

BACKGROUND

Green hydrogen (GH2) plays a pivotal role in the global transition to sustainable energy and Net Zero emission economies. It is a crucial energy carrier to facilitate the utilization of renewable energy (RE) in the sectors that are challenging to decarbonize.

Thanks to its abundant RE sources and strategically advantageous geographic location, **Viet Nam holds significant potential for the development of GH2 industry** and for establishing robust connections with global markets, particularly with hydrogen importers in the region such as Japan and South Korea.

However, the PtX/GH2 industry is still at its early stages, not only in Viet Nam but also globally. As a result, there exists a prevailing lack of awareness about this sector among both public and private stakeholders in Viet Nam.

Since 2021, the International PtX Hub has identified Viet Nam as one of the focus countries for directing its support through the PtX Outreach Project to raise awareness and promote the development of a sustainable market for PtX and GH2.

PROJECT IN A NUTSHELL

DONOR

German Federal Ministry for Economic Affairs & Climate Action (BMWK)

POLITICAL PARTNER

Viet Nam Department of Oil, Gas & Coal (Ministry of Industry & Trade)

IMPLEMENTING AGENCIES

International PtX Hub

GIZ Viet Nam

PERIOD

March 2022 - March 2024



"Over the past two years, we have been commissioned by the Vietnamese government to help develop the National Hydrogen Strategy, its Implementation Plan, and related policies. The project has also facilitated capacity-building activities to share international experiences in shaping the hydrogen market.

We believe the PtX Outreach Project has strengthened the Viet Nam - Germany energy partnership and paved the way for a new direction in Viet Nam's energy transition."

- **Markus Bissel**
Director of PtX Outreach Project

"I highly valued the training session on GH2 production, GH2 economy, and GH2 infrastructure during the "Training of Trainers" course in Germany. I also see that this set of content held special interest for the Vietnamese trainees. I hope more in-depth training programmes will be designed for Viet Nam, as the conditions and context for developing the green hydrogen industry in the country have the unique characteristics."

- **Associate Prof. Dr. Pham Hoang Luong**
Hanoi University of Science & Technology



"The Power-to-X training provides a comprehensive overview of the entire value chain of PtX. Being the only journalist in the 3rd PtX training in Viet Nam was a precious opportunity for me. It is not every day that I can sit with the professionals in the power and energy industries of Viet Nam, and listen to their in-depth sharing about the latest developments of the sector."

- **Ms. Vu Nguyen Hanh**
Journalist at Tuoi Tre Newspaper



FUTURE SUPPORT ON GREEN HYDROGEN & PTX

H2Growth

Following the PtX Outreach Project's success, a new project named "**H2Growth - Unlocking the green hydrogen economy in Viet Nam**" is under active discussion with the Vietnamese Government for further support in the field of GH2. The project is commissioned by the German Ministry for Economic Cooperation and Development (BMZ).

The H2Growth Project is expected to support the Viet Nam's Ministry of Industry and Trade in three main action areas: (1) Strategy development & framework conditions; (2) Capacity development for training and research institutions, and (3) Support for market development.

The project is planned to last for 4 years from 2024 to 2028.

H2Uppp

Another project in the pipeline is the **International Hydrogen Ramp-up Programme (H2Uppp)**. The project is funded by the German Federal Ministry for Economic Affairs and Climate Action (BMWK) and aims to promote projects and market development for green hydrogen in selected developing and emerging countries.

Throughout the H2Uppp project, market for GH2 and PtX technologies and applications, especially in developing countries (ODA countries) are further developed through partnerships with the private sector and the establishment of export - import relationship with Germany and EU.

Project duration: July 2024 - December 2025.

KNOWLEDGE HUB

WHAT ARE GREEN HYDROGEN AND POWER-TO-X?

Green hydrogen (GH2) is defined as hydrogen produced by splitting water into hydrogen and oxygen using renewable electricity.

Power-to-X (PtX) is a technology that allows renewable electricity from wind, solar, hydro, and geothermal power plants to be converted into various end products (X), including hydrogen or hydrogen-based synthetic fuels and feedstock such as methane, methanol or ammonia. These can be stored, transported and used across various energy-consuming sectors.

WHY GREEN HYDROGEN?

GH2 is clean, storable and portable.

GH2 decarbonizes hard-to-abate sectors, like heavy industries (steel & cement), shipping and aviation.

GH2 can stabilize power grids that rely on solar & wind power thanks to its long-term storage capabilities without significant losses.

