



In conjunction with BMC's 15th Anniversary

SUSTAINABLE METHANOL FORUM

Shaping the Future of Clean Energy Through Sustainable Methanol

Thursday, 11 September 2025 | 1:30 PM - 5:00 PM | Indera Samudra Grand Hall, The Empire Hotel

SUMMARY REPORT





Yang Mulia Dato Seri Paduka Hj Mohamad Azmi Bin Hj Mohd Hanifah
Deputy Minister (Energy) at the Prime Minister's Office

KEYNOTE SPEECH

Vision for Sustainable Methanol Aligned with Wawasan Brunei 2035

Yang Mulia Dato Seri Paduka Haji Mohamad Azmi Bin Haji Mohd Hanifah, Deputy Minister (Energy) at the Prime Minister's Office opened his address by warmly greeting dignitaries, industry leaders, and guests, and by expressing appreciation for the opportunity to discuss the future of sustainable methanol. He aligned his remarks with Wawasan Brunei 2035, emphasising the nation's aim for dynamic, sustainable economic growth and broad-based social development. To realise this vision, he highlighted the Department of Energy's strong focus on building a competitive downstream industry, which supports economic diversification while strengthening the resilience and capacity of Bruneians for the future.

Methanol's Pivotal Role in Economic Transformation

He underscored the methanol industry's pivotal role in this transformation, noting that the establishment of Brunei Methanol Company (BMC) in 2006 marked a breakthrough in moving from conventional oil and gas to higher-value products. BMC, he said, has created jobs, developed local expertise, and enabled energy and technology transfer, securing Brunei's position as a regional contender in methanol production and demonstrating the nation's innovative leap into downstream oil and gas expansion.

Advancing Sustainability and Innovation

YM Dato Seri Paduka Hj Mohd Azmi highlighted the path toward sustainability and innovation, recognising Brunei's ongoing energy transition and efforts to increase the share of renewables, especially solar power, in the national energy mix. He envisioned the methanol industry evolving by using renewable energy and responsibly sourced raw materials to produce low-carbon methanol, aligning with the global circular economy. Such advances, he explained, would allow Brunei to meet growing international demand for cleaner products, including low-carbon marine fuels and sustainable chemical feedstocks.

A Whole-of-Nation Effort for a Clean-Energy Future

In conclusion, he stressed that achieving this vision requires a whole-of-nation effort involving government, industry, finance, research institutions, and the wider community. By working together, stakeholders can help BMC become a regional leader in low-carbon products, reinforcing Brunei's role in regional trade while creating quality jobs and new economic opportunities. He congratulated BMC on its 15th anniversary and looked forward to continued collaboration to shape a clean-energy future through sustainable methanol.



Jesús Enrique Mora Marín
Chief Executive Officer
Brunei Methanol Company

OPENING REMARKS

Setting the Scene

Jesús Enrique Mora Marín opened his remarks by warmly welcoming attendees and thanking Yang Mulia Dato Seri Paduka Haji Mohamad Azmi Bin Haji Mohd Hanifah for his remarks. Mr Mora explained that the seminar aimed to share knowledge about methanol as a future green energy solution, noting that BMC already exports methanol across Asia for conventional uses, making Brunei a recognised regional supplier of this important chemical commodity.

Brunei's Clean Energy Goals and CO₂ Utilisation

He highlighted Brunei's commitment to Wawasan 2035 and the nation's 12th development plan, both of which guide the shift toward cleaner energy. A key challenge is cutting greenhouse gas emissions from methanol production. Although BMC currently uses natural gas, the true feedstocks for methanol are carbon dioxide (CO₂) and hydrogen, which means captured CO₂ can be reused as a raw material. This, he emphasised, positions methanol production as an ideal pathway to turn waste CO₂ into a valuable product and help Brunei lower its carbon footprint.

