Overview of ASEAN's Hydrogen and Ammonia Policies

Hydrogen & Ammonia Webinar on the Cleaner Energy Future Initiative for ASEAN (CEFIA)

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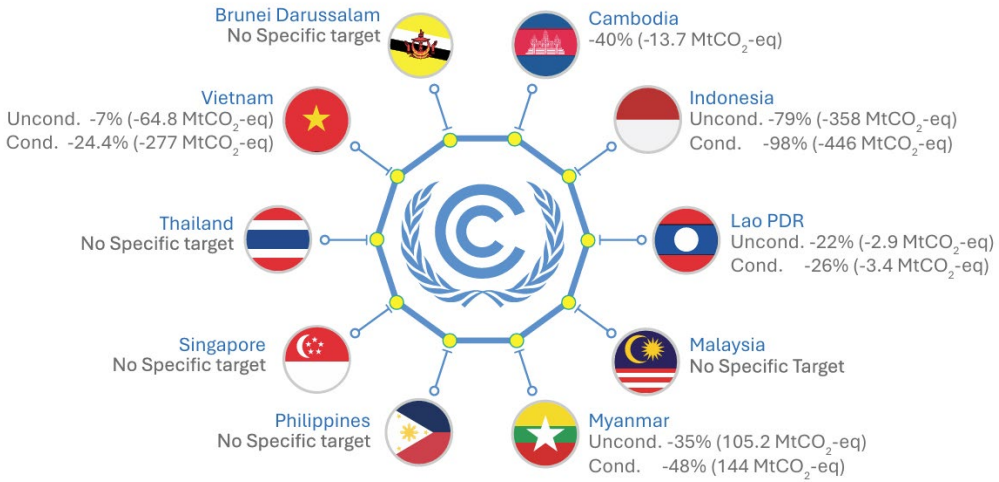
Presentation by:
Marcel Nicky Arianto
Research Analyst
Power Generation and Interconnection (PIN) Department

ASEAN Member States are exploring cleaner energy alternatives to reduce carbon emissions and reliance on fossil fuels.

Countries around the world, including ASEAN Member States have submitted their **Nationally Determined Contributions (NDCs) targets for greenhouse gas (GHG) reduction and net-zero/carbon neutrality**, to tackle the effect of climate change.

NDCs for GHG reduction targets



Source: ACE (2024) – The 8th ASEAN Energy Outlook

Net-zero targets

Brunei Darussalam
- Net-zero by 2050

Cambodia
- Net-zero and carbon neutrality by 2050

Indonesia
- Net-zero by 2060 o sooner

Lao PDR
- Net-zero by 2050, conditionally

Malaysia
- Net-zero by 2050

Myanmar
- Net-zero from forestry and other land use by 2040

Philippines
- No specific target

Singapore
- Net-zero by 2050

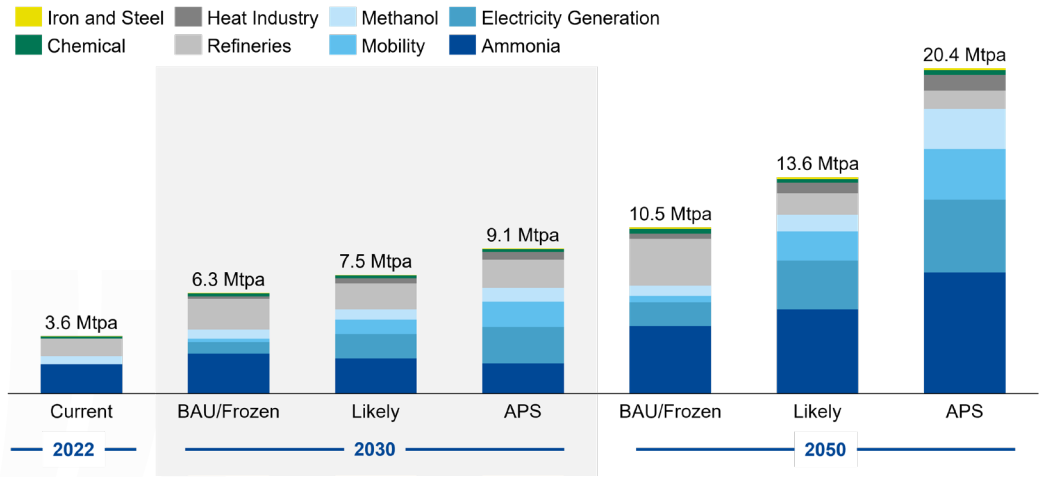
Thailand
- Carbon neutrality by 2050; net-zero by 2065

