

Disclosure based on TCFD Recommendations



Foreword

The J-POWER Group has positioned striking a balance between “stably supplying energy” and “addressing climate change” as its priority management challenge in order to do its part for the realization of a sustainable society. To address this priority challenge, in February 2021, we released the J-POWER “BLUE MISSION 2050” as our action plan aimed at achieving carbon neutrality and a hydrogen society by 2050.

In addition to agreeing with the recommendations formulated by the Task Force on Climate-related Financial Disclosures (TCFD), the J-POWER Group is pursuing the disclosure of information in line with “governance,” “strategy,” “risk management” and “indicators and targets” pertaining to climate change-related risks and opportunities, whose disclosure is recommended by TCFD. The Group also discloses information based on the “Guidance on Indicators, Targets and Transition Plans” released by TCFD in October 2021.

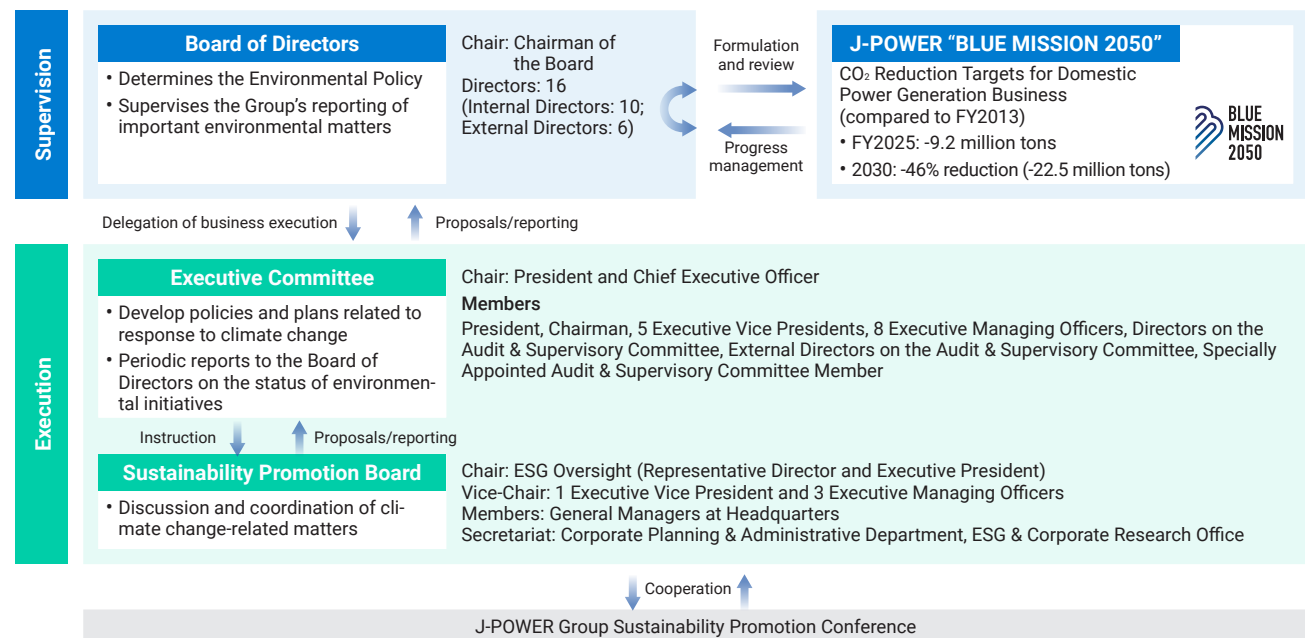
The figures in this scenario analysis have the potential to fluctuate due to various conditions that include the state of operation of power generation facilities and the external environment. As such, they have been simplified and calculated under certain suppositions solely for the purpose of ascertaining the sense of scale of the impact involved.

Governance

The J-POWER Group has identified “response to climate change” as one of its material issues. Important matters pertaining to that issue are determined by the Board of Directors. Additionally, the Group has established a sustainability framework supervised by the head of ESG Oversight (currently the President and Chief Executive Officer), who is appointed by the Board of Directors. In addition to establishing the Sustainability Promotion Board, the Group has also established the J-POWER Group Sustainability Promotion Conference to work towards promoting sustainability, including environment-related initiatives, for the Group as a whole.

The Sustainability Promotion Board convenes three or more times a year to deliberate areas such as strategy, planning and measures related to sustainability in general and risk management. It proposes and reports important matters out of those deliberated to the Board of Directors or the Executive Committee.

Governance framework related to climate change



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Governance

Since the establishment of J-POWER “BLUE MISSION 2050” in February 2021, the Board of Directors has been monitoring the progress of initiatives by management, receiving feedback through dialogues with shareholders and other stakeholders, and appropriately identifying changes in the business environment (including policy and international conditions), and discussing updates and revisions to the contents of the plan every year.

Recently, all Board members, including Independent Outside Directors, held several active discussions on whether our 2030 CO₂ reduction target set in February 2021 is at an appropriate level in light of the reduction target of Japan’s NDC, a party to the Paris Agreement.

From the discussions, we decided to raise the 2030 reduction

target (1.3 million tons) in May 2023 based on progress made in expanding mixed combustion of biomass and establishing a joint venture for the social implementation of CCS in Japan, expansion of renewable energy introduction and the actual reduction in CO₂ emissions from coal-fired power generation. Our new 2030 CO₂ reduction target will be a 46% reduction from the fiscal 2013 level, which is in line with the reduction target of Japan’s NDC.

In addition, from the perspective of sustainability management, the Nomination and Compensation Committee, whose chair and majority are Independent Outside Directors, held multiple discussions on the method of evaluating non-financial value from materiality initiatives in the officer compensation system.

Based on the committee’s conclusions, the Board of Directors decided to introduce five materialities as non-financial targets for

the evaluation of performance-linked compensation, including climate change initiatives such as achieving new renewable energy development targets and CO₂ reduction targets.

The Board of Directors of J-POWER will strive to appropriately manage climate change-related risks and prevent damage to corporate value through the realization of J-POWER “BLUE MISSION 2050,” while simultaneously viewing change as an opportunity for sustainable growth and increased corporate value.

