

**DRIVING THE NEW ENERGY** FRAMEWORK FOR INTERNATIONAL COLLABORATION



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# Driving Energy Transitions Across the Globe

By fostering collaboration within the energy system and across governments and sectors, championing advanced climate technologies, and prioritising robust energy security, Japan is establishing its position as a key architect of the global transition to the new multifaceted energy system. Leading the region in securing a carbon-neutral and stable energy future will require new commitments to multilateral partnerships and alliances, critical investment in energy transition innovation and infrastructure, and enabling effective new policy frameworks.

Japan's priority of a pragmatic, comprehensive and ambitious transition extends to its industrial sector, which will be a critical enabler of transition success. With industry contributing 22% to Japan's GDP and employing 15% of its total labour force, the opportunity for change will require collaboration between government and private sectors as well as partnerships between companies to maintain Japan's competitive advantage and economic stability. The transition to clean energy will also bring with it equitable access to energy as well as sustainable economic growth that delivers benefits such as jobs creation, increased access to education and more.

The Japan Energy Summit & Exhibition, taking place from 18 - 20 June 2025 in Tokyo, brings together key participants from across the global energy ecosystem to actively shape the future of energy, by providing an unmissable opportunity to source the latest equipment, systems and innovations, whilst facilitating critical dialogue across energy ecosystems.

The **Event** 6,000+Global Attendees Industry Delegates **Exhibiting Companies** 200+ **Expert Speakers** Regionally, Japan is building the platform with Australia and Asian countries by establishing the Asia Zero Emission Community (AZEC), which provides support in finance, technology, human resources and policy coordination. To date, Japan has committed up to \$8 billion funding for projects in renewables, energy saving, hydrogen and ammonia

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### 2-11 SPECIAL REPORT

Creating roadmaps for the global energy transition



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EU-Japan partnership spurs clean energy momentum



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Japan's critical role in advancing Africa's hydrogen and ammonia economy





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Striking a global decarbonisation partnership to accelerate e-NG adoption



\$5.7 trillion per year

Amount of investments the 1.5°C Scenario will require until 2030

Japan is a long-respected powerhouse of innovation and technology that has progressed the lives of populations around the globe. The country's transition to renewable energy is viewed as vital for not only its future energy security, but also for leading the charge on clean energy technologies globally.

Accelerating the development of innovative energy technologies is key, and the impact of this new era of Japanese innovation is being felt across the world, not least with the nation's renewed appetite for collaboration. Both aspects make Japan not only an ideal catalyst for building the future energy framework, but also the driver of the synergies and cooperation that the transition era demands.

# Global collaboration led by Japan for ensuring security of energy supply globally

Japan is clearly positioning itself as a key player in the global shift towards cleaner and sustainable energy sources. Collaboration within the global energy system led by Japan, remains crucial for ensuring the security of energy supply globally, especially natural gas and LNG.

In order to drive forward the momentum from the clean energy transition and at the same time capitalise on the huge opportunities, Japan is already in the process of reviewing its next Strategic Energy Plan, which is expected to be finalised by around mid-2025.

The new strategic document will outline the goals and policy direction on how Japan plans to accelerate decarbonisation toward 2035-2040 to contribute to international efforts against global warming, while simultaneously ensuring stable energy supplies.

Discussions will also touch on how Japan will reduce coalfired power generation and how to secure a long-term supply of I NG.

Japan's 6th Strategic Energy Plan (released in 2021) and the GX (Green Transformation) Decarbonisation Power Supply Bill (released in 2023) target an increase in the share of non-fossil fuel generation sources to 59% of the generation mix by 2030 compared with 31% in 2022. Policies target an increase in the share of renewable generation sources including solar, wind, hydropower, geothermal, and biomass from 26% in 2022 to 36%–38% by 2030, and an increase in the share of nuclear generation from 5% in 2022 to 20%–22% by 2030.

Generation by fossil fuels (natural gas, coal, and petroleum) is set to decline from 69% in 2022 to 41% by 2030. The policies also could expand hydrogen and ammonia use in natural gas and coal co-fired power generation, in difficult-to-electrify end-use sectors, and in advanced carbon capture and storage technology development.

Japan's involvement in global hydrogen and ammonia sectors exemplifies international collaboration aimed at achieving sustainable development goals. Through partnerships with

\$700

Annual fossil fuel investments that should be redirected to energy transition technologies.

institutions like the Africa Finance Corporation (AFC) and direct investments in transformative projects, Japan is making a significant contribution to Africa's energy transition and economic growth.

# Developing a practical framework for decarbonisation, deploying Japanese technology



The world will need around 100 million tonnes of clean hydrogen annually by 2030 to meet the Paris climate targets, and by 2050, this demand will rise to 500 million tonnes every year.

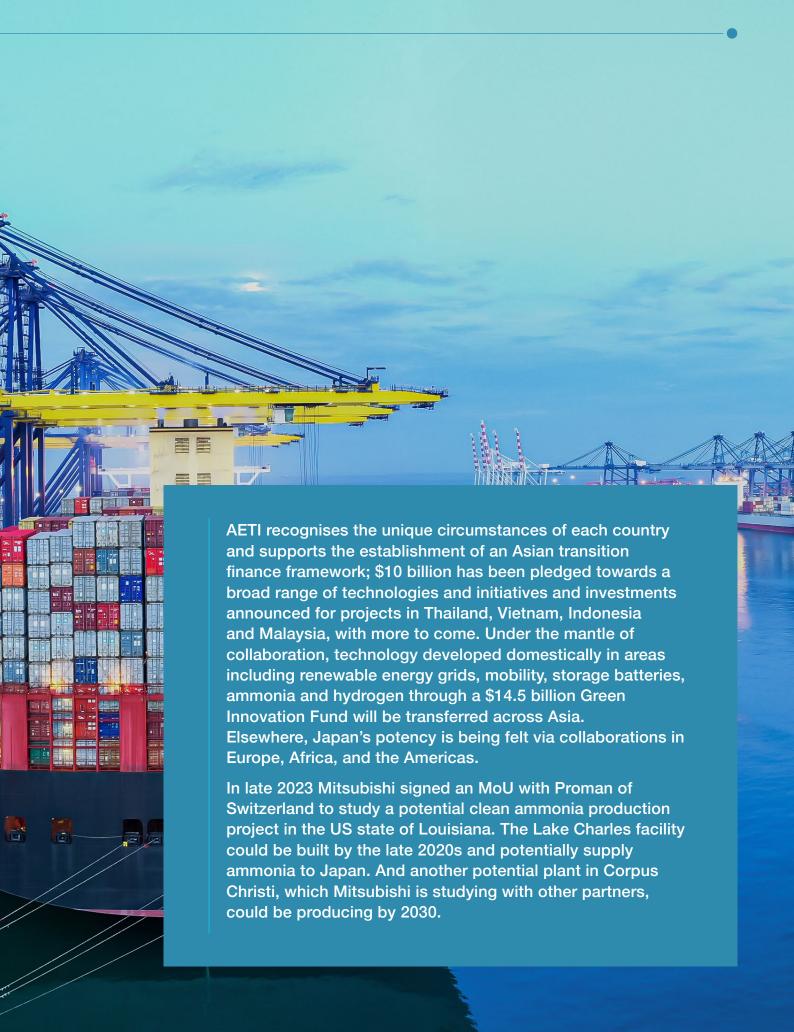
International Renewable Energy Agency Japanese technology has been exporting its products and innovation to the world for generations, transforming lives at an industrial scale as well as domestically, as the daily routines of millions have benefitted. Now the nation's innovations are helping power the decarbonisation goals of numerous countries.