Vietnam
- Net-zero by 2050

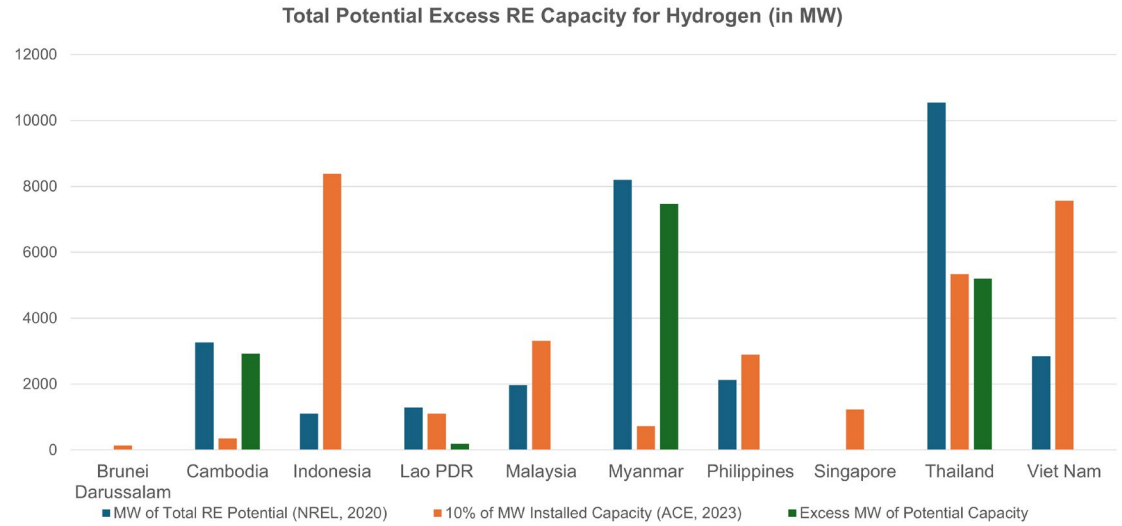
Almost 77% of the GHG in ASEAN are primarily generated from the energy sector, industrial process, and land use. To support the achievement of those targets, as well as to fulfil the rapid growth of energy demand, countries are **exploring cleaner alternative energy sources utilisation**, such as hydrogen and ammonia to decarbonise the energy and industrial sector.

Hydrogen (and ammonia) demand is rapidly growing and the ASEAN RE resources potential will suffice the growing demand.