Recent matters determined and deliberated with respect to sustainability in the governance framework

Determined by the Board of Directors	<ul style="list-style-type: none"> • Formulation of Basic Policy on Sustainability • Identification of material issues • Setting of interim targets for CO₂ reduction (FY2025) • Raise CO₂ reduction target (2030) • Introduce non-financial targets (materiality) in the evaluation of performance-linked compensation for executives • Feedback by Board of Directors on shareholder proposals regarding climate change
Determined by the President after deliberation by the Executive Committee	<ul style="list-style-type: none"> • Preliminary deliberations on matters proposed by the Board of Directors • Basic Policy on Environment and forecast on targets
Determined by the General Managers after deliberation by Sustainability Promotion Board Committee	<ul style="list-style-type: none"> • Preliminary deliberation of matters to be discussed by the Board of Directors and the Executive Committee • Setting of material issue targets (KPI) • Revision of Sustainability Promotion Regulations

Major recent reports to the Board of Directors related to climate change

- Domestic and overseas trends on climate change issues
- Basic policy regarding Green Transformation (GX) League
- Disclosure policy based on TCFD recommendations
- Actual CO₂ emissions (Scope 1-3)
- Dialogue with external stakeholders regarding climate change
- ESG evaluation
- Progress of ESG-related initiatives

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Governance

Officers' Compensation

J-POWER has established a policy for determining details of individual compensation, etc. for Directors (excluding those who serve as members of the Audit & Supervisory Committee) as stipulated in Article 361, Paragraph 7 of the Companies Act, as follows, by resolution of the Board of Directors after the deliberation by the Nomination and Compensation Committee, whose chairperson and majority of members are outside directors. Under this policy, the Representative Director President determines specific details of individual monthly compensation, performance-linked compensation and stock-based compensation for each Director (excluding those who are members of the Audit & Supervisory Committee) based on delegation from the Board of Directors.

The reason for delegating the authority for these decisions to the Representative Director President is that the Company has deemed that the Representative Director President is the most appropriate person to conduct evaluations while maintaining an overview of the performance of the Company as a whole. The Company has established a policy for determining the amount of compensation for each individual Director (excluding those who are members of the Audit & Supervisory Committee) as shown on the right, based on the basic policy of linking compensation to business performance and corporate value as well as providing an incentive for sustained improvement in business performance and an increase in corporate value over the long term.

The compensation structure and payment rate for Directors (excluding those who are members of the Audit & Supervisory Committee) who are not external Directors is set based on the following targets: Fixed monthly salary (annual amount) 70%; performance-linked compensation 20%; and stock-based compensation 10%.

In addition, the Company's five material issues, which are the benchmarks for performance-linked compensation, are supply of energy, response to climate change, respect for people, engagement with local communities, and enhancement of our business foundation. KPIs for addressing climate change include numerical targets for renewable energy development and CO₂ reduction targets.

Officer Compensation System

	Compensation type	Compensation details	Payment percentage estimate	
Fixed Compensation	Fixed Monthly salary	Monthly compensation is a fixed amount of monetary compensation calculated based on position of each Director	70%	70%
	Performance-linked compensation	(1) First Indicator Indicator factor: Level of achievement of consolidated ordinary income Fluctuation range: 0% minimum to 200% maximum (2) Second indicator Indicator factor: KPIs for the material issues comprehensive evaluation* Fluctuation range: 0% minimum to 120% maximum (3) Calculation of amount Factor of first indicator × 90% + factor of second indicator × 10%	20%	30%
Variable compensation	Stock-based compensation	Introduced as an incentive for the Company's long-term growth based on the characteristics of the Company's business content and business development.	10%	

*See p.11-12 of the Integrated Report for details of material issues (KPIs) and results of initiatives.

Material issues



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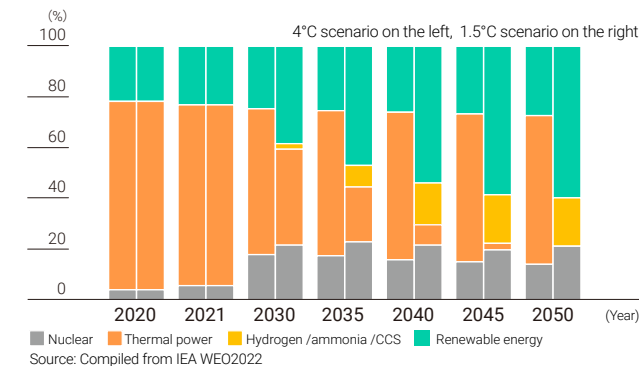
Strategy: Risk and Opportunities

J-POWER endeavors to ascertain the variety of risks and opportunities that arise from environmental issues, and pushes forward with initiatives while consistently verifying risks as it strives to bolster competitiveness. We believe that climate change in particular will require measures in the utilization of new technology and a number of other domains, including measures for addressing regulatory reinforcement by national governments. These factors have the potential to exert considerable impact on J-POWER's business domains as well, which will create business-based risk. However, our view is that the ability to appropriately handle that risk will link to the bolstering of our competitiveness and the acquisition of new business opportunities. We have detailed risks related to climate change based on that view and identified risks with a particularly high degree of

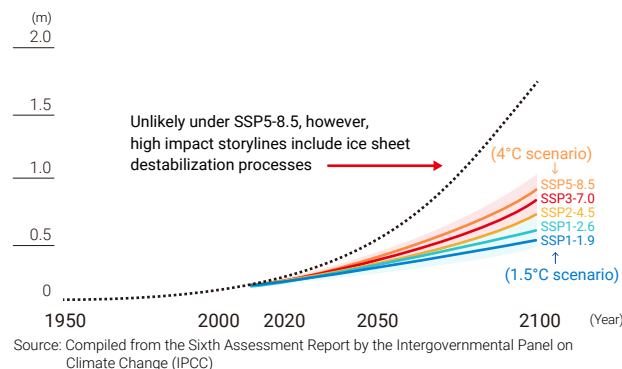
importance after also factoring in that degree of importance and concern on the part of stakeholders.

In our analysis of risk and opportunities, we assumed two cases: one where temperatures rise by 1.5°C and another by 4°C, and conducted analysis for both. In the former case, we assumed that formidable measures and regulations were enacted, and that in Japan as well, the renewable energy ratio grew by a wide margin, and the decarbonization of electric power progressed at a rapid pace. In the case where temperatures rise by 4°C, where it is assumed that global warming countermeasures will not be enforced, it is projected that by the year 2100, the average ground temperature across the globe will rise by at least 4°C, and that average sea levels will rise nearly one meter. There are concerns that if measures to combat climate change are not sufficiently taken, the physical risks of climate disasters in 2050 and beyond in particular will become prominent.