Close historical, cultural and economic ties to countries in Asia, alongside a tangible track record of development assistance and cooperation, place Japan in a strong position to collaborate closely with Asian and Middle Eastern nations to contribute to the regional energy shift. In the UAE, Mitsui is building an ammonia plant in its drive to grow global supply chains of greener fuels.

Due to start production in 2027 with some volumes going to Japan and some other Asian markets, the eastern Abu Dhabi plant is in partnership with TA'ZIZ, owned by ADNOC, Fertiglobe, and GS Energy, of South Korea. The project extends Mitsui's collaboration with ADNOC who have jointly developed and managed an LNG plant since the 1970s.

Japan is on a mission to build on the experience and connections by devising a blueprint for international collaboration and working towards a practical framework together with its regional partners.

The Asia Energy Transition Initiative (AETI), unveiled in May 2021, is central to this strategy. Its aim is to deliver a practical roadmap towards decarbonisation that leverages Japanese technology, systems and know-how, centred around a concept of balancing energy security, environment and economic growth which can inform other territories in their efforts.



Japan's collaborative reach is also being felt significantly in Africa where its key partnership in the continent's transition journey includes a strong focus on developing ammonia as well as hydrogen resources. This was backed by a pledge of \$30 billion for Africa over the course of three years, going some way towards filling the climate financing gap. Within that, Japan Bank for International Cooperation (JBIC) signed a momerandum of understanding (MoU) with the AFC to accelerate Africa's energy transition by financing infrastructure projects involving renewable energy technologies.

Paving the way for future collaborations in Europe, the EU-Japan Green Alliance was adopted in May 2021, putting a particular focus on hydrogen, offshore wind and power market reforms. Both sides have a well-developed energy dialogue covering topics such as natural gas and LNG, energy security, electricity market design, energy technologies and nuclear energy.

# Decarbonising energy-intensive industry through carbon capture

At the heart of the decarbonisation journey, hard-toabate sectors such as steel, cement, refining and chemicals and other energy-hungry industries present both a challenge and an opportunity. The world will continue to need and consume their products, but it requires production to be less carbon intensive. This demands creative solutions that can make a real difference.

Hard-to-abate sectors, also including heavy-duty trucking, shipping and aviation, account for about 25% of the world's energy consumption and around 20% of total CO2 emissions, according to IRENA. Their full decarbonisation will require a combination of approaches while effective emission reduction pathways rely primarily on renewable energy and energy efficiency.

Direct electrification will play an increasing role in multiple applications with some solutions already mature or approaching technological maturity. Examples include electric arc furnaces for steelmaking, battery electric trucks, heat pumps for low to medium temperature heating in



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Close EU-Japan cooperation will be essential for promoting renewable and low carbon hydrogen globally. The market is ready and this is the moment to make some additional efforts to allow it to take off."

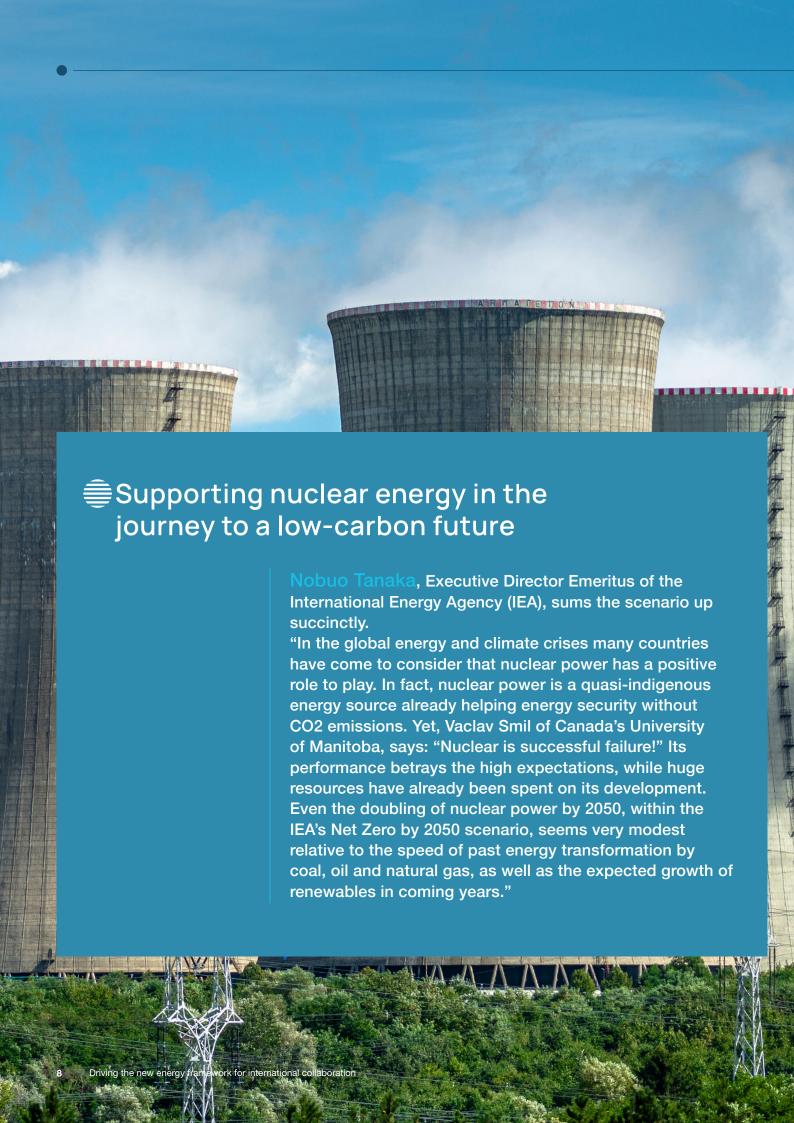
**Kadri Simson** European Commissioner for Energy industry, electric crackers to produce primary chemicals, and electrolysis of iron ores.