Existing and future hydrogen demand in ASEAN



Source: ERIA, 2024

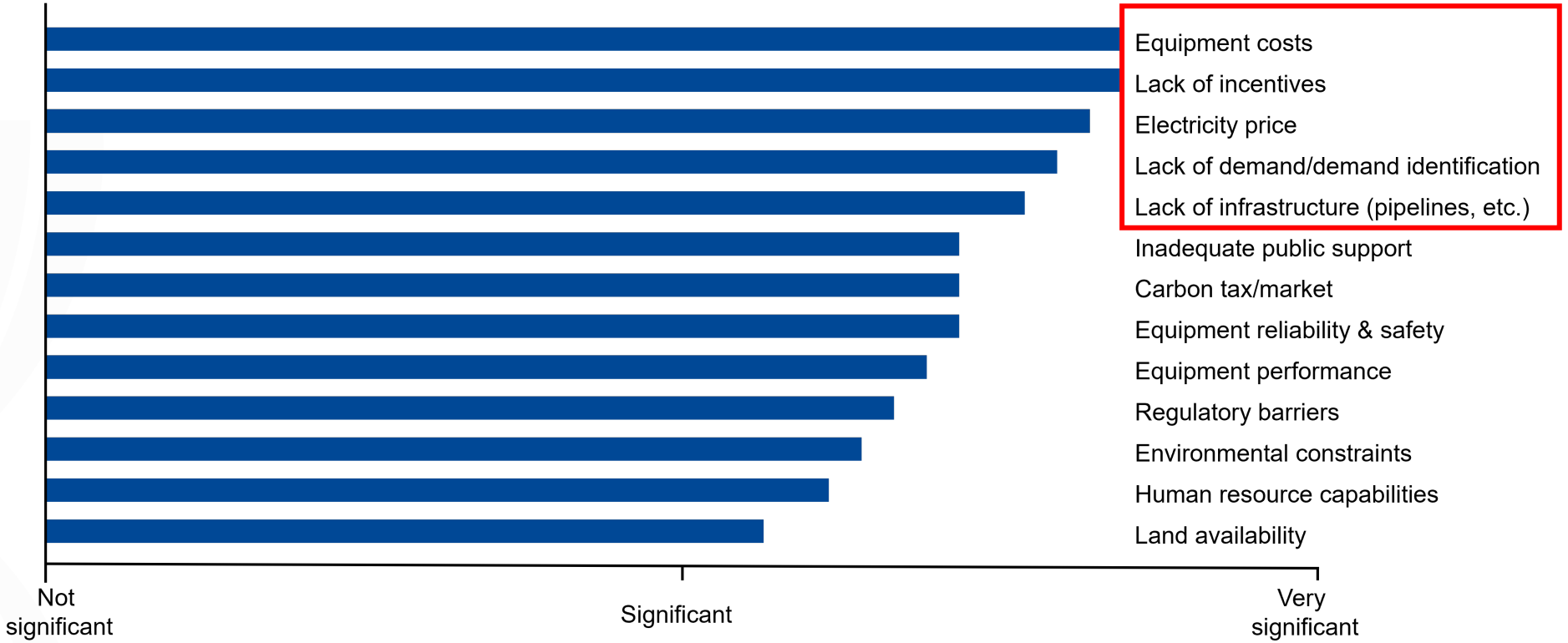


- In 2022, the region's hydrogen demand stayed at 3.6 Mtpa and expected to grow six times by 2050, if the targets are achieved.
- **Fossil fuels dominate the current hydrogen market** with green hydrogen taking less than 1% of the worldwide hydrogen production.
- The ASEAN region needs to **grow its RE production capabilities** to support the growing demand for low-carbon hydrogen.
- The ASEAN region possess around **15.78 GW of potential RE supply capacity** which could potentially be utilised to produce **138 Mtpa of green hydrogen**, exceeding the region's future hydrogen demand (enables utilisation in other sector).

Looking at the huge potential, what hurdles the ASEAN Member States from moving forward towards cleaner hydrogen adoption?

What are the key challenges that the ASEAN Member States face in adopting low-carbon hydrogen?

Based on the survey that ACE conducted in 2024, the ASEAN Member States raised concerns over the following issues which inhibit the hydrogen adoption progress. The respondents were from the policymakers, regulators, power utilities, and oil and gas enterprises.