Hydrogen's Role and Methanol as a Practical Carrier

Mr Mora also discussed the role of hydrogen in a green energy future, noting that while hydrogen can be produced through electrolysis, it is difficult to transport. Methanol and ammonia provide practical, stable carriers for hydrogen, and methanol's liquid form and low vapour pressure make it especially suitable for global shipping without major modifications to existing infrastructure. This makes methanol a promising vehicle for moving hydrogen to future markets.

Overcoming Cost Barriers and Mapping a Green Energy Roadmap

He concluded by acknowledging that producing green methanol is still costly because CO₂ capture and hydrogen production technologies are developing, but he expressed confidence that costs will decline as technology improves. Mr Mora framed the forum as a platform to explore technological solutions, learn from global partners, and map out an energy roadmap for BMC and Brunei—aimed at reducing CO₂ emissions and ensuring long-term sustainability in the green energy era.

PRESENTATION SESSION A: SHAPING THE FUTURE OF ENERGY

DRIVING ECONOMIC DIVERSIFICATION THROUGH METHANOL

Dina Yahya, Acting Director, Department of Energy (Prime Minister's Office), outlined how methanol supports Brunei Darussalam's economic diversification and low-carbon ambitions, aligning with Wawasan Brunei 2035 goals.

Key Highlights

Energy Sector's Central Role

- Contributes 57.8% of national GDP, with ~48% from upstream oil & gas and ~8-9% from downstream sectors including methanol.
- Provides high-quality jobs and 99.9% electricity access nationwide.

Wawasan 2035 Goals

- Department of Energy focuses on sustaining upstream oil & gas, growing downstream industries, and securing power and fuel, while advancing an energy transition to remain competitive.

Downstream Expansion & Methanol's Role

- Downstream oil and gas is identified as a priority sector alongside food, tourism, and ICT.
- BMC pioneered Brunei's gas-based downstream industry in 2010, and methanol remains a key GDP contributor despite price volatility.

Value-Chain Growth

- New SPARK plant (2028) will produce acetic acid and aniline using feedstock from BMC, Brunei Fertiliser Industries (BFI), and Hengyi Industries Sdn Bhd.
- Plan to expand the methanol value chain into higher-value secondary and tertiary products.

Low-Carbon Transition

- Target: 30% renewable energy share by 2035.
- Opportunities to produce bio- and e-methanol as feedstocks for low-carbon marine and aviation fuels, positioning Brunei as a regional low-carbon solution provider.

Whole-of-Nation Approach

- Requires collaboration across government, private sector, and communities to ensure feedstock supply, green energy, and logistics for a low-carbon methanol ecosystem.

Socio-Economic Contributions

- BMC provides local employment, BND 16.7 million in local spending (2024), and drives technology transfer and innovation.