Bioenergy and synthetic fuels will also play a key complementary role to electrification and be critical in providing feedstocks for chemicals. These avenues will have to be complemented by continuous energy efficiency improvements, circular economy activities such as recycled steel. In the meantime, emissions can be further reduced through the application of CO2 capture, utilisation and/ or removal measures, although these technologies need to achieve the necessary improvements in performance and economics to make them technically scalable and economically viable.

In the case of coal-fired power stations, the Japanese government and coal industry have presented the use of ammonia as a low carbon fuel for co-firing. By retrofitting plants to burn ammonia, a derivative of hydrogen, the fuel can be combusted alongside coal to generate power as it does not result in direct carbon emissions when combusted. Although this remains a nascent technology, Japan is championing ammonia co-firing as part of its power sector decarbonisation strategy, domestically and across Southeast Asia, as a means of reducing emissions from coal plants without retiring them.

In the move to transitioning the industry, shipping and heavy road transport, e-methane is being viewed as a solution. This synthetic gas is produced from renewable hydrogen and recycled CO2 and presents several advantages, such as converting non-storable electricity into storable renewable gas and recovering the CO2 released by industrial sites or extracted from biogas during the purification phase. As a substitute for natural gas, it has domestic and industrial applications and can be used in road and sea transport.

Japan is now making a renewed push for the development of its hydrogen/ammonia economy. It is targeting consumption of 20 million tons per year by 2050 with a goal of hydrogen and ammonia making up 1% of the country's primary energy mix by 2030. Hence, there is now heightened attention on Japanese energy policy and regulatory change with key market players watching closely for emerging investment opportunities.



### Intensifying cooperation on hydrogen and ammonia to accelerate deployment of new projects and technologies



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This transition will take longer and longer as the speed of transformation gets slower and slower. So now what we are trying to see happen is making the share of renewables in the energy mix increase at a much faster speed than any of the traditional fuels."

### Nobuo Tanaka

Executive Director Emeritus of the International Energy Agency

Clean hydrogen is seen as part of the solution in the industry's collective quest to achieve net-zero emissions by 2050. According to the International Renewable Energy Agency (IRENA), the current global production of pure hydrogen stands at around 75 million tonnes a year, equivalent to 3% of the global final energy demand and the annual energy consumption of Germany. The world will need around 100 million tonnes of clean hydrogen annually by 2030 to meet the Paris climate targets, and by 2050, this demand will rise to 500 million tonnes every year.

Therefore, global partnerships are crucial to expand production capacity worldwide and overcome infrastructural challenges that pose significant roadblocks.

In June 2024, Japan and the EU agreed to cooperate on hydrogen standards and regulatory requirements. It came during a High-Level Hydrogen Business Forum to deepen cooperation for hydrogen business and technology development in the framework of the EU-Japan Memorandum of Cooperation on Hydrogen.

Speaking earlier at the keynote address of the Japan Energy Summit and Exhibition 2024, Kadri Simson, the EU Commissioner for Energy, said: "Hydrogen will be an internationally traded commodity. So, close EU-Japan cooperation will be essential for promoting renewable and low-carbon hydrogen globally and a gradual convergence of high-standard rules ... This is an exciting time for EU-Japan energy relations. Japan is clearly positioning itself as a key player in the global shift towards cleaner and sustainable energy sources. So too is the EU. And together, there is so much we can achieve. Let's continue building ever stronger energy relations and business ties for more prosperous economies, and a cleaner, greener planet."

Collaborative projects involving Japan can be a template for collaboration elsewhere in the world.

### Japan leading the charge in the advancement of renewables, energy efficiency and cleaner fuel sources



Existing and future collaboration with other countries and territories will ensure development of supply chains and a broader economy for emerging commodities such as hydrogen and electric natural gas (e-NG), a synthetic natural gas produced from renewable hydrogen and CO2.

### It is evident that Japan is surging ahead with its role

in the energy transition – at home and overseas. Whether by the need for energy security in a changing world or feeding the global goal of a net-zero future, the country is highly motivated to pursue energy efficiencies, develop cleaner fuel sources, and scale the production and use of renewables.

Existing and future collaboration with other countries and territories will ensure development of supply chains and a broader economy for emerging commodities such as hydrogen and electric natural gas (e-NG), a synthetic natural gas produced from renewable hydrogen and CO2. A marriage of proven knowledge, dynamic collaboration and committed investment will continue to make Japan a leader of the pack in the new energy frontier.

It is clear that Japan is surging ahead with its role in the energy transition - both at home and overseas. IEA Executive Director Emeritus Nobuo Tanaka says: "We also need to bear in mind the broader context of the transition and understand that energy transformation needs longer time. As distinguished scholar and professor Vaclav Smil has put it, 'Every iteration of the energy transition is expected to take a longer and longer time'. First, for coal to replace wood, and then for oil to replace coal, and then natural gas to replace oil and other sources. This transition will take longer and longer as the speed of transformation gets slower and slower. So now what we are trying to see happen is making the share of renewables in the energy mix increase at a much faster speed than any of the traditional fuels."

"Adding another decade to the energy transition and reaching net zero would certainly help with a better transformation of the energy sector as well as preparing for the adaptation, but do we have that time? While being pragmatic, we have to be aware that the risk is lurking, and we cannot be complacent. We have to do our best to innovate and to put our investment into the necessary areas as quickly as possible."



The climate crisis doesn't discriminate. It is

the challenge of our age and is faced by all, regardless of culture, creed, social conditions or economic circumstances. While there is no one solution for every nation, dialogue is a common denominator and cooperation can become the most impactful language that unites regions on the pathway to decarbonisation.

Amid that scenario, Japan understands and believes the drive for decarbonisation can also be a driver of growth that aims to address social issues while creating a morally sustainable circle of growth and energy distribution. Its industries, companies and evolving solutions are primed to contribute significantly to the global mission for a sustainable, secure energy future, bringing knowledge as well as technical and financial value to the largest transformation of our time.

The case studies in the following pages reflect that belief, demonstrating how Japan's energy ecosystem is a vital part of driving the new energy framework for international collaboration.

### **CASE STUDY 1**

# EU-Japan partnership spurs clean energy momentum

BANKING ON CLEAN
HYDROGEN AND LNG
TO MEET CLIMATE GOALS

Global partnerships are crucial to build production capacity worldwide and overcome infrastructure challenges. A recent partnership between Japan's New Energy and Industrial Technology Development Organisation (NEDO) and Europe's Clean Hydrogen Partnership is a major milestone in this regard as it aims to accelerate the deployment of hydrogen technologies to create a global hydrogen market and contribute to carbon neutrality.



### PROJECT DETAILS

# Harnessing the power of the lightest element through partnerships

Japan's New Energy and Industrial Technology Development Organisation (NEDO) and the Clean Hydrogen Partnership, a public-private initiative that fosters research and innovation in hydrogen technologies across Europe, are working together to accelerate the deployment of hydrogen by exploring synergies and promoting joint research and demonstration projects. The partnership aims to facilitate greater cooperation between research institutions and industries in Japan and Europe, enhancing the collective capacity for hydrogen production and unlocking new opportunities for the industry.