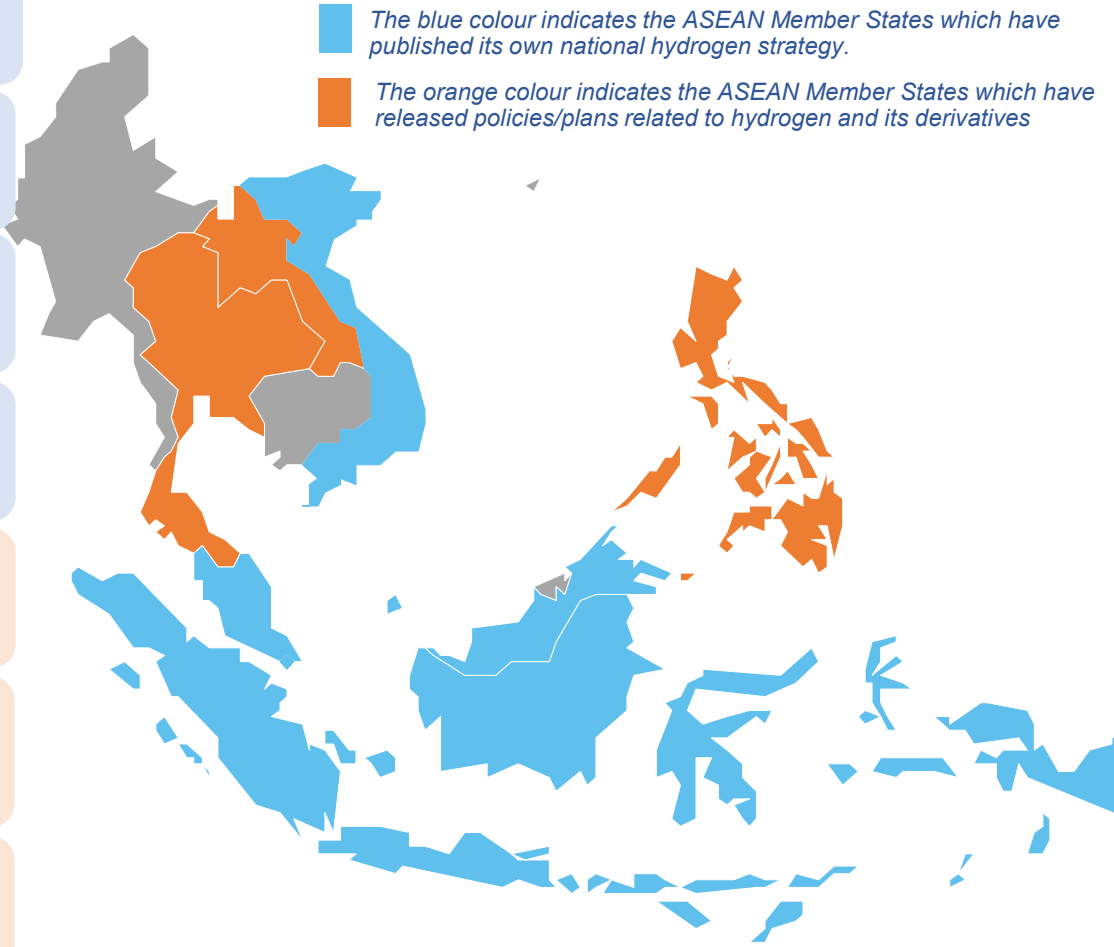


Looking at the top obstacles, the ASEAN Member States need to **explore innovative supporting policies** and **facilitation mechanisms** to support the adoption of hydrogen in the region.

What supporting policies do the ASEAN Member States develop to help tackle the challenges?

The four (4) AMS that have developed their own national hydrogen strategy need to set tangible targets for hydrogen utilisation, while the remaining AMS need to identify the potential role of hydrogen in the nation's energy mix and ultimately establish their national hydrogen strategies and plans.

Indonesia	Staged adoption of low-carbon hydrogen (and ammonia) in various sectors, with production target of 198 ktpa of H2 by 2025 and 1.69 Mtpa of hydrogen and 9.5 Mtpa of ammonia by 2035.
Malaysia	Pursuing hydrogen economy, with a target income of RM 12 billion by 2030 through the hydrogen economy.
Singapore	Focus on technology leadership and workforce training with hydrogen playing a major role to decarbonise the national energy sector by 2050.
Viet Nam	Aims to produce 10 – 20 Mtpa of green and blue hydrogen by 2050; promote green hydrogen utilisation and its derivatives in all sectors.
Lao PDR	In the process of drafting strategies to utilise hydrogen and ammonia as clean energy sources
Philippines	• Included hydrogen utilisation in the Philippines Energy Plan 2023 – 2050 • Released DOE DC2024-01-0001 which provides incentives for clean hydrogen production and utilisation
Thailand	Included hydrogen utilisation in the national Alternative Energy Development Plan (AEDP) 2018-2037



Through the supporting policies and plans, several pilot projects on hydrogen have been implemented within the region.

Hydrogen pilot projects and demonstations are essential to be developed to further understand the impact and benefits of hydrogen adoption in decarbonising various sectors. Listed below are the initiatives, pilot projects, and plans on hydrogen implementation have been done or made recently in ASEAN.

1. Brunei Darussalam

The AHEAD project piloted the first hydrogen supply chain project, **exporting 210 tons of hydrogen from Brunei Darussalam to Japan**.

