

Asia Zero Emission Community (AZEC)

Ministry of Economy, Trade and Economy (METI)

The importance of decarbonization in Asia

- Asian region has more than tripled its greenhouse gas emissions from 1990 to 2021 due to its economic growth and increasing energy demand.
- In 1990, emissions from the developed countries accounted for two-thirds of global emissions. Asian region is now accounting for more than half of the emissions.
- Decarbonizing Asian regions is key to global carbon neutrality.

GDP and Population Growth Forecasts

	GDP Growth 2020→2050	Population Growth 2020→2050
S.E Asia	3.8%	0.6%
World	3.0%	0.8%
North America	2.1%	0.5%
EU	1.5%	▲0.2%

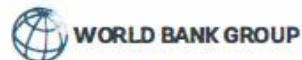
NDCs and CN Commitments of SE Asian Countries

Country	NDC Submission	Emission Reduction Target	CN
Thailand	November, 2022	30% reduction compared to BAU by 2030 *40% reduction with international support	2065 2050 for CO2
Indonesia	September, 2022	31.89% reduction compared to BAU by 2030 *43.2% reduction with international support	2060 or Sooner
Malaysia	July, 2021	45% reduction of GHG economic intensity in 2030 compared to 2005 level	2050
Brunei	December, 2020	20% reduction compared to BAU by 2030	-
Singapore	November, 2022	Peaking out GHG emission earlier with less than 60 million tons of CO2e emission by 2030	Later in this century
Lao PDR	May, 2021	60% reduction compared to BAU or reducing 62 million tons of CO2 equivalent by 2030	2050
Cambodia	December, 2020	41.7% reduction compared to BAU by 2030	2050
Vietnam	November, 2022	15.8% reduction compared to BAU by 2030 *43.5% reduction with international support	2050
The Philippines	April, 2021	Peaking out GHG emission by 2030 75% reduction compared to BAU	-
Myanmar	September, 2017	No nation wide target (specific actions are listed)	2050

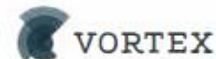
Source : IEA World Energy Outlook2021,

Global Distribution of Wind Power Potential

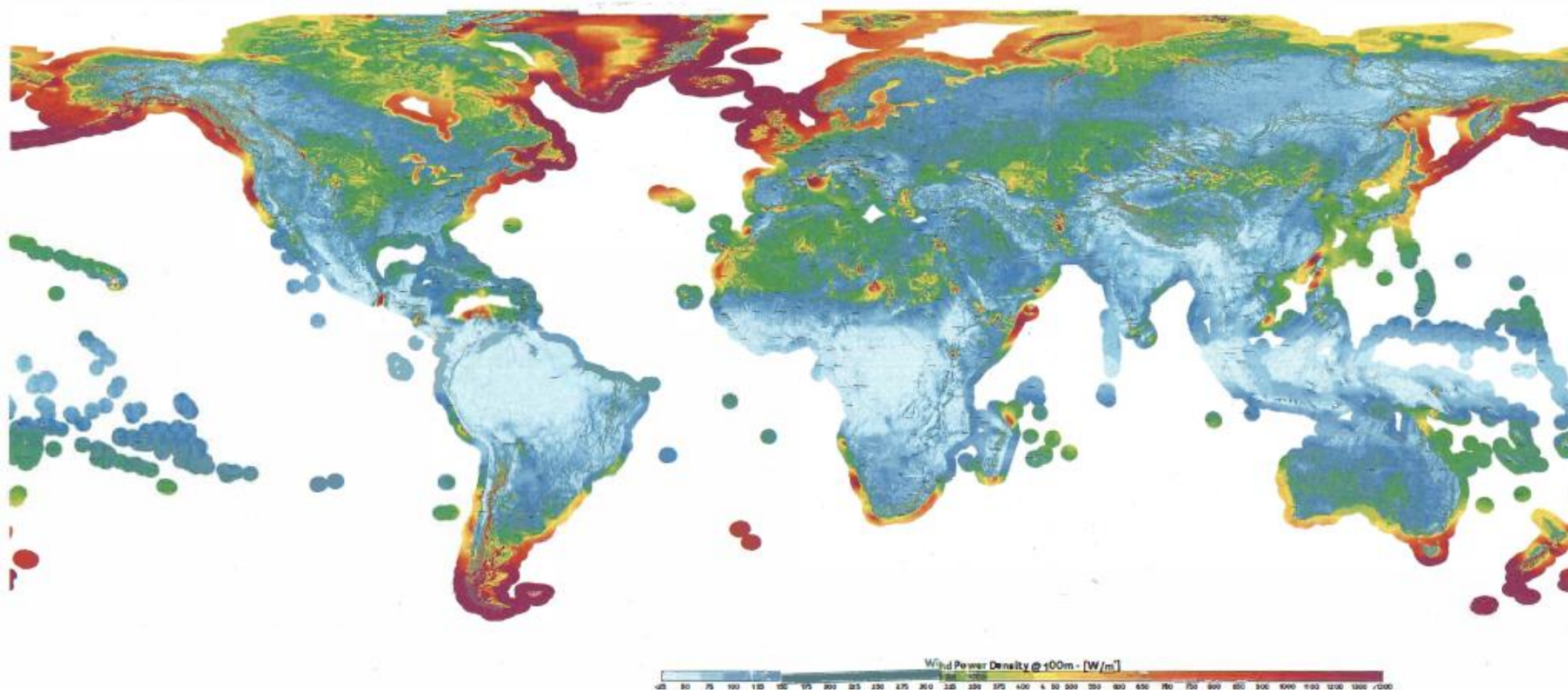
WIND RESOURCE MAP



DTU Wind Energy
Department of Wind Energy



WIND POWER DENSITY POTENTIAL



DESCRIPTION

This wind resource map provides an estimate of mean wind power density at 100 m above surface level. Power density indicates wind power potential, part of which can be extracted by wind turbines. The map is derived from high-resolution wind speed distributions based on a chain of models, which downscale winds from global models (~30 km), to mesoscale (3 km) to microscale (250 m). The Weather Research & Forecasting (WRF) mesoscale model uses ECMWF ERA-5 reanalysis data for atmospheric forcing, sampling from the period 1998-2017. The WRF output at 3 km resolution is generalized and downscaled further using the WAsP software, plus terrain elevation data at 150 m resolution, and roughness data at 300 m resolution. The microscale wind climate is sampled on calculation nodes every 250 m. For the microscale modeling, the terrain data is derived from the digital elevation models from Viewfinder Panoramas. The WAsP microscale modeling uses a linear flow model. For steep terrain, this modeling becomes more uncertain, most likely leading to an overestimation of mean wind speeds on ridges and hilltops. Users are recommended to inspect the terrain complexity of their region of interest.