Japan has been proactive in establishing such collaborations in Europe, marking this as the second significant partnership this year. In February, the Japan Organization for Metals and Energy Security (JOGMEC) signed a memorandum with Hamburg-based H2Global to advance a clean hydrogen society. JOGMEC, a key Japanese governmental body, actively supports hydrogen production and utilisation.

Japan and the European Union are also involved in multiple other partnerships, including the High-Level Hydrogen Business Forum, the Green Alliance, the Japan-EU Summit, the EU-Japan Memorandum of Cooperation on Hydrogen, and the Japan-EU High-Level Economic Dialogue.

The growing pace of engagement points at the urgency of finding solutions and overcoming barriers for adoption of green hydrogen – a field in which the expertise of Japanese companies is much sought after.

>1%

Percentage of hydrogen sourced from non-fossil fuel sources in 2022

14%

Desired percentage share of green hydrogen in the total energy consumption by 2050 5,500gw

Amount of cumulative installed electrolyser capacity needed by 2050 to meet green hydrogen demand

25,000

Number of new wind turbines needed in Europe to meet the electricity demands of electrolysers by 2030

## **■Organisations** involved

- Europe's Clean Hydrogen Partnership
- Japan's New Energy and Industrial Technology Development Organization (NEDO)
- Japan Organization for Metals and Energy Security (JOGMEC)
- H2Global

### **≣Industry**

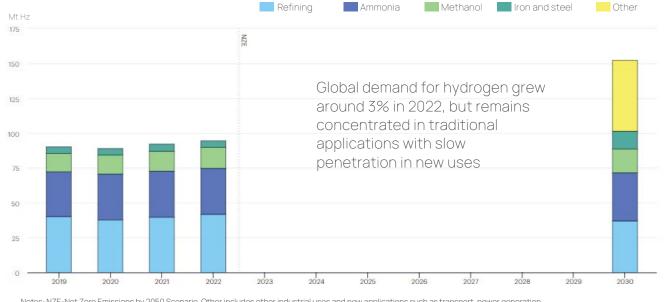
Green hydrogen, clean energy

**■**Location

Europe and Japan

### Global hydrogen demand by sector in the Net Zero Scenario \_

2020-2030



Notes: NZE-Net Zero Emissions by 2050 Scenario. Other includes other industrial uses and new applications such as transport, power generation, buildings and high-temperature heat in industry.

Source: IEA

The global clean hydrogen market presents substantial opportunities for decarbonising hardto-abate sectors and reducing greenhouse gas emissions. While energy efficiency, electrification and renewables can achieve 70% of the mitigation needed, hydrogen will be needed to decarbonise end uses where other options are less mature or more costly, such as heavy industry, longhaul transport and seasonal energy storage. Also, unlike traditional energy sources, green hydrogen provides a means to store and transfer energy without releasing harmful pollutants, making it crucial for a sustainable net-zero future. Considering these applications, hydrogen could contribute 10% of the mitigation needed to achieve the IRENA 1.5 degree Celsius scenario and 12% of final energy demand.

# Energy security and global LNG architecture

Apart from hydrogen, as two of the largest importers of LNG, the EU and Japan agreed to establish an energy security dialogue on global LNG architecture in 2023, in order to step up cooperation and develop secure and transparent

global markets, while reducing methane emissions in line with the Global Methane Pledge.

The dialogue focuses on three pillars: global security of supply, transparency of markets and reduction of methane emissions in the LNG supply chain, reinforcing the EU's strategic energy partnership with Japan. The dialogue will facilitate collaboration on a global early warning system, while the EU and Japan will build on their decadelong expertise in developing resilient energy security policies to pre-empt and eventually tackle energy crises.

The EU will also share its security framework, strengthened during the 2022 supply shock, supported by a pan-EU gas storage policy and the gas demand aggregation tool, AggregateEU. In addition to bilateral cooperation, Japan and the EU will pursue engagement with the International Energy Agency (IEA) and proactively contribute to discussions on the IEA's role in the gas sector.

The EU and Japan will also continue collaborating on reducing methane emissions in line with the Global Methane Pledge and the Joint Declaration from Energy Importers and Exporters on Reducing Greenhouse Gas Emissions



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We need to tackle as fast as possible the challenges linked with energy transition and climate changes. The agreement between NEDO and Clean Hydrogen is a game changer. It will strengthen the knowledge and capacity of scientific and industrial sectors along the value chain and will put our research centres and our industries on a fast track."

Valerie Bouillon Delporte Executive Director of the Clean Hydrogen Partnership from Fossil Fuels. Through this framework, they will cooperate on monitoring, reporting and verification of methane emissions and promote abatement measures, contributing also to enhancing energy security globally.

### THE WAY FORWARD

The strengthening EU-Japan energy partnership aims to deliver a more secure and sustainable energy future for the world and demonstrates Japan's key role in finding global solutions to energy challenges.

As frontrunners in hydrogen technology, for instance, the EU and Japan will work together for sustainable and affordable production, trade, transport, storage, distribution and use of renewable and low-carbon hydrogen. This is significant in light of key hurdles to mass production of green hydrogen – such as high costs, regulatory constraints, limited renewable energy availability, and insufficient infrastructure. Coordinated investment and supportive policies are vital to providing the incentives needed to scale green hydrogen from niche technology to a global solution. Japan's efforts to collaborate with European governments represent a significant step in this direction. By addressing these challenges and taking collective action, Japan is at the forefront of facilitating the transition to a low-carbon economy and helping achieve climate targets.

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- $5 \hbox{--https://www.offshore-energy.biz/eu-and-japan-step-up-hydrogen-cooperation/}\\$

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### **CASE STUDY 2**

# Building pathways for a swifter energy transition

HYDROCARBONS TO HYDROGEN: JAPAN AND THE UAE DEEPEN COOPERATION

Japan has long been a major importer of oil, with the Middle East supplying the majority of its needs. As of 2023, nearly 95% of Japan's crude oil imports came from the Gulf Cooperation Council (GCC), with 43% sourced specifically from the UAE. However, the strategic partnership between Japan and the UAE has expanded beyond traditional hydrocarbon dependencies, evolving into a deeper relationship in recent years. Both nations are collaborating to explore energy transition pathways and promote cleaner use of fossil fuels. Japan's focus on renewable energy, technology, and innovation aligns with its goal of paving the way for a more sustainable and mutually beneficial economic future with the UAE.



# PROJECT DETAILS Investing in new energy technologies

In recent years, Japan has shifted towards developing pathways for energy transition in response to global climate change commitments and its own energy requirements. The country has partnered with public and private entities across various regions to advance its green agenda and secure energy supply chains.

