green sources, like green ammonia, has increased rapidly.

Egypt emphasizes the crucial role of green ammonia in its agricultural industry by boosting partnerships.

Major Green Ammonia Fertilizer Project

Date	Capacity
January 2024	2,400 t/d

Partners

Abu Qir Fertilizers Company, ABB International Group, MPS Infrastructure Company, & Petrojet

Aim

Producing green ammonia as a raw material for producing the granulated ammonium nitrate fertilizer

GREEN AMMONIA LANDSCAPE IN EGYPT

Signed Agreements

Major companies are poised to invest billions in green ammonia and green hydrogen projects in Egypt that could produce millions of tons of green fuel. Several partnering companies have drawn up a framework for agreement and investment and are preparing studies to build their projects in the General Authority for the Suez Canal Economic Zone (SCZONE).

These agreements have been signed between international companies and the SCZONE, the Sovereign Fund of Egypt (TSFE), the Egyptian Electricity Transmission Company (EETC), and the New and Renewable Energy Authority (NREA) to produce green ammonia.

Main Inked Agreements

Signing Date	Partners	Production	Investment Cost ($ billion)
November 2022	Infinity Power, Masdar, and Hassan Allam Utilities	2.3 mmt	-
February 2023	ECHEM, MOPCO, and Scatec	150,000 t/y	0.88
May 2023	Energy China	1.2 mmt/y	7
June 2023*	ReNew Power	100,000 t/y (1st Phase) 1 mmt/y (2nd Phase)	8
December 2023	ACWA Power	600,000 t/y	4

*Framework Agreements

Signed MoUs

Many leading international companies have expressed their intention to execute numerous green hydrogen and ammonia projects in Egypt, and to benefit from promising prospects in implementing these initiatives. In this regard, several memorandums of understanding (MoUs) have been signed with the SCZONE, TSFE, the EETC, and the NREA to produce green ammonia.

Major Signed MoUs

Signing Date	Partners	Production (t/y)	Investment Cost ($ billion)
May 2023	TotalEnergies, Enara Capital	300,000* (1st Phase)	-
August 2023	MEP	120,000	0.25
	Alfanar	500,000	3.5-4
	Actis	200,000**	1.5

*To Reach a Total Capacity of 1.5 mmt/y
**Green Hydrogen & Green Ammonia

1st Digitally Established Company for Green Ammonia Production

In alignment with Egypt's efforts to increase green ammonia production through establishing specialized companies, Damietta Green Ammonia Production Company marked the first digitally-established company.

This company aims to enhance the state's plans for creating an attractive investment climate and utilizes its efforts to shift towards clean and sustainable energy by fully leveraging its abundant natural resources.

Establishment Date
August 2023

Location
Damietta

Digital Platform
GAFI

FUTURE TARGETS AND GOALS

Egypt possesses a range of significant capabilities that position it as a potential regional hub for the manufacturing and distribution of green energy, especially green hydrogen and green ammonia.

Based on that, Egypt confirmed its national strategy for green hydrogen, which will boost the production of green hydrogen, leading to an increase in green ammonia production.

This offers a more convenient and cost-effective storage and transportation solution; whereas storing hydrogen in large amounts is challenging and costly. Also, ammonia can be readily converted into hydrogen gas as required.

Furthermore, as per the strategy, Egypt aims to capture a 5% to 8% share of the global hydrogen market to attract more investments in this sector, according to the Egyptian Cabinet.

In this regard, a project was presented by Benchmark Power International (BPI) to boost the production of green ammonia and green hydrogen, which is a part of the state's green hydrogen strategy. This progress is leading Egypt towards achieving carbon neutrality, according to the Egyptian Cabinet.

BPI's Green Ammonia and Green Hydrogen Production Project

Date
December 2023

Location
Gulf of Suez

Investment Cost
$1 billion

Establishment of
Electrolysis Facility & Ammonia Station

400 MW
Electrolysis Facility Capacity

Daily Targeted Production (t/d)

Green Hydrogen **183**

To Produce

Green Ammonia **1,000**

Egypt is experiencing a notable rise in renewable energy projects, particularly in cutting-edge projects like green hydrogen and green ammonia. Additionally, Egypt possesses a competitive edge in the production of green ammonia, including significant incentives for green projects, along with a vast capacity for generating electricity from renewable sources.

Green ammonia presents a hopeful option for storing energy and its ability to incorporate various components into the energy system makes it a vital component in worldwide initiatives to decrease carbon emissions and advance comprehensive carbon neutrality strategies.

Green ammonia is a crucial new solution for delivering low-carbon and clean energy. In addition, thanks to the significant capabilities of Egypt as a key hub in the region, Egypt has successfully attracted numerous major investments and initiated projects that will boost prosperity, enhance economic growth, and further attract investments in the future.

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