Japan’s Carbon-Neutral Scenario &
Asia Energy Transition Initiative (AETI)

September, 2021
Japan’s Carbon-Neutral Scenario
In October 2020, Japan declared **Carbon-Neutral by 2050**.

In April 2021, Japan announced **aiming to reduce its GHG emissions by 46 percent in FY 2030 from its FY 2013 levels, with continued strenuous efforts toward 50 percent reduction**.

### 2019
- **Non-electricity**:
  - Consumer: 110 million ton
  - Industry: 280 million ton
  - Transport: 200 million ton

### 2030
- **Electricity**:
  - Consumer: 2019
  - Industry: 2030
  - Transport: 2030

### 2050
- **Electricity**:
  - Consumer: 2019
  - Industry: 2030
  - Transport: 2030

- **Total GHG emission**: 1.03 billion ton
- **2030 (46% reduction compared to 2013)**
- **2050 = net zero (▲100%)**

**Carbon removal**

- **Decarbonized electricity sources**
- **Hydrogen**
- **Synthesis fuel methanation**
- **Biomass**
- **Electrification**
- **Plantation, DACCs, etc**
For achieving **carbon neutrality in 2050** and a new reduction target for **2030**, the **1st draft of the new Strategic Energy Plan** was compiled in August.

**<Basic Policy>**

**S+3Es (Safety + Energy Security + Economic Efficiency + Environment)**

**~2030**

- Massive introduction of renewable energy as the main energy source
- Thorough **energy efficiency**
- Restart of **nuclear power**
- R&D to accelerate **innovation**.

**2030~2050**

- Electricity sector ➔ Decarbonized power source
- Industry/ transport/ consumer sector ➔ use of hydrogen/ CCUS
- Implementation/scaling up of **innovation** such as **hydrogen** and **CCUS/ Carbon Recycling**.
-Policy responses for 2030 -

- Main policy for 2030 is **Renewable Energy, Energy Efficiency, and Nuclear Power** in order to achieve **46%** GHG emission reduction.

- **Maximum introduction of renewable energy** will be the top priority policy.

- **Further pursuit of thorough energy efficiency**

- **Necessary scale of nuclear power** will be continuously used on the premise of **safety**.

- **Thermal power ratio** representing power generation mix will be lowered as much as possible.

- **Innovation** in the thermal power, by means of **hydrogen/ammonia-fired power generation and CCUS/Carbon Recycling** will be pursued.
Green Growth Strategy -Roadmaps for 2050-

- In order to realize CN 2050, Japan has developed a Green Growth Strategy consisting of R&D support, financial support, and regulatory reform.
- The contents of this strategy will be used to accelerate the energy transition in Asia.

Overview

- Ambitious goals (**Roadmaps**) to induce companies’ investment and fully support the private sector’s efforts
  - Supported by **Government’s Finance, Tax incentives, Regulatory reform**
- Action plans for 14 **growing industrial sectors**
- **Green Innovation Fund** (2 trillion yen)
<table>
<thead>
<tr>
<th>Growth Sector</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Offshore wind, Solar, Geothermal</strong></td>
<td>Form domestic market of 30-45 GW by 2040, and develop <strong>floating technology</strong> for the expansion into Asia. Commercialization of new technologies such as perovskite.</td>
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<td><strong>2. Hydrogen, Fuel Ammonia</strong></td>
<td>Combustion burner. Expand hydrogen use as electric power fuels in addition to automobile. Develop hydrogen power generation turbines.</td>
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<td><strong>4. Nuclear power</strong></td>
<td>Innovation for SMR (Small Modular Reactor), fast reactors, high-temperature gas-cooled reactors.</td>
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<tr>
<td>Growth Sectors</td>
<td>Examples</td>
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<tr>
<td><strong>(5) Mobility and battery</strong></td>
<td>• EV (electric vehicle), FCV (fuel cell vehicle), <strong>all-solid-state lithium batteries</strong></td>
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<tr>
<td><strong>(6) Semiconductor and ICT</strong></td>
<td>• Data centers, energy-saving semiconductors (demand-side efficiency)</td>
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<tr>
<td><strong>(7) Maritime</strong></td>
<td>• Fuel-cell ships, electric propulsion ships, gas-fueled ships</td>
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<tr>
<td><strong>(8) Logistics, people flow and infrastructure</strong></td>
<td>• Smart transportation, drones for logistics, fuel-cell construction machinery</td>
</tr>
<tr>
<td><strong>(9) Foods, agriculture, forestry and fisheries</strong></td>
<td>• Smart-agriculture, wooden skyscrapers, blue carbon</td>
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<tr>
<td><strong>(10) Aviation</strong></td>
<td>• Hybrid electric, Hydrogen-powered, Aircraft</td>
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<tr>
<td><strong>(11) Carbon Recycling, Material</strong></td>
<td>• Concrete, biofuel, plastic materials</td>
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<td><strong>Home/ Office</strong></td>
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<tr>
<td><strong>(12) Housing and building, Next generation energy management</strong></td>
<td>Commercialization of new technologies, distributed energy resources, microgrid</td>
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<tr>
<td><strong>(13) Resource circulation</strong></td>
<td>Biomaterials, recycled materials, waste power generation</td>
</tr>
<tr>
<td><strong>(14) Lifestyle-related industry</strong></td>
<td>Local decarbonization business</td>
</tr>
</tbody>
</table>
Asia Energy Transition Initiative (AETI)
Divestment from fossil fuels