ABOUT

The World Bank Group has published this wind resource map using data from the Global Wind Atlas version 3, to support the scale-up of wind power in our client countries. This work is funded by the Energy Sector Management Assistance Program (ESMAP), a multi-donor trust fund administered by The World Bank and supported by 18 donor partners. It is part of a global ESMAP initiative on Renewable Energy Resource Mapping that covers biomass, hydropower, solar and wind. This map has been prepared by the Technical University of Denmark (DTU Wind Energy) and Vortex FdC S.L. (VORTEX), under contract to The World Bank.

To obtain additional maps and information, please visit:

<https://globalwindatlas.info>

TERMS

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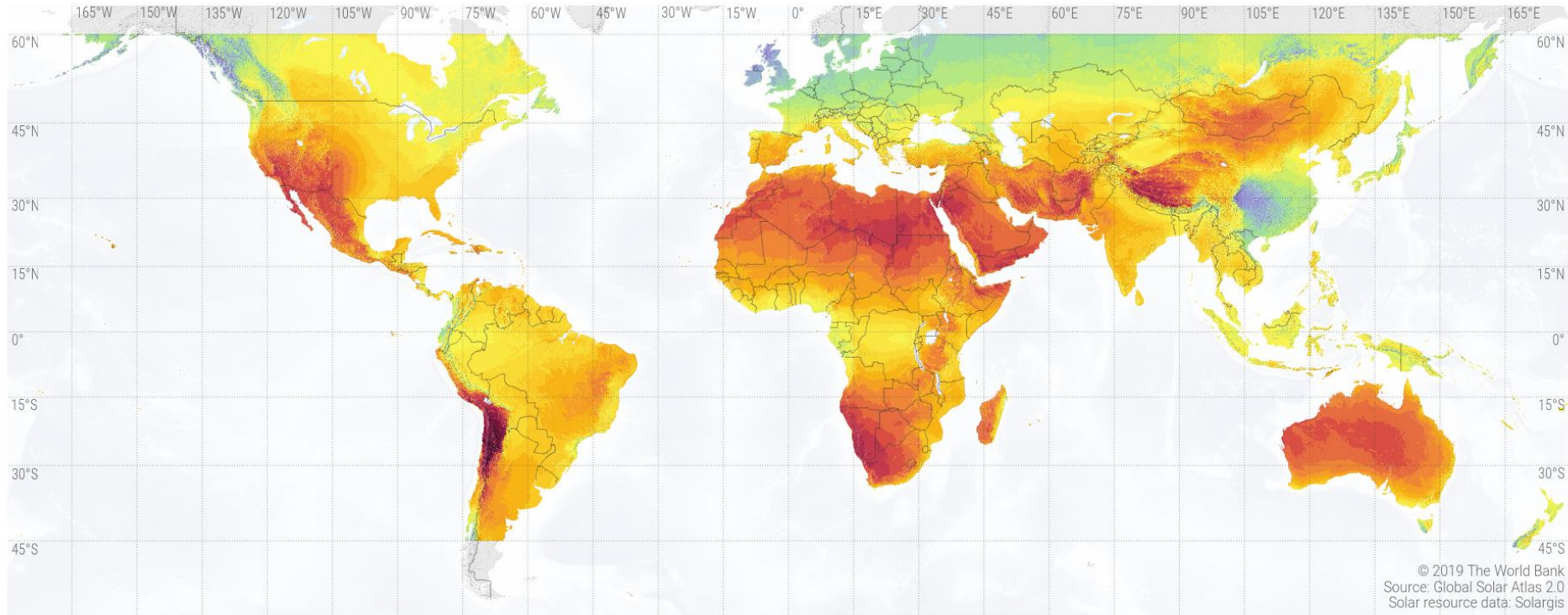
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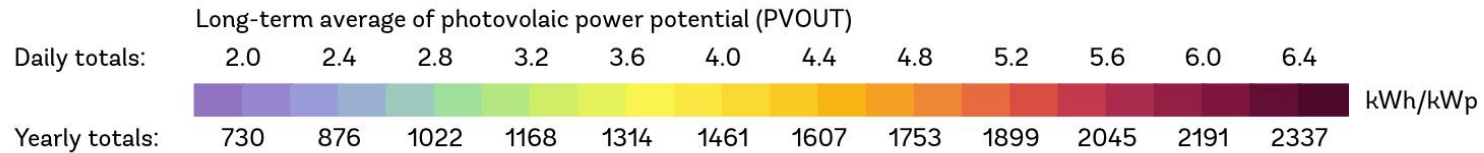
Global Distribution of Solar Power Potential

