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PETRONAS advances Asia's energy transition

The Edge, Malaysia



PETRONAS advances Asia's energy transition by accelerating innovation through collaborative ecosystems

As the world grapples with the urgent need to balance energy security, affordability and sustainability, Petroliaam Nasional Berhad (PETRONAS) is leading the charge in Asia's transition towards a cleaner energy future through partnerships and innovation.

With a steadfast commitment to achieving net zero carbon emissions (NZCE) by 2050, PETRONAS is harnessing cutting-edge technology, digital transformation and strategic partnerships to redefine how energy is produced, distributed and consumed.

In an in-depth discussion with Ir Ts Mohd Yusri Mohamed Yusof, senior vice-president of Projects, Technology & Health, Safety, Security & Environment at PETRONAS, the company's vision for a sustainable energy ecosystem comes to light.

Yusri underscores how PETRONAS is not only reinforcing its core oil and gas operations with lower-carbon solutions but also accelerating the adoption of renewable energy, hydrogen and digital innovations to meet the demands of a rapidly evolving energy landscape.

A DUAL MANDATE: ENERGY SECURITY AND SUSTAINABILITY

PETRONAS operates at the intersection of two critical roles – as Malaysia's national oil company and a global energy player.

This dual responsibility requires a balanced approach to energy transition, ensuring that economic growth is not compromised in the pursuit of decarbonisation.

"Our Energy Transition Strategy is built on three pillars," explains Yusri. "First, we are strengthening our core business by optimising hydrocarbon production with lower emissions. Second, we are expanding into new energy solutions, such as renewables and hydrogen, to diversify our portfolio. And, third, we are relentlessly pursuing our NZCE 2050 goal. Committed to the above, we continue to actively foster technological innovation and collaborative ecosystems to accelerate results."

AI REVOLUTION IN ENERGY OPERATIONS

One of the most transformative forces in PETRONAS' energy transition journey is artificial intelligence (AI).

The company has embedded AI across its value chain – from upstream exploration to downstream retail – enhancing efficiency, reducing costs, and minimising environmental impact but at the core, empowering its people to thrive in an increasingly disruptive digital environment.

PETRONAS' AI journey began in 2018 with the establishment of a robust digital ecosystem, designed to scale AI applications securely and efficiently. Today, AI is deployed in multiple facets of operations:

- Process optimisation to optimise production energy efficiency in refineries, petrochemical and LNG plants;
- Predictive maintenance to prevent equipment failures and extend asset lifespan; and
- Supply chain and logistics management to reduce emissions and improve delivery networks.

A standout example is the Pengerang Cogeneration Plant (PCP), which was given the "Sustainable Plant of the Year 2024" award at the Asian Downstream Summit. The plant leverages AI-driven analytics to enhance operational reliability while significantly cutting carbon emissions.

To ensure structured and ethical AI deployment, PETRONAS has set up an Artificial Intelligence Centre of Excellence (AI CoE) in 2022, which oversees governance, use-case implementation, and workforce upskilling.

"AI is not just a tool – it's a strategic enabler that empowers our people, optimises our assets and positions us as a leader in the future energy landscape," Yusri emphasises.

Equally important, PETRONAS is nurturing an AI-ready workforce through inclusive in-house programmes that facilitate data-backed decision-making, enhance productivity, and spark innovation at all levels. These programmes are open to all employees, regardless of role or background, underscoring its commitment to accessibility, capability-building, and innovation.

COLLABORATIVE ECOSYSTEMS: THE KEY TO SCALING INNOVATION

While PETRONAS has built a strong internal innovation framework, the company recognises that no single entity can drive the energy transition alone. Instead, it actively fosters partnerships with governments, academia, technology providers and industry peers to accelerate sustainable solutions.

From clean hydrogen and cross-border renewable energy trade, to digital transformation and technology co-development, PETRONAS is working with a wide network of partners to unlock synergies and accelerate impact across the energy value chain.