2. Cambodia

Ministry of Mines and Energy of Cambodia is at a feasibility stage to develop a multi-MW Renewstable® hydrogen power plants, aligning with Cambodia's 2022-2040 PDP in providing 24/7 green baseload power.

3. Indonesia

PT PLN (Persero) inked an MOU with HDF Energy to develop the Renewstable® Power Plant (hybrid power plant of solar and wind generator, hydrogen generator, fuel cells, and energy storage) in Sumba, Indonesia.

4. Lao PDR

Tsubame BHB, Agri Laos, and SAS are developing Lao PDR's first renewable ammonia and low-carbon fertiliser project using surplus hydropower.

5. Malaysia

Two projects are being developed in Sarawak, namely the **H2ornbill** project which produce **90 ktpa of green hydrogen** for Japan and the **H2biscus** project which produce **150 ktpa of green hydrogen** for South Korea.

6. Philippines

Philippines' Department of Energy announced of opening bids for native hydrogen exploration in February 2024

7. Singapore

PacificLight Power aims construct a **600 MW of hydrogen-compatible natural gas power plant** in Jurong Island, COD by 2029.

8. Thailand

EGAT has piloted the **storage of electricity from wind turbines in the form of hydrogen with the capacity of 300 kW** at EGAT Learning Centre in Lam Takong, Nakhon Ratchasima.

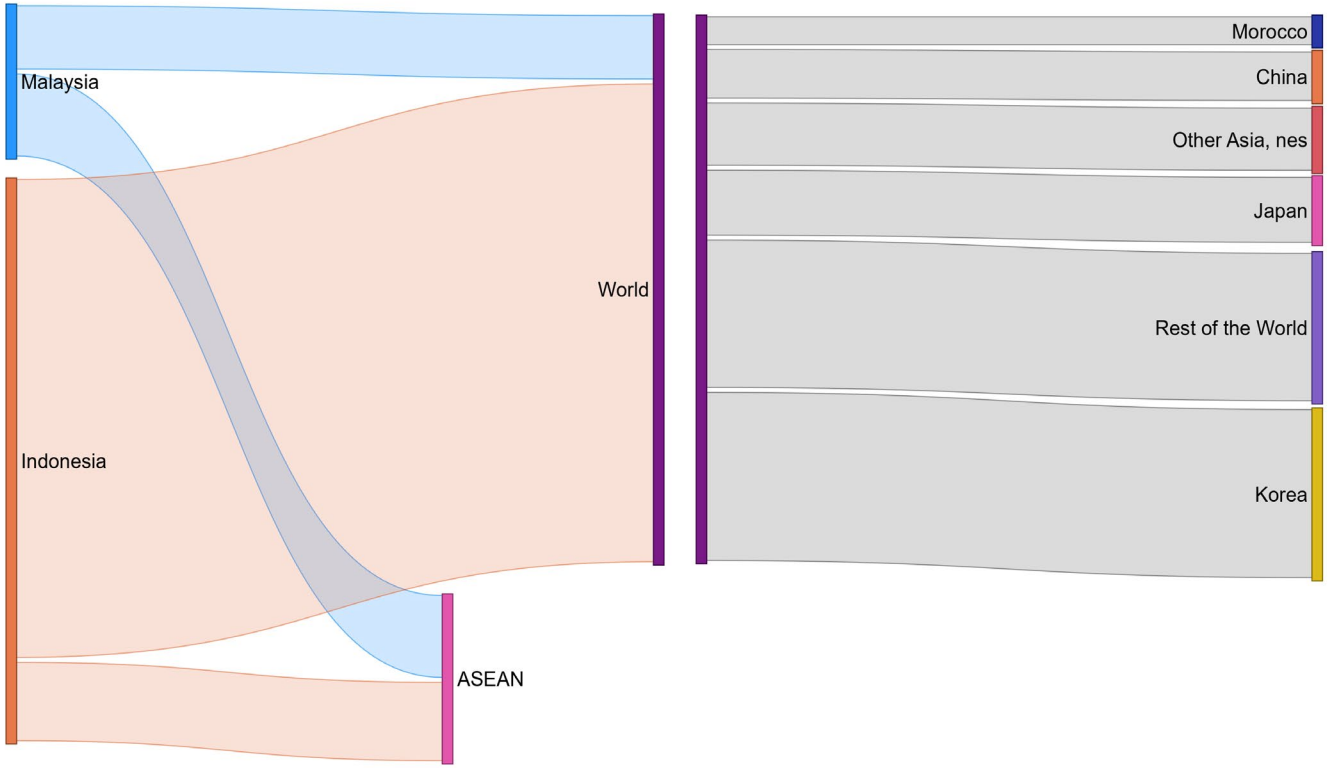
9. Viet Nam

PetroVietnam Gas Corporation (PV GAS) planned to launch **pilot project for small-scale green hydrogen production for industrial and transportation** sectors.