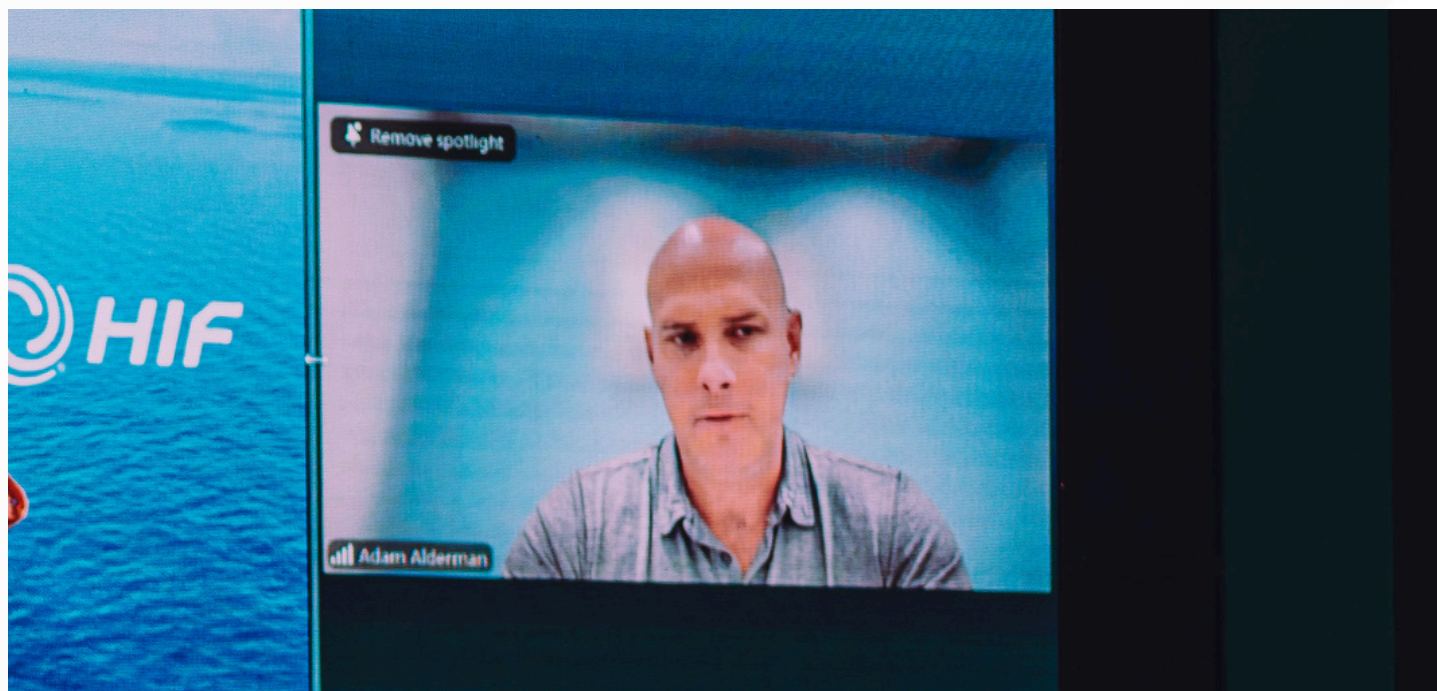
Conclusion

Dina Yahya emphasised that methanol is central to Brunei's economic diversification and climate goals, enabling a shift from conventional downstream products to low-carbon methanol. This transformation will sustain competitiveness, integrate climate ambitions, and support a sustainable, carbon-neutral economy.



Noor Dina Zharina binti Haji Yahya
Acting Director
Energy Policy and Strategy Division
Department of Energy at the Prime Minister's Office

E-FUELS OVERVIEW (VIRTUAL PRESENTATION)



Adam Alderman

Executive Manager & Project Director HIF APAC
HIF Global

Adam Alderman, Executive Manager and Project Director of HIF APAC and HIF Global, presented an overview of e-fuels and their role in future energy systems. Speaking virtually from Sydney, he highlighted HIF's global projects and how e-fuels can support large-scale decarbonization in transport and shipping.

Key Highlights

HIF Global Overview

- Founded in 2016 as a spinoff of Chile's AME to harness Patagonia's strong wind resources.
- Operates the world's first fully operating e-fuels facility, the Haru Oni plant in southern Chile, producing 350 TPA e-methanol and 57,000 gallons/year of e-gasoline since 2022.
- Supported by investors such as Porsche and Baker Hughes.

Global Projects

- Four advanced developments: Tasmania (Australia), Matagorda (Texas, USA), Cabo Negro (Chile), and Paysandú (Uruguay).
- Tasmania project will supply e-methanol for maritime shipping using biogenic CO₂ and renewable energy.

E-Fuels Production

- **Process:** Renewable energy + water electrolysis → green hydrogen, combined with captured CO₂ to produce e-methanol, which can be further synthesised into e-gasoline or e-jet fuel.
- Feedstock flexibility allows carbon capture from industrial sources or biogenic residues.

Market Outlook

- Rapid growth expected: e-fuels demand projected to reach ~35 MTPA by 2030 and ~300 MTPA by 2040.
- Essential for decarbonising sectors where electrification is limited, such as aviation, maritime, and heavy road transport.