SOLAR RESOURCE MAP

PHOTOVOLTAIC POWER POTENTIAL

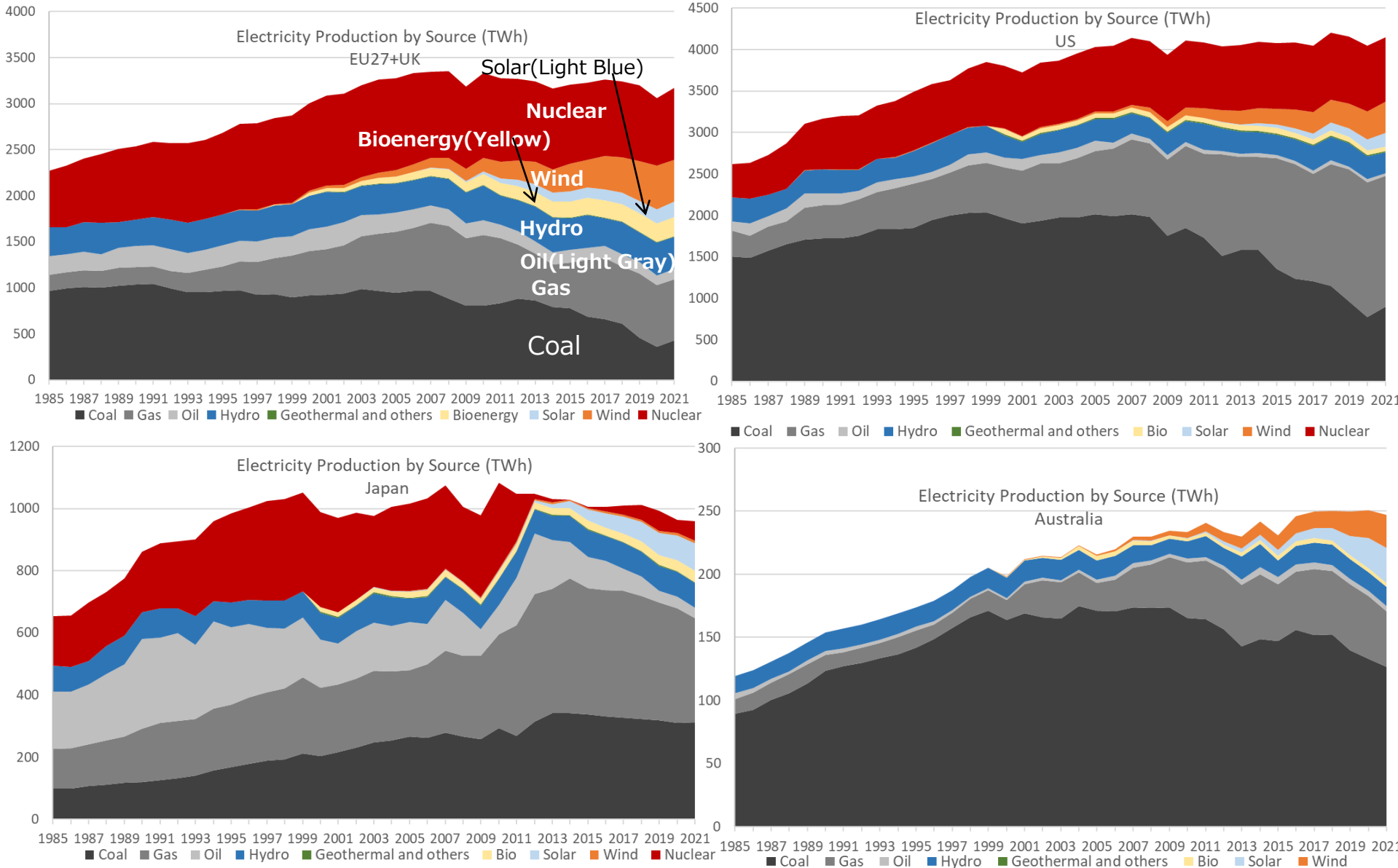


© 2019 The World Bank
Source: Global Solar Atlas 2.0
Solar resource data: Solargis



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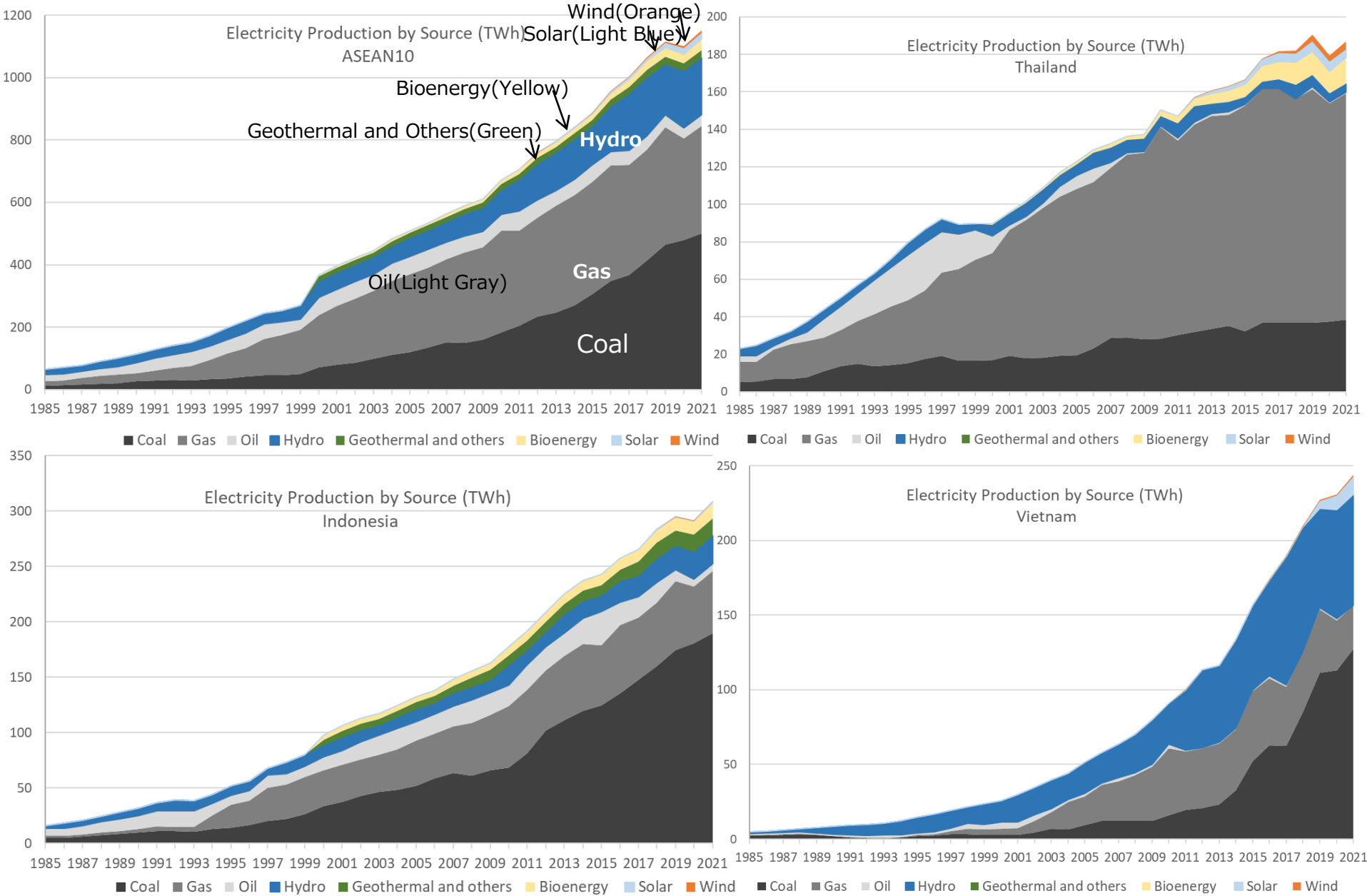
Electricity Production by Source (Developed Countries)