In the Middle East, Japan has strengthened its ties with the UAE through a series of high-profile visits, investments, and collaborations. Japanese Prime Minister Fumio Kishida's visit to the Middle East in July 2023 marked a significant milestone. During this visit, Japan signed 23 agreements with the UAE, focusing on energy, technology, and advanced industries. Among these agreements were collaborations on hydrogen and ammonia production, which are crucial to Japan's energy diversification strategy.

Hydrogen and ammonia hold significant potential in a net-zero economy as both emit no carbon at the point of use. These fuels are versatile and can be produced and utilised in various ways, including from renewable sources, and applied to decarbonise challenging sectors such as heavy transport, industry, and heat, as well as for energy storage and transport.

For now, both fuels face challenges that require technological advancements, including in their generation, storage, and utilisation, particularly concerning the costs involved in achieving net-zero lifecycle emissions. Continued research, development, demonstration, and deployment are needed to determine where hydrogen and ammonia can effectively make a practical difference.

As technology advances, the International Energy Agency (IEA) predicts that global underground hydrogen capacity will grow

75%

Percentage share of hydrogen in the elemental mass in our universe

200,000%

Percentage increase in the underground hydrogen capacity globally in the next 30 years

20-30%

Percentage of hydrogen volume that can lead to a 7–11% decrease in CO2 emissions

\$224 bn

Estimated global demand for ammonia by 2050

# **■Organisations** involved

- Japan Bank for International Cooperation
- Japan External Trade Organisation
- Africa Finance Corporation
- IHI Corporation
- Emirates National Oil Company
- ADNOC
- Masdar
- JERA
- Tsubame BHB
- Sumitomo Corporation
- Mitsui

### **≣Industry**

Hydrogen and ammonia

■**Location** 

Japan and UAE

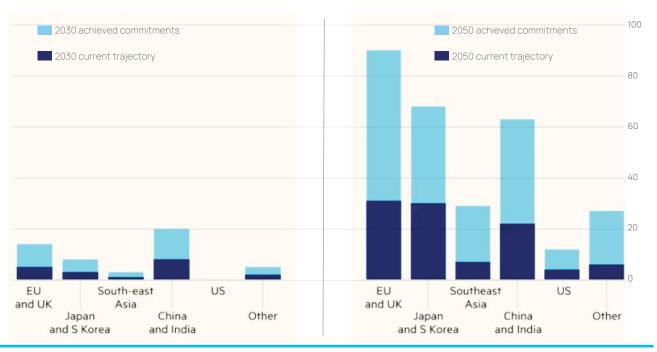
**≣Cost** 

Multi-billion dollars across several projects



### Cross-border hydrogen trade forecasts \_

Megatonne of hydrogen equivalent



Source: McKinsey and Hydrogen Council Global Hydrogen Flows

by more than 200,000% in the next 30 years, reaching 1,200 TWh in 2050. That amount of energy can power 70,000 US homes for an entire year, underscoring the untapped potential that lies within hydrogen.

Japan is eager to develop green hydrogen and ammonia with the UAE and has invested in various partnerships and collaborations. In 2021, Japan signed a pact with the UAE to explore hydrogen production and establish an international supply chain. This was followed by a November 2022 agreement between Japan's IHI Corporation and Dubai-based Emirates National Oil Company (ENOC) to produce green ammonia and low-carbon hydrogen. Further advancing this collaboration, a July 2024 agreement saw a \$3 billion green financing deal between the Japan Bank for International Cooperation (JBIC) and ADNOC, aimed at reducing emissions and supporting ADNOC's low-carbon initiatives.

The Japan-UAE Collaboration Scheme for Advanced Technology, initiated in January 2023,

is a key component of this bilateral relationship. This scheme focuses on integrating Japanese technology with UAE resources to foster innovation and sustainability. The agreement includes partnerships between Masdar, JERA, and Japanese companies such as Tsubame BHB and Sumitomo Corporation, working on projects ranging from waste-to-energy to carbon capture.

### The way forward

For Japan, reducing reliance on traditional hydrocarbon imports and investing in renewable energy sources is vital for enhancing energy security and achieving its 2050 net-zero carbon target. The UAE's progress in green hydrogen and ammonia production aligns well with Japan's energy diversification objectives.

In June 2024, ADNOC shipped thousands of tonnes of blue ammonia to Mitsui in Japan for power generation, marking the world's first certified bulk commercial shipment of blue ammonia.

This shipment was certified as "low-carbon" by the



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The Global Green Energy
Hub intends to combine
the respective strengths
of our two countries: the
geographical advantages,
low-cost renewable
energy resources and
strong investment
capacities of the UAE and
the Middle East on one
hand; and the cuttingedge decarbonisation
technologies of Japan on
the other."

**Fumio Kishida**Prime Minister of Japan

German certification body TÜV SÜD, which introduced its standard for blue hydrogen and its derivatives late last year. This standard requires the production process to emit 70% fewer greenhouse gases compared to a benchmark of 94g of CO2-equivalent per megajoule at lower heating value, a measure of the energy content of hydrogen or its derivatives.

It is collaborations like this that raise hopes for the global scaling of new energy technologies and infrastructure. Japan's technological expertise in areas such as energy efficiency and carbon capture complements the UAE's ambitions to lead in clean energy. Collaborative projects not only aid in achieving shared environmental goals but also drive innovation and technological advancement.

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### **CASE STUDY 3**

# Japan's critical role in advancing Africa's hydrogen and ammonia economy

# INVESTING IN PARTNERSHIPS FOR A GREENER TOMORROW

As the most abundant and energy-dense element in the universe, hydrogen has emerged as a kingmaker in the increasingly complex equation to lower greenhouse gas emissions – with significant impact across multiple sectors such as power and heat, energy storage, and transport. Ammonia, a compound of hydrogen and nitrogen developed a century ago with the world on the brink of a food crisis, is being increasingly seen as the enabler of the hydrogen economy and a catalyst for global net-zero goals.

This is especially true of Africa – a continent that despite its abundant energy resources attracts only about 3% of global energy investment.

Developing green hydrogen and its derivatives such as green ammonia, is vital for Africa's energy transition, as



these resources can be used as feedstocks for low-carbon industries, zero-carbon fuels for shipping and aviation, and energy carriers that can be converted back into electricity. However, achieving this potential requires substantial financing.

PwC estimates that transitioning Africa's power sector to carbon neutrality and achieving universal access to electricity would cost \$2.6 trillion, nearly equivalent to Africa's current GDP.

That's why Japanese partnerships and investments in Africa to develop the continent's hydrogen and ammonia sectors are a model of international collaborations aimed at achieving sustainable development goals. Japan, through partnerships with institutions like the Africa Finance Corporation (AFC), and direct investments in transformative projects, is significantly contributing to Africa's energy transition and economic growth.