Conclusion

HIF Global's pioneering projects demonstrate that e-fuels can bridge the gap to a low-carbon future, with scalable technology, strategic global sites, and strong industry partnerships positioning HIF as a leader in the emerging e-fuels market.

CARBOPATH™ AS A DRIVER FOR METHANOL'S POTENTIAL



Mr. Masahiko Naito

Executive Officer

Division Director of C1 Chemicals Division, Green Energy & Chemicals Business Sector
Mitsubishi Gas Chemical (MGC)

Mr Masahiko Naito, Executive Officer and Division Director of the C1 Chemicals Division at Mitsubishi Gas Chemical (MGC), celebrated BMC's 15th anniversary and presented "Carbopath™ as a Driver for Methanol's Potential. He outlined MGC's century-long expertise, global methanol leadership, and a stepwise plan to help Brunei transition to a low-carbon, circular economy.

Company Legacy

- Founded in 1918: 107 years in chemical innovation.
- First natural-gas methanol production in Japan (1952); later expanded to Saudi Arabia, Venezuela, and Trinidad & Tobago.
- Established Brunei Methanol Company (BMC) in 2006, integrating the entire methanol value chain from gas exploration to advanced applications.

Carbopath™ Circular-Carbon Platform

- Produces methanol from captured CO₂, renewable hydrogen, and waste biomass, enabling a shift from fossil-based linear production to a circular, low-carbon economy.

Brunei's Three-Step Low-Carbon Path

1. By 2030: Add captured CO₂ to natural gas feedstock (~250,000 t CO₂/year).
2. By 2040: Introduce green hydrogen and biomass to further cut natural gas use.
3. By 2050: Fully replace natural gas, potentially consuming ~1.2 million t CO₂/year (~13% of Brunei's 2022 emissions).

Technology & Partnerships

- **Advances:** Verified CO₂-to-methanol catalysts and gasification tech (2022-23); membrane-separation processes under development.
- **Projects:** Bio-methanol production in Niigata (2024); CO₂ recycling with hard-to-abate industries.
- **Applications:** Marine fuels, hydrogen carrier technology, renewable DME, and CO₂-based plastics.

Conclusion

Mr Naito emphasised that MGC's technology and global collaborations position BMC to evolve from a methanol producer into a comprehensive low-carbon solutions provider, helping Brunei become a regional leader in renewable methanol and a sustainable, carbon-neutral economy.

PRESENTATION SESSION B: INNOVATING FOR A LOW-CARBON METHANOL FUTURE

MARKET POTENTIAL OF LOW-CARBON METHANOL

Ms. Sukanya Boonneung, Executive Director at S&P Global, explained that the low-carbon methanol market is emerging quickly. Its growth is being shaped by different methanol production pathways, capacity trends, economic challenges, and rising demand—especially from the marine bunker fuel sector. She highlighted both the opportunities and the hurdles ahead for sustainable methanol development.

