Carbon Neutrality Plan 2025 Edition

Message from the CTO

We are determining the technological direction for carbon neutrality to contribute to the advancement of the business strategies of the entire Group.

Fujiyama Yuichiro
Senior Vice President, CTO
In charge of Carbon Neutral Strategy Dept.,
Central Technical Research Laboratory
ENEOS Holdings, Inc.

Energy-related social trends have changed. While we are fundamentally in line with the major shift in direction toward decarbonization, we are still in an environment where emphasis is placed on a stable and economical supply of energy, including petroleum. We recognize that this is largely due to heightened uncertainty, stemming from rising awareness of energy security, policy risks in various countries, and the increasing costs of achieving a decarbonized society.

Taking these changes into account, when formulating the Carbon Neutrality Plan 2025 edition, which was published in May 2025, we began by establishing multiple scenarios.

In an era of heightened uncertainty, formulating a business strategy based on a single forecast of the future carries risks. While the movement toward carbon neutrality is advancing steadily, the pace may speed up or slow down depending on global conditions. Therefore, the ENEOS Group is using multiple scenarios for social changes and visions for the future. And in any scenario, it is the Group's mission to continue supplying the energy and materials needed by customers and society. The Carbon Neutrality Plan 2025 edition was formulated with this strong resolve. In addition, the ENEOS Group Carbon Neutrality Policy has been updated in this plan as shown at right.

Fossil resources remain an energy source that our world will have no choice but to rely on for the foreseeable future, and the technologies to utilize them effectively remain critical. Digital technology development that contributes to the efficient operation of refineries and other facilities, as well as carbon dioxide capture and storage (CCS), are key pieces of the puzzle. Meanwhile, renewable energy must be made more affordable and used without waste. It is also important to refine the technologies required for energy management, including AI technology, which is already in practical use. While the effective utilization of biomass presents issues of competition with food and limitations in terms of quantity, it remains an important, economically rational means of achieving carbon neutrality for the time being. Furthermore, as the transition progresses, hydrogen and synthetic fuels will play an important role in ensuring a stable energy supply.

In these uncertain times, we must establish the technologies that society needs so that we can respond quickly to any situation. This is the mission of the Group's technology resources, who support today's normal while taking the lead for tomorrow's normal.

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.*

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.

* 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.

Carbon Neutrality Plan 2025 Edition

In May 2023, the Group announced its Carbon Neutrality Plan, which aims to achieve a carbon-neutral society in cooperation with the government and society. Based on subsequent changes in the business environment, we formulated the 2025 edition of the plan together with our fourth Medium-Term Management Plan.

The new Carbon Neutrality Plan was the subject of extensive discussions at meetings of the Carbon Neutrality Promotion Committee (chaired by the CTO), which was established in fiscal 2024. Amid growing uncertainty surrounding decarbonization, we established three societal scenarios and revised our Carbon Neutrality Policy. To reduce the Group's operational emissions, we have aligned our reduction targets with Japan's Nationally Determined Contributions (NDCs), and to contribute to the reduction of downstream emissions from sold products, we have created roadmaps for energy and materials transitions that meet societal demands. We will continue to lead the supply of energies and materials necessary for these transitions.

→ For details, see our corporate website.

WEB Measures to Realize a Carbon-Neutral Society
https://www.hd.eneos.co.jp/english/about/carbon_neutral/

ENEOS Group's Presumed Societal Scenarios

Progress of a carbon-neutral society	Scenario	Societal trends	Energy trends	Global average temperature[4]	Global emissions[5] (2040)
	Drift	**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°C**	**+8%**
	Current	**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°C**	**-24%**
	Beyond	**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°C**	**-62%**

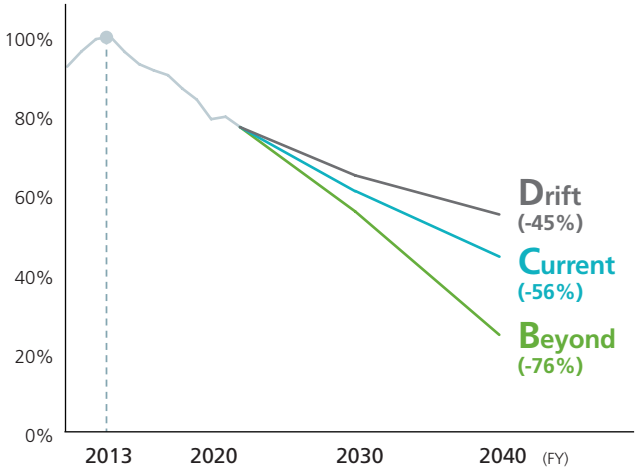
4 Projected temperature changes by 2100 relative to 1850–1900 levels 5 Uses emissions from 2020 as the base year