# PROJECT DETAILS Japan helps bridge Africa's clean energy gap

Japan has positioned itself as a pivotal partner in Africa's transition to renewable energy, with a strong focus on developing hydrogen and ammonia resources. The collaboration between Japan and African institutions gained further momentum at the eighth Tokyo International Conference on African Development (TICAD), where Japanese Prime Minister Fumio Kishida pledged \$30 billion to the African continent over the course of the next three years.

As a part of that commitment, in May 2023, the Japan Bank for International Cooperation (JBIC) signed a landmark Memorandum

3 %

Percentage of global spending on energy in Africa<sup>(1)</sup>

### 40 Megatons

Expected amount of hydrogen to be exported by Africa by 2050<sup>(7)</sup>

# 400-600 Mt per year

Projected global growth in demand for hydrogen by 2050<sup>(6)</sup>

### \$30 billion

Amount of public and private financial contributions to Africa pledged by Japan until 2026<sup>(5)</sup>

## **■Organisations** involved

- Japan Bank for International Cooperation
- Japan External Trade Organisation
- Africa Finance Corporation
- Hive Energy
- Sasol
- Mitsubishi UFJ Financial Group
- Mitsui OSK Lines

### **≣Industry**

Hydrogen and ammonia

■**Location** 

Africa

Cost

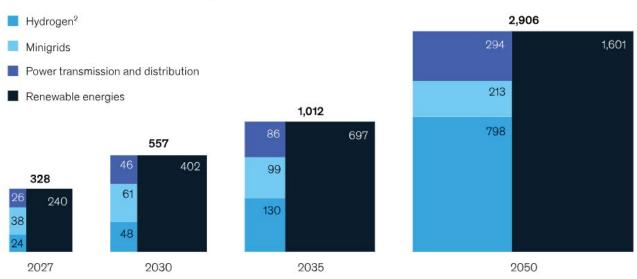
Multi-billion dollars across several projects



### Just under \$3 trillion of cumulative expenditure

Would be required to shift Africa's energy landscape

### Cumulative expected investment, \$ billion



<sup>1</sup> In Africa in Achieved Commitments scenario

<sup>2</sup> Hydrogen assets the related renewables build-up (47%), electrolyzer and production assets (31%), and transmission and distribution (22%)

Source: McKinsey & Company

of Understanding (MoU) with AFC to accelerate Africa's energy transition by financing infrastructure projects involving renewable energy technologies such as green and blue hydrogen, ammonia, and carbon capture and storage (CCS).

Such Japanese partnerships have helped Africa tackle a significant shortfall in climate financing. According to the International Energy Agency (IEA), energy investment needs to double to more than \$200 billion per year by 2030 for African countries to achieve their energy-related development goals, including universal access to modern energy and full compliance with their nationally determined contributions (NDCs).

Since its inception in 2007, the AFC has played a crucial role in advancing this agenda in terms of infrastructure, energy projects, and climate finance across Africa, with investments totaling \$11.5 billion. Japan has been an important partner for AFC in fulfilling this mission: in 2022, AFC successfully closed a \$389 million dual currency Samurai term loan facility, its second foray into the Japanese capital markets. With AFC providing the

gateway to the continent, Japanese companies have helped realise several projects.

### South Africa-Japan Green Hydrogen Partnership

Another example of Japan's global energy collaboration is its partnership with South Africa, which aims to invest R300 billion (around \$16.1 billion) over five years, marking a significant commitment to South Africa's green hydrogen sector. The partnership focuses on leveraging South Africa's abundant platinum-group metals (PGMs) to develop large-scale hydrogen technologies and could be pivotal in advancing energy-related projects in the country, including hydrogen corridors for freight transport and the Boegoebaai Green Hydrogen Special Economic Zone (SEZ).

South Africa needs nearly \$18 billion annually to meet its net-zero goal by 2050 and \$29 billion per year to meet its NDC target by 2030, according to the Climate Policy Initiative. Japan's MoU with South Africa will facilitate rapid progress in the



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Partnerships with like-minded financial institutions like JBIC are critical in mobilising the capital and expertise needed to achieve a pragmatic path to net zero in Africa. Through this collaboration, we envision a transformative alliance that harnesses the expertise, resources, and innovative financing solutions, to drive a greener future for the continent whilst advocating for African industrialisation."

### Sanjeev Gupta

Executive Director & Head of Financial Services, Africa Finance Corporation

energy sector, with local companies like Hive Energy and Sasol securing investments from Japanese entities. These projects are expected to create significant job opportunities and advance hydrogen technology. The Hive Hydrogen project, with a projected investment of \$5.9 billion, aims to produce green ammonia and is drawing interest from major Japanese firms such as Mitsubishi UFJ Financial Group and Mitsui OSK Lines.

### THE WAY FORWARD

Africa stands at a crucial crossroads in its developmental trajectory, and energy will play a pivotal role in shaping its future. Maximising the benefits of Africa's clean energy potential will require action on multiple fronts, including industrial policies, energy systems, domestic markets, regional cooperation, and international partnerships.

Japan's leading role in Africa's hydrogen and ammonia sectors exemplifies international collaboration aimed at achieving sustainable development goals. With partnerships with institutions like the AFC and direct investments in transformative projects, Japan is making a significant contribution to Africa's energy transition and economic growth. As these initiatives continue to develop, they promise to reshape Africa's energy landscape and establish the continent as a leader in renewable energy innovation.

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### **CASE STUDY 4**

# Striking a global decarbonisation partnership to accelerate e-NG adoption

# EXEMPLAR OF FUTURE CLEAN ENERGY SOURCES

The year 2050 stands as a pivotal milestone for two crucial reasons: the global economy is projected to soar to \$250 trillion, a significant leap from its current state of just over \$100 trillion. Also, 2050 marks the target year for several countries worldwide to achieve net zero emissions

Balancing climate goals with economic growth requires investments and innovation in energy, and Japan's decarbonisation strategy – which depends on natural gas both as a transition fuel and in decarbonised forms – is an exemplar of future clean energy sources.

Natural gas will play an important role in Japan's 2030 energy transition, according to the Ministry of Economy, Trade and Industry (METI). While moving existing oil and coal production to natural gas will take



care of 3% of Japan's 2030 CO2 reduction goals, switching to natural gas in the industrial sector could account for another 5% reduction.

Recent collaborations among global players such as Itochu Corporation and Tree Energy Solutions (TES) to develop alternative fuels, especially electric natural gas (e-NG), a synthetic natural gas produced from renewable hydrogen and CO2, as well as TES' partnership with Saibu Gas to advance the adoption of e-NG as a clean energy solution, demonstrate major opportunities to pursue energy growth without harming the environment.