Source: Our World in Data based on BP Statistical Review of World Energy (2022); Ember's Global and European Electricity Reviews (2022)

Note: 'Other renewables' includes waste, geothermal, wave and tidal.

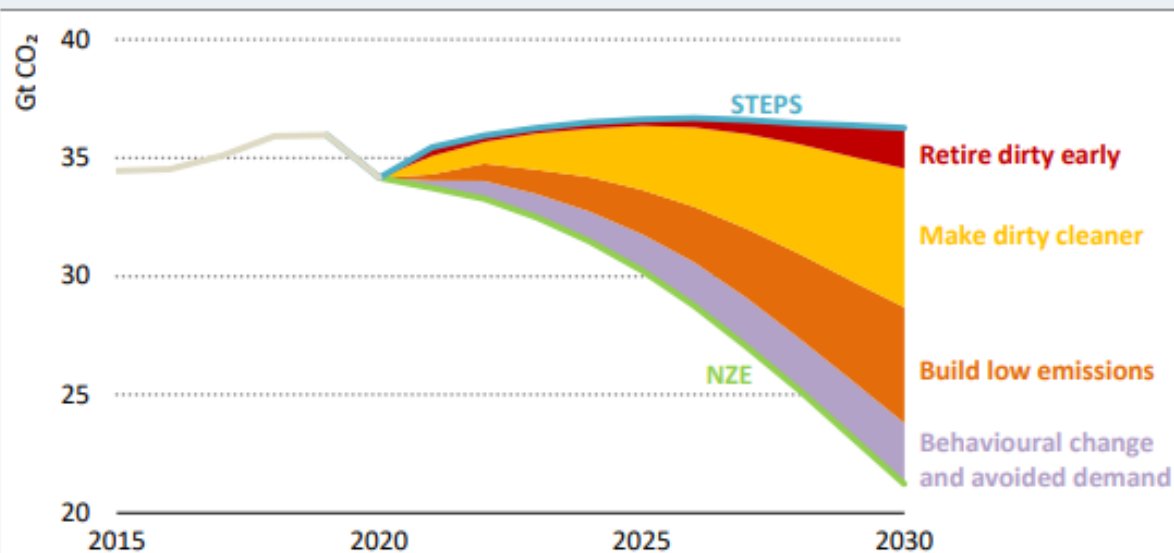
Electricity Production by Source (ASEAN, Indonesia, Thailand, Vietnam)



Necessity of Transitional Technologies

- In the World Energy Outlook, 2021 IEA reported that the combination of *i) retiring from dirty early ii) make dirty cleaner iii) build low emissions iv) behavioral change and avoided demand* is essential for filling the gap of STEPS and Net Zero Emission trajectory.
- It is stated that the middle ground of actions that “make dirty cleaner” is crucial in determining the speed and scope of energy transitions, and delivers the largest share of emissions reductions.

Figure 1.13 ▶ Emissions reductions in the Net Zero Emissions by 2050 Scenario relative to the Stated Policies Scenario



IEA. All rights reserved.

Delivering net zero requires more than retiring dirty and building low emissions projects; there is a large middle ground that defines the speed and scope of change

Importance of approaching energy transition reflecting different national circumstances in Asia

- While the goal of CN is common across countries, the pathways should be various and realistic in accordance with the different situation of each country.
- Given the future prospects for further economic growth, it is important to aim for carbon neutrality by ensuring economic growth and energy security at the same time.

Situation in Asia/ASEAN

- Rapidly growing energy demand
- Uneven distribution of renewable potential (Wind potential is generally weak, precipitation is relatively heavy, flat areas are mostly populated.)
- Small grid size, weak in inter grid connections
- Limited availability in pipeline gas and shifting to LNG

⇒ Because no single approach can secure 3Es, various approaches should be considered.

Asian countries should form “one team”
under the concept of “ one goal, various pathways”.

Asia Zero Emission Community (AZEC)

- "Asia Zero Emission Community (AZEC)" concept aims for **energy transitions tailored to each country's circumstances**, together with Asian countries that are actively trying toward carbon neutrality while having similar challenges to Japan in decarbonization.
- AZEC is a **platform consisting of Asian countries that are promoting decarbonization**. Japan intends to contribute its resources and experience to AZEC, by **providing support on technology, finance, and human resources** through AETI, JCM, etc., and by **policy coordination** with partner countries. AZEC aims to support new technologies and reduce costs through market expansion.

Examples of supports

- **Financial support by JBIC, NEXI, JICA, etc.**
- **Assistance in developing roadmap** and long-term strategy for CN
- Establishment and dissemination of **Asia Transition Finance**
- **Development, demonstration, and deployment of decarbonization technologies** such as renewable energy, energy saving, hydrogen, ammonia, biomass, and CCUS

Examples of policy coordination

- Share information on **maximizing deployment renewable energies**
- **Establish standards** for energy conservation, energy management, and other decarbonization technologies
- **Share the direction** of utilization of bio-energy, hydrogen, ammonia, etc. in the field of thermal power generation.
- Consider of **effective utilization of power grids**

Prime Minister Fumio Kishida's Speech on the Concept of Asia Zero Emissions Community

Policy Speech by PM to the 208th Session of the Diet, Jan. 17, 2022 (Excerpt)

- One more important point is that Japan will make use of its technologies, systems and know-how in hydrogen and ammonia and other areas to contribute to the decarbonization of the world, especially Asia, and lead the world in technical standards and international infrastructure development, together with the countries of Asia.
- We aim to join forces with like-minded countries in Asia in creating something that can be called the "Asia Zero Emissions Community."