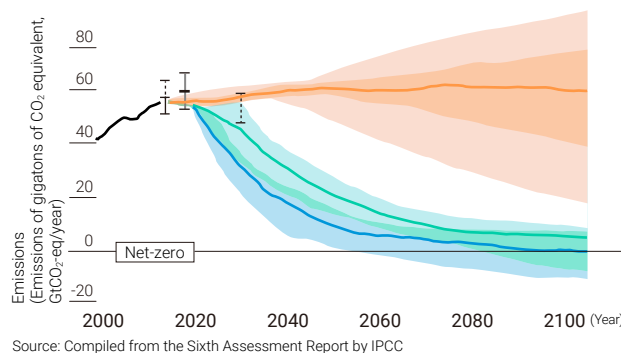
Japan's Energy Mix Outlook



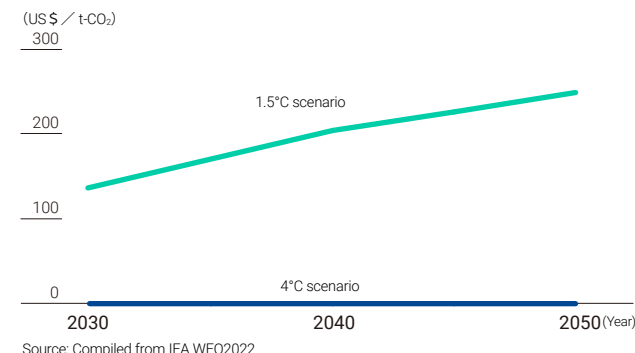
Sea Level Rise by Scenario



Greenhouse Gas Reduction Pathways by Scenario









Japan's Carbon Price Outlook



Configured scenarios	Reference scenarios	Coverage scope and period	Scenario Description	Results of Scenario Analysis
1.5°C scenario	<ul style="list-style-type: none"> "World Energy Outlook 2022" by the International Energy Agency (IEA) Net Zero Emissions by 2050 Scenario (NZE Scenario) Sixth Assessment Report by IPCC, etc. 	Japan, 2050 * As each country and region has unique conditions and demands tailored solutions, overseas territories are not included in the scenario analysis.	Scenario in which formidable measures and regulations are enacted, carbon neutrality is achieved by 2050, and the rise in outdoor temperatures is kept to 1.5°C	<ul style="list-style-type: none"> Development of technologies involving hydrogen, ammonia, and other substances will be promoted, and thermal power plants using these substances will continue to operate to some extent. Maximum introduction of CO₂-free power sources such as renewable energy and nuclear power Electrification of the demand side and diffusion of distributed power sources will progress No significant increase in extreme weather events
4°C scenario	<ul style="list-style-type: none"> SSP5-8.5 Scenario of the Sixth Assessment Report by IPCC Current Policies of IEA WEO2019, etc. 		Maximum emission scenario in which climate policies are not introduced due to fossil fuels dependence-based developments	<ul style="list-style-type: none"> Distributed generation becomes widespread, but thermal power plants remain to some extent due to lack of technological alternatives Despite progress in energy conservation and electrification, which are cost-effective with existing technologies, a significant portion of the energy system still relies on fossil fuels

Disclosure Based on TCFD Recommendations

Strategy: Risk and Opportunities (Identify and assess those with significant impact on our business and finances)

	Division	Risk and Opportunity Category	Specific examples from the Company	Timing of occurrence			Response Strategies		
				Short Term	Medium term	Long term			
1.5°C Scenario	Transition risk	Policy, legal system and regulation risk	<ul style="list-style-type: none"> Introduction of carbon pricing Regulatory measures aimed at phasing out inefficient coal (Aging thermal book value of 64 billion yen at the end of FY2022) 	●	●	●	<ul style="list-style-type: none"> Introducing internal carbon pricing and utilizing it upon making investment judgments Standard scenario: \$40/t-CO₂ Risk scenario: \$90/t-CO₂ (as of 2030) Competitiveness assessment and phase-out policy development for power plants based on regulatory measures 		
		Technology risk	<ul style="list-style-type: none"> Transformation of thermal power generation facilities for which CO₂ emission reduction measures are not being taken into stranded assets 		●	●	<ul style="list-style-type: none"> Curtailing or discontinuation of coal-fired thermal power while considering its importance in maintaining a steady energy supply; Progressive adoption and extension of emission reduction strategies including mixed combustion of biomass and ammonia and CCS, etc.; Eventual transition to CO₂-free hydrogen power generation. 		
		Market risk	<ul style="list-style-type: none"> Changing preference for CO₂-free electricity 		●	●	<ul style="list-style-type: none"> Formation of a balanced power supply portfolio (Hydroelectric, wind, geothermal, solar, nuclear, and CO₂-free hydrogen generation) Accelerate business expansion by leveraging strengths of renewable energy top-runners (No. 2 share of both hydroelectricity and wind power in Japan) 		
		Evaluation risk	<ul style="list-style-type: none"> Drop in corporate image due to CO₂ emissions Divestment engagement by investors 	●	●	●	<ul style="list-style-type: none"> Steady progress of J-POWER "BLUE MISSION 2050" Enhancement of information disclosure regarding climate change and continuous dialogue with stakeholders 		
	Opportunities	Resource efficiency	<ul style="list-style-type: none"> Developments in low carbon/decarbonization technology and expansion of opportunities Improvement of existing asset value 	●	●	●	<ul style="list-style-type: none"> Creation of new value through existing assets (upcycling) Short- to medium-term: Promote GENESIS Matsushima Plan and NEXUS Sakuma Plan Initiatives to reduce CO₂ emissions Short- to medium-term: Expanded introduction of biomass, introduction of mixed combustion with ammonia, realization of CCUS Long-term: Development of hydrogen mono-fuel combustion technology, conversion to CO₂-free hydrogen power generation through CCUS 		
		Energy sources	<ul style="list-style-type: none"> Realization of new businesses pertaining to hydrogen, ammonia, and other energy sources 		●	●	<ul style="list-style-type: none"> Challenges with CO₂-free hydrogen manufacturing and initiatives geared toward supply Australian brown coal hydrogen project, joint examination of green ammonia manufacturing and negative emission hydrogen manufacturing, etc. 		
		Products and services	<ul style="list-style-type: none"> Increase in revenues due to expansion of renewable energy Provision of services that correspond to consumer and end user needs 	●	●	●	<ul style="list-style-type: none"> Develop more than 1,500 MW of new renewable energy by FY2025 (compared to FY2017) Construction and operation of Ohma Nuclear Power Plant 		
		Markets	<ul style="list-style-type: none"> Increase in electricity sales due to progress in electrification Growing need for sustainable finance 		●	●	<ul style="list-style-type: none"> Reinforcement of business foundation Allocating investment funds with a view to realizing J-POWER "BLUE MISSION 2050." Strategic investment from FY2023 to FY2030: 700 billion yen Diversification of financing Green bond issuance: 20 billion yen (January 2021) 10 billion yen (January 2022), 17 billion yen (November 2022) 		
		Resilience	<ul style="list-style-type: none"> Expansion of renewables, decentralized power sources and end user-side businesses Diversification of low-carbon fuels Expansion of opportunities for network development conducive to renewable energy introduction 	●	●	●	<p style="text-align: center;">Investment result and forecast</p> <table style="width: 100%; text-align: center;"> <tr> <td style="width: 50%;"> <p>FY2022</p>  <p>Renewable Energy, Power Networks, Nuclear Energy, CCS 36%</p> </td> <td style="width: 50%;"> <p>FY2023 forecast</p>  <p>Renewable Energy, Power Networks, Nuclear Energy, CCS 49%</p> </td> </tr> </table>	<p>FY2022</p>  <p>Renewable Energy, Power Networks, Nuclear Energy, CCS 36%</p>	<p>FY2023 forecast</p>  <p>Renewable Energy, Power Networks, Nuclear Energy, CCS 49%</p>
		<p>FY2022</p>  <p>Renewable Energy, Power Networks, Nuclear Energy, CCS 36%</p>	<p>FY2023 forecast</p>  <p>Renewable Energy, Power Networks, Nuclear Energy, CCS 49%</p>						
4°C Scenario	Physical risk	Acute risk	<ul style="list-style-type: none"> Facility damage caused by extreme weather phenomena such as torrential rain disasters, forest fires, cold waves and heat waves Insufficient supply of water to power plants Negative impact on profit of -240 million yen per day should operation of power generation facilities (thermal power plant: 1,000 MW) be obstructed 		●	●	<ul style="list-style-type: none"> Carrying out revisions of BCP based on updated knowledge as appropriate Water Risk Reduction Response Risk assessment and management utilizing WRI Aqueduct (3.0)*. <p><small>*A global standard assessment tool for water risk developed by the World Resources Institute (WRI).</small></p>		
		Chronic risk	<ul style="list-style-type: none"> Assumes negative impact on facilities caused by prolonged rises in average outdoor temperatures, changes in rainfall and rises in sea surface <p><small>*Thermal power generation facilities: 120 billion yen, Hydroelectric power generation facilities: 74 billion yen Thermal: Damage rate from less than 0.5m sea level rise x 0.296 Hydroelectric: Damage rate from flooding x 0.189 multiplied by the current book value of facilities</small></p>			●			