- The World Bank and European financial institutions have announced their tough stance on fossil fuel financing.
- **Asia Development Bank (ADB) is also planning to stop financing oil and natural gas field exploration, and coal-fired capacities.**

**2013:** Stop financing coal  
**2019:** Stop financing upstream oil and gas

**2020:** End to finance oil production with routine venting and flaring (burning excess gas)

**2021:** Stop funding oil, gas and coal projects at the end of 2021

**2021:** **Dirty forms of oil such as shale**
**2025:** Exploration & development of **new oilfields**
**2035:** Exploration & development of **new gasfields**

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**ADB**

**DRAFT (as of August 16th)**

- **ADB will not support any natural gas exploration or drilling activities,** and will be selective in its support for midstream and downstream natural gas.
- **Natural gas projects in all categories must meet all of the following conditions:**
  
  i. No other low-carbon or zero-carbon technology, or combination thereof, can provide the same service at an equivalent or lower cost at a comparable scale.
  
  ii. The project’s operating lifetime is consistent with the carbon stabilization trajectory aiming to **achieve carbon neutrality by about 2050,** or by a time set by DMCs that is consistent with their **nationally determined contributions (NDCs).** The project also avoids long-term lock-in into carbon infrastructure and the associated risk of creating stranded assets.
  
  iii. The project is economically viable considering the social cost of carbon and an operating lifetime consistent with (ii).
Global trend towards net-zero emissions

Opening statement at Climate Adaptation Summit (Jan. 25, 2021)

- In the long term, driving towards net-zero emissions, **no later than 2050 and keeping a 1.5-degree limit within reach**, remain the best policies for climate resilience and adaptation.

Source: IEA World Energy Outlook 2020

Opening statement at Climate Adaptation Summit (Jan. 25, 2021)

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Source: IEA World Energy Outlook 2020
Some European leaders insist that developing countries could easily achieve the carbon neutrality (“leapfrog” over fossil fuels), by means of installing renewable energies.

IEA Net Zero Summit (March 31, 2021)
- The industrializing countries have a “huge potential” to leapfrog straight to clean energy from the fossil fuel-driven model.
- It's true that hydrogen is expensive, but we can bring down the costs by scaling up development, as economies of scale had brought down the cost of wind and solar, and would do the same for hydrogen.

Interview by Forbes (March 15, 2021)
- Oil, coal, and natural gas can play a role, but it is the worst option.
- The developing countries can leapfrog (over fossil fuels) and this has to be a common effort.

Growing energy demand in Southeast Asia

- According to IEA's stated policies scenario (STEPS), overall energy demand in Southeast Asia grows by 60% to 2040. **Fossil fuels still represent approximately 80% of total energy demand in 2040.**

- Similarly, overall electricity demand doubles in the next 20 years in the region. **The importance of fossil fuels remain unchanged, accounting for around 70% of total electricity consumption in 2040.**

Source: IEA Southeast Asia Energy Outlook 2019
Growing energy demand in Southeast Asia

- In the Asia-Pacific region, **IEA expects that fossil fuels will still be an important source of supply**, even if a rapid shift to renewable energy occurs.
- Especially in Southeast Asia, where the access to electricity is still insufficient, **the proportion of coal and natural gas will remain almost unchanged**.

