

# Climate Change Scenario Analysis

## 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

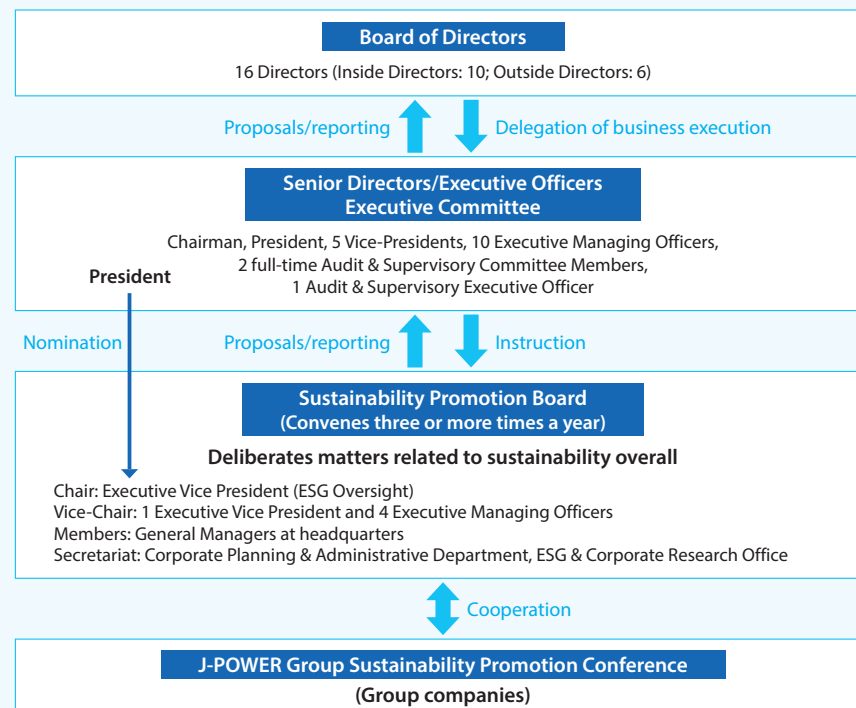
The J-POWER Group has identified “response to climate change” as one of its material issues. Important matters pertaining to that issue are determined by the Board of Directors.

Additionally, the Group has erected a sustainability framework supervised by the Executive Vice President of ESG Oversight, who was nominated by the President and Chief Executive Officer (Following the June 2023 General Meeting of Shareholders, ESG Oversight will be supervised by the President and Chief Executive Officer). In addition to establishing the “Sustainability Promotion Board” as a meeting body, the Group has also placed a “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/reports important matters out of those deliberated to the Board of Directors or the Executive Committee.

Since the J-POWER “BLUE MISSION 2050” was established 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.

### Governance framework related to climate change



## Climate Change Scenario Analysis

Recently, all Board members, including outside directors, held several active discussions on whether our 2030 CO<sub>2</sub> 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, and the Intergovernmental Panel on Climate Change Sixth Integrated Report (AR6). 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 CO<sub>2</sub> emissions from coal-fired power generation. Our new 2030 CO<sub>2</sub> 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 outside directors, held multiple discussions on the method of evaluating non-financial value from materiality initiatives in the executive 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 CO<sub>2</sub> 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	Formulation of Basic Policy on Sustainability Identification of material issues Setting of interim targets for CO <sub>2</sub> reduction (FY2025) Feedback by Board of Directors on shareholder proposals regarding climate change Raise the CO <sub>2</sub> reduction target (2030) Introduce non-financial targets (materiality) in the evaluation of performance-linked compensation for executives
Determined by the President after deliberation by the Executive Committee	Basic Policy on Environment and forecast on targets
Determined by the General Managers after deliberation by Sustainability Promotion Board	Setting of material issue targets (KPI) Revision of Sustainability Promotion Regulations

### Recent main matters of reporting to Board of Directors

- Domestic and overseas trends on climate change issues
- Basic Policy Regarding Green Transformation (GX) League
- Disclosure policy based on TCFD recommendations
- Actual CO<sub>2</sub> emissions (Scope 1-3)
- Status of dialogue with external stakeholders regarding climate change
- Status of evaluations by ESG evaluation agencies
- External evaluation of ESG initiatives

# Climate Change Scenario Analysis

\*The Strategies section on pages 43-49 does not reflect the increase in the 2030 reduction target called for in Progress of J-POWER Medium-Term Management Plan announced May 10, 2023. This will be included in the TCFD disclosure in the next Integrated Report to be issued in August 2023.