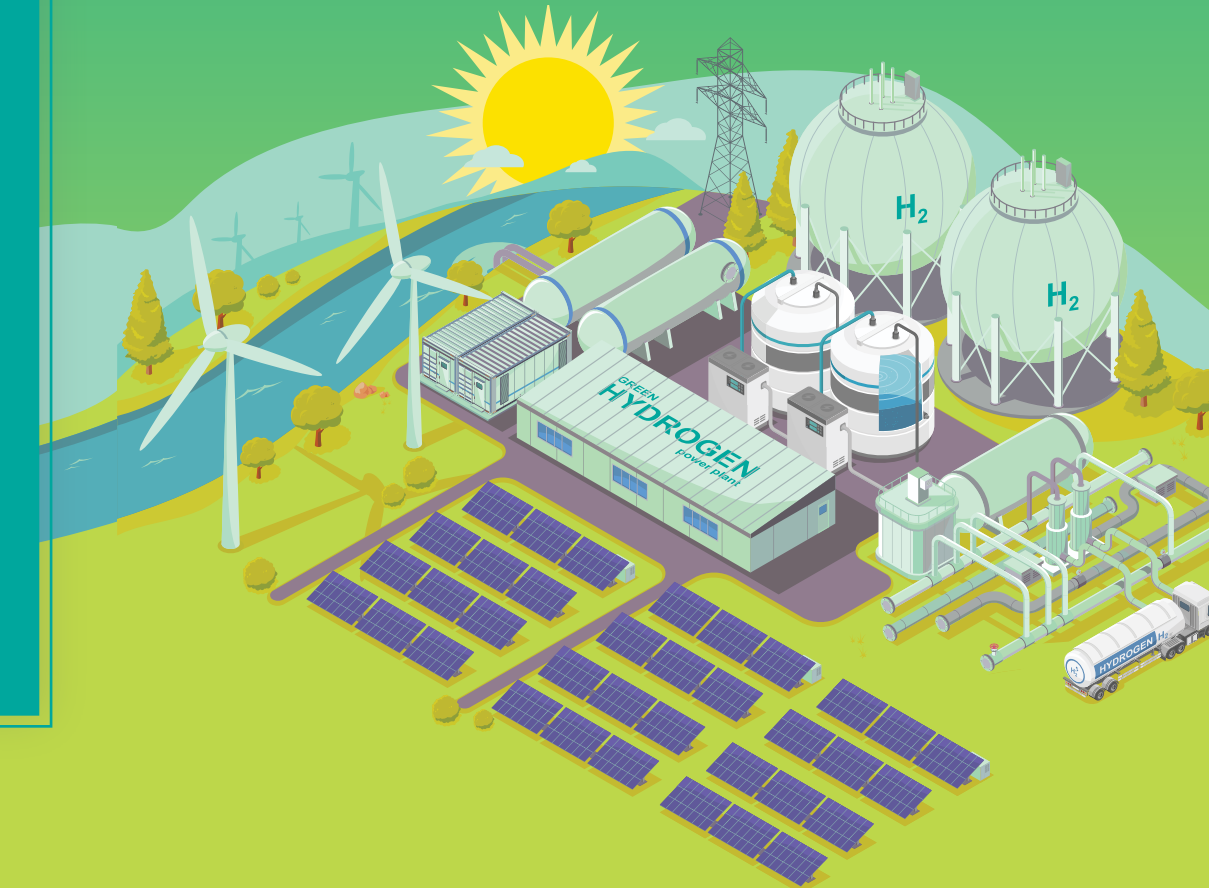
VIET NAM'S VISION

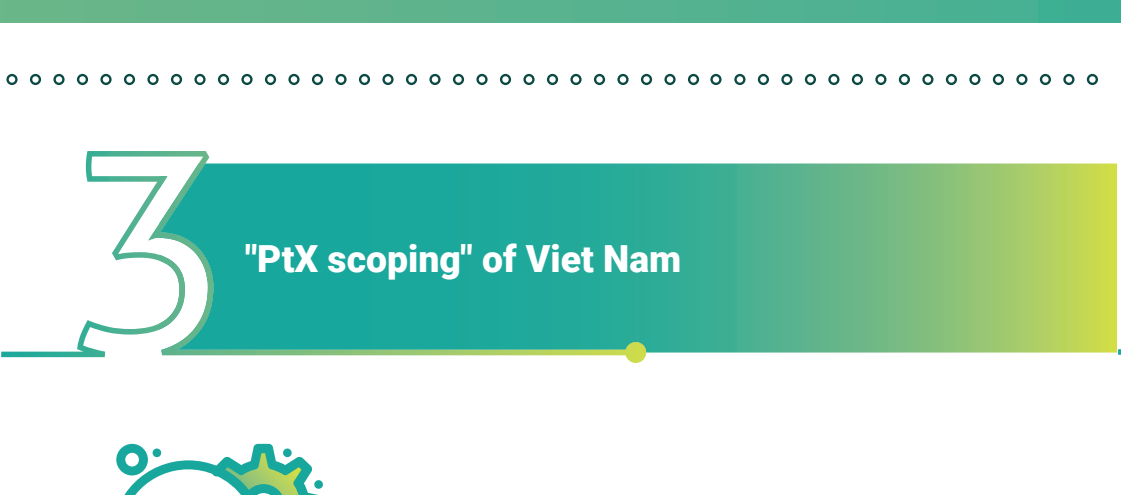
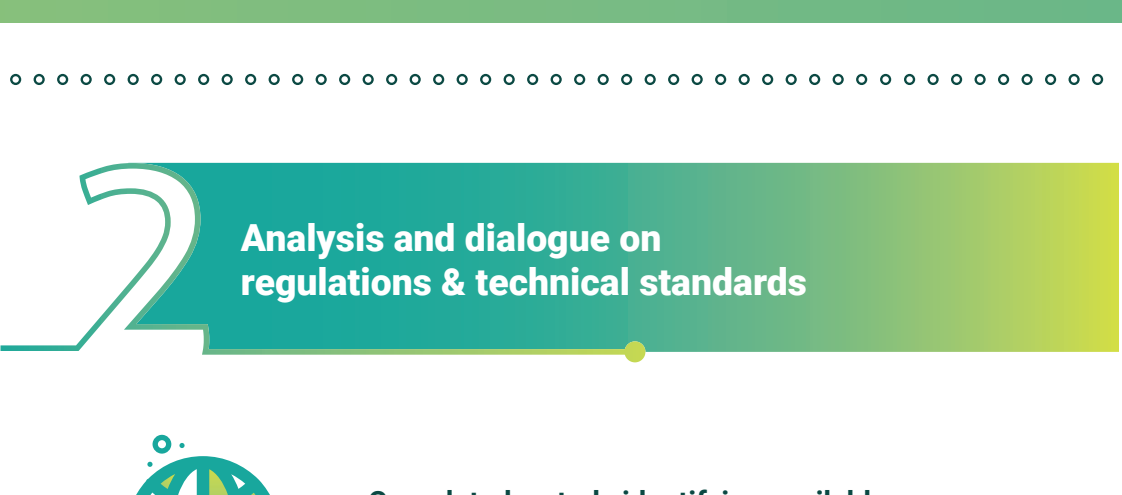
The country's goal is to develop a hydrogen ecosystem including production, storage, transportation, distribution based on renewable energy.

Viet Nam aims to produce 100,000-500,000 tons/year of hydrogen from renewable sources and other processes incorporating carbon capture **by 2030, and 10-20 million tons/year by 2050.**



The PtX Outreach Journey Milestones & Achievements Unveiled





INTRODUCTION

2021

In 2021, green hydrogen & Power-to-X were introduced for the first time to Viet Nam's Oil & Gas Group (PVN) officials by GIZ staff.

The discussion has set the stage for the beginning of the PtX Outreach Project.

2024

In February 2024, the Viet Nam's National Hydrogen Strategy to 2030, vision to 2050 was officially approved by the Prime Minister, emphasizing its goal to develop a hydrogen ecosystem based on renewable energy.

MILESTONES

5 trainings

2 "Training of Trainers" courses
3 basic trainings on Green Hydrogen & PtX

4 certified trainers & 67 certified trainees

31.3% female

5 workshops & seminars delivered to over 230 officials and experts in energy sector

135 officials from state institutions (MOIT, PVN, EVN,...)

79 staff & experts from private sector encompassing oil & gas, chemicals, transportation, metallurgy, fertilizer, refinery, etc.

1 Assessment & advice on the sustainability of PtX projects & policies



Completed a study on the Introduction of key sustainability criteria for Viet Nam's PtX industry.

Key findings

Governance criteria are essential for the success of the PtX industry in Viet Nam. Tailoring policies and roadmaps to fit Viet Nam's practical situation and conditions, and the government's development orientation is necessary. This approach will guide the PtX industry's development, leverage its existing potential, and draw in foreign investment.