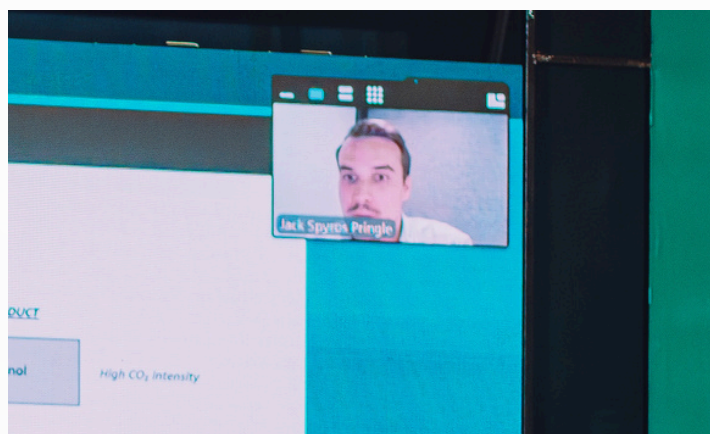


Sukanya Boonneung
Executive Director, Chemical Consulting
S&P Global

Key Highlights

- Methanol today can be produced through several methods, but low-carbon options are still at an early stage. Key production routes include biomass gasification and processes using green hydrogen. However, producing low-carbon methanol remains costly because of high feedstock prices and large capital investments.
- Globally, conventional methanol production is expected to level off and gradually shift toward low-carbon, blue, and green methanol by 2040 and beyond, as decarbonization policies strengthen. Demand for methanol in fuel applications, particularly for biodiesel bunkering, is rising. Regulatory incentives are helping drive this growth, even though the high costs remain a challenge.
- Among the opportunities, methanol as a marine fuel for bunkering stands out as the largest growth sector. It has an estimated 350 – 370-million-ton market potential, supported by regional and international decarbonization regulations.
- Low-carbon methanol, whether blue, green, or blended with biogas, is becoming an important pathway for decarbonizing the shipping industry and other sectors. But high production costs and the small scale of many projects continue to pose barriers.
- Strong regulatory frameworks, carbon pricing, and regional bunkering initiatives, especially in Singapore and across ASEAN, will play a crucial role in making low-carbon methanol commercially feasible. With global demand for green marine fuels increasing, the region is well-positioned to become a strategic hub for sustainable methanol production and supply.

MARITIME FUTURE FUEL OUTLOOK & BIO-METHANOL OPPORTUNITIES (VIRTUAL PRESENTATION)



Mr. Jack Spiros Pringle
Global Head
Energy Transition Advisory
Lloyds Register

Methanol as a Marine Fuel

- **Fuel Types**
 - Biomethanol: Produced from biomass; low CO₂ but limited by feedstock availability.
 - E-methanol: Derived from renewable electricity and electrolyzers; very low CO₂ but currently costly.
- **Regulatory Advantage**
 - Biomethanol's lifecycle emissions (~18 gCO₂eq/MJ) fall well below GFI targets, allowing operators to generate surplus credits and avoid penalties.

Demand Outlook

- **Global Demand**
 - Projected to rise from under 1 million tonnes today to ~5 million tonnes annually by 2030.
 - Driven primarily by capable vessels rather than retrofitted ready vessels due to high conversion costs.
- **Singapore Hub Advantage**
 - Singapore handles ~22% of global bunkering and is advancing alternative fuel infrastructure.
 - Methanol marine fuel demand there could reach ~1 million tonnes by 2030, positioning nearby Brunei as a cost-efficient supplier.

Conclusion

Global shipping faces a rapidly tightening regulatory environment, with IMO's GFI standard and EU carbon measures compelling a shift to low-carbon fuels. Biomethanol and e-methanol emerge as leading solutions due to their compliance advantages and scalability. With Singapore as the world's largest bunkering hub and Brunei's proximity and methanol production capacity, Brunei is uniquely positioned to capture a significant share of the growing maritime biomethanol market by 2030.

This virtual presentation by Jack Spiros Pringle, Global Head of Energy Transition Advisory at Lloyd's Register, examined the growing role of biomethanol and e-methanol as alternative maritime fuels. He explains how evolving global and regional regulations are driving demand for low-carbon marine fuels and why Brunei's proximity to Singapore's major bunkering hub creates strategic opportunities.

Key Highlights

Regulatory Drivers of Methanol Adoption

- **International Maritime Organisation (IMO) Net Zero Framework**
 - Introduces the Greenhouse Gas Fuel Intensity (GFI) Standard, measuring ships' well-to-wake emissions in gCO₂eq/MJ.
 - Ships below the emissions trajectory earn credits; those above pay penalties of \$100–\$380/ton CO₂eq.
- **Regional Rules**
 - EU Emissions Trading System (ETS) and FuelEU Maritime directive penalise fossil fuel usage and reward alternative fuels.
- These overlapping measures create a strong economic push toward low-carbon fuels like biomethanol and e-methanol.