## 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 constantly verifying risks as it endeavors to bolster competitiveness. We believe that climate change in particular will require measures in the employment 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 sorted out risks related to climate change based on that view and have 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 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 surface water level will elevate by close to 1 m. 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.

Configured scenarios	Reference scenarios
1.5°C scenario	"World Energy Outlook 2021" by the International Energy Agency (IEA) Net Zero Emissions by 2050 Scenario (NZE Scenario) 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 (The rate of electrification will rise from the current level of 20% to approx. 50% by 2050)
4°C scenario	Sixth Report by the Intergovernmental Panel on Climate Change SSP5-8.5 scenario Maximum emission scenario in which climate policies are not introduced due to fossil fuels dependence-based developments

-  Degree of impact assumed to be massive
-  Degree of impact assumed to be somewhat large
-  Degree of impact assumed to be minute




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

	Division	Specific examples	Timing of occurrence			Degree of impact (Businesses, finance)	State of measures	
			Short term	Medium term	Long term			
1.5°C scenario	Transition risk	Policy, legal system and regulation risk	●	●	●	↑	<ul style="list-style-type: none"> <li>Introducing internal carbon pricing as of 2030 with the use of IEA WEO2020 as a reference and utilizing it upon making investment judgments Standard scenario: \$40/tCO<sub>2</sub> Risk scenario: \$90/tCO<sub>2</sub></li> <li>Successfully tackling phasing out of power plants starting with dilapidated ones, expansion of mixed combustion with biomass, mixed combustion with either hydrogen or ammonia and upcycling</li> </ul>	
		Technology risk		●	●	↑	<ul style="list-style-type: none"> <li>Transition to CO<sub>2</sub>-free hydrogen power generation (CCUS and mono-fuel combustion with hydrogen, biomass or ammonia)</li> <li>Non-current assets for thermal production facilities: 401.1 billion yen; percentage accounted for by inefficient coal-fired thermal power: Slightly over 10%</li> </ul>	
		Market risk	<ul style="list-style-type: none"> <li>Increase in fuel procurement costs</li> <li>Preference for CO<sub>2</sub>-free electric power</li> </ul>		●	●	↗	<ul style="list-style-type: none"> <li>Formation and operation of balanced power source portfolio through accelerated development of CO<sub>2</sub>-free power sources</li> <li>Expansion of businesses with manifestation of strengths as leader in renewables (second highest domestic share in hydroelectric power; second highest domestic share in wind power)</li> </ul>
		Evaluation risk	<ul style="list-style-type: none"> <li>Drop in corporate image due to CO<sub>2</sub> emissions</li> <li>Divestment engagement by investors</li> </ul>	●	●	●	↑	<ul style="list-style-type: none"> <li>Carrying out J-POWER "BLUE MISSION 2050" and contributing to the realization of carbon neutrality and a hydrogen society</li> <li>Promoting information disclosure, etc. in line with TCFD recommendations and reinforcing disclosure of status of initiatives</li> <li>Reinforcing dialogue with stakeholders</li> </ul>
4°C scenario	Physical risk	Acute risk		●	●	↗	<ul style="list-style-type: none"> <li>Carrying out revisions of BCP based on updated knowledge as appropriate</li> <li>Negative impact in profit of -240 million yen per day should operation of power generation facilities (thermal power plant: 1 million kW) be obstructed by torrential rain disaster</li> </ul>	
		Chronic risk	Negative impact on facilities caused by prolonged rises in average outdoor temperatures, changes in rainfall and rises in sea surface			●	↑	<ul style="list-style-type: none"> <li>Assumed that impact of droughts, torrential rains and rises in sea surface is conceivable at nearly all of J-POWER's power plants and that they are exposed to physical risk; non-current assets for thermal production facilities: 401.1 billion yen; non-current assets for hydroelectric production facilities: 360.1 billion yen</li> </ul>






