Green Hydrogen for Energy Self-Sufficient Hotels, Resorts and Islands

By EGS Plan and GIZ

The Challenge

According to the thirteenth national economic and social development plan (2023 – 2027) Thailand has announced its goal to achieve carbon neutrality by 2050 and net zero GHG emission by 2065.

A current trend following advances in new technologies increases demand for clean energy. Thailand will see a significant opportunity in the upcoming period. All sectors must therefore progress to prepare infrastructure to produce renewable energy from photovoltaic (PV), hydropower, wind power and others and, especially, apply green hydrogen energy storage technologies. The trends correspond with the rising development of green hydrogen projects across the Southeast Asia region where interest and investments in green hydrogen technologies are growing.

If Thailand's cost of producing green hydrogen drops, the price will rise to a competitive level in the market, which will drive the development of hydrogen-related projects and contribute to Thailand's goals. A rapid escalation of funding and investment is necessary to meet these goals. The Thai government has given specific recommendations on how to unleash clean energy initiatives through the country's clean energy finance and investment roadmap.

In remote areas, particularly on islands in Thailand, the tourism industry plays a crucial role, but it often grapples with limited access to reliable electricity. Many of these islands are not connected to the main grid or face frequent power disruptions.

Due to unfavorable terms for the current renewable loan programmes, there are significant obstacles to financing and investment for small-scale clean energy. Another problem is access to capital and knowledge for microgrids in remote, off-grid island communities as well as growing costs associated with the supply chain.

The Solution

Off-grid hotels, resorts and islands depend on diesel generation (or submarine cables for the island case). To provide a cheaper and more sustainable option, energy storage in combination with solar energy would support the decarbonisation of remote areas, improve grid stability and reduce the negative impact of diesel generators on the immediate surrounding (noise emission, exhaust gas, oil spills). This requires extensive studies on potential applications, feasibility and impacts involved in integrating such technologies to promote energy self-sufficiency for hotels, resorts and islands in remote areas.

Addressing this challenge, this PPP holds significant importance. It aims to enhance electrification in these remote regions while showcasing the potential of hydrogen technology for applications in remote settings and building infrastructure. The primary beneficiaries of this initiative are the residents of these remote areas, including hotel and resort owners who seek to transition from traditional generators to more sustainable energy solutions.

By conducting a feasibility study on hydrogen as a green energy storage alternative, the project offers a pathway to decarbonise these remote areas through the adoption of clean and renewable energy sources. The assessment yields several results. It provides technical concepts for each technology option (Diesel, BESS, HESS), conducts calculations and simulations to predict annual system performance, estimates investment costs for energy supply,

compares energy costs across various scenarios, e.g., carbon taxation, evaluates project payback periods, assesses lifecycle costs, and calculates the potential CO2 emissions reduction achieved by these alternatives.

Our Services

This PPP aims to conduct feasibility and impact assessment of replacing diesel generators with green hydrogen in combination with battery energy storage and solar power. This is part of the project's contribution to promoting green hydrogen and sustainable energy solutions for off-grid hotels, resorts and islands in Thailand and Southeast Asia.

To achieve the project's goal, several key activities and studies have been planned:

1. **Location Identification and Stakeholder Engagement:** the project will identify and select the suitable locations of hotels/resorts in a remote location or a small island that are in off-grid areas and supplied by diesel generator.
2. **Market Study about the H2 Supply Chain in Southeast Asia:** a market study about the H2 supply chain in Southeast Asia will be conducted in collaboration with local hotels, resorts and islands in the designated areas;
3. **"Feasibility Study on Green Hydrogen in an Existing Off-Grid Hotel, Resort or Island in Southeast Asia":** this study will provide insight for a pre-design for an off-grid energy supply by utilising solar energy, hydrogen and battery storages and a holistic comparison with a conventional energy supply system; and
4. **Simulation Study on Green Hydrogen in Energy Self-Sufficient Hotels, Resorts and Islands in Southeast Asia:** this study aims to simulate the environmental and economic impact of different locations considering weather and of the HESS/BESS system in comparison to diesel generation for different locations in Southeast Asia.

Once all the study outputs have been achieved, the project team will prepare a holistic report about results of the project and organise dissemination activities to share the results with the public.

(From left) Dr Dominika Kalinowska, GIZ; Tim Nees, GIZ; Dr Robert Himmler, EGS-Plan Co., Ltd. (Bangkok); and H.E. Dr Ernst Reichel, Ambassador of Germany to Thailand at the project's kick-off ceremony

Expected outcomes

This PPP will contribute to enhancing energy security, reducing carbon emissions, and minimising environmental impacts such as air and noise pollution in Thailand's tourism industry. The results of this study also have the potential for replication in other Southeast Asian countries such as Indonesia, the Philippines, Malaysia, and Vietnam.

At a glance	
Duration	September 2024 to December 2025
Country	Thailand
Objective	Assess the feasibility of replacing diesel generators by hydrogen and/or battery-based green energy storage, along with PV systems, in hotels and resorts on islands and remote areas which are off-grid.
Partners	EGS-Plan (Bangkok) Co., Ltd.
Expected Outcomes	The feasibility assessment of green H2 at off-grid locations will increase the public awareness about the technology especially in the hospitality sector and therefore access new markets and

The International Hydrogen Ramp-up Programme (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.

Published by:
Deutsche Gesellschaft für
Internationale Zusammenarbeit (GIZ) GmbH

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Bonn and Eschborn, Germany

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Thailand, January 2025

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Design
Peppermint Werbung Berlin GmbH, Germany

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GIZ / Natthapon Phanpinij

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