Speech by PM at "Davos Agenda", Jan. 18, 2022 (Excerpt)

- I am also aware that many Asian countries have energy structures that are similar to Japan. Just as the European Union started as the European Coal and Steel Community during the Cold War, Japan envisions an "Asia Zero Emissions Community" in Asia where both geopolitical and geo-economic challenges are intensifying. This community would become a platform to advance efforts such as international joint investment on development of zero-emission technologies and hydrogen infrastructure, joint financing, standardization of related technologies, and establishment of an Asian emissions trading market.



AZEC Ministerial Meeting

- On 4 March 2023, METI hosted **Asia Zero Emissions Community (AZEC) Ministerial Meeting**.
- Minister Nishimura, Minister of Economy, Trade and Industry of Japan, who chaired the meeting, made remarks on **the importance of decarbonization in Asia, AZEC concept, and Japan's specific efforts**.



Participating countries (in alphabetical order)

Australia, Brunei, Cambodia, Indonesia, Japan, Laos, Malaysia, Philippines, Singapore, Thailand, Viet Nam

Participating international organizations (in alphabetical order)

Economic Research Institute for ASEAN and East Asia (ERIA)

International Energy Agency (IEA)

AZEC Ministerial Meeting (Joint Statement and Chair's Summary)

- The participants launched AZEC as a platform and agreed to AZEC joint statement including the three following common views:
 - 1) Advancing cooperation towards carbon neutrality/net-zero emissions while ensuring energy security
 - 2) Promoting energy transition while achieving economic growth
 - 3) Recognizing there are various and practical pathways toward carbon neutrality/net-zero emissions depending on the circumstances of each country
- After the ministerial meeting, Minister Nishimura issued "Chair's Summary" that reflects the comments and opinions expressed in the ministerial meeting under his responsibility, as for following areas.
 - 1) **Energy efficiency and demand-side energy conversion**
 - 2) **Renewable Energy/Energy Management**
 - 3) **Natural gas and LNG**
 - 4) **CCUS/Carbon Recycling**
 - 5) **Hydrogen and Ammonia**
 - 6) **Critical Minerals**

AZEC Public-Private Investment Forum

- On 3 March 2023, the **Asian Zero Emissions Community (AZEC) Public-Private Investment Forum** was co-hosted with KEIDANREN (Japan Business Federation). Approximately 700 participants, both local and online, attended.
- Ministers and CEOs of SOEs in Asia explained their **efforts toward decarbonization** and **expectations for cooperation with Japan** were made by.
- **Japanese companies** introduced **their decarbonization technologies**, including renewable energy, biomass, hydrogen, ammonia, and CCS, and **their initiatives to accelerate energy transitions in Asia**.
- Japanese government related organizations explained that **they are ready to provide all kinds of support measures**, including financial support and knowledge sharing, for realistic energy transitions.



Philippines,
Secretary,
Department of
Energy, H.E.
Lotilla



Pertamina, President
Director and CEO,
Ms. Nicke Widyawati



Australia, Assistant
Minister for Climate
Change and Energy,
Hon. Jenny McAllister



MOU between NEXI and PLN on cooperation to decarbonize the power sector
(From left: Minister of Economy, Trade and Industry Nishimura, NEXI President Kuroda, PLN President Daruwaman, and Minister of Energy and Mines Arifin)

AZEC Public-Private Investment Forum

- In conjunction with the Forum, a total of 28 new MOUs were announced for cooperation in a wide range of decarbonization areas, including renewable energy, biomass, hydrogen, ammonia, CCUS and LNG.

<Examples of MOU>

The Development of Clean Hydrogen/Ammonia Value Chain

- **Project Overview** : Development of project focusing on producing clean hydrogen/clean ammonia from renewable energy in southern provinces of Thailand in order to trade it to domestic and/or international industries for the utilization throughout the value chain.
- **Purpose of MOU** : Toward the realization of decarbonization target in Thailand, Chiyoda Corporation, Mitsui O.S.K. Lines, and Mitsubishi Company (Thailand) Limited aims to study and provide expertise to Electricity Generating Authority of Thailand (EGAT), the Thailand's leading state-owned enterprise, to cooperate and exchange the ideas relating the supply chain of clean hydrogen/ clean ammonia in southern provinces of Thailand, including the production, storage, transportation and utilization.



MoU for Cooperation on Decarbonization Projects with EGAT

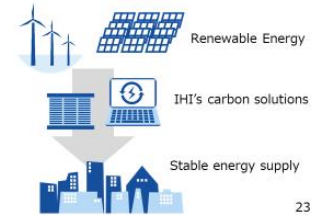


- **Outline**: Thailand is promoting decarbonization efforts to achieve GHG emission reduction targets of 40% by 2030, and Net ZERO by 2065. EGAT plays an important role in this process, and this MOU establishes a framework for discussion and business matching platform to promote the study and realization of measures to achieve these goals.
- **Purpose/Aims**: To kickstart discussions and information exchange regarding several applicable decarbonization and energy storage solutions. Ultimately, the aim is to reach a common understanding on a comprehensive decarbonization and energy transition roadmap for Thailand and EGAT.