Short term: Up to 2025 Medium term: 2030 Long term: 2050

Disclosure Based on TCFD Recommendations

Strategy: Scenario analysis toward carbon neutrality in 2050—Japan as a whole

The J-POWER Group performed climate change scenario analysis for Japan as a whole based on the 1.5°C scenario advocated in the Paris Agreement, which pursues efforts to limit the average temperature increase at the end of this century to less than 1.5°C, the level prior to the Industrial Revolution. The 1.5°C scenario dictates that CO₂ emissions must essentially be kept to zero (carbon neutrality) by 2050.

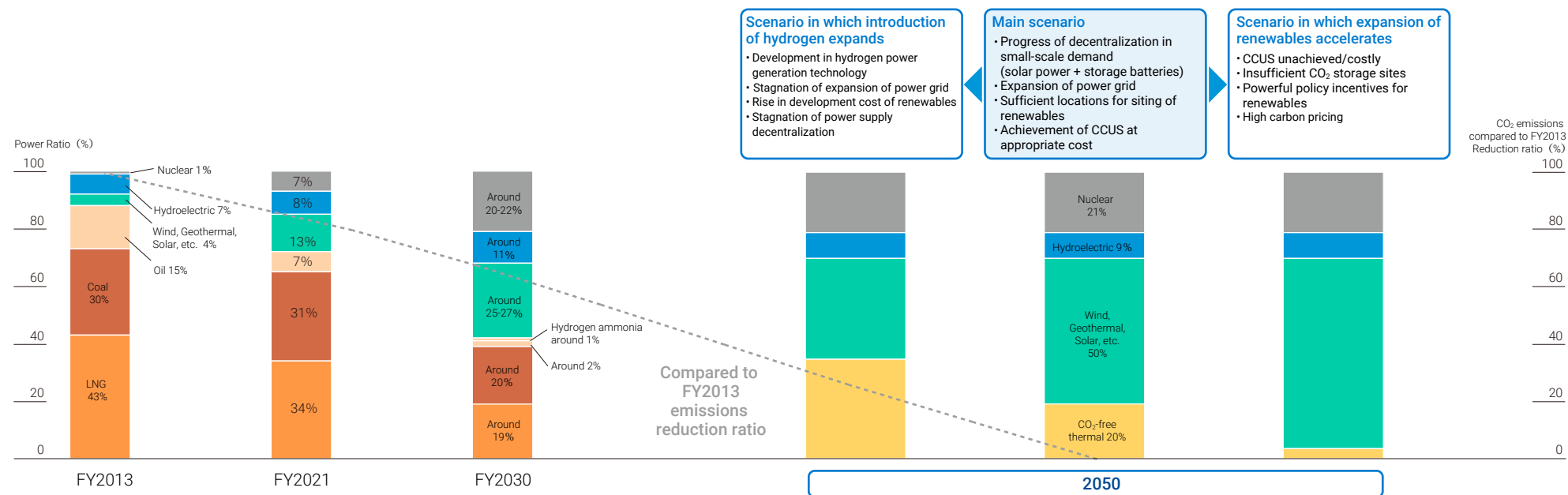
While the IEA's WEO2022 NZE 1.5°C scenario does not lay out the energy mix in 2050 in Japan, which has declared 2050 Net Zero, we have determined that the APS scenario under WEO2022 is close to the NZE scenario, and have therefore adopted this scenario as the main scenario while using the energy mix in 2050

under the APS scenario (JPN) used as a reference. The power source composition for FY2030 is based on the Japanese government's Sixth Strategic Energy Plan.

According to IEA projections, by the year 2050, total variable renewable energy (VRE) as represented by solar and wind power will be 70% of total power in the EU and the U.S. Conversely, in Japan, VRE is projected at 40% and 60% of total renewable energy by 2050, with nuclear power accounting for 20% and the remaining 20% comprised of hydrogen/ammonia and thermal power + CCUS. We believe this is because electric power systems in Japan are interconnected in tandem rather than mesh-shaped like their Western counterparts, leaving them with weak

inter-grid linkage and poor versatility and flexibility. In addition, there are also constraints on the introduction of VRE due to the lack of appropriate sites for it, and therefore from the perspective of stable supply, making it necessary to provide supply regulation power through CO₂ free thermal power generation. Note that the possibility exists that the actual environment in the year 2050 may not take the shape of the assumptions under this main scenario. Given that, we also analyzed scenarios in cases where we modified preconditions related to renewables and thermal energy power generation, which are believed to be areas where the J-POWER Group will be particularly impacted.

