May 12, 2025

ENEOS Group Fourth Medium-Term Management Plan

Carbon Neutrality Plan

2025 edition

ENEOS Holdings, Inc.
[E'-ne-ohs]

ENEOS Group Japan's Premier Energy and Materials Corporate Group

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Harnessing the Earth’s power for the common good and for the day-to-day life of each individual

Throughout the years, we have devoted ourselves to supporting "today’s normal" and taking the lead for "tomorrow’s normal" in a constantly changing era, striving to meet the diverse needs of our customers and society.

At the same time, the uncertainty surrounding society's response to decarbonization is increasing, and so as a company, we must prepare for all possible scenarios.

Our updated "Carbon Neutrality Plan" is designed to flexibly respond to these societal changes, providing a guideline and roadmap for our challenge toward achieving a carbon-neutral and circulating society.

Moving forward, we will continue to meet the evolving needs of our customers and society, adapting to the times. Our accumulated experience and achievements will make this possible.

The ENEOS Group will continue to challenge itself to achieve both a stable supply of energy and materials and the realization of a carbon-neutral society through creation and innovation in energy and materials.

We will contribute to the development of our communities and help to ensure a vibrant future.

ENEOS Group

Changes in the Business Environment from FY2023 Onward

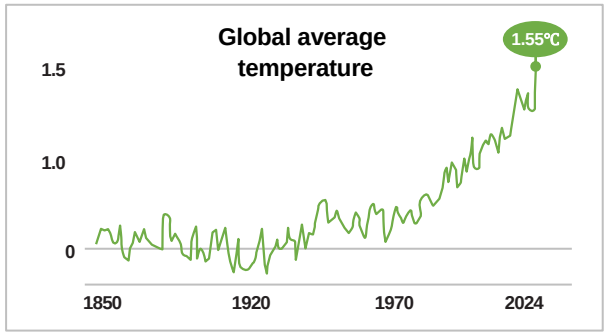
While policy frameworks related to climate change are being developed in various countries, the international situation surrounding energy and materials is becoming increasingly uncertain.

May 2023 **Publish the ENEOS Group's Carbon Neutrality Plan**

Changes in the business environment surrounding decarbonization

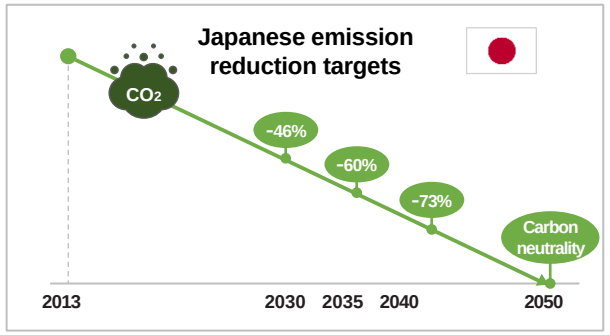
Progression of global warming

The World Meteorological Organization (WMO) announced that the global average temperature in 2024 reached its highest level on record, approximately 1.55°C higher than pre-industrial levels. As global warming will certainly continue to advance, it is imperative that governments, municipalities, businesses, and citizens alike from all over the world recognize the gravity of the issue and take proactive measures to address it.



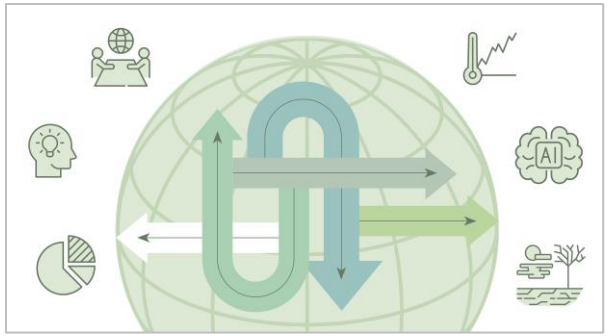
Advancement of Japanese GX policies

In February 2025, the government of Japan approved the 7th Basic Energy Plan and GX2040 Vision, outlining the medium- to long-term direction toward Japan's carbon neutrality. Additionally, the Plan for Global Warming Countermeasures, which was formulated simultaneously, set new reduction targets for Japan's Nationally Determined Contributions (NDCs): a 60% reduction by FY2035 and a 73% reduction by FY2040.



Increasing uncertainty

The uncertainty surrounding the future energy supply and demand balance is increasing due to a combination of factors, including the advancement of AI technology, shifts in national policies, the geopolitical tensions arising from Russia's invasion of Ukraine, and the situation in the Middle East. Additionally, these circumstances have heightened the ambiguity around the path to achieving carbon neutrality.



May 2025 **Publish the ENEOS Group's Carbon Neutrality Plan (2025 edition)** (We presumed societal scenarios to prepare for uncertainties and updated goals and strategies related to emission reductions for the ENEOS Group and society)

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Presumed Societal Scenarios

To respond more flexibly to uncertainties, we have presumed three societal scenarios and aim to enhance the resilience of our carbon-neutral strategy.

ENEOS Group's presumed societal scenarios

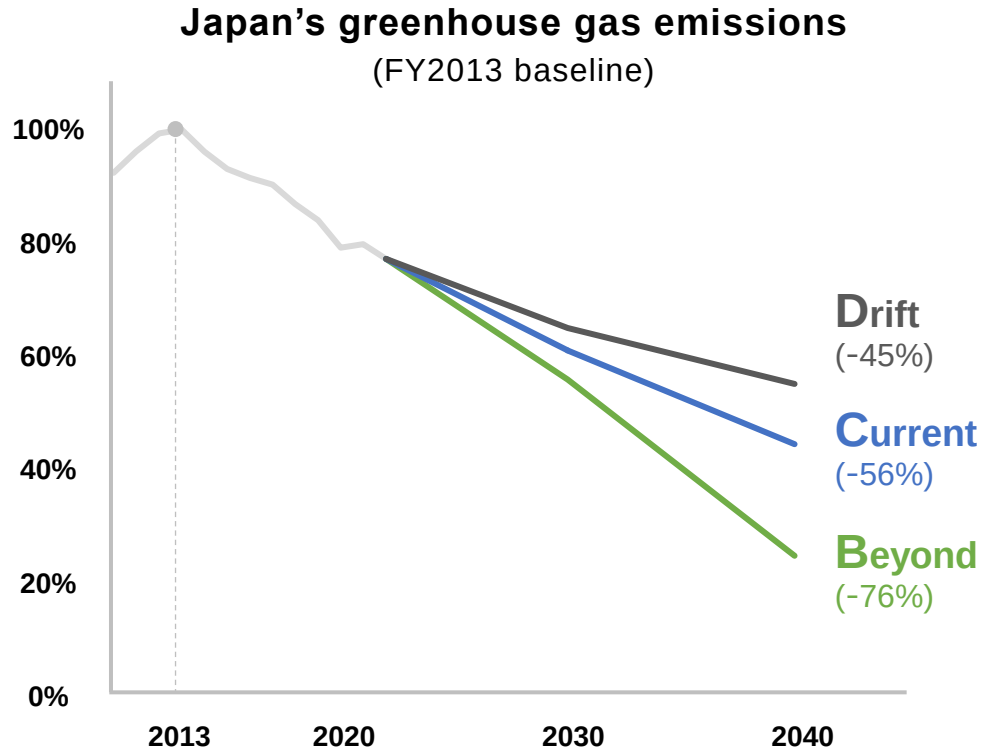
Assuming uncertainty in the future business environment, we have presumed three societal scenarios.[1] Amid the increasing uncertainty surrounding climate change, we aim to capture global trends and respond swiftly to future trends.

Progress of a carbon-neutral society

	Societal trends	Energy trends	Global average temperature[2]	Global emissions[3] (2040)
Drift scenario	**Prioritization of economic development due to intensifying regional conflicts**	Continued use of fossil fuels such as oil, prioritizing national economies	**+3.0 to 4.0℃**	**+8%**
Current scenario	**Limited progress in decarbonization, mainly in leading regions**	Progress in low-carbon measures such as LNG and biofuels, centering on developed countries	**+2.0 to 2.5℃**	**-24%**
Beyond scenario	**Accelerated progress in decarbonization through international cooperation** (in addition to significant technological advancements)	Significant advances worldwide in improving the economic efficiency of decarbonization through innovative technologies.	**+1.5 to 2.0℃**	**-62%**

Presumed emission reduction pathways in each scenario (in Japan)

We will formulate a resilient carbon-neutral strategy based on the emission reduction pathways corresponding to each scenario.



1 These are scenarios based on the IEA WEO2024 and IPCC Sixth Assessment Report, and they don't indicate the emission reduction targets or strategies of the ENEOS Group toward achieving carbon neutrality.
2 Projected temperature changes by 2100 relative to 1850-1900 levels 3 Uses emissions from 2020 as the base year

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ENEOS Group Carbon Neutrality Policy

The ENEOS Group will promote various initiatives in line with the Carbon Neutrality Policy for the entire Group in order to realize its Long-Term Vision.