## Climate Change Scenario Analysis

### Strategy: Risk and Opportunities

Configured scenarios	Reference scenarios
1.5°C scenario	"World Energy Outlook 2021" by the International Energy Agency (IEA) Net Zero Emissions by 2050 Scenario (NZE Scenario) 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. (The rate of electrification will rise from the current level of 20% to approx. 50% by 2050)
4°C scenario	Sixth Report by the Intergovernmental Panel on Climate Change SSP5-8.5 scenario Maximum emission scenario in which climate policies are not introduced due to fossil fuels dependence-based developments

-  Degree of impact assumed to be massive
-  Degree of impact assumed to be somewhat large
-  Degree of impact assumed to be minute

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

	Division	Specific examples	Timing of occurrence			Degree of impact (Businesses, finance)	State of measures	
			Short term	Medium term	Long term			
1.5°C scenario	Opportunities	Resource efficiency Developments in low carbon/decarbonization technology and expansion of opportunities Improvement of existing asset value	●	●	●		<ul style="list-style-type: none"> <li>• <b>New value creation using existing assets (upcycling)</b> Short to medium term: Promotion of GENESIS Matsushima Plan</li> <li>• <b>Initiatives aimed at reducing CO<sub>2</sub> emissions</b> Short to medium term: Expanded introduction of biomass, introduction of mixed combustion with ammonia and realization of CCUS Long term: Development of hydrogen mono-fuel combustion technology and promotion of zero emissions from thermal power generation through CCUS</li> </ul>	
		Energy sources Realization of new businesses pertaining to hydrogen, ammonia, and other energy sources		●	●		<ul style="list-style-type: none"> <li>• <b>Challenges with CO<sub>2</sub>-free hydrogen</b> Australian brown coal hydrogen project, joint examination of green ammonia manufacturing and negative emission hydrogen manufacturing, etc.</li> </ul>	
		Products and services Increase in revenues due to expansion of renewables Provision of services that correspond to consumer and end user needs			●	●		<ul style="list-style-type: none"> <li>• <b>Acceleration of development of CO<sub>2</sub>-free power sources</b> Allocating investment funds with priority to development of renewable energy and aiming to achieve development targets of 1.5 million kW or more by FY2025 Making investments in the range of 300 billion yen in the development of renewable energy between FY2022-FY2025 Investments in renewables with issuance of green bonds: 20 billion yen (January 2021); 10 billion yen (January 2022)</li> </ul>
		Markets Increase in revenues through access to new markets Expansion of electric power markets in emerging countries			●	●		<ul style="list-style-type: none"> <li>• <b>Reinforcement of business foundation</b> Allocating investment funds with a view to realizing J-POWER "BLUE MISSION 2050." (Renewables, electric power networks, upcycling aimed at hydrogen power generation, and nuclear power generation) FY2021 power generation business results: Invested 22% of 185 billion yen in investment funds FY2022 forecast: Plan to invest at least 30% of investment funds, or at least 60 billion yen</li> </ul>
		Resilience Expansion of renewables, decentralized power sources and end user-side businesses Diversification of low-carbon fuels	●	●	●		<ul style="list-style-type: none"> <li>• <b>Steady expansion of overseas business foundation</b> Expanded development of renewable energy overseas</li> </ul>	

## Climate Change Scenario Analysis

### Strategy: Selection of FY2050 Scenario—Net Zero (1.5°C Scenario)

The J-POWER Group performed climate change scenario analysis based on the 1.5°C scenario advocated in the Paris Agreement. Under that scenario, the average rise in outdoor temperatures is to be kept to under 1.5°C, the level prior to the Industrial Revolution. The 1.5°C scenario dictates that CO<sub>2</sub> emissions must essentially be kept to zero (carbon neutrality) by 2050.