Energy mix in Japan



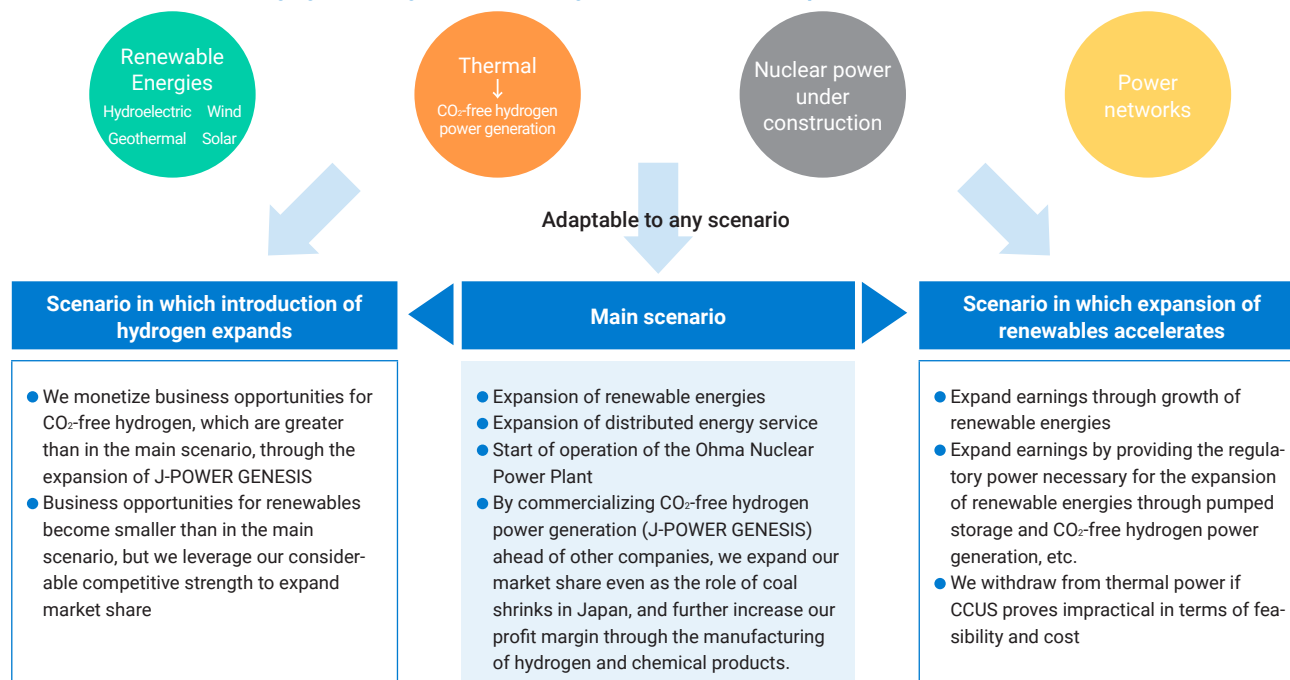
Disclosure Based on TCFD Recommendations

Strategy: Scenario Analysis for Carbon Neutrality in 2050—Our Company

Based on the scenario analysis of Japan as a whole on the previous page, power generators, including the J-POWER Group, will need to focus on developing renewable energy sources to achieve carbon neutrality in 2050, approximately 30 years from now, while also converting coal- and gas-fired power generation to a certain extent to eventually convert to CO₂-free hydrogen from the perspective of stable supply. We believe it to be economically sound to convert to CO₂-free hydrogen by making gradual capital investments (upcycling) in the latest innovations while utilizing existing power plant infrastructure that has already been fully depreciated. We also believe that upcycling is an important means of sustainably using developed renewable energy. The J-POWER Group has formed and operated a well-balanced power source portfolio consisting of renewable energies

(hydroelectricity, wind, geothermal, and solar) and thermal power, and has also accumulated a wealth and wide range of technologies and expertise in nuclear power construction and the development of CO₂-free hydrogen production and generation technologies. Therefore, by accelerating the expansion of renewable energy and flexibly upcycling existing power generation facilities while keeping an eye on the progress of innovation and economic trends, Japan can respond to not only the main scenario of its energy mix in 2050, but also the scenario in which expansion of renewables accelerates and the scenario in which introduction of hydrogen expands.

The extensive and wide-ranging technologies and knowledge of the J-POWER Group



Column

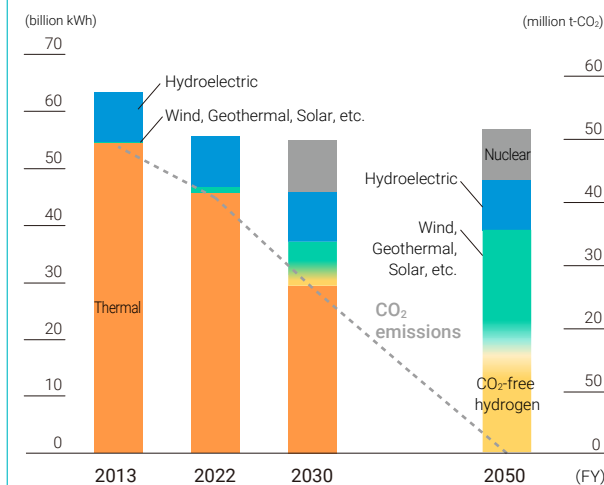
Projected Electricity Generated by J-POWER

Based on our past scenario analysis and our transition strategy, J-POWER "BLUE MISSION 2050,"*1 we have projected the transition of our power generation volume to carbon neutral by 2050 with certain assumptions. In 2022, approximately 80% of the power generated in Japan was thermal power. 2050 will see the expansion of renewable energy,*2 which is a priority for development, as well as the addition of nuclear power generation. We will continue to reduce or eliminate thermal power generation, while taking into consideration its role in ensuring a stable supply. We will gradually introduce and expand measures to reduce CO₂ emissions, such as mixed combustion (biomass and ammonia) and CCS, and eventually convert to CO₂-free hydrogen power generation.

*1 Established in February 2021. Details are on the next page.

*2 Wind power generation is assumed to expand at the same rate its share expands in Japan as a whole under the APS scenario.

J-POWER Electricity Generation Trends and Forecasts



Disclosure Based on TCFD Recommendations

Strategy: Transition plan to achieve goal of carbon neutrality: J-POWER “BLUE MISSION 2050”

Realizing a carbon-neutral, hydrogen society (value provided to society)

We stably supply energy and take efforts against climate change to contribute to our sustainable development in Japan and abroad.

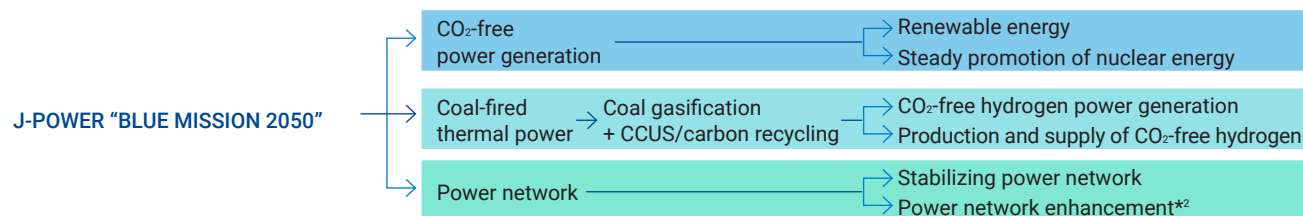
The J-POWER Group has formulated the J-POWER “BLUE MISSION 2050” to accelerate its efforts to issues related to climate change. We are steadily working to achieve a carbon neutral and hydrogen society based on the three pillars of expansion of CO₂-free power sources; production, supply, and generation of CO₂-free hydrogen; and stabilization and enhancement of the electric power network.

J-POWER has been engaged in hydroelectric, thermal, wind, and geothermal power generation, transmission, and substation projects with the mission of “meeting people’s needs for energy without fail, and playing our part in the sustainable development of Japan and the rest of the world.” To achieve our mission, we aim to further develop the comprehensive technical capabilities and balanced portfolio that we have cultivated over the years, and will approach our work from various angles.