2 Analysis and dialogue on regulations & technical standards



Completed a study identifying available technical standards and regulations for hydrogen and PtX in other countries that can be recommended to Viet Nam's context.

Key findings

Establishing a comprehensive standard system for the production, storage, transportation, distribution, and consumption of hydrogen is essential to create a safe environment and unfilled market for commercial hydrogen devices and systems.



3 "PtX scoping" of Viet Nam



Completed a study analyzing hard-to-abate sectors encompassing power, transportation, steel, and chemical manufacturing sectors.

Key findings

To fully harness its potential of GH2, Viet Nam should rest on two deeply intertwined pillars: firstly, an ambitious renewable energy production target, especially in wind and solar; and secondly, an integrated approach to transition its domestic industrial processes from fossil fuel-based to green hydrogen.



Completed a study on ammonia usage, providing an overview of available ammonia-related technologies in the world & recommendations for Viet Nam's power generation.

Key findings

Green ammonia produced from renewable energies, co-fired in coal power plants ranging from 20% to 100% can slightly reduce the GHG-emissions. However, it will significantly increase the levelized costs of electricity (LCOE) as well as requesting to retrofit coal fired power plants with large-scale expenditure. Thus, coal fired power plants fired with ammonia would likely be used only as peaking power plants with substantially lower capacity factor.

4 International PtX Academy: knowledge building on PtX worldwide

TRAINING AREAS



PtX technology, economics, infrastructure, markets, sustainability criteria & regulations.

RESULTS IN NUMBERS



02

"Training of trainers" (ToT) courses successfully delivered

04

Vietnamese trainers globally certified after the ToT courses

03

Basic trainings on GH2 & PtX by 02 Vietnamese certified trainers from ToT

67

Trainees certified from MOIT, PVN, EVN, consulting companies & private sectors.