### Source: IEA “World Energy Outlook 2019” Stated Policies Scenario
IEEJ “IEEJ Outlook 2020” as for Vietnam, Thailand, and Indonesia
Renewable energy potentials in ASEAN countries

- In ASEAN countries, **renewable energy resource potentials are unevenly distributed.**
- There are only a limited number of regions where renewable energy can be introduced at low costs.

Source: Lee Nathan et al.(2020), EXPLORING RENEWABLE ENERGY OPPORTUNITIES IN SELECT SOUTHEAST ASIAN COUNTRIES
Joint Statement of the 14\textsuperscript{th} East Asia Summit Energy Ministers Meeting

- The Ministers reiterated the importance of promoting the utilisation of liquefied natural gas (LNG) and development of infrastructure to support LNG markets in the region.
- The Ministers noted the conduct of the LNG Producer Consumer Web Conference 2020.

Joint Statement of the 17\textsuperscript{th} ASEAN+3 Ministers on Energy Meeting

- The Ministers recognised that energy transition in ASEAN is focusing not only on shifting from fossil fuel to renewables, but also to affordable, reliable, and resilient cleaner energy options and technology towards post-pandemic recovery.

Chairman’s Statement of the 23\textsuperscript{rd} ASEAN+3 Summit

- We acknowledged the importance of realistic and pragmatic energy policy by utilising appropriate energy sources and technologies for achieving both goals of economic growth from COVID-19 pandemic and reducing emissions of greenhouse gases.

<Commitment for Asia>

Japan will fully support realistic and sustainable decarbonsation and energy transition initiatives, which are suitable to current situation in Asia.
Roadmap towards carbon neutrality in Asia

- In order to attract foreign investment, it is essential for each Asian country to **(1) declare to achieve carbon neutrality (not requiring its target year)** and **(2) draw its own roadmap** towards carbon neutrality.
  
  ⇒ Japan will support the drafting of roadmaps in collaboration with ERIA.

- Japan will **support projects and activities designated in each country’s roadmaps** towards carbon neutrality, and **present the new concept of “Asian version of Transition Finance”**.

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**Cost minimisation model**

- Drafting each Asian country’s roadmaps towards carbon neutrality based on the assumption that **the cheapest energy sources and technologies will be introduced first**, followed by more expensive ones.
Japan announced “Asia Energy Transition Initiative (AETI)”, which includes a variety of support for the realisation of various and pragmatic energy transitions in Asia.

Asia Energy Transition Initiative (AETI)

1. Support for formulating energy transition roadmaps
2. Presentation and promotion of the concept of Asia Transition Finance
3. US$10 billion financial support for renewable energy, energy efficiency, LNG, CCUS and other projects
4. Technology development and deployment, utilizing the achievement of Green Innovation fund (e.g.) Offshore wind, Fuel-ammonia, Hydrogen etc.
5. Human resource development, knowledge sharing and rule-making on decarbonisation technologies
   - Capacity building of decarbonisation technologies for 1,000 people in Asian countries
   - Workshops and Seminars on energy transitions
   - Asia CCUS network

Announcement of AETI by Minister Kajiyama at Japan-ASEAN Business Week Opening Session
Energy Transition Technologies

To support various and pragmatic energy transitions in Asia, Japan will support potential energy transition technologies as follows:

### Renewable energy/ Energy efficiency

**<Potential Technologies>**
- O&M technologies related to grid stability (Supply-side).
- Energy management technology including storage batteries (Demand-side).
- Energy efficiency in industrial /transportation sector, and buildings.

**<Cooperative approach>**
- Capacity building, Assistance for FS and/or demonstration, Financial support to each project etc.

### Conversion to gas

**<Potential Technologies>**
- Conversion to Gas (Coal to gas, Diesel to gas).

**<Cooperative approach>**
- Capacity building, Assistance for FS and/or demonstration, Financial support to each project etc.

### Co-firing of ammonia/hydrogen

**<Potential Technologies>**
- Co-firing or full-combustion of ammonia or hydrogen.

**<Cooperative approach>**
- Establishing Asia CCUS network etc.

### CCUS

**<Potential Technologies>**
- CCS/CCU (Carbon recycling)

**<Cooperative approach>**
- Establishing Asia CCUS network etc.
On 21st June, the Special Meeting of ASEAN Ministers on Energy and the Minister of Economy, Trade and Industry of Japan was held via video conference.

At the meeting, Minister Kajiyama emphasised that in order to achieve carbon neutrality throughout the world, it is important to steadily promote realistic energy transitions that utilize a wide range of energy sources and technologies, and reflect different circumstances of each country.