Sirindhorn Dam Hydro & Floating PV by EGAT



<https://www.egat.co.th/home/en/20211103-pre/>



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News Release

Japanese

<https://www.meti.go.jp/press/2022/03/20230306005/20230306005.html>

English

https://www.meti.go.jp/english/press/2023/0306_002.html

MOU List

Japanese

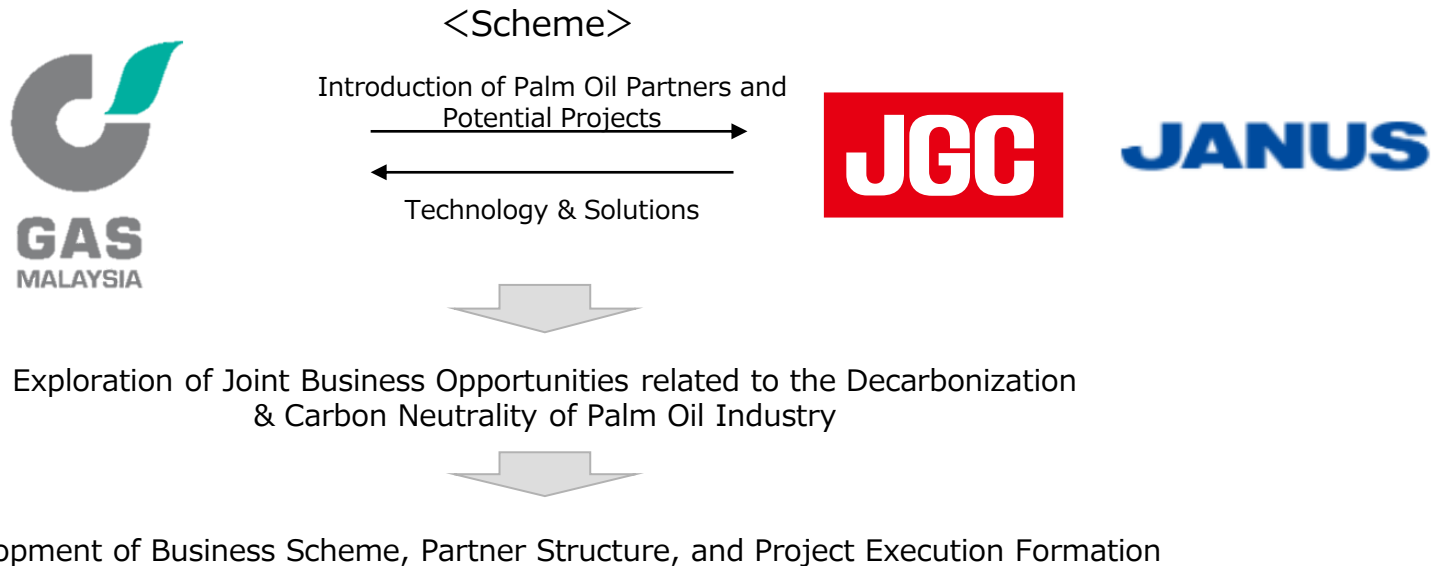
<https://www.meti.go.jp/press/2022/03/20230306005/20230306005-31.pdf>

English

https://www.meti.go.jp/english/press/2023/pdf/0306_002a.pdf

MOU on the Promotion of Carbon Neutrality through the Effective Utilization of Palm Oil Waste

- **MOU/Corporate Alliance Overview** : JGC Group and Gas Malaysia have agreed to conduct a feasibility study on the production and sales of biofuels and biochemicals through effective utilization of unutilized wastes (POME, EFB, waste wood, etc.) generated by the palm oil industry in order to promote decarbonization in Malaysia
- **Significance and Aim of this Cooperation** : JGC Group, with its capabilities for the effective utilization of organic waste including palm residue, and Gas Malaysia will cooperate to explore joint business opportunities and conduct joint studies with a view to future commercialization, thereby contributing to making the palm oil industry sustainable and the country carbon neutral.
- **Others** : A detailed project plan and scheme will be developed by the end of 2023, with a view to establishing an SPC.

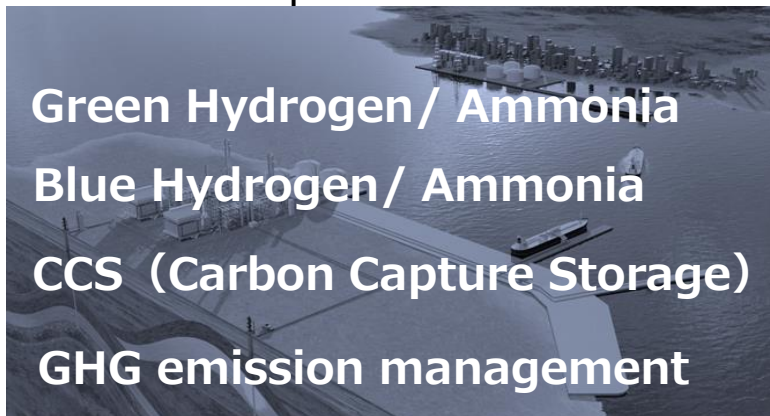


PETRONAS and JOGMEC MOC in ENERGY TRANSITION INITIATIVES TOWARDS ACHIEVING NET ZERO CARBON EMISSION TARGETS



- **The Outline of MOC** : PETRONAS and JOGMEC have agreed to conduct joint research on projects targeting carbon-neutral fields such as clean energy such as hydrogen/ammonia, GHG emissions management in energy projects, and various CCS projects.
- **The Significance of the collaboration** : To enhance PETRONAS and JOGMEC collaboration to promote and develop sustainable energy sources and technologies to achieve respective mutual energy transition and decarbonization targets. This joint-effort also aims to spur business opportunities and provide technical and financial supports for Japanese companies to participate in PETRONAS projects, both inside and outside of Malaysia.