With an eye toward 2050, we will take on the challenge of incrementally achieving carbon neutrality in our power generation business. As a milestone, we aim to reduce CO₂ emissions by 9.2 million tons in 2025 and 46% in 2030 compared to the FY2013 level.

* For J-POWER “BLUE MISSION 2050,” see p.18.

The three pillars of J-POWER “BLUE MISSION 2050”



J-POWER “BLUE MISSION 2050” Roadmap

CO₂ reduction target from domestic power generation business CO₂ emissions (compared to FY2013)

		2020	2025	2030	2040	2050
			-9.2 million tons *1	-22.5 million tons -46% *1	Realization of carbon neutrality Net-zero emissions	
Expansion of CO ₂ -free power sources	Renewable energy	New developments on the scale of 1,500 MW globally		Additional new developments, upcycling of existing facilities		
	Nuclear power	Construction and start of operations at Ohma Nuclear Power Station				
Zero-emission power sources	Domestic coal-fired power	Gradual phase-out of aging power plants, coupled with CO ₂ reduction initiatives (Expansion of mixed combustion with biomass, introduction of mixed combustion with ammonia, etc.)				
	CCS	Development of business environment, design and construction of facilities		CO ₂ injection and storage		CO ₂ -free hydrogen power generation
	Hydrogen power generation	Demonstration tests in Japan	Upcycling (adding gasifiers to existing assets)			
	Fuel production (CO ₂ -free hydrogen)	Demonstration tests overseas	Utilization in other industries			
Power network stabilization and enhancement	Stabilization	Upscaling hydroelectric power, J-POWER GENESIS, and distributed energy services				
	Enhancement*2	Completion of the New Sakuma Frequency Converter Station, etc.		Contribution to power network enhancement		

*1 Compared to the three-year average results for FY2017-2019, 2025 target: 7 million ton reduction, 2030 target: 44%/20.3 million ton reduction

*2 Strengthening the power network is an initiative of J-POWER Transmission Network Co., Ltd.

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Strategy: J-POWER 2030 Scenario Analysis—Our Company

As part of our J-POWER “BLUE MISSION 2050,” we have set a milestone of a 46% reduction in CO₂ emissions by 2030 and a goal of becoming carbon neutral by 2050. The NDC (Nationally Determined Contribution) made by Japan in accordance with the Paris Agreement is compatible with this. The financial impacts and specific initiatives for a 46% reduction are estimated by the 2030 scenario analysis.

By curtailing the use of thermal power, mixed combustion of

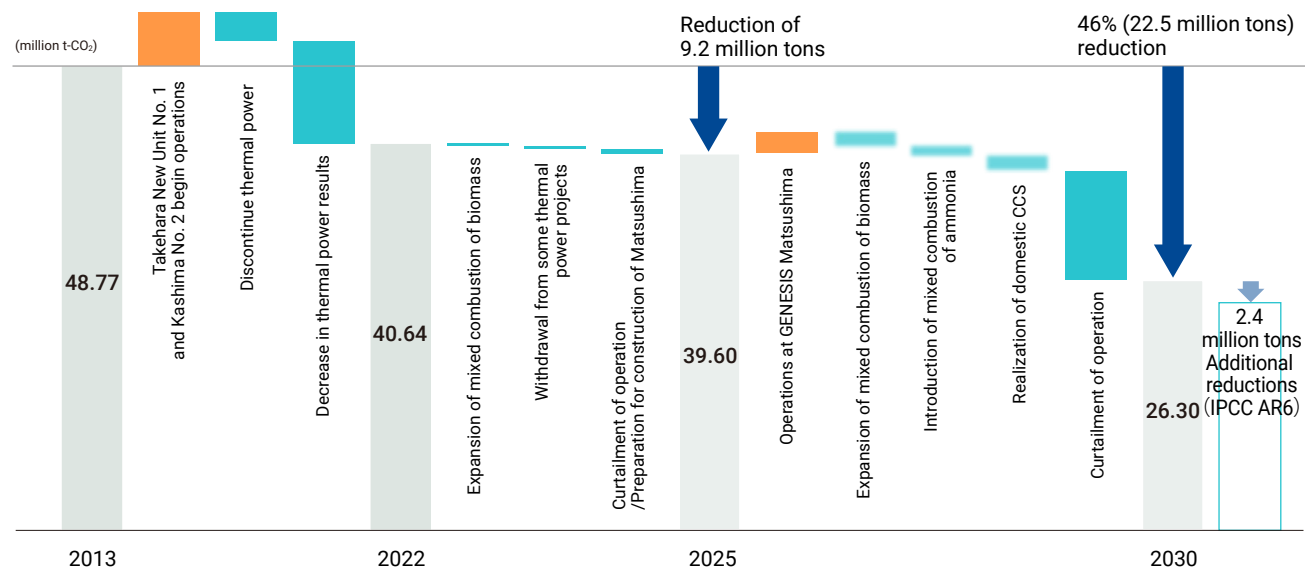
biomass/ammonia, upcycling existing facilities, and implementing CCS in Japan, we will gradually reach our CO₂ reduction goal by 2030. On the following page, the results of our financial analysis of scenarios based on our reduction targets are shown. We will work to offset the effects of the decrease in thermal power sales through our efforts to increase renewable energy in order to reduce the financial burden of our response to climate change.

We have established a goal for the growth of renewable energy

of over 1,500 MW of new development (compared to FY2017) by FY2025.

While J-POWER will not immediately reduce its own GHG emissions if it develops a CO₂-free power source like renewable energy, it will replace other thermal power sources in Japan as a whole and help the country lower its CO₂ emissions overall. By 2030, we predict that our CO₂-free power sources will have contributed more to reducing emissions than they did in 2022, about 4.6 million tons—roughly 11 million tons.

Initiatives to achieve CO₂ reduction targets



Our CO₂-free power sources contribute to CO₂ reduction in Japan nationwide

	FY2022	FY2030	Calculation Formula
Hydroelectric power	4.0 million t-CO ₂	4.2 million t-CO ₂	Power generation capacity × Annual operating hours × Facility utilization rate × Emission factor t-CO ₂ /MWh
Wind power	0.45 million t-CO ₂	2.5 million t-CO ₂	
Geothermal power	0.07 million t-CO ₂	0.12 million t-CO ₂	
Solar power	—	0.02 million t-CO ₂	
Nuclear Power	—	4.15 million t-CO ₂	

Further GHG emission reductions in accordance with the IPCC Sixth Assessment Report (AR6)

Moreover, GHG emissions for the 1.5°C emission scenario outlined in the IPCC AR6 were examined.

The global pathway predicted by the IPCC AR6 is 43% below 2019 levels for 2030 reductions and 60% below levels for 2035 reductions, which would limit warming to 1.5°C (>50%) with no or limited overshoot. When our emissions are matched with the emission target for 2030, it will take an extra 2.4 million tons of reduction to reach the emission target for Japan as a whole, which is comparable to a reduction of nearly 51% from the 2013 level.