Minister Kajiyama also proposed the “Asia Energy Transition Initiative (AETI)” as a Japan’s comprehensive support measure for energy transitions in Asia.

ASEAN countries welcomed Japan’s initiative, and a joint statement which was adopted at the meeting, also included items of Japan’s proposal.

Japan will actively promote and share the importance of steady implementation of energy transitions toward the realization of carbon neutrality and efforts to support such transitions to the world through various opportunities.
Minister Kajiyama’s Statement at the meeting (Summary)

- Japan will actively promote the development of innovative technologies and their implementation in society to achieve carbon neutrality by 2050 and 2030 emission reduction targets. Japan will also **actively contribute to energy transitions and green growth in Asia.**

- **Various and pragmatic energy transitions, which reflect different circumstances of each country and utilise all energy sources and technologies,** are necessary to realise decarbonisation in Asia, where energy demand will continue to grow.

- As international pressure on fossil fuels intensifies, **it is concerned that financing will not be available for the energy infrastructure, which plays an important role for economic growth in Asia. Therefore, in order to attract foreign investment, it is important for each country to declare to achieve carbon neutrality, and develop its own roadmap for its realization.**

- Japan will support realistic energy transitions in Asia, which reflect different circumstances of each country, through **“Asia Energy Transition Initiative (AETI)”**.

- **It is necessary to actively introduce and share idea and efforts for energy transitions in Asia to the world.** The meeting is a starting point to spread these ideas and efforts to the world on the occasion of various international conferences such as ASEAN summit, the G20 and COP26.

- Japan will hold the **Asia Green Growth Partnership Ministerial Meeting in October**, planning to invite ministers from Asian countries including ASEAN, the U.S., Canada, Australia, Middle Eastern countries and others to the meeting.
Joint Statement (Outline)  
“Enhancing Partnerships in Realising Energy Transitions in ASEAN”

1. The Meeting welcomed further collaboration between ASEAN and Japan, including with the Economic Research Institute for ASEAN and East Asia (ERIA).

2. The Meeting recognized that the ASEAN Member States are at various stages of economic development and differing geographical conditions, in order for the realisation of energy transitions.

3. The Meeting noted the unique energy policies of each country, which address energy security, economic competitiveness and environmental sustainability based on each country’s circumstances.

4. The Meeting recognized the energy transition strategies, including but not limited to the expansion of multilateral power trading, development of common ASEAN gas market, the Clean Coal technology (CCT), CCUS, energy efficiency, renewable energy, acceleration of regional energy policy, and nuclear.

5. The Meeting noted the need to improve the utilisation of all energy sources, technologies, information, expertise, and related policies to meet the growing energy demand in ASEAN.

6. The Meeting affirmed the necessity of adequate financing to support the realisation of energy transitions in the region. The Meeting welcomed Japan’s “Asia Energy Transition Initiative (AETI)”, which includes a wide range of support for energy transitions in ASEAN, such as the proposed Asia CCUS Network, and studying the details of the Asia Energy Transition Finance concept.

7. The Meeting noted Japan’s initiative to convene the Asia Green Growth Partnership Ministerial Meeting in October 2021.
In October 4th, Japan will hold the **Asia Green Growth Partnership Ministerial Meeting (AGGPM)**, planning to invite ministers from Asian countries including ASEAN members, the US, Canada, Australia, Middle Eastern countries and others, which share the importance of realistic energy transitions.

Japan will also share the outcomes of the meetings to the G20, COP26 and other related international conferences.

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<tr>
<th>Date</th>
<th>Event</th>
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<tr>
<td>Jun. 21(^{st})</td>
<td><strong>Special Meeting of ASEAN Ministers on Energy and METI Minister of Japan</strong></td>
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<td>Jul. 23(^{rd})</td>
<td>G20 Energy Ministers Meeting</td>
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<tr>
<td>Sep. 13(^{th})-16(^{th})</td>
<td>ASEAN Energy Ministers Meeting (AMEM Week)</td>
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<td>21(^{st})-27(^{th}) G20 Energy Ministers Meeting</td>
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<td>UN General Assembly</td>
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<td>Oct. 4(^{th})</td>
<td><strong>Asia Green Growth Partnership Ministerial Meeting (AGGPM)</strong></td>
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<td>26(^{th})-28(^{th}) ASEAN Summit</td>
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<td>30(^{th})-31(^{st}) G20 Summit</td>
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<td>Nov. 1(^{st})-12(^{th})</td>
<td>COP26</td>
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