ASEAN's high RE potential brings opportunities for hydrogen supply chain development within and beyond the region.

ASEAN has been trading hydrogen beyond the region with an estimated total trade value of **1.4 billion USD in 2022**, placing the region as one of the top exporters in the global hydrogen supply chain.

Hydrogen Trade Flow of ASEAN Countries



Source: World Bank, 2022
**in the form of anhydrous ammonia*

- Supported by established hydrogen (and ammonia) production facilities within the countries, both Indonesia and Malaysia become two of the main exporting countries in ASEAN, with a total **trade volume of 1.58 Mtpa in 2022.**
- The trading initiatives generated **significant economic benefits for the countries and ASEAN**, thus creating opportunities for the ASEAN Member States to supply hydrogen to the importing countries.
- Pilot project implementation to tap into ASEAN's RE resources for low-carbon hydrogen production through **interregional collaboration** is pivotal in shifting the end-to-end hydrogen supply chain towards cleaner sources.

The ASEAN Centre for Energy (ACE) is supporting the region's efforts towards low-carbon hydrogen adoption.

Through joint studies, projects, and publications, the ASEAN Centre for Energy (ACE) is supporting the ASEAN Member States in helping towards regionwide low-carbon hydrogen adoption.

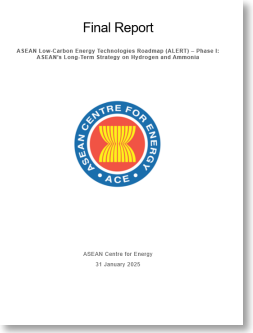
Policy Brief by ACE

"How Southeast Asia Should Embrace Hydrogen: Energy Security and Climate Change Perspectives", published in April 2023

ASEAN Energy Booklet Vol.1: Low Carbon Hydrogen in ASEAN

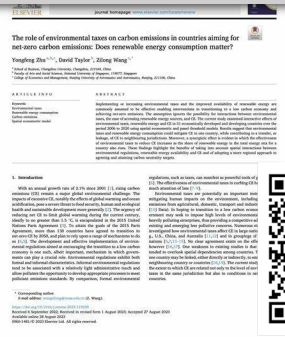
ACE officially launched Booklet Vol.1 published in January 2024 through a public webinar bringing together policymakers and technology experts to discuss hydrogen deployment in ASEAN.

ASEAN Low-Carbon Energy Technologies Roadmap (ALERT) – Phase I



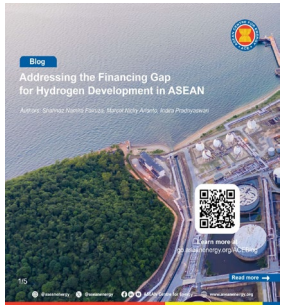
ACE collaborate with ERIA to study on the role of low-carbon hydrogen and ammonia in the ASEAN energy mix and develop strategies to further accelerate the adoption of hydrogen in ASEAN

ACE co-authored the publication in the International Journal of Hydrogen

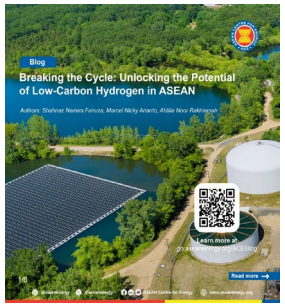


"A Strategic Roadmap for ASEAN to Develop Hydrogen Energy: Economic Prospects and Carbon Emission Reduction" published in September 2024

Blog and Opinion Editorial (Op-Ed)



Breaking the Cycle: Unlocking the Potential of Low-Carbon Hydrogen in ASEAN



Addressing the Financing Gap for Hydrogen Development in ASEAN

Scan here for more!

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Thank You