ENEOS Group Long-Term Vision

The ENEOS Group is taking on the challenge of achieving both a stable supply of energy and materials and the realization of a carbon-neutral society.

ENEOS Group Carbon Neutrality Policy

We will promote initiatives that contribute to the energy and materials transition and the circular economy, while promoting measures to reduce greenhouse gas emissions in the ENEOS Group and taking into consideration social issues such as biodiversity.

In pursuit of realizing a carbon-neutral and circulating society in step with the government and society, the ENEOS Group will continue to create “tomorrow’s normal” based on the principle of S+3E.[1]

We will respond to the changing demands of our customers and society as the times change, and promote initiatives to prepare for multiple societal scenarios in a rational manner so as to reliably deliver the energy and materials needed.

1 The basic energy policy of the Japanese government. With Safety as a major premise, it aims to simultaneously achieve Energy Security, Economic Efficiency, and Environment.

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Policies on Initiatives for the Realization of a Carbon-Neutral Society

We will pursue the reduction of our greenhouse gas emissions while actively contributing to the reduction of greenhouse gas emissions in society.

Policies on initiatives for the realization of a carbon-neutral society		ENEOS Group measures
Reduction of our greenhouse gas emissions[1] (Scope 1+2)	**Mitigation of greenhouse gas emissions**	■ Appropriate processing of crude oil (according to demand) ■ **Reduction of greenhouse gas emissions in manufacturing and business operations** (**energy saving, fuel conversion, utilization of renewable energies**, **etc.)** ■ Utilization of carbon credits and other similar mechanisms[2]
	Reduction through CO_2 fixation	■ **CCS (Carbon dioxide capture and storage)** (Including new methods such as BECCS[3] and DACCS[4])
	Enhancement of the biogenic CO_2 removals	■ Generating carbon credits through **removal by forests** and other similar methods[5]
Contribution to the reduction of greenhouse gas emissions in society (Scope 3, avoided emissions)	**Promotion of energy and materials transition**	■ **Promotion of low-carbon fossil fuels and products** (LNG and avoided emissions products) ■ **Expansion of renewable energies** (solar and wind power) ■ **Utilization of resources such as biomass** (biofuels and bio-based materials) ■ **Decarbonization of fossil fuels** (CCS for other companies and CDR[6]) ■ **Utilization of hydrogen** (hydrogen and synthetic fuels[7])
	Promotion of a circular economy	■ **Promotion of resource recycling** ■ **Resource conservation**, promoting environmental contributions' value, etc.

1 This includes initiatives of both reduction and removal actions. Removal is conducted as a mitigation activity outside the value chain. These activities are also applied to offset the operational emissions through the generation of credits.
2 This includes non-fossil certificates and other similar mechanisms. 3 Bioenergy with carbon capture and storage. Capture and storage of CO_2 emitted during biomass power generation 4 Direct air capture with carbon storage. Direct capture and storage of CO_2 from the atmosphere
5 This includes biogenic CO_2 removals and emission mitigation methods such as blue carbon and rice paddy methane suppression in addition to afforestation and forest management. 6 Carbon dioxide removal 7 This includes bio-derived fuels.

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Reduction of ENEOS Group's Greenhouse Gas Emissions

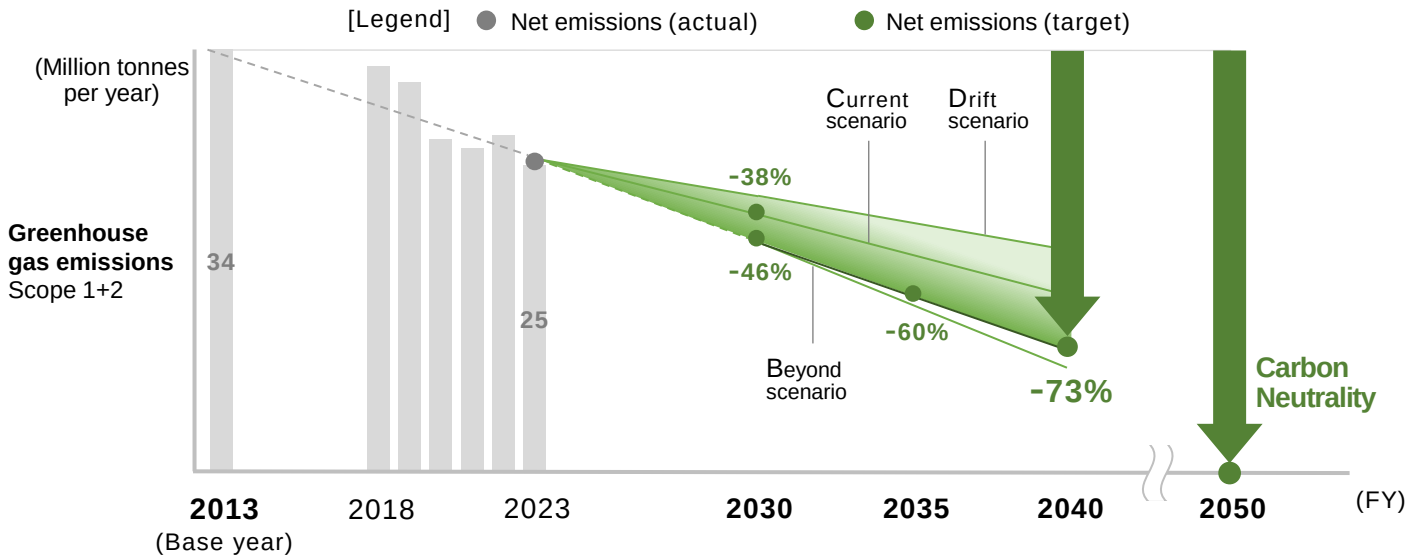
To achieve carbon neutrality by 2050, we will promote the reduction of our greenhouse gas emissions together with the government and society.

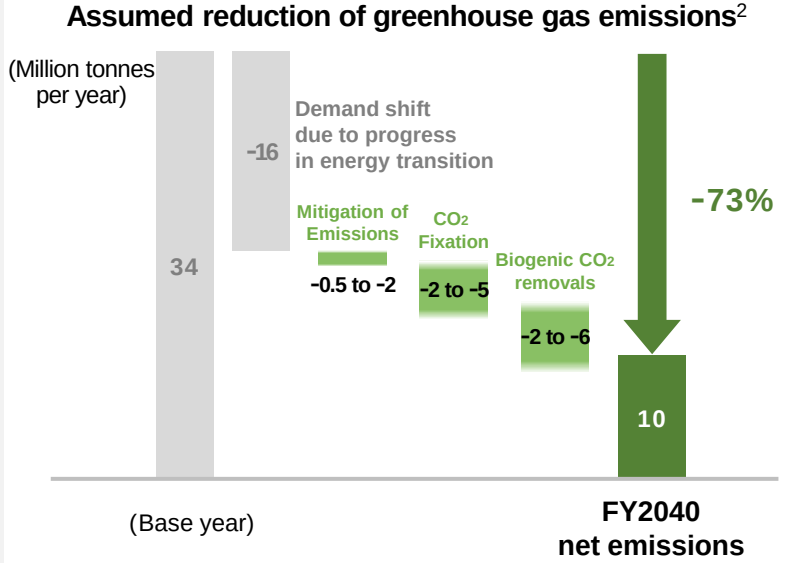
Reduction of our greenhouse gas emissions [1,2] (Scope 1+2)

The ENEOS Group, together with the government and society, will promote the reduction of its greenhouse gas emissions. We aim to achieve a 73% reduction in line with the government's targets by FY2040 and carbon neutrality for operational emissions by FY2050.

(Units: million tonnes per year)

Greenhouse Gas Emission Target (Scope 1+2)	FY2013 (Base year, actual)	FY2023 (Actual)	FY2030	FY2035	FY2040	FY2050
	34	25	19 to 21 or less (-38 to -46%)	14 or less (-60%)	**10 or less (-73%)**	**Carbon Neutrality**





1 Greenhouse gas emissions and emission targets may be adjusted as necessary, taking into account the application of future Sustainability Standards Board of Japan (SSBJ) Climate Standard.
2 Assumes that the external environment, including policies and regulations by the government and other parties, has been sufficiently developed to achieve Japan's NDCs across the entire nation.

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Initiatives toward the Reduction of ENEOS Group's Greenhouse Gas Emissions

We will promote our initiatives to reduce Scope 1+2 greenhouse gas emissions in order to achieve our emission reduction targets.

Initiatives by ENEOS Group to reduce greenhouse gas emissions

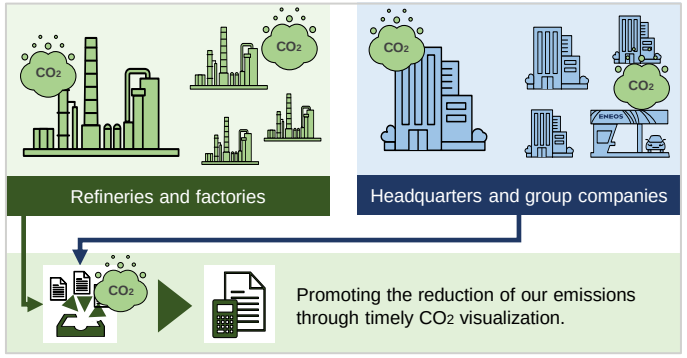
Mitigation of greenhouse gas emissions

Improving energy efficiency in the manufacturing process

Positioning the improvement of energy consumption efficiency in manufacturing processes as a key issue, we will promote various energy-saving measures such as production process improvements, fuel conversion, and equipment upgrades.