Fleet Adoption Trends

- **Current Fleet**
 - As of March 2025, 1,133 methanol-ready/capable vessels are in service or on order, with 394 fully capable of using methanol.
 - Container ships dominate adoption, driven by Maersk's early leadership.
- **Future Orders**
 - At least 331 additional methanol-capable vessels are on order, potentially bringing totals to nearly 400 capable and 740 ready by 2030.
- **Terminology**
 - Methanol-capable: Equipped to burn methanol from day one.
 - Methanol-ready: Designed for easy future conversion.

Strategic Opportunity for Brunei

- Brunei's regional production capacity aligns well with rising Singapore demand, lowering shipping costs and strengthening its role in the low-carbon maritime fuel supply chain.

ROLE OF RENEWABLES (HYDRO & SOLAR) IN SUSTAINABLE METHANOL



Peder Elfving

Co-Founder

Asia Pacific Energy Solutions (APES)

Peder Elfving, Renewable Energy Specialist and founder of EOGC, presented “Role of Renewables (Hydro & Solar) in Sustainable Methanol.” Drawing on his international solar and storage experience, he outlined how solar PV and imported hydro can help Brunei meet its Wawasan 2035 goals while freeing valuable natural gas for high-value exports.

Key Highlights

Strategic Rationale

- **Gas Is More Valuable as an Export:** Burning gas for domestic electricity costs ~\$0.14/kWh, while LNG export value is higher; large-scale solar costs <\$0.045/kWh.
- **Energy Mix Vision:** Combine solar PV for daytime, imported hydro for baseload, and gas as backup, enabling more gas for methanol, ammonia, and LNG exports.

Deployment Options

- **Rooftop PV:** Immediate, visible opportunities (e.g., Brunei Ministry of Finance 1.4 MWp system) but limited by roof area.
- **Ground-Mount PV:** Potential near industrial loads (e.g., BMC site 36 MWp) but constrained by Brunei’s forested land.
- **Floating PV:** Largest scale potential— >350 MWp across six reservoirs, supplying ~600 GWh/yr, >30% of area coverage.

National Benefits of Solar & Hydro

- **Economic:** Higher gas export revenue and lower long-term system costs.
- **Reliability:** Diverse energy sources strengthen grid stability and resilience.
- **Climate Goals:** Supports Brunei’s decarbonization commitments and enhances its international reputation.

Conclusion

Elfving emphasised that solar power is not just clean energy but a strategic enabler: by pairing rooftop, ground-mount, and floating PV with imported hydro, Brunei can cut domestic power costs, free more natural gas for profitable exports, and advance its low-carbon, diversified energy future.

ESG – MYTHS TO MEASURABLE IMPACT

Shaji Krishnan, Managing Director of Arete Solutions Sdn Bhd, shared practical insights on Environmental, Social, and Governance (ESG) implementation. He emphasised the critical role of reliable data and highlighted Brunei Methanol Company (BMC)'s ESG initiatives as a model for progress.

Key Highlights

Understanding ESG & Common Myths

- **ESG Covers All Three Pillars:** Environment, Social, and Governance—not just environmental issues.
- **Myths debunked:**
 - Only for large corporations.
 - Merely compliance or CSR.
 - Temporary trend or too costly.
- **Reality, ESG creates:**
 - **Long-Term Value:** Achieved through credible ESG data and strong governance, which enhance investor confidence, improve access to capital, and build lasting stakeholder trust.
 - **Drives Efficiency:** Reliable ESG metrics enable continuous monitoring and innovation, helping organisations streamline operations and adopt resource-saving practices
 - **Reduces Risks:** Comprehensive ESG frameworks mitigate regulatory, environmental, and reputational risks, lowering the likelihood of penalties and operational disruptions