<Area of Cooperation>



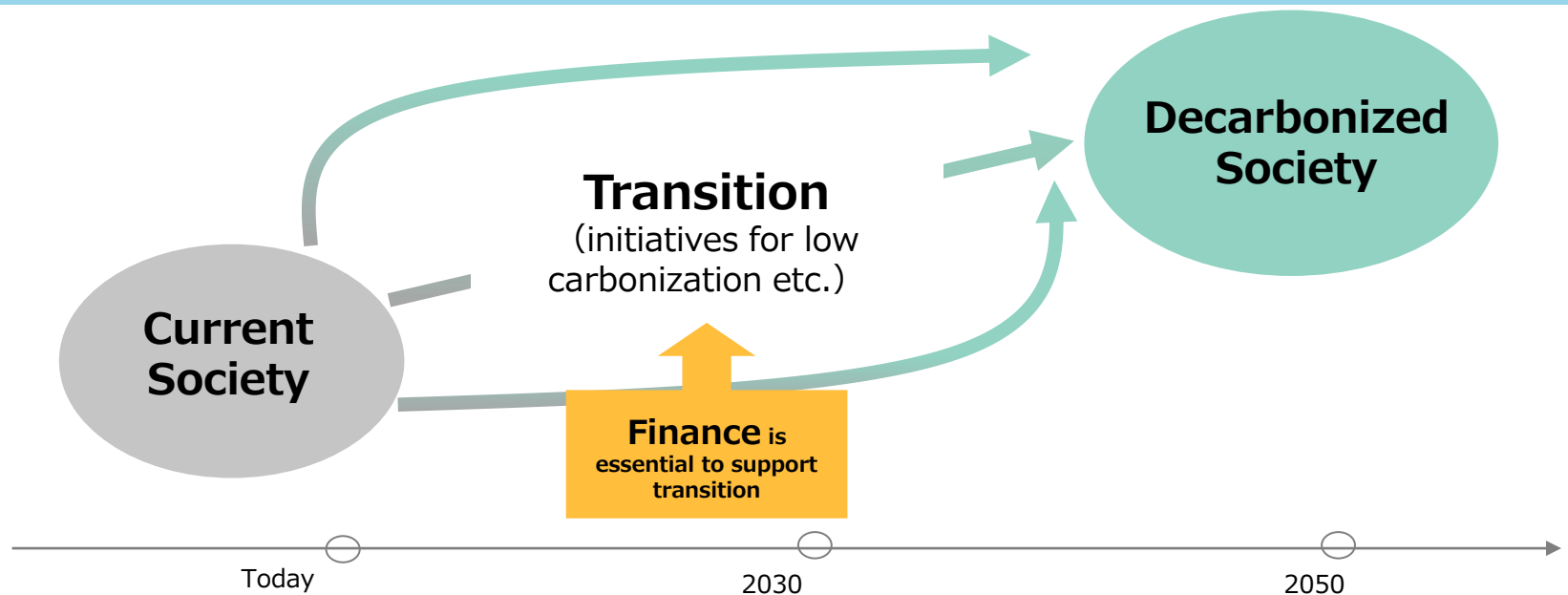
<Scheme>



The Importance of Transition Finance

Transition finance refers to financial services supporting the whole-of-economy transition, in the context of the SDGs, towards lower and net-zero emissions and climate resilience, in a way aligned with the goals of the Paris Agreement.

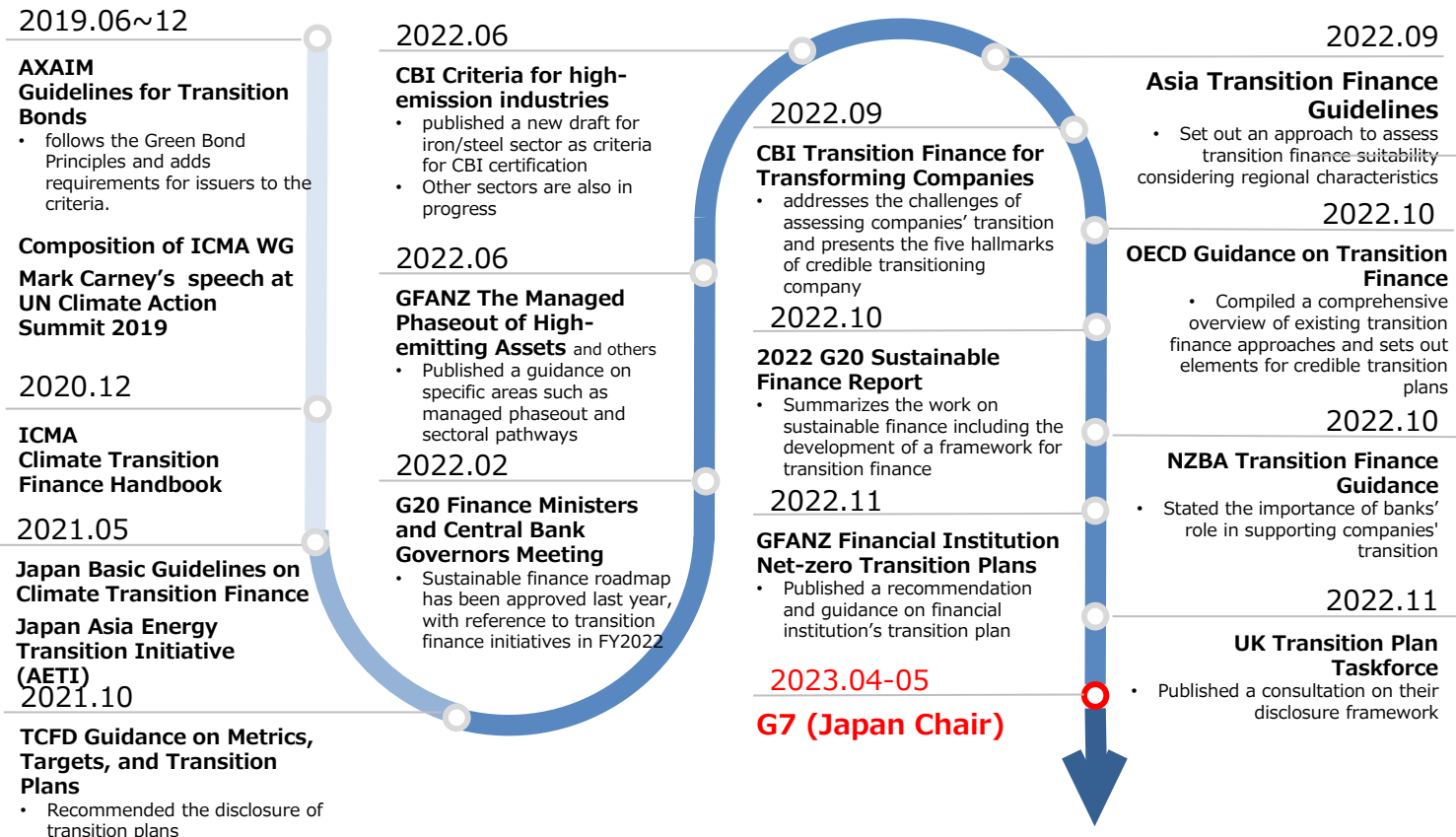
- Companies in many hard-to-abate sectors cannot immediately jump into the decarbonized society due to the outside factors including limitation of innovative technologies and geographical background of energy mix.
- To meet the Paris goals, it is salient to green all sectors and industries. Sectors that are currently GHG intensive but in its process of transitioning to net-zero emissions also require financing in their journey towards net-zero.
- Active engagement with all sectors and industries through transition finance is key in realizing this whole-of-economy transition.



