GH2 Potential for Decarbonisation of Maritime Transport in Small-Island Context

The challenge

Indonesia targets carbon neutrality by 2060 and is advancing its energy transition through renewable energy and green hydrogen (GH2). National targets include increasing the renewable energy share to 34% by 2030 and achieving net-zero power sector emissions by 2050. A national hydrogen roadmap is under preparation to explore hydrogen's role across key sectors.

Despite this progress, green hydrogen deployment remains at an early stage. Policy, technical, and financial frameworks are still developing, and institutional capacity requires further strengthening.

These gaps are evident in the maritime sector, particularly small-island ferry systems. Ferries and port operations rely almost entirely on diesel, leading to high operating costs and emissions. While the Indonesia's Ministry of Transport **(MOT)** cooperates with the IMO under the **Green Voyage 2050** programme, no hydrogen or hybrid ferry application has yet been demonstrated in Indonesia, and most island ports remain diesel-dependent.

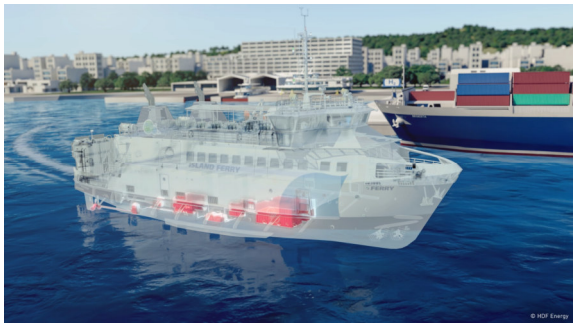
To move forward, Indonesia needs **replicable, evidence-based models** that show how hydrogen and battery systems can work in ferry operations with end goals are to assist in defining standards, safety rules, and investment pathways for maritime decarbonisation and the wider hydrogen economy.

The solution

To address this specific gap, **GIZ Indonesia**, together with technology **partners Neuman & Esser and HDF Energy**, is conducting a pre-feasibility study on hybrid ferry concepts combining hydrogen and battery propulsion.

The cooperation focuses on assessing technical design options, operational requirements, and port-side infrastructure needs, rather than immediate deployment. The study will integrate technical, economic, and regulatory analysis to develop a replicable framework that can support informed decision-making by public authorities, ferry operators, and potential investors.

By linking international hydrogen technology experience with Indonesia's maritime and regulatory context, the project also supports structured public–private dialogue and contributes to building a shared understanding of potential pathways toward cleaner inter-island transportation.



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How it will be done

- Conduct a pre-feasibility study on a hybrid ferry concept combining hydrogen and battery power.
- Designing the hydrogen fuel solution with necessary compression and tank storage sizing.
- Analyse technical, economic, and regulatory aspects of ferry operations and port hydrogen infrastructure.
- Assess market potential, risks, and investment opportunities.
- Review environmental, safety, and policy frameworks for hydrogen use in maritime transport.
- Organise capacity-building workshops for government, industry, and port stakeholders.

This study is aligned with the IMO Green Voyage 2050 assessment undertaken with Indonesia's MoT, which focuses on technical analysis on board ship technologies to accommodate hybrid power system. Study results and recommendations will be shared publicly to help shape Indonesia's hydrogen policies and promote future pilot projects.

Expected outcome

- A pre-feasibility study with clear technical, economic, and regulatory findings.
- A blueprint for maritime decarbonisation using hydrogen and renewable energy.
- Build capacity for key stakeholders, including the Ministry of Transport, classification agencies, ferry owners, and shipbuilders.
- Advance hydrogen adoption by sharing study results publicly using non-confidential data.

These results will help Indonesia identify viable paths for maritime decarbonisation and build readiness for a hydrogen economy.

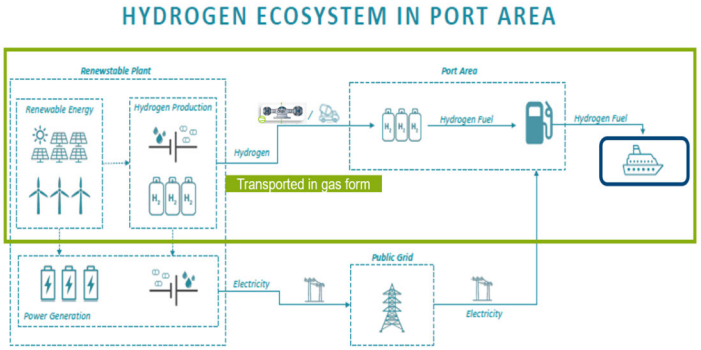

Figure 2: PPP scope of work focus, highlighted in green line

The project at a glance	
Duration	2025-2026
Country	Indonesia
Objectives	To explore the use of green hydrogen and battery systems for decarbonizing maritime transport in small islands through a pre-feasibility study.
Partners	HDF Energy, Neuman & Esser and GIZ on behalf of the German Federal Ministry for Economic Affairs and Energy
Outputs	• Pre-feasibility study with technical, economic, and regulatory findings. • Blueprint for maritime decarbonisation using hydrogen and renewables. • Capacity building for key stakeholders. • Public dissemination of non-confidential study results to promote hydrogen adoption.

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