Visualization of CO_2

- In collaboration with WasteBox and NTT Data, a CO_2 visualization system was introduced at refineries to promote the reduction of greenhouse gas emissions, establishing a framework for centralized management of emissions across the group companies (Apr. 2024).



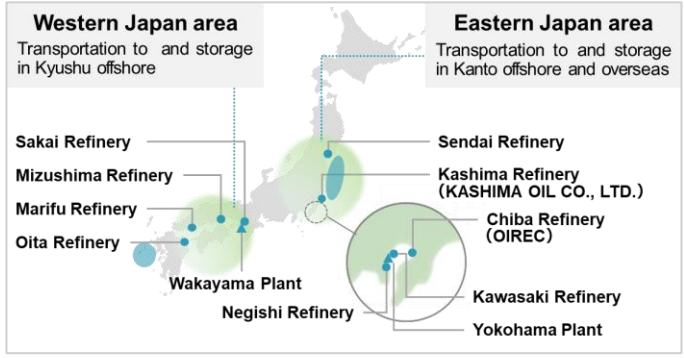
Reduction through CO_2 fixation

Development of the CCS value chain

We are aiming to build a CCS value chain in collaboration with the government and other companies for the commercialization of CCS as a means of CO_2 reduction, with future applications to DACCS and BECCS also in consideration.

CCS

- We established the Western Japan Carbon dioxide Storage Survey in collaboration with Electric Power Development to explore CO_2 storage in Western Japan (Feb. 2023).
- The Offshore Western Kyushu CCS and Northern Offshore of Peninsular Malaysia CCS projects were selected as advanced CCS projects (Sep. and Oct. 2024).



Enhancement of the biogenic CO_2 removals

Promotion of CO_2 removal utilizing forests and oceans

We will promote the generation of carbon credits through increased CO_2 removal domestically and internationally by engaging in forest conservation and blue carbon initiatives in collaboration with local governments, forestry cooperatives, and other such organizations.

Removal by forests

- We signed "Collaboration Agreement for Achieving a Decarbonized Society Utilizing Forests" with forest managers such as forestry corporations in Wakayama and Fukushima Prefectures and the forestry cooperative in Tsurui Village, Hokkaido, to promote the creation and utilization of forest-derived J-Credits (from 2022 onward).

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Contribution to the Reduction of Greenhouse Gas Emissions in Society

To respond to societal demand, we will lead the supply of energies and materials that contribute to the transition and a circular economy.

Contribution to the reduction of greenhouse gas emissions in society
(Scope 3, avoided emissions)

The ENEOS Group will lead the supply of energies and materials necessary for the transition to meet the societal demand for the reduction of greenhouse gas emissions, aiming to achieve carbon neutrality 6 by 2050.

Vision for FY2040 for achieving carbon neutrality by FY2050

Promotion of energy and materials transition	**Promotion of low-carbon fossil fuels and products**	■ **Stable supply of low-carbon energies** such as LNG to support the transition ■ **Contributing to a low-carbon society** through the spread of avoided emissions products	**Carbon intensity (CI) of supplied energy**[2] (FY2020 baseline)	**-20 to -50%**
	Expansion of renewable energies	■ Establishing a revenue base through **the development of renewable energies sources and effective utilization of supply-demand adjustments**		
	Utilization of resources such as biomass	■ **Expanding the adoption of low-carbon petroleum products** through biofuels, bio-based materials, etc. • Full-scale introduction of SAF,[1] ethanol-blended gasoline, methanol, and biochemicals	**Avoided emissions**[3] **(energy)**	**Avoided emissions**[3] **(materials)**
	Decarbonization of fossil fuels	■ **Building the CCS value chain** and making it profitable	**15 million t-CO_2e** or more	**3.5 million t-CO_2e** or more
	Utilization of hydrogen	■ Establishing a manufacturing and supply system with the top domestic market share ■ **Operation of commercial plants for synthetic fuels** (including bio-derived fuels)		
Promotion of a circular economy	**Promotion of resource recycling and resource conservation**	■ **Expanding product supply by utilizing recycled resources** ■ Contributing to **resource conservation through materials and services**	**Percentage of green chemicals**[4]	**Green lubricant production volume**
			Up to **35%**	Up to **200 thousand kL**

1 Sustainable aviation fuel 2 CI of supplied energy (index of CO_2 emissions [g] per energy supply [MJ]) reduction targets may be adjusted as necessary, taking into account the future application of SSBJ Climate Standard.
3 Avoided emissions are estimated based on the GX League's guidelines for emission reduction measures consistent with the Ministry of Economy, Trade and Industry's technology roadmaps for each sector.
4 Ratio of products made from green chemicals to ones made from crude oil processed by a naphtha cracker

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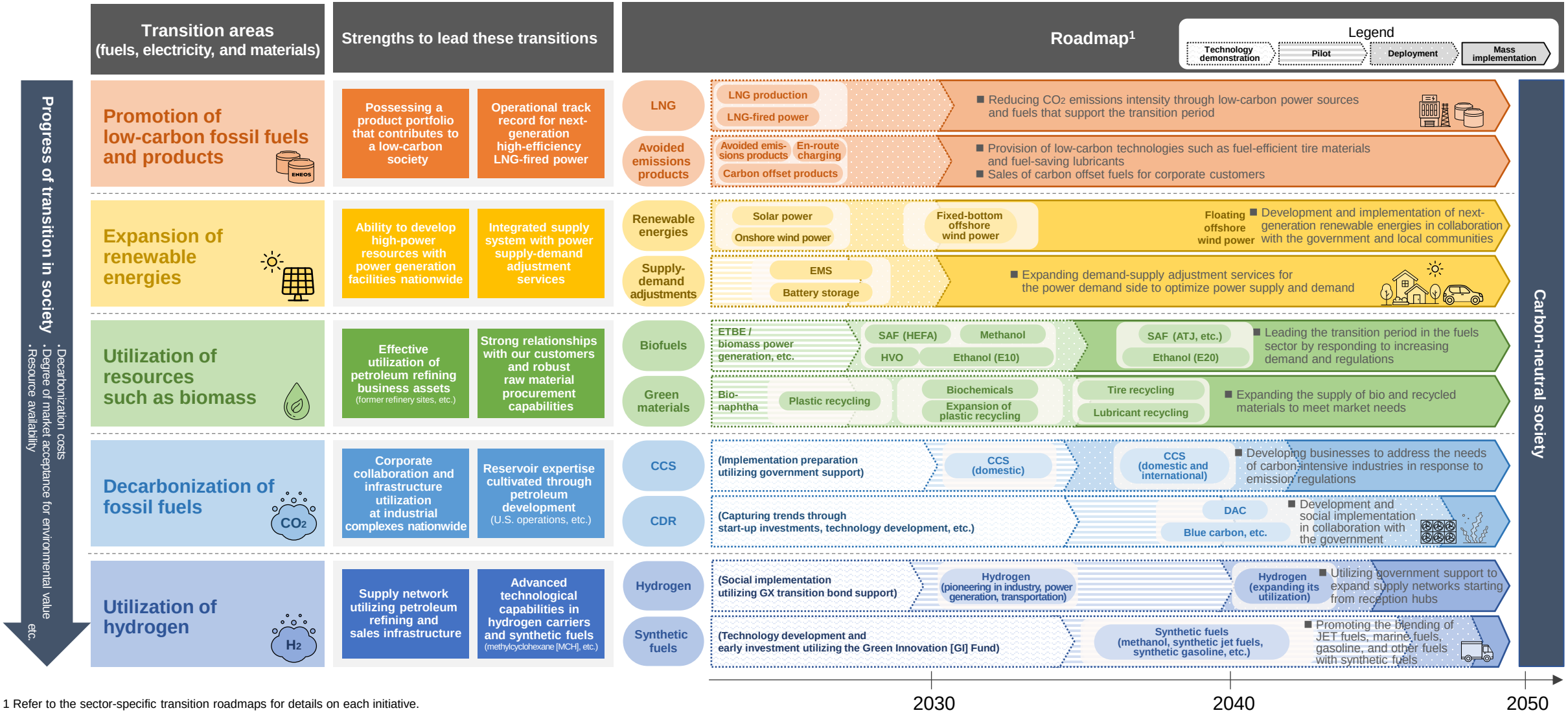
Roadmap for the Reduction of Greenhouse Gas Emissions in Society

As societal transitions progress, we will leverage our strengths to ensure a stable supply of energy and materials.