Scenario Analysis

The Group conducts scenario analysis in response to changes in the external environment. In the scenario analysis for the Carbon Neutrality Plan 2025 edition, three scenarios—Drift, Current, and Beyond—were used based on STEPS[1], APS[2], and NZE[3] from the IEA's World Energy Outlook 2024, and the IPCC Sixth Assessment Report. We believe that by formulating and executing strategies based on these scenarios, we can maintain a high level of resilience. The fourth Medium-Term Management Plan was also formulated within the scope of the same three presumed scenarios.

1 Stated Policies Scenario: A scenario that reflects government policies already announced
2 Announced Pledges Scenario: A scenario that assumes that countries will achieve their ambitious targets
3 Net Zero Emissions by 2050 Scenario: A scenario in which the world will achieve net zero in 2050

Japan's Greenhouse Gas Emissions (Fiscal 2013 Baseline)



Risks and Opportunities

The Group implements enterprise risk management (ERM) (see page 68). Based on the ERM process, we recognize that our response to climate change involves both material management risks and opportunities, which we have identified in the table below. For transition risks, we estimated higher costs for achieving carbon neutrality based on CO_2 emission reduction targets, and we estimated the decline in petroleum demand within the scope of our presumed societal scenarios. We estimated physical risks based on the IPCC RCP 8.5 scenario[1] as the stress case. However, these estimates include many potential risks, uncertainties, and assumptions, and changes in material factors may lead to significantly different outcomes.

1 Intergovernmental Panel on Climate Change (IPCC) assessment scenario, in which the global average temperature rises by approximately 4°C by 2100 compared to the period from 1986 to 2005

Financial Impacts for Each Timeline of Identified Risks and Opportunities

Category		Financial impact			
		Short term (2027)	Medium term (2030)	Long term (2040)	Assessment method
Transition risks	• Higher costs for achieving carbon neutrality	None	¥45 billion/year	¥110 billion/year	Amount of decline in operating profit when the 2030 target reduction of 6 million tonnes and the 2040 target reduction of 15 million tonnes are multiplied by the internal carbon price[2] 2 50 US dollars/t-CO_2 (fiscal 2024)
	• Decline in petroleum demand due to the progress of energy transition • Declining demand for petroleum due to growing environmental awareness	Limited impacts	Approx. ¥20 billion/ year decline	Approx. ¥80 billion/ year decline	Amount of decline in operating profit if domestic petroleum demand is expected to decrease by approximately 10% in 2030 and by 40% in 2040 compared to 2023 (calculated based on fiscal 2023 operating profit)
	• Stranding of upstream oil assets	Limited risk			Estimation of oil upstream asset reserves based on the number of extractable years discounted by current production
Physical risks	• Increasing frequency and severity of wind and flood damage due to extreme weather events (major typhoons) and rising sea levels	¥100 to ¥200 million/year			Referenced the IPCC RCP8.5 scenario for estimation of the total amount of damage (decrease in operating profit) using WRI Aqueduct[3], etc. for 31 of our facilities and assets in Japan, such as refineries and smelters 3 A water risk assessment tool developed by the World Resources Institute
	• Rising sea levels caused by global warming	Limited risk			Estimated from amount of increase (approx. 0.2 meters) in sea level around Japan as of 2040 as projected by Aqueduct
Opportunities	• Increasing demand for decarbonization (renewable energy, hydrogen, carbon-neutral fuels, etc.)	Up to ¥10 billion/year	Up to ¥30 billion/year	Up to ¥180 billion/ year	Operating profit estimated based on certain assumptions about the estimated market size, the Company's market share, and operating profit margin due to an expected increase in demand for renewable energy, hydrogen, and carbon-neutral fuels associated with advancements toward a decarbonized, circulating society
	• Increasing demand for low-carbon solutions (LNG, biofuels, green materials, etc.)	Up to ¥50 billion/year	Up to ¥120 billion/ year	Up to ¥220 billion/ year	Demand for LNG, biofuels, etc. is expected to increase as energy sources during the transition period toward carbon neutrality. Operating profit is estimated based on certain assumptions regarding the estimated market size, the Company's market share, and operating profit margin.