Importance of Data

- Reliable, accurate, and traceable data is essential for measuring performance, managing risk, supporting compliance, and building stakeholder trust.
- Data enables:
 - **Transparency:** Verified, traceable data allows companies to make clear, credible disclosures to stakeholders and the public, building trust and avoiding greenwashing.
 - **Informs decisions:** Accurate data provides management with measurable ESG performance indicators, helping them identify risks and opportunities and make sound sustainability and investment choices
 - **Drives innovation:** Continuous monitoring and analysis of ESG metrics reveals efficiency gaps and new opportunities, encouraging the development of innovative processes and technologies to improve environmental and social outcomes

Data Management & Assurance

- **Challenges:**
 - Diverse data sources and a lack of standardisation.
 - Evolving regulations and weak data governance.
 - Technology limitations and data traceability issues.
- **Solutions:**
 - Integrated ESG platforms, advanced analytics, robust governance frameworks, and staff training.

BMC's ESG Journey

- **Three Phases:**
 - a. Framework Study & Goal Setting aligned with Brunei Vision 2035.
 - b. GHG Accounting: Established processes for Scope 1, 2, and 3 emissions, with 2024 data collected and verified.
 - c. Framework Development: Deploying the Ecodrisil platform for automated reporting and analytics.
- **Achievements:**
 - **Environmental:** Fuel optimisation, cleaner energy strategy, methanol intensity reduction.
 - **Social:** Strong safety culture, 10 million man-hours without incidents, local hiring, active community engagement.
 - **Governance:** No penalties in 5 years, strong regulatory engagement, robust cybersecurity, and well-maintained legal compliance.



Shaji Krishnan
Managing Director
Arete Solutions Sdn Bhd

Conclusion

Krishnan highlighted that credible data and robust governance underpin successful ESG strategies. BMC's structured approach—combining technology, clear processes, and stakeholder alignment—demonstrates how ESG can enhance transparency, reduce risk, and create lasting value for both business and society.

DRIVING DECARBONISATION THROUGH RESEARCH AND INNOVATION



Dr HJ Abdul Hanif Bin Dato Paduka Hj Mahadi

Assistant Vice Chancellor (Research, Innovation and Sustainability)
Universiti Brunei Darussalam (UBD)

Dr Haji Abdul Hanif bin Dato Paduka Haji Mahadi, Assistant Vice Chancellor (Research, Innovation & Sustainability) of Universiti Brunei Darussalam (UBD), presented “Driving Decarbonisation through Research and Innovation.” He highlighted UBD’s role in advancing Brunei’s low-carbon transition through research, education, and industry partnerships.

Key Highlights

UBD’s Mission and National Alignment

- Brunei National Climate Change Policy (BNCCP) guides UBD’s sustainability agenda, emphasising a whole-of-nation approach to reduce emissions and strengthen climate resilience.
- UBD integrates climate goals into curriculum, research, and campus practices, promoting a holistic, sustainable ecosystem.

Research and Innovation Initiatives

- Centre for Advanced Material and Energy Sciences (CAMES) focuses on CO₂ utilisation and decarbonization technologies, supported by over BND 500,000 in research funds since 2019.
- UBD has published 50+ high-impact research articles, engaged in international collaborations, and trained students in advanced CO₂ conversion techniques.

CO₂ as an Opportunity

- CO₂ is seen as a valuable carbon feedstock for sustainable methanol and fuel production, closing the carbon cycle.
- UBD develops model catalysts (e.g., PdZn/ZnTiO₃) for high-productivity methanol synthesis at low temperature and pressure, reducing energy intensity.

Multi-Pathway CO₂ Utilization

- Active research on low-temperature methanation, CO₂-to-syngas, and C₂+ hydrocarbons using stable, coke-resistant catalysts.

Education and Engagement

- **GenNext** cross-disciplinary program equips students with sustainability knowledge across science, business, and arts.
- UBD promotes industry partnerships, including an MoU with Brunei Methanol Company for sustainable methanol from CO₂ feedstock.

Conclusion

Dr Hanif emphasised that research, innovation, and strategic R&D investment enable UBD to pioneer CO₂ conversion technologies, produce sustainable methanol, and prepare skilled graduates—positioning Brunei as a regional leader in low-carbon solutions.

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