1 Refer to the sector-specific transition roadmaps for details on each initiative.

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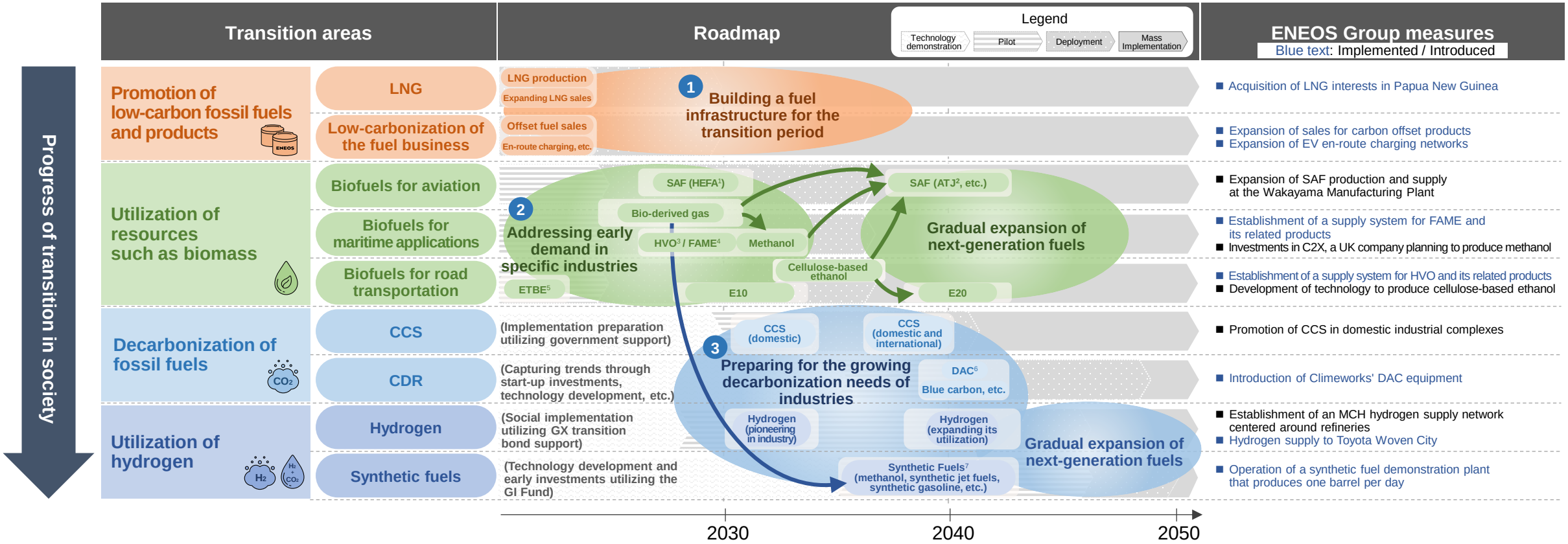
Transition Roadmap for the Fuels Sector

We will prioritize the supply of LNG and biofuels while advancing technology development and demonstration projects in preparation for a transition to new societal scenarios.

Fuels | Electricity | Materials

In addition to ① **addressing the projected expansion of LNG demand**, we will promote ② **low-carbonization through the supply of biofuels** and ③ **advance demonstration projects and technology development for future solutions such as CCS and hydrogen.**



1 Technology for producing SAF from used edible oil and other waste oils 2 Technology for producing SAF from alcohol 3 Biofuels produced by hydrogenating vegetable oils and similar materials
4 Biofuels produced by chemically processing vegetable oils, including used edible oil 5 Fuel synthesized from bioethanol and petroleum-derived isobutene 6 Technology for separating and capturing CO_2 from the atmosphere 7 This includes bio-derived materials.

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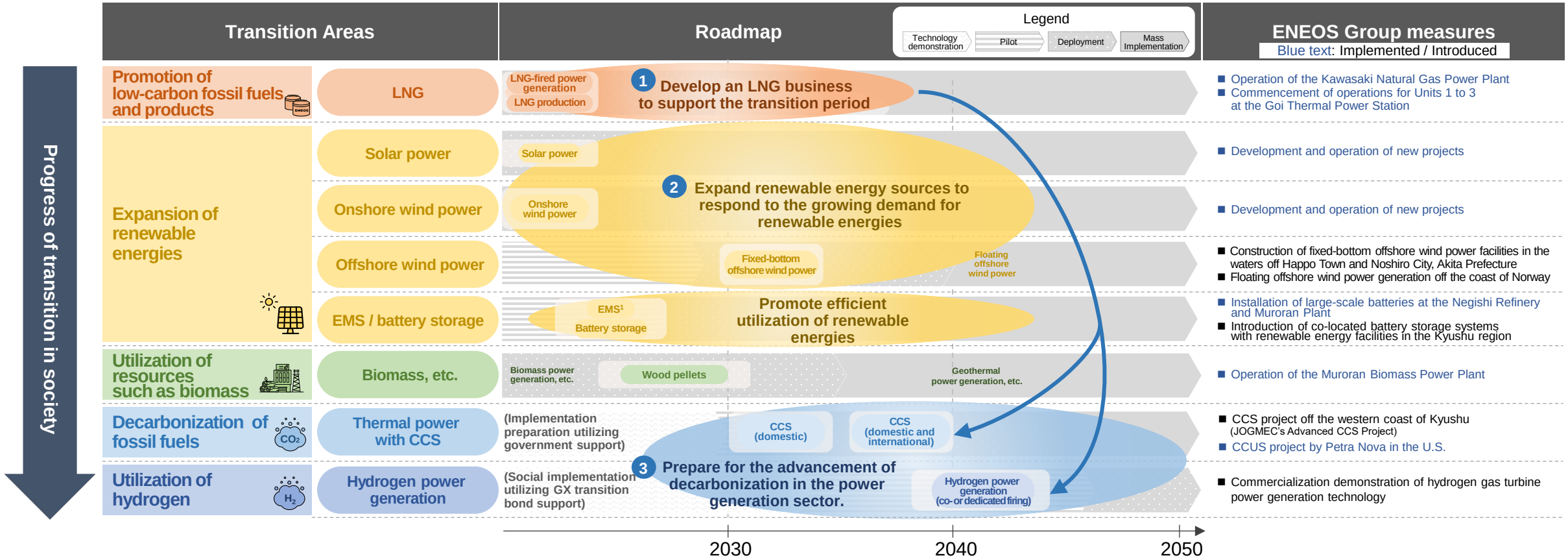
Transition Roadmap for the Electricity Sector

We will establish a foundation for next-generation power generation, including LNG and renewable energies, and prepare for advancements in decarbonization by promoting the exploration of future technologies.

Fuels | **Electricity** | Materials

In addition to the economically rational development of ①**LNG-related infrastructure to support the transition** and ②**renewable energies**, we will prepare for scenario shifts and ③**advance our business feasibility assessments for CCS and hydrogen.**



1 A system for monitoring energy usage and optimizing operational efficiency.

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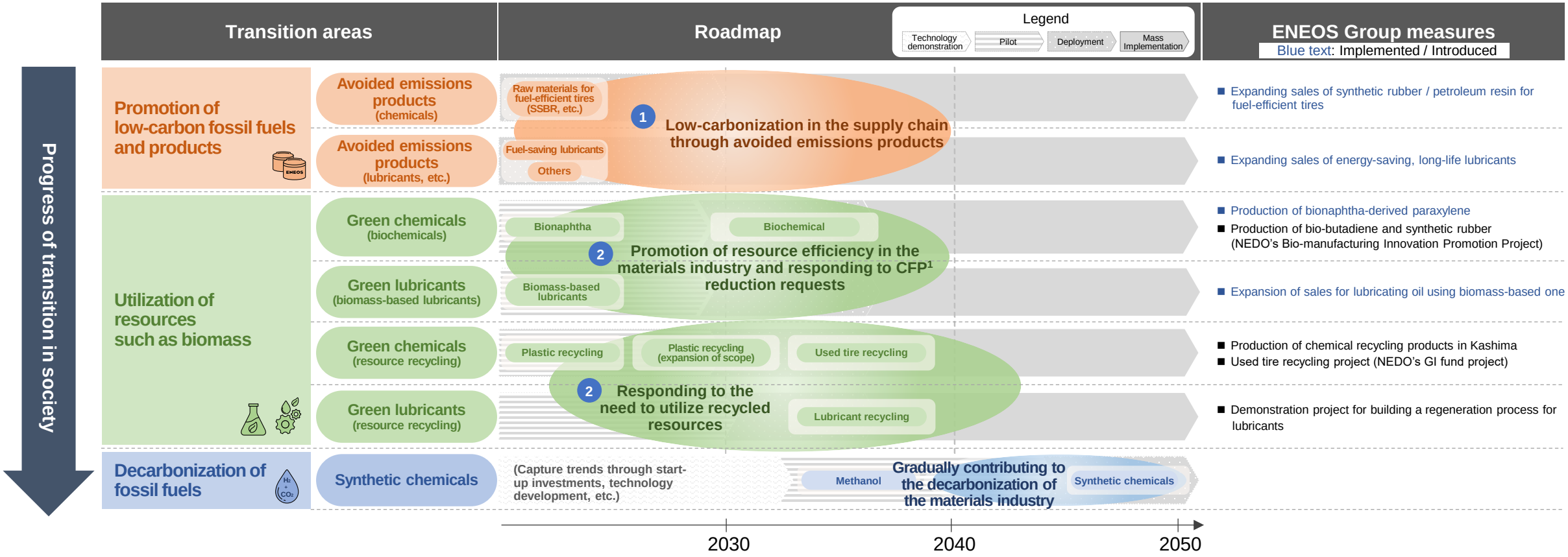
Transition Roadmap for the Materials Sector

In addition to expanding the supply of avoided emissions products, we will promote the utilization of non-fossil resources such as biomass and recycled resources.