# PROJECT DETAILS Advancing green energy

Earlier this year, TES, a global leader in the production of e-NG, announced a strategic collaboration with Japan's Itochu Corporation to drive the adoption of e-NG to decarbonise hard-to-abate sectors. The collaboration between Itochu and TES represents a major advancement in developing innovative solutions for global decarbonisation through e-NG, a green molecule obtained by combining green hydrogen with biogenic or recycled CO2.

The partnership is in line with Itochu's target to reduce GHG emissions by 40% from 2018 levels by 2030 and achieve net zero GHG emissions by 2050. Actively seeking businesses that contribute to emission reduction, Itochu's commitment aligns seamlessly with TES' mission to establish a supply chain of e-NG to usher in a low-carbon economy.

Key areas of collaboration include potential long-term offtake agreements to supply e-NG to low-carbon fuel users, primarily in

2.5 Mt

Amount of carbon emissions avoided annually by 2030 by use of e-NG

96%

Percentage drop in carbon emissions, if fossil fuels are replaced by e-NG 26%

Share of natural gas in the global energy mix by 2050

5.36 Tcm

Global natural gas demand by 2050

# **■Organisations** involved

- Tree Energy Solutions (TES)
- Itochu Corporation
- TotalEnergies
- Engie
- Mitsubishi
   Corporation
- Osaka Gas
- Sempra Infrastructure
- Tokyo Gas
- Toho Gas

### **≣Industry**

Logistics, supply chain, heavy industry, energy

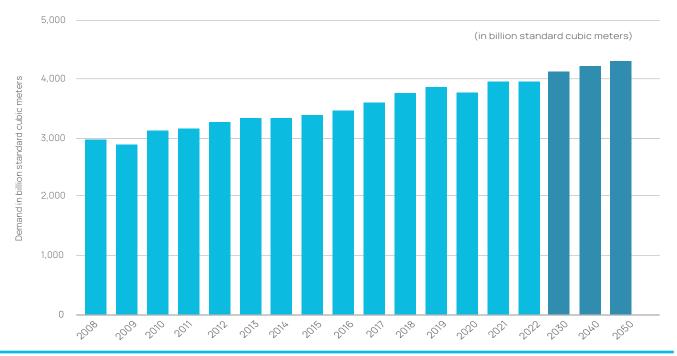
### **■**Location

Global with focus on North America, Europe, and Japan



### Natural gas has an important role in global energy transiition.

Demand for natural gas worldwide from 2000 to 2050



Source: Statista 2024

Japan, leveraging Itochu's existing investments in green hydrogen production companies. The agreement also includes exploring potential opportunities to produce and promote e-NG utilising CO2 emissions from hard-to-abate sectors in North America.

"We embark on this journey with great enthusiasm ... Together, we are poised to unlock new possibilities, scale up e-NG production, and drive meaningful change in tackling the most challenging aspects of emissions reduction," said Daisuke Inoue, Executive Officer, Chief Operating Officer, Metals & Minerals Resources Division at Itochu Corporation.

According to Marco Alverà, CEO and Co-Founder of TES, the collaboration marks a significant milestone in its efforts to develop a global portfolio of e-NG projects and strategically expand into the Japanese energy market. "Japan is a crucial frontier in our growth strategy for e-NG, and partnering with Itochu will undoubtedly speed up our journey to deliver reliable and affordable green molecules," he said.

### Clean molecules for Japan's city gas supply

In yet another milestone partnership in the same sector, TES also joined forces with Saibu Gas, a leading Japanese gas utility, in August to advance the adoption of e-NG as a clean energy solution. This collaboration aligns with Japan's ambitious target of achieving 90% e-NG usage in its city gas supply by 2050. As a part of the strategic partnership, TES will work with Saibu Gas to enhance the stability and cleanliness of the energy provided in Japan's city gas supply chain. Central to this initiative is the exploration of a long-term e-NG offtake contract, allowing Saibu Gas to purchase e-NG produced by TES.

Both the collaborations are poised to unlock new possibilities, scale up e-NG production, and drive meaningful change in tackling the most challenging aspects of emissions reduction while enabling the engines of economic growth.



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This collaboration marks a significant milestone in our efforts to develop a global portfolio of e-NG projects and strategically expand into the Japanese energy market. Japan is a crucial frontier in our growth strategy for e-NG, and partnering with Itochu will undoubtedly speed up our journey to deliver reliable and affordable green molecules."

# Marco Alverà Chief Executive Officer and Co-Founder of TES

### THE WAY FORWARD

Decarbonising energy extends beyond production – and partnerships such as these not only support Japan's carbon neutrality goals but also mark a significant step in establishing an international supply chain for e-NG. By integrating e-NG into Japan's energy landscape, the collaborations aim to foster a sustainable value chain that contributes to the country's climate objectives while ensuring a reliable supply of clean energy.

With e-NG's entire lifecycle estimated to emit about 3.5 grams of CO2 equivalent per megajoule, significantly lower than the 94 grams of CO2 equivalent per megajoule emitted by fossil fuels, these collaborations offer hope for a swift transition to green energy and the decarbonisation of heavy industries in Japan and around the world. Japan's approach provides valuable lessons for the industry in developing innovative solutions for global decarbonisation, and offers a strong model for stakeholders to follow.

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# First Executive Committee meeting of Japan Energy Summit and Exhibition 2025

Looking ahead to Japan's updated Strategic Energy Plan



Japan's highly anticipated review of its Strategic Energy Plan due early next year will chart the way forward in ensuring a stable supply of non-carbon energy as it transitions towards a more sustainable, secure and diversified energy supply mix for the future. With a strategic focus on achieving carbon neutrality by 2050, the ambitious review is expected to accelerate investment in renewable capacity, encourage increased use of nuclear energy, and advocate optimised use of fossil fuels for electricity generation.

Taking place in the weeks immediately after the expected update to the Strategic Energy Plan, the 7th Japan Energy Summit and Exhibition that is scheduled to run from 18 - 20 June 2025 is uniquely positioned as the only commercially focused platform in Japan that will chart the future pathway of the energy industry towards a more sustainable future and showcase Japan's global leadership in

low-carbon technologies and solutions.

That was the prevailing view from the first Executive Committee meeting of Japan Energy Summit and Exhibition 2025 that took place in Tokyo in August, with committee members looking forward to a new era of partnerships and alliances, investments in energy transition innovation and infrastructure, and new policy frameworks that the updated Strategic Energy Plan will herald.

From Japan's historical reliance on imported gas and LNG as a cornerstone of the country's energy transition, to the surging power market in Asia, the development of sustainable marine fuels, and the role of carbon credits in shaping a low-carbon future, the meeting discussed and dissected strategies to position Japan Energy Summit and Exhibition 2025 at the forefront of accelerating Japan's energy transition through innovation and global connections.