IPCC Sixth Assessment Report

2030 43% reduction*, 2035 60% reduction (compared to 2019)

*Equivalent to 51% reduction (compared to FY2013) in Japan's NDC
 ↓
 Converted to our “BLUE MISSION 2050”

2030 24.9 million ton reduction (compared to FY2013) (an additional reduction of 2.4 million tons)

Disclosure Based on TCFD Recommendations

Strategy: 2030 Scenario Analysis—Estimated Financial Impact

As a result of several steps—the implementation of carbon pricing, support for the development and introduction of CO₂ emission reduction measures, and more—to reach carbon neutrality in 2050, it is anticipated that Japan’s energy costs would rise in the future. Although the financial effect estimates that follow contain information that will result in higher expenses, we will work to control rising energy bills using methods that are economically sound.

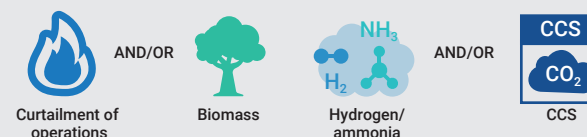
Financial impact in 2030: According to our reduction target (46% reduction; reduction of 22.5 million tons)

	Factors	Calculation details	Impact in value
Thermal power	Decrease in quantities of electric power sales from thermal power	• An estimated 40% decrease in electricity sales, mainly due to the closure of inefficient coal-fired thermal power plants, will decrease ordinary profit by approximately 10 billion yen.	Decrease in profits of approx. 10 billion yen
	Carbon pricing	• Assuming a carbon price of 700–3,000 yen/t and calculating the carbon tax for the 26.3 million tons of emissions we expect to produce in 2030, we estimate an increase in cost of 18 billion yen – 79 billion yen. However, due to the rise in revenue from the non-fossil value of CO ₂ -free power sources and the potential for part of the cost to be passed on to energy rates, predicting the precise impact is challenging. (Calculated based on a non-fossil value of 0.3–1.3 yen/kWh and an average JEPX intensity of 0.445 kg/kWh in FY2022)	—
	Biomass/ammonia mixed combustion	<ul style="list-style-type: none"> • Aiming to expand the introduction of mixed combustion of ammonia and biomass in coal-fired power plants. • Regarding CCUS, we will take the lead in the feasibility study of domestic CCS and endeavor to begin injection and storage in 2030. • Compared to the increased cost of carbon pricing, measures that can be taken below carbon pricing are economical. • Assuming that 6% of CO₂ emissions (about 3 million tons) are reduced by low-carbon technologies, the cost increase is expected to be 12 billion yen – 54 billion yen. However, policy support such as the Long-Term Decarbonization Power Source Auction, and first mover support will be used to reduce the impact amount. (Mixed combustion of ammonia and biomass: estimated to be 1.5 to 3 yen/kWh higher than coal-firing) (CCS: Estimated at 10,800 yen/t CO ₂ as estimated by the CCS Long-Term Roadmap Study Group)	—
	Introduction of CCUS		0
	GENESIS Matsushima Plan	<ul style="list-style-type: none"> • By adding gasification facilities and other equipment to the existing Matsushima Thermal Power Plant and “upcycling” it, we aim to reduce CO₂ emissions by 10% as soon as possible while contributing to a stable supply. We will pursue CO₂-free hydrogen power generation in the future. • Use the Long-Term Decarbonization Power Source Auction to recoup capital expenditures and other fixed costs. 	0
	Reduction in coal-fired thermal power repair expenses and renewal investment	<ul style="list-style-type: none"> • Constraining repair expenses and renewal investment for coal-fired thermal power plants prior to constraint of operations anticipated from 2030. • Actual repair costs for, as well as investments to replace, coal-fired thermal power will require about 45 billion yen per year, while investment for renewal will require about 20 billion yen per year, though some reductions are possible. 	+α
CO ₂ -free power sources	Expansion of revenues for renewable energy Wind power	<ul style="list-style-type: none"> • As of March 31, 2022, the total output of wind power plants in operation and such plants on which we launched research for construction is expected to increase by approximately 1.6 million kW from FY2017. • Electric power generated in cases where all operations for wind power generation that have yet to enter operation is expected to commence in 2030 will come to approximately 3.5 billion kWh. • The incremental revenue is calculated based on the premise of the existing profitability of FIT power sources. 	Increase in profits of approx. 10 billion yen
	Expansion of revenues for renewable energy Hydroelectric	• If all non-fossil value is sold, there is a sales potential (0.3-1.3 yen/kWh) of 3–13 billion yen, although it is challenging to predict a precise impact level due to carbon pricing and other considerations.	—
	Ohma Nuclear Power Station (Under construction)	• As the project is currently being evaluated based on the new regulatory criteria, the financial impact has not been considered in the financial impact estimation.	—

If aligned with the 1.5°C target of the IPCC Sixth Assessment Report (+2.4 million tons reduction)

Additional measures for approximately 500 MW of coal-fired thermal power are needed

Although costs are expected to increase by about 10–44 billion yen, we will try to reduce the impact by making maximum use of an optimal combination of options, policy support, etc.



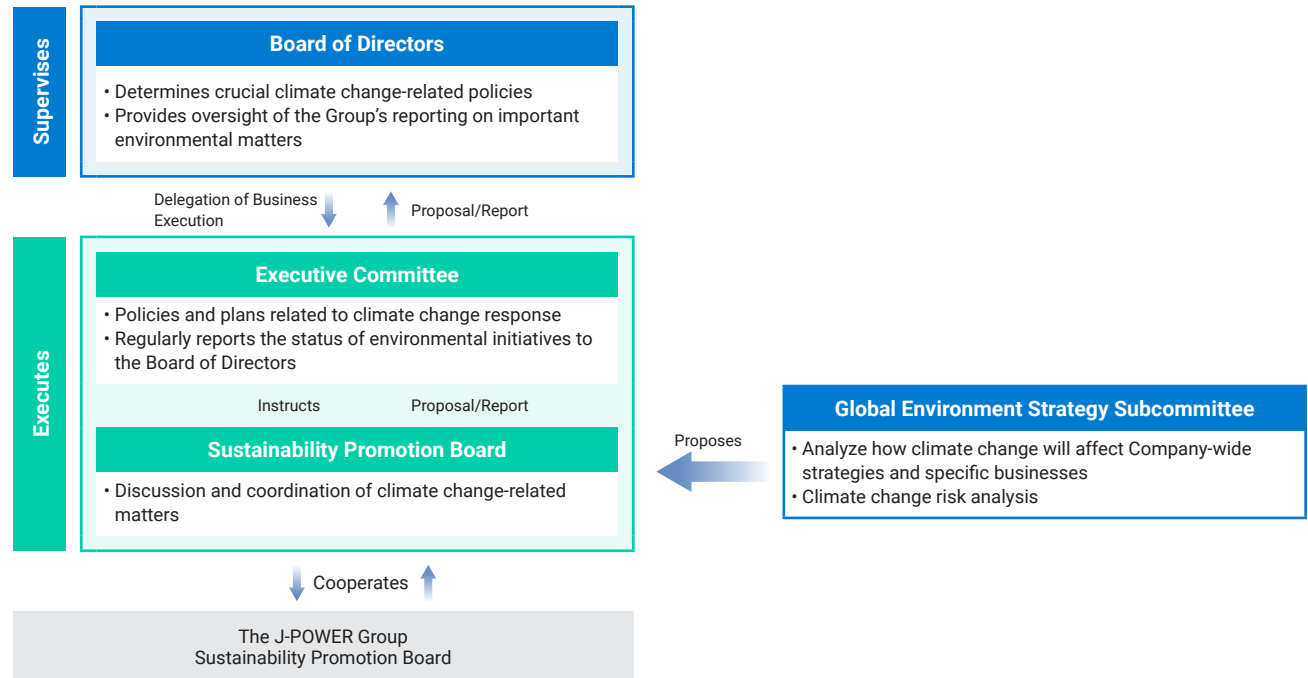
Disclosure Based on TCFD Recommendations