Fuels | Electricity | **Materials**

In addition to ① **expanding the supply of avoided emissions products through improved fuel efficiency** of chemicals, lubricants, and other products, we will promote the ② **utilization of non-fossil resources such as biomass and recycled resources.**



1 CO_2 emissions throughout the product's lifecycle

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Promotion of a Circular Economy

In addition to the energy and materials transition, we will also integrally promote initiatives aimed at realizing a circulating society.

Promotion of energy and materials transition

- Promotion of low-carbon fossil fuels and products
- Expansion of renewable energies
- Utilization of resources such as biomass
- Decarbonization of fossil fuels
- Utilization of hydrogen

×

ENEOS Group's action guidelines for realizing a circulating society

Protecting finite resources

Responding to the growing demand for the development of materials that **do not rely on conventional resources** and **for resource efficiency**

Reducing environmental impact

Promoting collaboration with the government and society to **utilize waste effectively and reduce CO_2 emissions throughout the entire supply chain**

Leveraging changes in society as opportunities

Providing products, services, and value that address social needs arising from **changes in consumer behavior** and **certifying the value to environmental contributions**

Areas of circular economy initiatives for realizing a circulating society

Materials and services

Utilizing recycled resources

Supply of products utilizing recycled resources

- Promoting recycling
- Utilizing biomass
- Capturing and utilizing CO_2

Conserving resources

Conservation of resource through materials and services

- Providing avoided emissions products
- Reducing our waste

Energy

Supplying clean energies

Supply of clean energies to support a circular economy

- Supplying renewable energies and next-generation fuels

Common

Certifying the value to environmental contributions

Enhancing societal acceptance of value from environmental contributions

- Evaluating environmental value and facilitating its distribution

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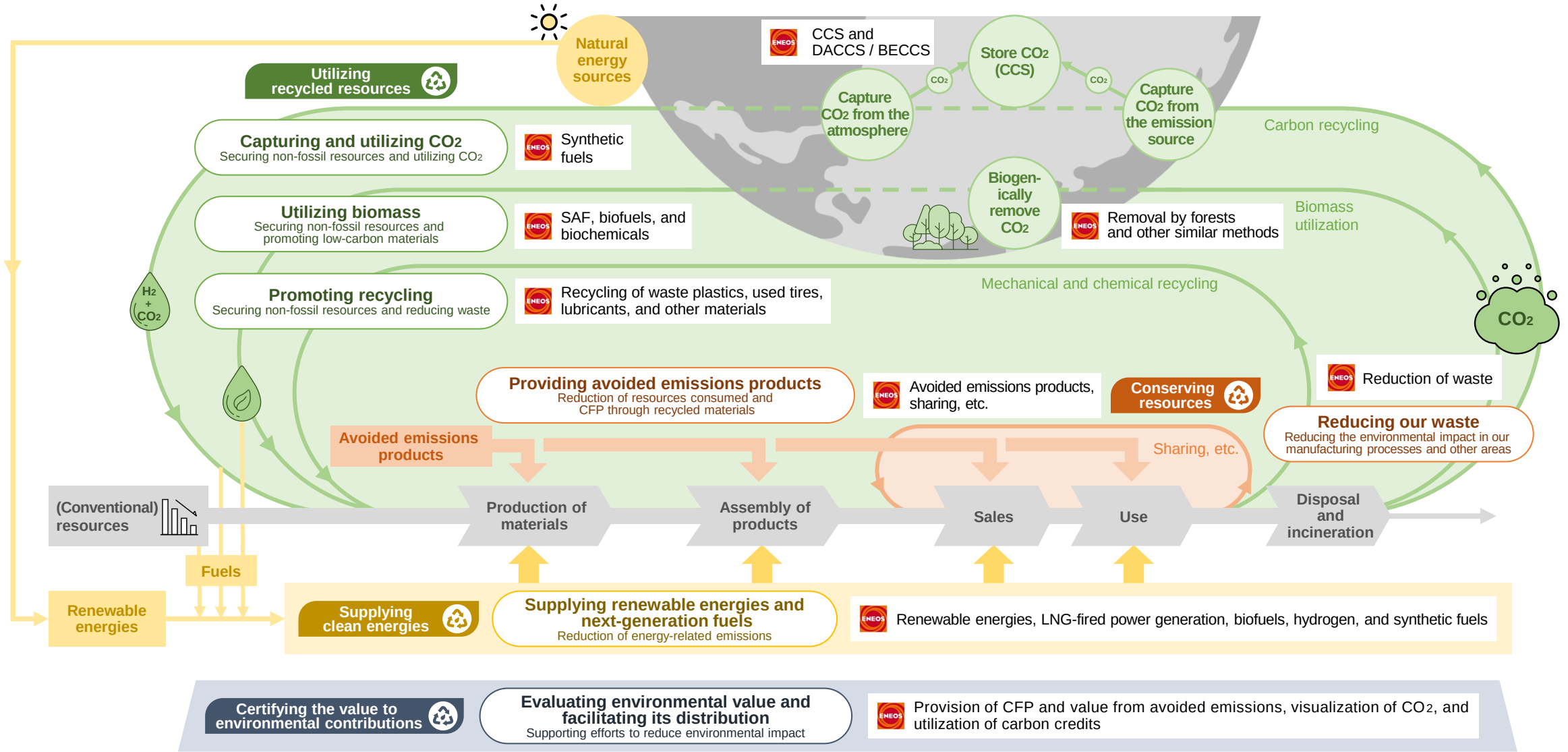
Aiming to Achieve a Circulating Society

We will strengthen circular economy initiatives across the entire supply chain to achieve a circulating society.



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DX Initiatives Supporting the Realization of a Carbon-Neutral Society

We accelerate initiatives toward the realization of a carbon-neutral society by leveraging DX technologies such as visualization of CO_2, AI, and materials informatics.

DX Initiatives by ENEOS Group Toward the Realization of a Carbon-Neutral Society

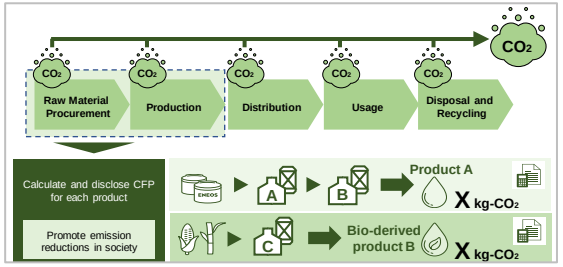
Visualization of CO_2

Data Collection → Analysis / Prediction → Execution

Offering CFP

Accelerating emission reductions in society through CO_2 visualization

- In collaboration with NTT DATA and WasteBox, we have developed CO_2 visualization system for refineries in the domestic oil industry and have begun disclosing the CFP for certain materials and lubricant products (Apr. 2024).



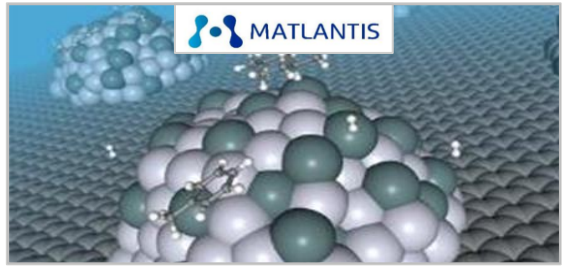
Development of Innovative Materials

Data Collection → Analysis / Prediction → Execution

Materials Informatics[1]

Accelerating development of materials contributing to emission reduction in society from both internally and externally the company

- In collaboration with Preferred Networks, we have developed the Matlantis™ AI×Simulation platform, and started providing the new version (ver.7). Since the start of provision externally as a SaaS solution in 2021, more than 100 companies and organizations have adopted (Dec. 2024).



Optimization of electricity supply and demand

Data Collection → Analysis / Prediction → Execution

EMS

Maximizing the use of renewable energies by adjusting the balance between electricity supply and demand

- We are building a virtual power plant [VPP] system[2] for comprehensively monitoring and controlling resources such as storage batteries and Evs, and continue expanding VPP resources when required.
- We utilize an optimal operation system (hammock®) equipped with proprietary AI to control large storage batteries (Aug. 2023).