The key focus areas of the deliberation included:

- Japan's regional and global leadership in the energy sector and its contribution to the global energy transition through initiatives such as AZEC and championing the adoption of LNG.
- The great restart of Japan's nuclear ambitions, leveraging the country's expertise in collaborating with large reactor set-ups around the world as well as focusing on SMRs and Nex-Gen nuclear technology.
- How to overcome the decarbonisation challenge in heavy industries and the manufacturing sector through partnerships and working with supply chains.
- Addressing energy storage and grid integration with improved storage technologies and supporting the ambition for an Asian super-grid infrastructure like in Europe that will ensure uninterrupted and efficient distribution of energy across the continent.
- The role of natural gas and LNG as an effective transition fuel, offering a lower-carbon source of baseline power production to balance intermittency issues usually associated with the widespread use of renewables.

# Why the global industry must attend Japan Energy Summit & Exhibition 2025

In interviews conducted during the first gathering of the Executive Committee for Japan Energy Summit & Exhibition 2025, here are what members said about the event:





We are looking forward to Japan Energy Summit & Exhibition 2025 as it takes place after the review of Japan's Strategic Energy Plan is completed and pathways identified for the transition to a low-carbon economy by 2050 – creating huge opportunities for the private and public sector in Japan and around the world for further collaboration in the journey towards net zero.

### Nobuo Tanaka

Executive Director Emeritus, International Energy Agency & Chair of Executive Committee, Japan Energy Summit & Exhibition 2025





With Japan leading global decorbonisation efforts in technology, market development and finance, the Japan Energy Summit & Exhibition is great opportunity for the industry and all global stakeholders to discuss collaboration and partnerships around the world and fully understand Japan's progress in the energy sector.

### Kohei Toyoda

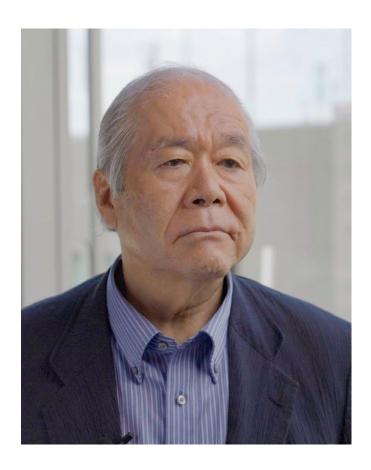
Director General for Energy Transformation Strategy, Japan Bank for International Cooperation (JBIC) & Japan Energy Summit & Exhibition Executive Committee member 2025

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The Japan Energy Summit & Exhibition covers a wide spectrum of topics in the energy sector, not only for fossil fuels but also about decarbonisation across new fields that can give participants a better sense of how the energy transition actually works. This event is a major milestone in our collective energy transition journey.

### Shigeru Muraki

President, Clean Fuel Ammonia Association, Japan Energy Summit & Exhibition Executive Committee member 2025







As one of the world's largest energy markets for more than 50 years and as a leader in decarbonisation, Japan sets the benchmark for many countries around the world, and that's why the Japan Energy Summit & Exhibition is such an important global event for the entire industry.

### Katsumi Kuroda Senior Advisor, Cheniere & Japan Energy Summit & Exhibition Executive Committee member 2025

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It's very important for every industry to have an opportunity to think and work around reducing emissions – and such a big event in Japan is a good opportunity for everyone to focus on this important agenda, not just for the country, not just for the company but for the entire world. And this is very important for Mitsubishi as well.

### Shunsuke Kobayashi

Executive Vice President, Diamond Gas International & Japan Energy Summit & Exhibition Executive Committee member 2025



### Japan Energy Summit and Exhibition 2025 Event Overview

The event offers an enhanced platform to unveil the latest global innovations and technologies. These advancements will play a pivotal role in Japan's efforts to decarbonise the value chain, fostering accelerated growth throughout the energy markets.

The exhibition floor will be an exploratory journey packed with inclusive features and content to maximise the sourcing opportunities across natural gas & LNG, hydrogen & ammonia, low-carbon solutions, ports and shipping, renewable energy, energy efficiency, digitalisation and Al.



### **EXHIBITION**

A showcase of the latest products and solutions from around the world, providing direct into the future of energy.



### STRATEGIC SUMMIT

High-level discussions and policy-making sessions that shape future directions of the energy sector.



### TECHNICAL CONFERENCE

In-depth presentations and seminars on the latest technical advancements, scientific research

and engineering solutions.



### CLIMATETECH ZONE

A dedicated zone for climate technology innovations, at the forefront of climate solutions.



### LEADERSHIP ROUNDTABLES

Government and industry leaders are brought together to discuss and debate the strategies needed to reshape tomorrow's energy ecosystems.



### NETWORKING EVENTS

Curated meetings, gatherings, and networking designed to foster new partnerships and collaborations.

Contact the Japan Energy Summit & Exhibition team today for a tailored proposal to deliver on your company's objectives at the event.



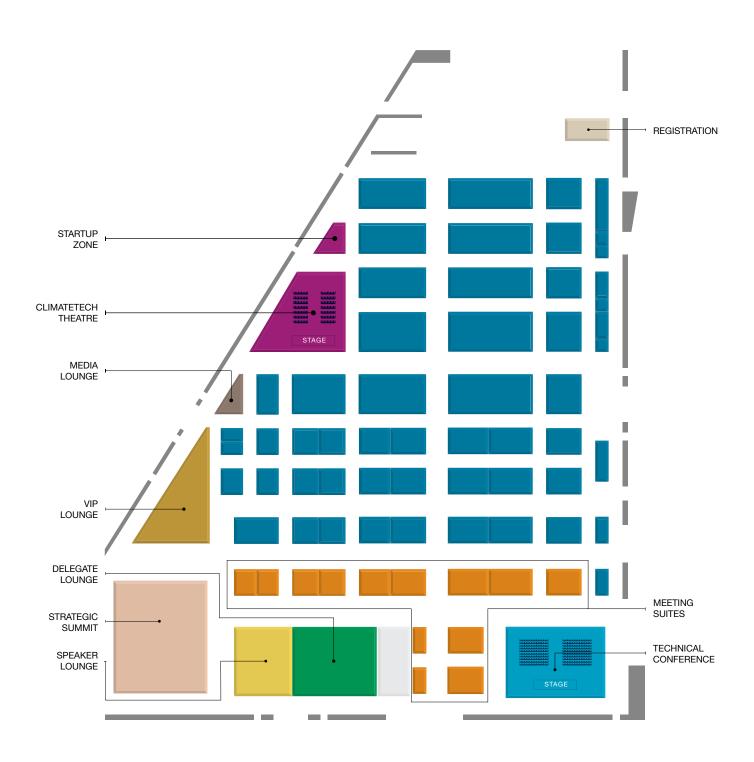
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### A Platform for Collaboration

### The Exhibition

More than 300 exhibiting companies will be showcasing products and solutions that will support the pursuit of their various and practical pathways towards net-zero emissions and carbon neutrality.



# Secure your place at the next edition

Get in touch to discuss your tailored participation

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