Note: The above was developed in May 2025. It will be reviewed as appropriate in accordance with changes in various conditions surrounding the economy and the formulation of our medium- to long-term business strategies.

Carbon Neutrality Plan 2025 Edition

Reduction of operational emissions (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 fiscal 2040 and carbon neutrality for operational emissions by fiscal 2050.

Working Toward Carbon Neutrality by Fiscal 2050

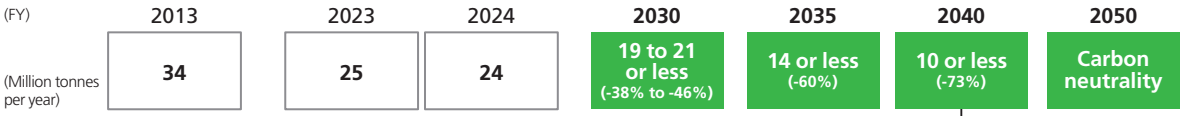
The Group aims to reduce operational emissions by 73% compared to fiscal 2013 by fiscal 2040 and to become carbon neutral by fiscal 2050. This target is consistent with the Japanese government's targets and is in line with the Group's policy, which calls for working together with the government and society to achieve a carbon-neutral society.

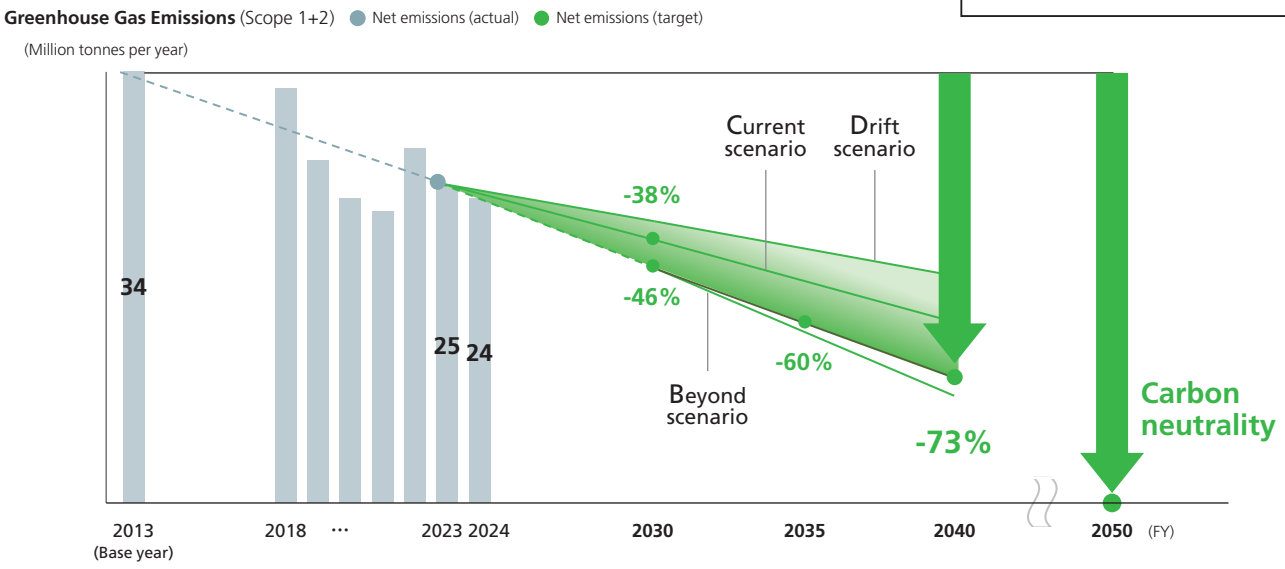
To achieve this target, we will mitigate greenhouse gas emissions by appropriately processing crude oil according to demand, reducing greenhouse gas emissions in manufacturing and business operations through energy saving, fuel conversion, utilization of renewable energies, etc., and utilizing carbon credits. We will also work to reduce emissions through CO_2 fixation using carbon dioxide capture and storage (CCS) and enhance biogenic CO_2 removals by generating carbon credits through removal by forests and other methods.