Enhancement of manufacturing processes

Data Collection → Analysis / Prediction → Execution

Automated Operation of Plants

Automated plant operations that is more stable and efficient than manual operations

- We have successfully implemented AI-based autonomous operation of butadiene extraction equipment at Kawasaki Refinery's petrochemical plant (Jan. 2023).
- We have achieved the world's first continuous automated operations in atmospheric distillation unit, which is a large-scale oil refining plant (May 2024).

1 A technology that utilizes information science, such as machine learning, to enhance the efficiency of material development. 2 A system for the integrated control of decentralized energy sources to adjust power supply and demand.

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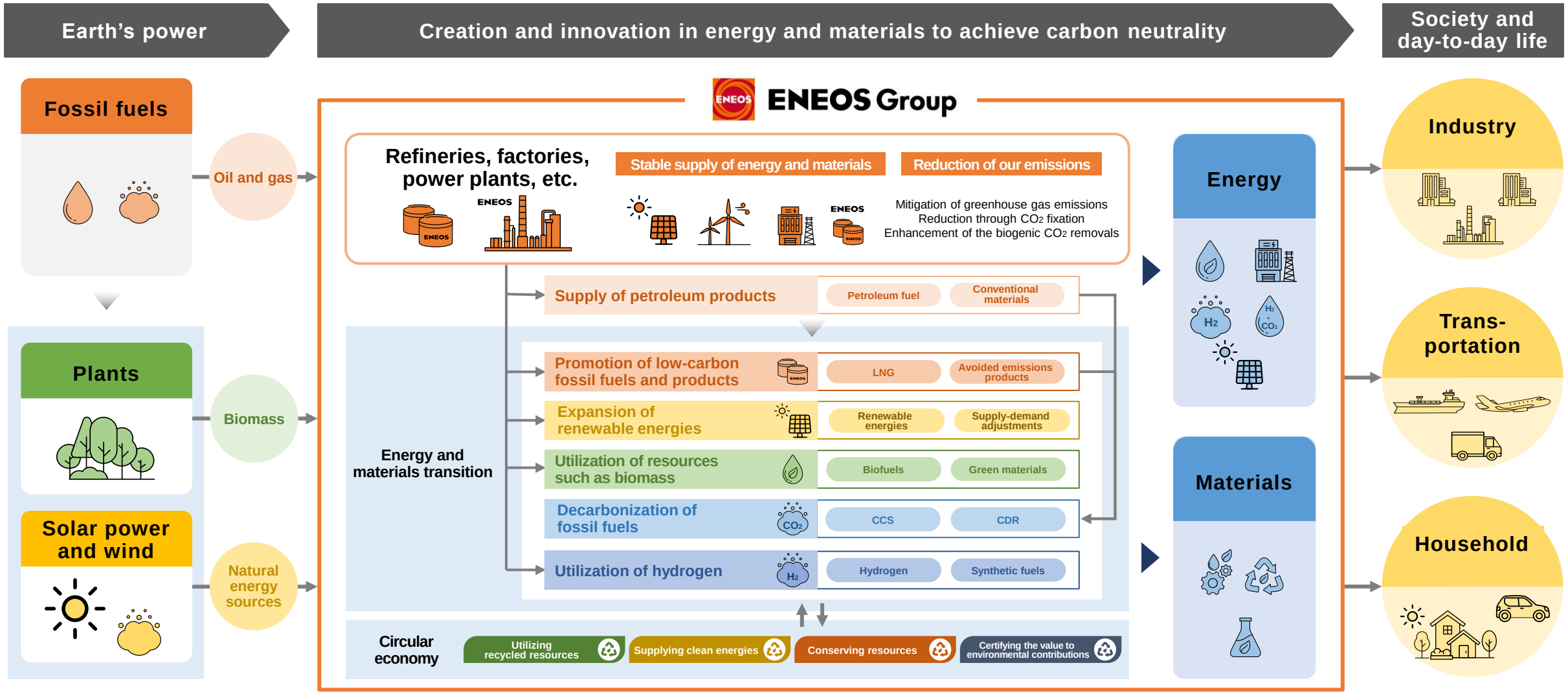
Harnessing the Earth's Power for the Common Good and for the Day-to-Day Life of Each Individual

The ENEOS Group will contribute to the development of our communities and help to ensure a vibrant future by fully leveraging our manufacturing facilities, achievements, experience, and expertise to balance energy and materials transition with a stable supply.



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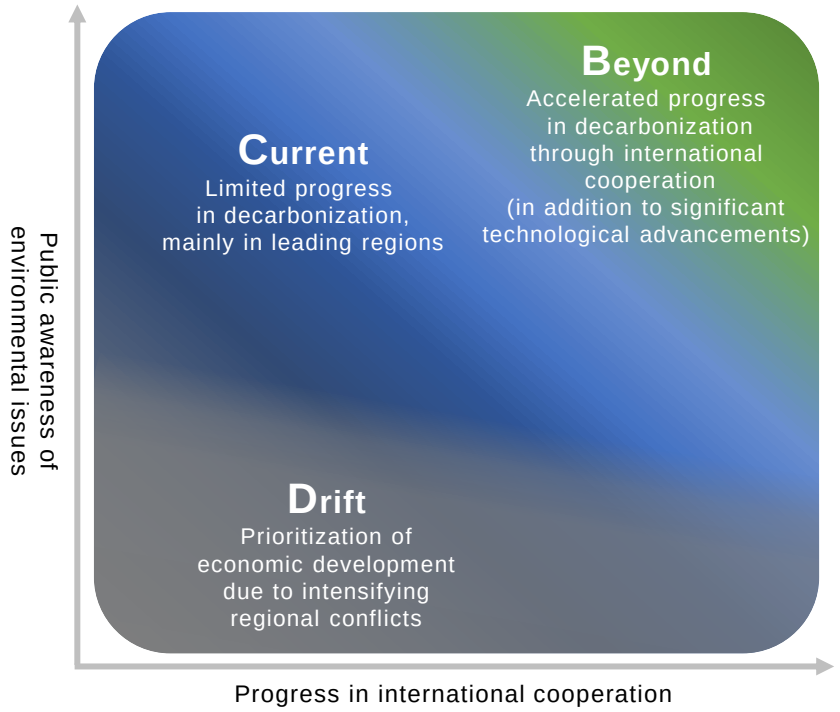
Appendix

Societal Scenarios

To respond more flexibly to uncertainties, we have presumed three societal scenarios.

ENEOS Group's presumed societal scenarios

Based on key drivers of public awareness and international relations, three societal scenarios have been presumed.[1]



Worldview in each scenario

	Social trends	Energy trends
Drift Scenario (+3.0 to 4.0℃[2])	■ Countries prioritize their own economies, resulting in **limited progress in decarbonization** ■ Environmental policies and government support in each country remain stagnant, and **the enforcement of emission reduction obligations is limited**	■ **Dependence on low-cost fossil fuels** that contribute to domestic economic growth ■ Further expansion of **renewable energies** is limited ■ The adoption of innovative decarbonization technologies is extremely limited
Current Scenario (+2.0 to 2.5℃[3])	■ While international cooperation on decarbonization remains limited, **environmental initiatives and policies progress, mainly in developed countries** ■ **Initiatives are advancing in sectors such as aviation and maritime vessels**, where the development of international regulations is progressing	■ **Low-carbon measures such as LNG and biomass** progress ■ Economically viable **renewable energies** are progress ■ Decarbonization technologies, such as **CCS**, are partially implemented
Beyond Scenario (+1.5 to 2.0℃[4])	■ Environmental awareness increases, and there is **progress in decarbonization globally** ■ Government support for decarbonization policies is significantly expanded, **driving innovation in decarbonization technologies**	■ **Fossil fuels usage declines** ■ **Renewable energies** adoption progresses significantly ■ Significant improvement in economic efficiency through the adoption of innovative technologies such as **hydrogen and CCS**

Progress of a carbon-neutral society

Figures in parentheses indicate the global average temperature[5]

1 These are scenarios based on the IEA WEO2024 and IPCC Sixth Assessment Report, and they don't indicate the emission reduction targets or strategies of the ENEOS Group toward achieving carbon neutrality.
2 IPCC Sixth Assessment Report, equivalent to C6 and C7 3 IPCC Sixth Assessment Report, equivalent to C4 and C5 4 IPCC The Sixth Assessment Report, equivalent to C1 to C3 5 Based on the average temperatures between 1850 and 1900

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Key Drivers of the Presumed Societal Scenarios

In presuming the societal scenarios for the ENEOS Group, we have identified the key drivers based on the following environmental analysis.

Drivers influencing divergence of societal scenarios

We evaluated and categorized highly uncertain drivers that affect the pathways for the reduction of greenhouse gas emissions, identified public awareness and international relations as key drivers, and then presumed societal scenarios based on these factors.

Social factors

Social situation

Social stability

Key driver 1

Public awareness

Citizens' intentionality toward environmental issues as reflected in civic activities and voting behavior

Key driver 2

International relations

Trends in energy security and international cooperation based on geopolitical risks

Political factors

Decarbonization policy

Reduction targets and decarbonization promotion policies to achieve those targets

Carbon price

Carbon pricing policies such as carbon taxes, CBAM[1], and emissions trading systems

Economic and trade policies

Economic growth potential and trade policies

Economic factors

Industrial and transport sectors

Activity levels of existing industries, new industries (such as data centers and semiconductors), and the transportation sector, etc.