One of PETRONAS' recent collaborative initiatives is the Hybrid Hydro Floating Solar and Green

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— Mohd Yusri

Hydrogen Hub Development, a strategic collaboration with Tenaga Nasional Berhad (TNB), leveraging the current partnership between TNB's power generation subsidiary TNB Genco Sdn Bhd and Terengganu Inc at Kenyir Lake. This project aims to support Malaysia's aspiration to become a regional leader in green hydrogen production, while spurring socio-economic growth in Terengganu.

This collaboration converges TNB's power expertise with PETRONAS' energy capabilities to create a dynamic, future-ready energy ecosystem, adds Yusri.

"It's a testament to how collaboration can drive both national energy security and regional decarbonisation."

CROSS-BORDER RENEWABLE ENERGY TRADE

PETRONAS is also pioneering regional energy integration through a joint development agreement with key corporations in Vietnam and Singapore to explore the export of renewable electricity from Vietnam's offshore wind farms.

The collaboration brings together MY Energy Consortium (a partnership between PETRONAS and TNB), PetroVietnam Technical Services Corp (PTSC), a member of Vietnam National Industry – Energy Group (Petrovietnam) of Vietnam, and Sembcorp Utilities Pte Ltd, a wholly-owned subsidiary of Singapore-based Sembcorp Industries (Sembcorp). The landmark initiative aligns with the Asean Power Grid vision, positioning Malaysia as a key enabler of clean energy trade across Southeast Asia.

"Together, these consortia will focus on unlocking Vietnam's rich renewable energy resources – particularly offshore

wind power – as a source of green electron generation and to supply clean electricity across borders. This alliance reflects the growing momentum towards a regionally integrated ASEAN Power Grid," notes Yusri.

Digital transformation is a cornerstone of PETRONAS' strategy, and collaborations with technology companies on driving innovation, low-carbon technologies, and AI ecosystem among others, are accelerating this shift.

"Building alliances is not just about technology – they're about building a sustainable digital backbone for the energy sector to bring about a sustainable future for our stakeholders," Yusri explains.

NURTURING FUTURE ENERGY LEADERS, ADVANCING EMERGING TRENDS AND TECHNOLOGIES

A successful energy transition requires skilled talent, and PETRONAS is addressing this point through the PETRONAS Energy Transition Academy (P-ETA).

Established in collaboration with the Energy Institute (EI), P-ETA offers specialised programmes in carbon management, hydrogen, renewables and circular economy practices.

"We are equipping the next generation of energy professionals with the expertise to lead in a low-carbon world," says Yusri. "This is critical for ensuring that Malaysia remains at the forefront of the global energy transition."

As part of its commitment to a just and equitable transition, PETRONAS is also investing in broader upskilling and community development programmes – helping Malaysians across all levels of society seize new opportunities emerging from the energy transition.

CALL TO COLLECTIVE ACTION

PETRONAS' message is clear: The energy transition cannot be achieved in isolation. It requires unified efforts from governments, industries and communities to drive meaningful change.

"Every decision we make today will shape the energy systems of tomorrow," Yusri concludes. "Thus, our rallying call is clear: Let us unite with purpose, commit to tangible actions, and lead the change – because delivering Asia's net zero is not just an ambition; it's a responsibility we all share."

Through technological empowerment, strategic collaborations and a commitment to inclusive growth, PETRONAS is proving that the energy transition is not just a challenge – but an opportunity to redefine the future. By emphasising that technology and innovation serve to enrich lives for a sustainable future, the company is setting a benchmark that rallies widespread support from like-minded partners to effectively advance a just energy transition for Asia and beyond.

As PETRONAS continues to innovate and collaborate, its journey serves as a blueprint for how energy companies can thrive in a decarbonising world – balancing profitability with planetary responsibility. The road to net zero is complex, but with vision, innovation and collective effort, PETRONAS is paving the way forward.