Emissions Results for Fiscal 2024

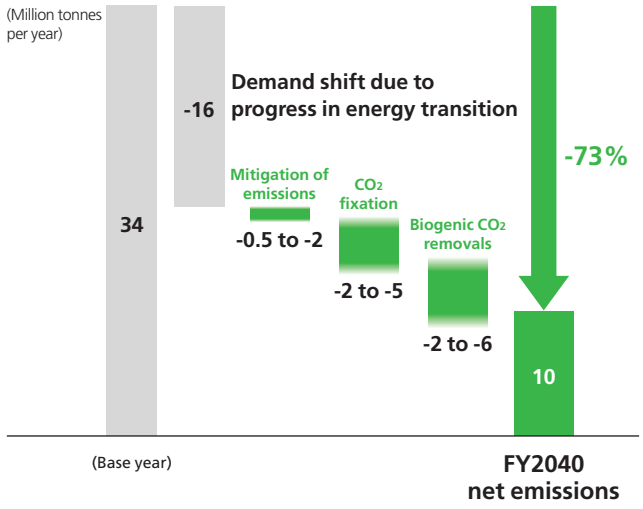
In fiscal 2024, the Group's CO_2 emissions (Scope 1+2) totaled 24.7 million tonnes (preliminary figures), a decrease from 25.4 million tonnes in the previous fiscal year, resulting from improvements in refinery efficiency and a decline in domestic demand.

Greenhouse Gas Emission Target (Scope 1+2)*





Assumed Reduction of Greenhouse Gas Emissions



* 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.
Assumes that the external environment, including policies and regulations by the government and other parties, has been sufficiently developed to achieve Japan's nationally determined contributions (NDCs) across the entire nation.

Contribution to the reduction of downstream emissions from sold products (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 by fiscal 2050.

Promoting the Transition and a Circular Economy in Response to Societal Demands

The Group aims to achieve carbon neutrality, including Scope 3, by fiscal 2050. However, there are many uncertainties in the presumed scenarios (see page 31). We will flexibly promote the transition to ensure a stable supply of energy and materials, whatever the future holds. In response to societal demands and in step with the government and society, we will promote, for example, the use of low-carbon fossil fuels and products, the expansion of renewable energies, the utilization of biomass and hydrogen, and the decarbonization of fossil fuels through CCS and carbon dioxide removal (CDR). We will also focus on initiatives for a circular economy (see page 35) to realize a circulating society.

Vision for Fiscal 2040

Working toward carbon neutrality in fiscal 2050, we have established our vision for fiscal 2040 as shown in the table below. By setting targets that allow us to see the overall picture in terms of the energy and materials transitions, namely, CI values and reduction contributions, we will be able to select measures with greater economic rationality in accordance with the ever-changing business environment.

Vision for Fiscal 2040 for Achieving Carbon Neutrality by Fiscal 2050

Promotion of energy and materials transition

Progress of transition in society

		Carbon intensity (CI)[1] of supplied energy (FY2020 baseline)	
		-20% to -50%	
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	Avoided emissions[2] (energy)	Avoided emissions[2] (materials)
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, ethanol-blended gasoline, methanol, and biochemicals		
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

		Percentage of green chemicals[3]	Green lubricant production volume
Promotion of resource recycling and resource conservation	• **Expanding product supply by utilizing recycled resources** • Contributing to **resource conservation through materials and services**	Up to 35%	Up to 200 thousand kL

1 The CI of supplied energy (an indicator of CO_2 emissions [g] per unit of energy supply [MJ]) may be adjusted as necessary, taking into account the future application of climate change-related standards of the Sustainability Standards Board of Japan (SSBJ).
2 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.
3 Ratio of products made from green chemicals to ones made from crude oil processed by a naphtha cracker