Consumers and investors

Criteria for consumption and investment

Fossil fuels

Demand for fossil fuels

Technical factors

Decarbonization technology

Development trends in renewable energy technologies (such as offshore wind power), carbon removal technologies (such as CCS and CDR), and hydrogen-related technologies, etc.

Societal scenarios and presumed emission reduction pathways

1 A system that imposes import charges on specific products imported from outside the region based on carbon pricing.

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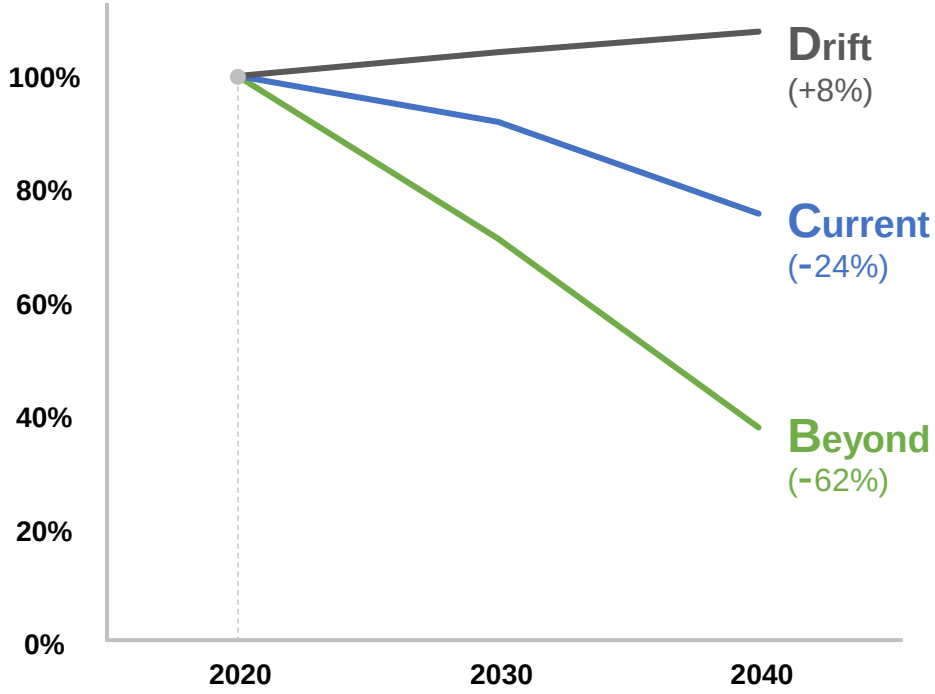
Global and Japan's Emission Reduction Pathways for Each Presumed Societal Scenario

We have developed an implementation plan to flexibly respond to each emission reduction pathway.

Global emission reduction pathways for each presumed scenario

We have presumed reduction pathways for global greenhouse gas emissions for three distinct societal scenarios, taking into account public awareness and international relations that can shift under unstable social conditions.

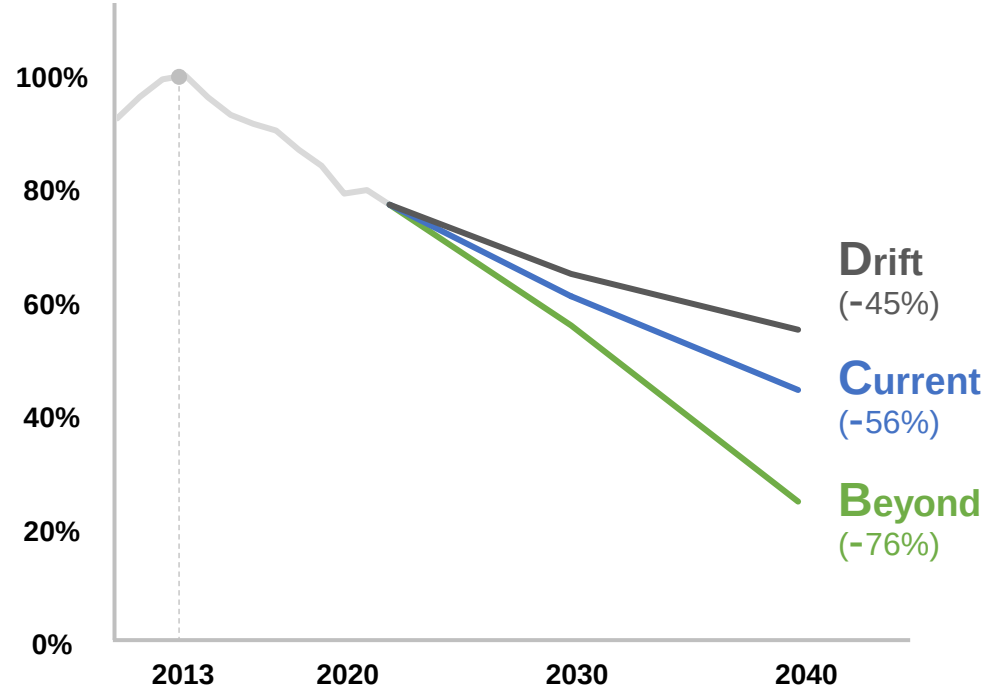
Global Greenhouse Gas Emissions[1] (2020 baseline)



Japan's emission reduction pathways for each presumed scenario

We have presumed Japan's emissions reduction pathways for each societal scenario, taking into account the circumstances of domestic drivers that can shift under the influence of international social dynamics.

Japan's Greenhouse Gas Emissions[1] (FY2013 baseline)



1 Based on future projections organized from IEA WEO2024 and IPCC Sixth Assessment Report, this does not represent the emission reduction targets or strategies for achieving carbon neutrality by the ENEOS Group.

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Initiatives for Reduction of ENEOS Group's Greenhouse Gas Emissions

Looking ahead to the widespread adoption of the GX-ETS in Japan, we will promote the reduction of our greenhouse gas emissions together with the government and society.

Initiatives for reduction of ENEOS Group's greenhouse gas emissions

		FY2030	FY2040	ENEOS Group measures
Greenhouse Gas Emission Target (Scope 1+2) Figures in the parentheses indicate the ratio against base year		**19 to 21 million tonnes or less (-38 to -46%)**	**10 million tonnes or less (-73%)**	–
	Methane emissions[2] (oil development department)	Less than 300 tonnes	±0	–
Estimated emissions based on the demand for fuels and other energy sources		**21 to 24 million tonnes**	**15 to 21 million tonnes**	■ Appropriate processing of crude oil (according to demand)
Mitigation of greenhouse gas emissions	**Reduction of greenhouse gas emissions In manufacturing and business operations**	**-0.5 to -1 million tonnes**	**-0.5 to -2 million tonnes**	■ Energy saving, fuel conversion, utilization of renewable energies
Reduction through CO_2 fixation[3]		**–**	**-1.5 to -5 million tonnes**	■ Promotion of Japanese CCS in response to government support
	CCS	**–**	**-1.5 to -4 million tonnes**	
	BECCS and DACCS, etc.	**–**	**-0 to -1 million tonnes**	
Enhancement of the biogenic CO_2 removals[3]		**-1 to -2 million tonnes**	**-2 to -6 million tonnes**	■ Creation of credits through removal by forests both in Japan and internationally ■ Exploration of blue carbon, methane reduction in rice paddies, and other initiatives
	Removal by forests	**-1 to -2 million tonnes**	**-2 to -5 million tonnes**	
	Removal by other similar methods	**–**	**-0 to -1 million tonnes**	

1 Base year greenhouse gas emissions (FY2013): 34 million tonnes 2 Methane emissions (FY2021): 1,600 tonnes
3 FY2040 targets are based on the assumption that the external environment, including policies, laws, and technological progress, is sufficiently developed to enable large-scale commercialization.

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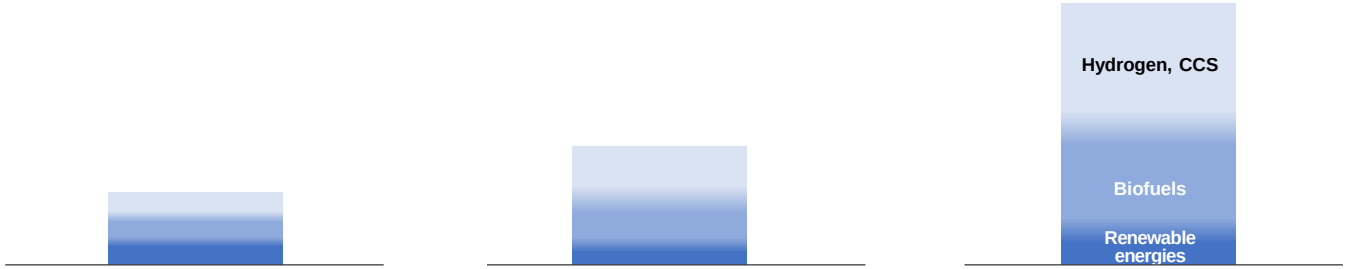
Contribution to the Reduction of Greenhouse Gas Emissions in Society

We have set milestones and will promote various initiatives to advance the transition in energy and materials and to drive a circular economy.