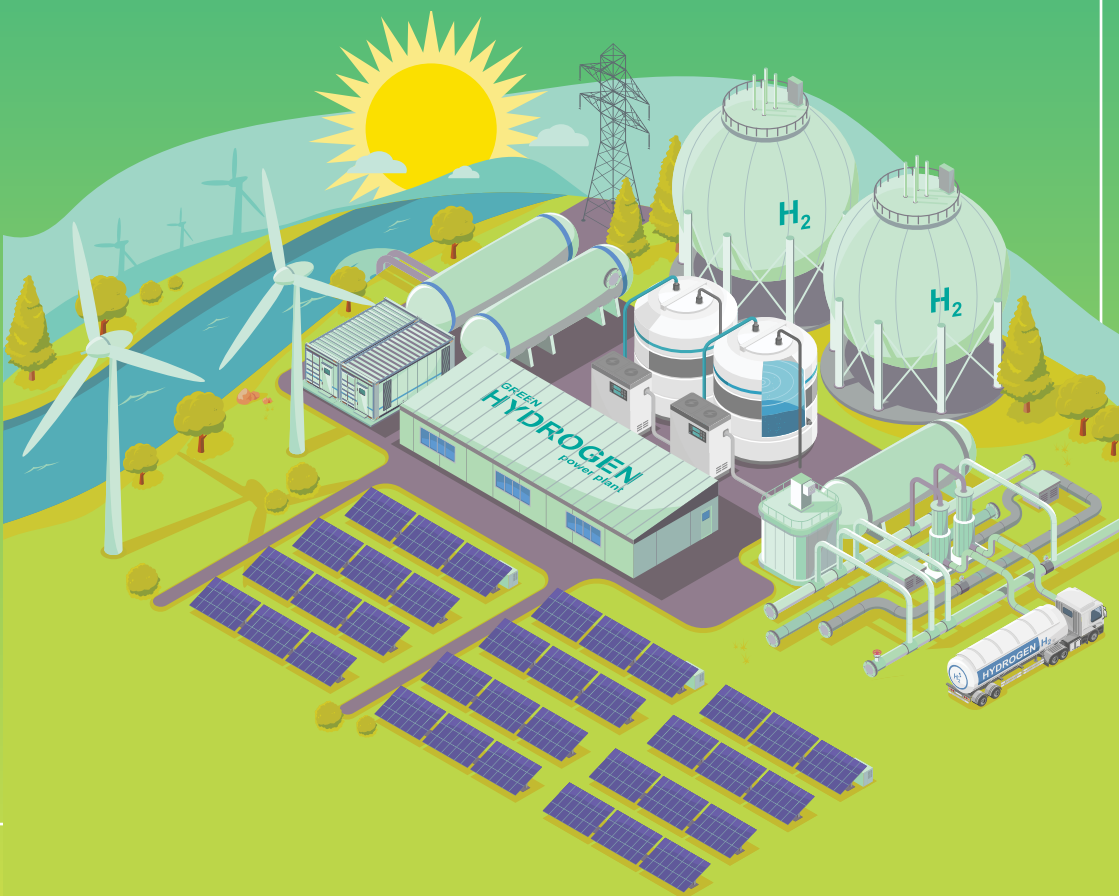
IMPACTS

- ➔ Vietnamese trainer pool for GH2 and PtX is expanded.
- ➔ Awareness raising about GH2 economy and its role in Viet Nam's energy transition.
- ➔ Support Viet Nam to prepare officials and labors with updated knowledge & skills; thereby promoting domestic market development, keeping pace with global trends, and enabling Viet Nam to timely seize opportunities.



The PtX Outreach Journey

Milestones & Achievements Unveiled





INTRODUCTION ○ ○ ○ ○ ○

Over the years, the Project has been helping Viet Nam lay the groundwork for green hydrogen (GH₂) & Power-to-X (PtX) development. This involves adding sustainability aspects to the industry, sharing international expertise on designing legal frameworks, and capacity building for policy makers & educational institutes.

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PROJECT SUCCESS

The Project achievements are determined by **4 activities**

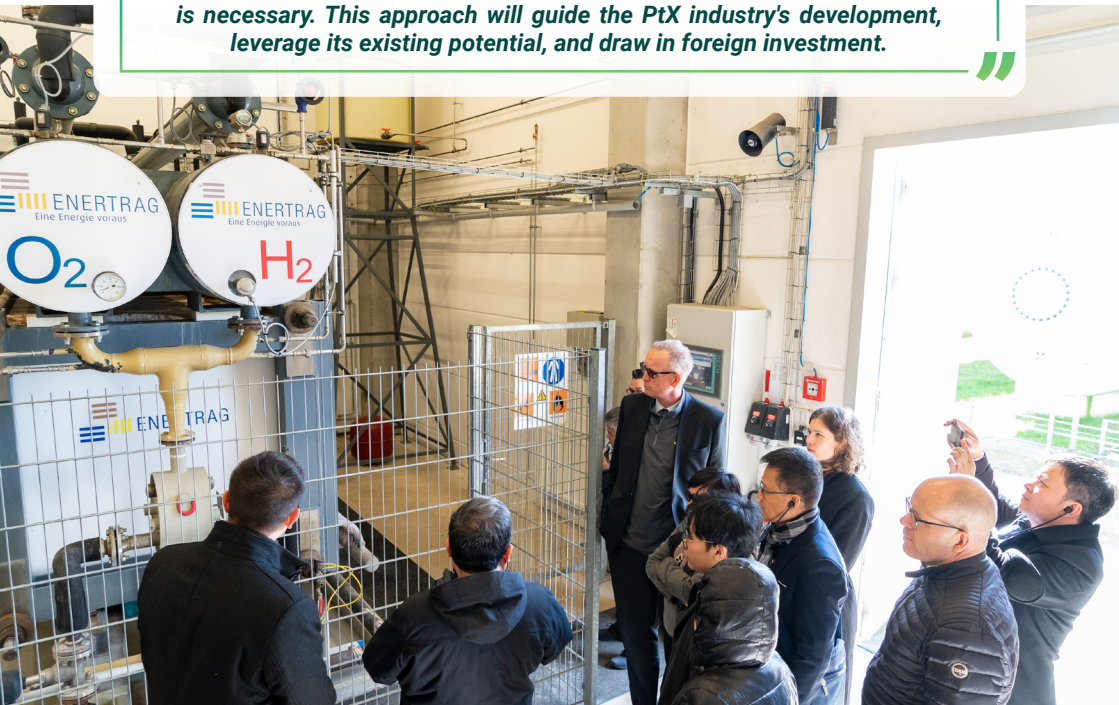
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Federal Ministry
for Economic Affairs
and Climate Action



Ministry of Industry and Trade



Implemented by



Deutsche Gesellschaft
für Internationale
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PtX Outreach Project
GIZ Energy Support Programme Unit 041, 4th Floor, Coco Building
14 Thuy Khue Str., Tay Ho District, Hanoi, Viet Nam
T + 84 24 39 41 26 05 | F + 84 24 39 41 26 06
E office.energy@giz.de
I www.giz.de/viet-nam | www.gizenergy.org.vn

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