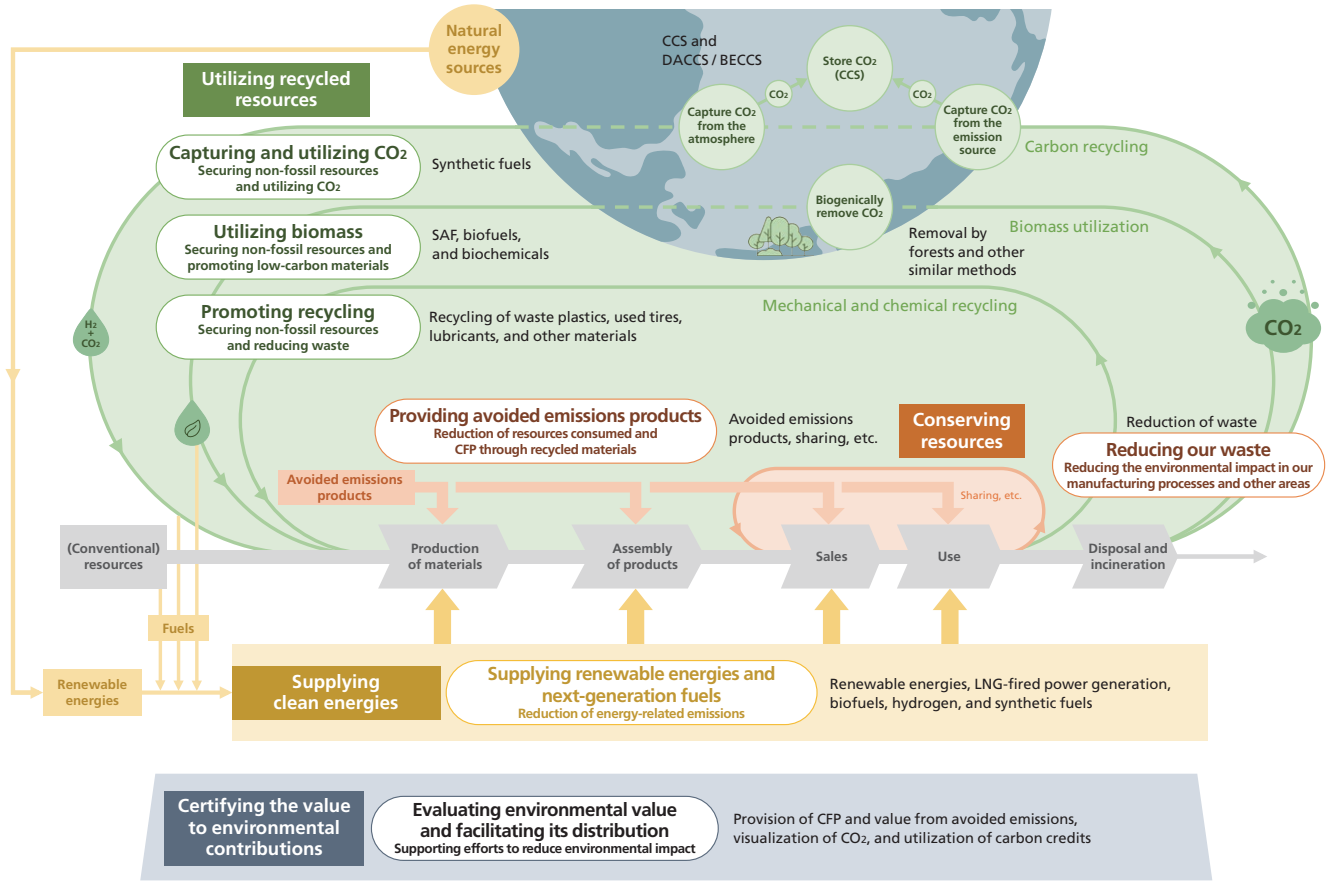
Pursuit of a Circular Economy

Society is shifting from a linear economy[4] based on mass consumption to a circular economy based on resource recycling. A circular economy goes one step further than the 3Rs by considering the environment from the design stage, using maintenance to lengthen product life, and enhancing usage efficiency by incorporating leasing and sharing.

The Group is helping to realize a circular economy, and by extension a carbon-neutral, circulating society, in the materials and services field by shifting to non-fossil raw materials and developing sharing businesses.

4 An economic system where products flow in a single direction with resources being consumed and disposed without recycling or reuse

Circular Economy Initiatives for Realizing a Circulating Society Not Dependent on Conventional Resources



ENEOS Group's Action Guidelines for Realizing a Circulating Society

The Group has established three action guidelines for realizing a circulating society and identified areas for initiatives based on these guidelines.