Initiatives for reduction of greenhouse gas emissions in society

			FY2030	FY2035	FY2040
Promotion of energy and materials transition	Energy	CI of supplied energy[1,2] (Scope 1+2+3, FY2020 baseline)	-5 to -8%	-10 to -15%	-20 to -50%
	Energy	Avoided emissions[3] (Energy)	4 to 7 million t-CO_2e	7 to 10 million t-CO_2e	15 million t-CO_2e or more
	Materials	Avoided emissions[3] (materials)	2.5 million t-CO_2e	3 million t-CO_2e	3.5 million t-CO_2e
Promotion of a circular economy		Percentage of green chemicals[4]	3 to 5%	Up to 20%	Up to 35%
		Green lubricant production volume		Up to 100 thousand kL	Up to 200 thousand kL



1 Sustainable aviation fuel 2 CI of supplied energy (index of CO_2 emissions [g] per energy supply [MJ]) reduction targets may be adjusted as necessary, taking into account the future application of SSBJ Climate Standard. . 2 The items included in CI are fuel oil, carbon neutral fuels (biofuels and synthetic fuels), hydrogen, electricity (LNG-powered and renewable energies), CCS (implement into in-house manufacturing processes and sites to which energies are supplied), carbon offsets, and so on. 3 Avoided emissions are estimated based on the GX League's guidelines for emission reduction measures consistent with the Ministry of Economy, Trade and Industry's Technology Roadmap for each sector. Energy is based on stock; materials are based on flow. 4 Percentage of green chemicals to the production volume of naphtha cracker-derived products.

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Initiatives for Transition in the Fuels Sector

While prioritizing the supply of LNG and biofuels, we are promoting the development of next-generation technologies and initiatives for demonstration in preparation for the transition to new societal scenarios.

Initiatives by ENEOS Group in each sector toward the realization of a carbon-neutral society

Fuels | Electricity | Materials

Production and expansion of natural gas and LNG

Building a fuel base for the transition period

We are promoting the reduction of CO_2 emissions intensity unit by developing and expanding low-carbon fuels, which are expected to see increased demand as transitional energy during the transition period.

Production of natural gas and LNG

- In 2023, we signed a contract to acquire LNG interests in Papua New Guinea, and additional production from the Angore gas field began in 2024.

Expansion of biofuel supply

Addressing early demand in specific industries

We are promoting the expansion of the biofuel supply (such as SAF, HVO, FAME, ethanol blends, etc.) to meet industry-specific regulations and achieve targets in the aviation, maritime, and road transportation sectors.

SAF

- A stable supply system for SAF is being established through SAF production in Japan and imports from overseas. We are considering the commercialization of the first SAF (HEFA) production unit in Wakayama, with a capacity of 400 thousand kL per year.

Development of next-generation technologies such as hydrogen

Social implementation in response to growing decarbonization needs

We are promoting the early development and implementation of value chains for next-generation decarbonization technologies, such as hydrogen, in collaboration with the government and other companies.

Hydrogen

- Utilizing government support, such as GX transition bonds, along with our assets, including refineries, we are promoting the development of receiving facilities within industrial complexes and the construction of supply chain.

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Initiatives for Transition in the Electricity Sector

We are promoting the expansion of supply through infrastructure development for next-generation power generation, such as LNG and renewable energies, alongside initiatives to optimize the supply and demand for electricity using battery storage.

Initiatives by ENEOS Group in each sector toward the realization of a carbon-neutral society

Fuels | **Electricity** | Materials

Development and expansion of LNG-fired power generation

Development of LNG-related infrastructure

We are promoting the reduction of CO_2 emissions intensity by developing and expanding low-carbon power sources, which are expected to see increased demand as transitional energy during the transition period.

LNG-fired power

- The state-of-the-art and high-efficiency Goi Thermal Power Plant, which employs gas turbines and a combined cycle [GTCC] system fueled by LNG, has begun operations. With a total capacity of 2.34 million kW across Units 1, 2, and 3, it ensures a stable power supply.

Expansion of renewable energies hubs and supply

Proactive securing of power sources in response to growing demand

We are promoting the expansion of renewable energies hubs, including solar and onshore wind power, that leverage the unique characteristics of each region.

Solar and onshore wind power

- Efforts are underway to expand the number of installations and generation capacity, with a focus on solar and onshore wind power. For example, commercial operations for a solar power plant in Kamaishi City, Iwate Prefecture, and a wind power plant in Kitsuki City, Oita Prefecture, are set to begin in April 2025.

Optimization of the supply and demand for electricity

Promoting efficient use of renewable energies

By storing electricity during surplus periods and discharging it during shortages, we aim to stabilize the supply-demand balance and promote the efficient utilization of renewable energies.

Battery storage business (VPP)

- Large-scale battery storage systems were installed at our refineries, such as Negishi Refinery and Muroran Manufacturing Plant. Using our AI technology to control and optimize charging and discharging, we will contribute to stabilizing the electricity supply-demand balance.

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Initiatives for Transition in the Materials Sector

We will strengthen initiatives to expand the supply of avoided emissions products, as well as promote the utilization of biomass and recycled resources.

Initiatives by ENEOS Group in each sector toward the realization of a carbon-neutral society

Fuels | Electricity | **Materials**

Expansion of supply for products contributing to reduction

Low-carbonization across the entire supply chain

By developing and providing avoided emissions products, such as raw materials for fuel-efficient tire materials and fuel-saving lubricants, we aim to promote emission reductions across the entire supply chain.

Raw materials for fuel-efficient tires

- We independently developed and provide fuel-efficient tires that use solution styrene butadiene rubber on the treads. These tires contribute to improving vehicle fuel efficiency and reducing CO_2 emissions.

Utilization of biomass materials for raw materials

Response to the demand for resource conservation and CFP reduction

By transitioning to bio-based materials, such as biochemicals and biomass-based lubricants, we aim to promote the reduction of the impact on the environment throughout the product lifecycle.

Biochemical

- Established a supply chain for sustainable PET resin made from bio-paraxylene in collaboration with Suntory and Mitsubishi Corporation.

Biomass-based lubricants

- Sales of lubricants and grease products made from plant-based raw materials, the "ENEOS GX Series."
- Development of engine oil made with 100% plant-based base oil.

Expansion of the use of circular resources

Response to the demand for utilizing circular resources

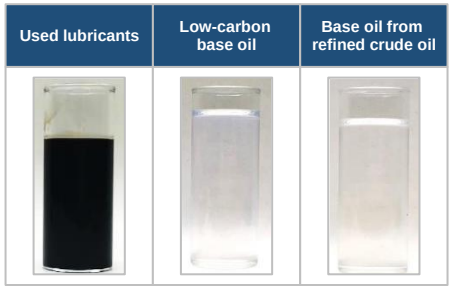
Promoting recycling technologies and product manufacturing to address the growing social demand for resource circulation, driven by the finite nature of resources and the need to reduce the environmental impact.

Plastic recycling

- In collaboration with Mitsubishi Chemical, the largest plastic liquefaction facility in Japan is scheduled to begin operations in the Kashima area in FY2025.

Resource circulation of lubricants

- Successfully produced low-carbon base oil from used lubricants as part of a project commissioned by Japan's Ministry of the Environment.



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Consideration for Biodiversity Conservation in Achieving a Carbon-Neutral Society

We will promote energy and materials transition initiatives while considering the impact on ecosystems and other related factors.

Consideration for biodiversity conservation in achieving a carbon-neutral society

In the process of reducing greenhouse gas emissions to achieve a carbon-neutral society,
we will promote initiatives that take into account the impact on natural capital, harmony with ecosystems, and coexistence with local communities.

Promotion of low-carbon fossil fuels and products | Expansion of renewable energies | Utilization of resources such as biomass | Decarbonization of fossil fuels | Utilization of hydrogen

Promotion of energy and materials transition

Consideration of impact

Land | Ocean | Fresh water | Atmosphere

Initiatives to consider the impact on biodiversity on land

Solar and onshore wind power generation, and biomass resources

In expanding solar and onshore wind power generation, we **consider the impact on forest ecosystems**. Additionally, in utilizing biomass resources, we undertake initiatives such as **obtaining certifications that consider forest conservation and the impact on land use**.

Forests

In initiatives related to generating credits through CO_2 removal by forests, we will **implement forest management that considers biodiversity in collaboration** with local communities and municipalities.

Land

Initiatives to consider the impact on biodiversity in the ocean

Offshore wind power generation

In advancing the introduction of offshore wind power generation, we conduct preliminary **environmental assessments that consider the impact on marine ecosystems.**

Blue Carbon

In generating blue carbon credits through CO_2 removal by seaweed, we will contribute to **ecosystem conservation through the creation and restoration of seaweed beds.**

Ocean

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