International Initiatives on Transition

Finance

- The importance of transition plan are being recognized as a crucial tool to achieve the Paris Agreement and related initiatives are seen worldwide.



Japan's 4 policy pillars on Climate Transition Finance

- Although green projects have been attracting investment, more investments need to support transition to net zero.
- To encourage private finance flow for transition, Japanese government take 3-step-policy. (1)**Basic Guidelines** in line with ICMA transition handbook, (2) **Sector Roadmaps** which show technology options for carbon neutrality and (3) **Model Projects** to secure a good quality of practices without greenwashing. A **follow-up guidance** for financiers to use after the issuance of transition finance was issued in June 2023.
- As required by Basic Guidelines, companies are expected to show their transition strategy. They can account for their plan by referring to the technologies and pathway of the roadmap.

1. Basic Guidelines

- ✓ FSA, MOE and METI formulated the Guidelines to establish transition finance in line with the ICMA transition handbook.



2. Sector Roadmaps

- ✓ Roadmaps with technologies for transition is formulated for 8 sectors: **iron & steel, chemical, electricity, gas, oil, cement and paper & pulp, and automobiles.**
- ✓ The roadmaps can be referred by companies to formulate their strategies and pathways and by financial entities to evaluate those of clients

3. Model Projects

- ✓ 21 model projects from shipping, steel, aviation, chemical, energy and heavy industry sectors.
- ✓ **The market of transition finance has reached 1 trillion yen cumulatively.**

4. Follow-up Guidance

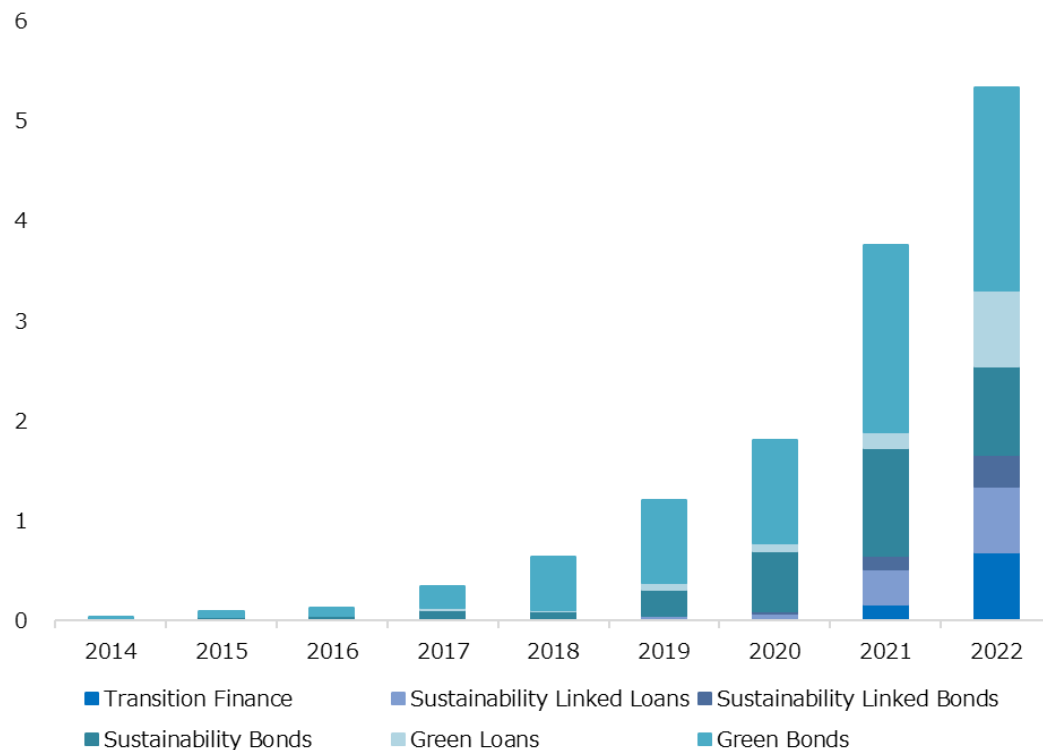
- ✓ **Guidance for financiers (especially bond issuers)** in following up after the issuance of transition finance was released in June 2023



Trends in amount of transition-labeled bonds and loans

- The cumulative amount of transition-labeled bonds and loans has grown and surpassed **1 trillion JPY**.

(trillion JPY)



Issuance of Transition Bonds
by Japanese Companies and
Other Entities in 2022

approx. **420** billion JPY

the cumulative amount of
transition-labeled bonds and loans
in Japan
(Jan.2021-Mar.2023)

approx. **1** trillion JPY

Source) MOE "Green Finance Portal" (<https://greenfinanceportal.env.go.jp/>),
METI "Transition Finance HP" (https://www.meti.go.jp/policy/energy_environment/global_warming/transition_finance.html), Other public information.

(Transition Finance)

- Sapporo G7 Ministers` Communique (para 51)-

We also highlight that **transition finance, in line with keeping a limit of 1.5 ° C temperature rise within reach, avoiding carbon lock-ins and based on effective emissions reduction, has a significant role in advancing the decarbonization of the economy as a whole.**

- Sapporo G7 Ministers` Communique

We highlight the need for corporates to implement their net-zero transition, in line with the temperature goal of the Paris Agreement, based on credible corporate climate transition plans. **We recognize that transition finance can support such efforts** so long as it is in line with keeping a limit of 1.5°C temperature rise within reach, avoids carbon lock-ins, and is based on effective emissions reduction, as described in such documents as the OECD Guidance on Transition Finance and other global best practices.

- G7 Finance Ministers` Communique

We remain committed to supporting the implementation and monitoring of the G20 Sustainable Finance Roadmap, including **the transition finance framework. Transition finance, in line with keeping a limit of 1.5°C temperature rise within reach, avoiding carbon lock-ins and based on effective emissions reduction, has a significant role in advancing the decarbonization of the economy as a whole.**