In the materials and services area, we will supply products that utilize recycled resources and work to conserve resources. In the energy area, we will reduce CO_2 emissions throughout the supply chain by supplying the clean energies necessary for resource recycling. We will also leverage changes in society, such as changes in consumer behavior and the value placed on environmental contributions, as opportunities to supply products and services that address social needs arising from these changes.

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**

Examples of Initiatives and Activities in Fiscal 2024

We have established policies and are implementing various measures to reduce both operational emissions and downstream emissions from sold products (see tables below).

Reduction of Operational GHG Emissions

As part of its efforts to reduce greenhouse gas emissions, ENEOS became the first company in Japan's lubricants industry to begin offering carbon footprint of products (CFP) for lubricant and grease products in October 2024. We are working to visualize CO_2 emissions and establish a CFP calculation system.

Also in October 2024, two projects undertaken by the Group to reduce CO_2 emissions through CO_2 fixation were selected for inclusion in Japanese Advanced CCS Projects. We are committed to building an integrated CCS value chain, from CO_2 separation and capture to transportation and storage.

To enhance biogenic CO_2 removals, we have been working with six partners, including forestry public corporations and associations, with whom we began collaborating in fiscal 2024, to generate J-Credits[1].

1 A system in which the government certifies greenhouse gas emission reductions and removal amounts as credits

Contribution to the Reduction of Downstream GHG Emissions from Sold Products

In the energy and materials transition, we are moving forward with initiatives such as the full operation of the Goi LNG Thermal Power Plant, the start of operation of renewable energy power plants, the first import and sale of SAF by a Japanese oil refiner, and the operation of shuttle buses powered by synthetic fuel for the Osaka-Kansai Expo.

In promoting a circular economy, we have successfully produced low-carbon base oil from used lubricants. We are strengthening our collaboration with Bridgestone Corporation and JGC Holdings Corporation to commercialize tires made from plant-based synthetic rubber.

Reduction of Operational Greenhouse Gas Emissions[2]

Policies on initiatives	ENEOS Group measures	Progress and examples of activities in FY2024
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[3]	• Improvements in refinery efficiency resulted in Scope 1 and 2 emissions for fiscal 2024 totaling 24.7 million tonnes (preliminary figure), a decrease from 25.4 million tonnes in the previous fiscal year.
Reduction through CO_2 fixation	• CCS (Carbon dioxide capture and storage) (Including new methods such as BECCS[4] and DACCS[5])	• The Northern Offshore Malay Peninsula and Offshore Western Kyushu projects were selected as Japanese Advanced CCS Projects for fiscal 2024.
Enhancement of the biogenic CO_2 removals	• Generating carbon credits through removal by forests and other similar methods[6]	• Cooperation agreements signed with Wakayama Public Corporation for Forests and Greenery, Fukushima Midorino Morizukurikosha Public Interest Incorporated Association, and JForest Tsurui Village in Hokkaido

Contribution to the Reduction of Downstream Greenhouse Gas Emissions from Sold Products

Policies on initiatives	ENEOS Group measures	Progress and examples of activities in FY2024
Promotion of energy and materials transition	• Promotion of low-carbon fossil fuels and products (LNG and avoided emissions products) • Expansion of renewable energies (power generation development and supply-demand adjustment) • Utilization of resources such as biomass (biofuels and green materials) • Decarbonization of fossil fuels (CCS/CDR[7]) • Utilization of hydrogen (hydrogen and synthetic fuels[8])	• LNG-fired Goi Thermal Power Plant began full operations • Nine solar and onshore wind power plants began operations • First oil refiner to import SAF and begin supplying it to Japan Airlines Co., Ltd. • Two Group projects selected for the FY2024 Japanese Advanced CCS Projects • Operation of synthetic fuel shuttle buses at the Osaka-Kansai Expo
Promotion of a circular economy	• Resource recycling, resource conservation, clean energy supply, and certifying the value to environmental contributions	• Successfully produced low-carbon base oil from used lubricants • Strengthening collaboration to commercialize tires made from synthetic rubber derived from plant resources

2 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. 3 This includes non-fossil certificates and other similar mechanisms.
4 Bioenergy with carbon capture and storage. Capture and storage of CO_2 emitted during biomass power generation 5 Direct air capture with carbon storage. Direct capture and storage of CO_2 from the atmosphere
6 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. 7 Carbon dioxide removal 8 This includes bio-derived fuels.