Risk Management

We assess numerous risks related to our Company activities in order to uphold and enhance our financial stability and corporate value. The Sustainability Promotion Board analyzes and assesses sustainability issues, including climate change, and discusses mitigation strategies.

Under the Sustainability Promotion Board, the Global Environmental Strategy Subcommittee has been established as a promotion structure to evaluate climate change threats, hold discussions there, and make recommendations or reports to the Executive Committee and Board of Directors.

The Board of Directors works to identify risks, including those related to ESG and sustainability, at an early stage by receiving regular reports on the status of business execution and by ensuring mutual checks and balances in the internal decision-making process, discussions at various meetings, and the creation of a crisis management system in accordance with internal regulations. In addition, we are aiming to reduce the effect of losses when they occur while fully understanding and minimizing risks in the execution of company activities, including ESG and sustainability risks.



Greenhouse gas (GHG) Emissions

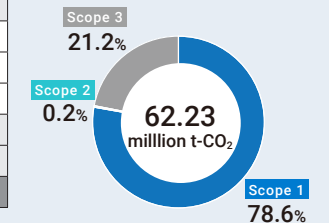
In order to increase the accuracy of the greenhouse gas emission data given in this Integrated Report, the J-POWER Group underwent third-party verification of the appropriateness of the calculation technique and the scope of computation.

Data for FY2022 GHG emissions denoted by a ★ is subject to third-party certification. For more details, see p.102.

GHG Emissions 3-year Results

	Unit	FY2020	FY2021	FY2022★
Scope 1	million t-CO ₂	53.58	47.95	48.91
Domestic Electric Power Generation Business		45.38	41.62	40.64
Overseas Electric Power Generation Business		5.36	4.90	7.94
Other Business		2.84	1.42	0.33
Scope 2 (Location Criteria)		0.13	0.14	0.15
Scope 3		15.27	13.60	13.17
Total		68.98	61.68	62.23

FY2022 Breakdown by Scope



Scope 1 : Direct greenhouse gas emissions by business operators themselves (burning fuel and industrial processes) **Scope 2** : Indirect emissions accompanying use of electricity and heat/steam from other companies **Scope 3** : Indirect emissions other than Scope 1 and Scope 2 (emissions by other companies related to the activities of the business)

Disclosure Based on TCFD Recommendations

Indicators and Targets

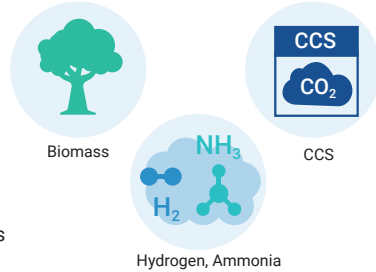
Targets

Promotion of zero emissions from power sources

Indicators

- (1) FY2025: Reductions of **9.2 million tons*** of emissions from domestic power generation business
- (2) 2030: Reductions of **46%** (22.5 million tons)* of emissions from domestic power generation business

*Compared to FY2013



(1) FY2025: Reductions of 9.2 million tons of emissions from domestic power generation business

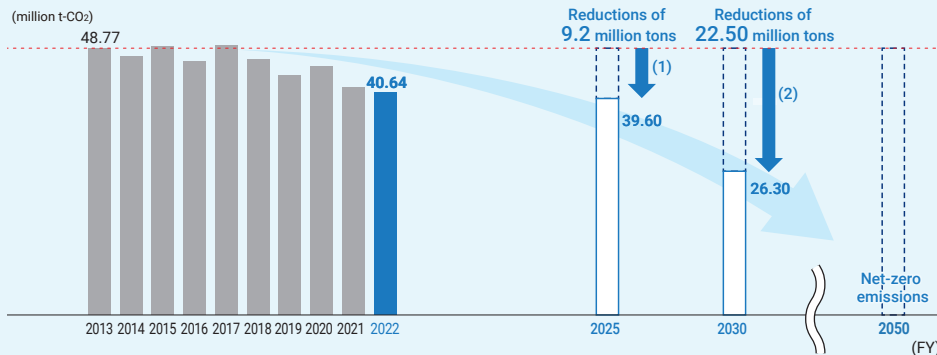
- Decrease in power generated by Matsushima Thermal Power Plant due to the construction of GENESIS Matsushima
- Expansion of mixed combustion with biomass (10% by weight mixed-combustion at the Takehara Thermal Power Plant New Unit No. 1)
- Curtailing the operation of aging coal-fired thermal power plants (Takasago and Takehara Unit No. 3)

(2) 2030: Reductions of 46% (22.5 million tons) of emissions from domestic power generation business

- Expansion of mixed combustion with biomass
- Introduction of mixed combustion with ammonia
- Realization of CCS in Japan
- Curtailing the operation or abolition of aging coal-fired thermal power plants

* Book value of aged coal-fired thermal power plants is approximately 64 billion yen.

Movements in CO₂ emissions in domestic power generation business



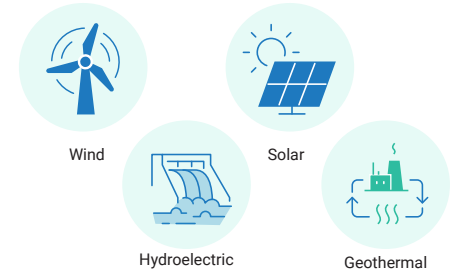
Targets

Expansion of CO₂-free power sources

Indicators

New development of **1.5 million kW** by FY2025*

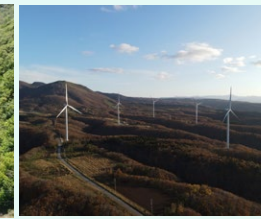
*compared to FY2017



Major CO₂-free power sources in operation (since FY2022)



Hokkaido-Shinkatsurazawa Power Plant (Hydroelectric)
Owned capacity: 16.8 MW



Hokkaido-Esashi Wind Farm
Owned capacity: 14.7 MW



Miyagi-Onikobe Geothermal Power Plant
Owned capacity: 14.9 MW

Renewable energy development transition