While the NZE 1.5°C scenario contains no mention of Japan's energy mix in 2050, in Japan, which has declared 2050 Net Zero, we have

determined that the APS scenario under WEO2021 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. 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 US.

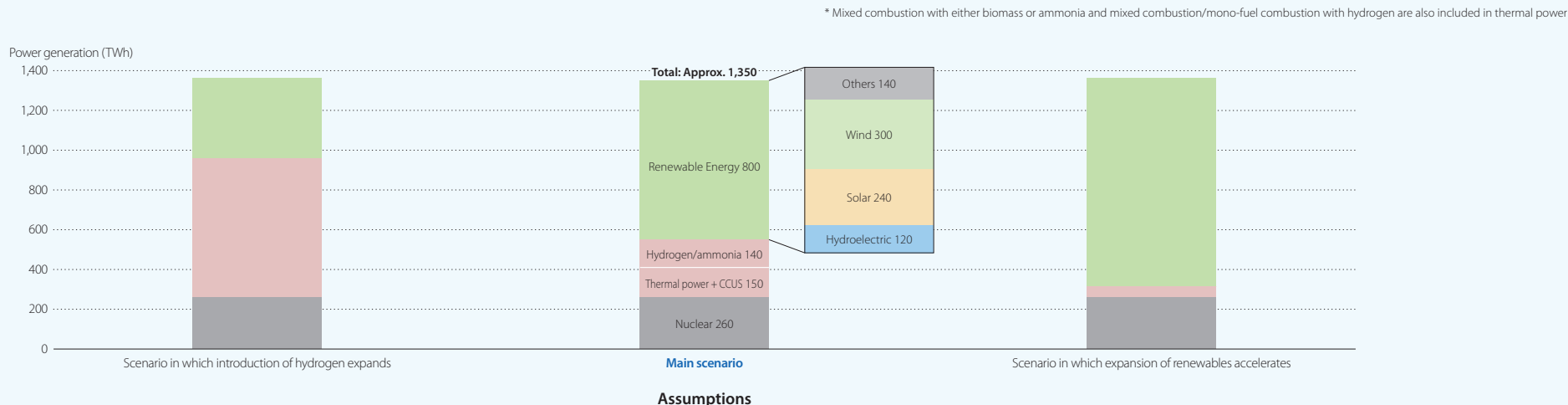
Conversely, in Japan, the VRE is projected to be 40% by 2050, total renewables, nuclear

power and the total of hydrogen/ammonia and thermal power + CCUS are respectively projected to be 60%, 20% and 20%. 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, and because there are constraints on the introduction of VRE due to the lack of appropriate sites for it, making it necessary to provide adjustment capability through

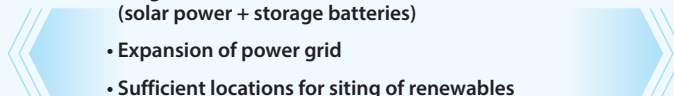
hydrogen/ammonia and thermal power with CCUS.

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



- Development in hydrogen power generation technology
- Realization of CCUS at low cost and on large scale
- Stagnation of expansion of power grid
- Insufficient locations for siting of renewables
- Rise in development cost of renewables
- Stagnation of decentralization through solar power + storage batteries



- Progress of decentralization in small-scale demand (solar power + storage batteries)
- Expansion of power grid
- Sufficient locations for siting of renewables
- Achievement of CCUS at appropriate cost

- CCUS unachieved/costly
- Insufficient CO<sub>2</sub> storage sites
- Obstacles to fossil fuel procurement (supply chain collapse)
- Powerful policy incentives for renewables
- High carbon pricing

## Climate Change Scenario Analysis

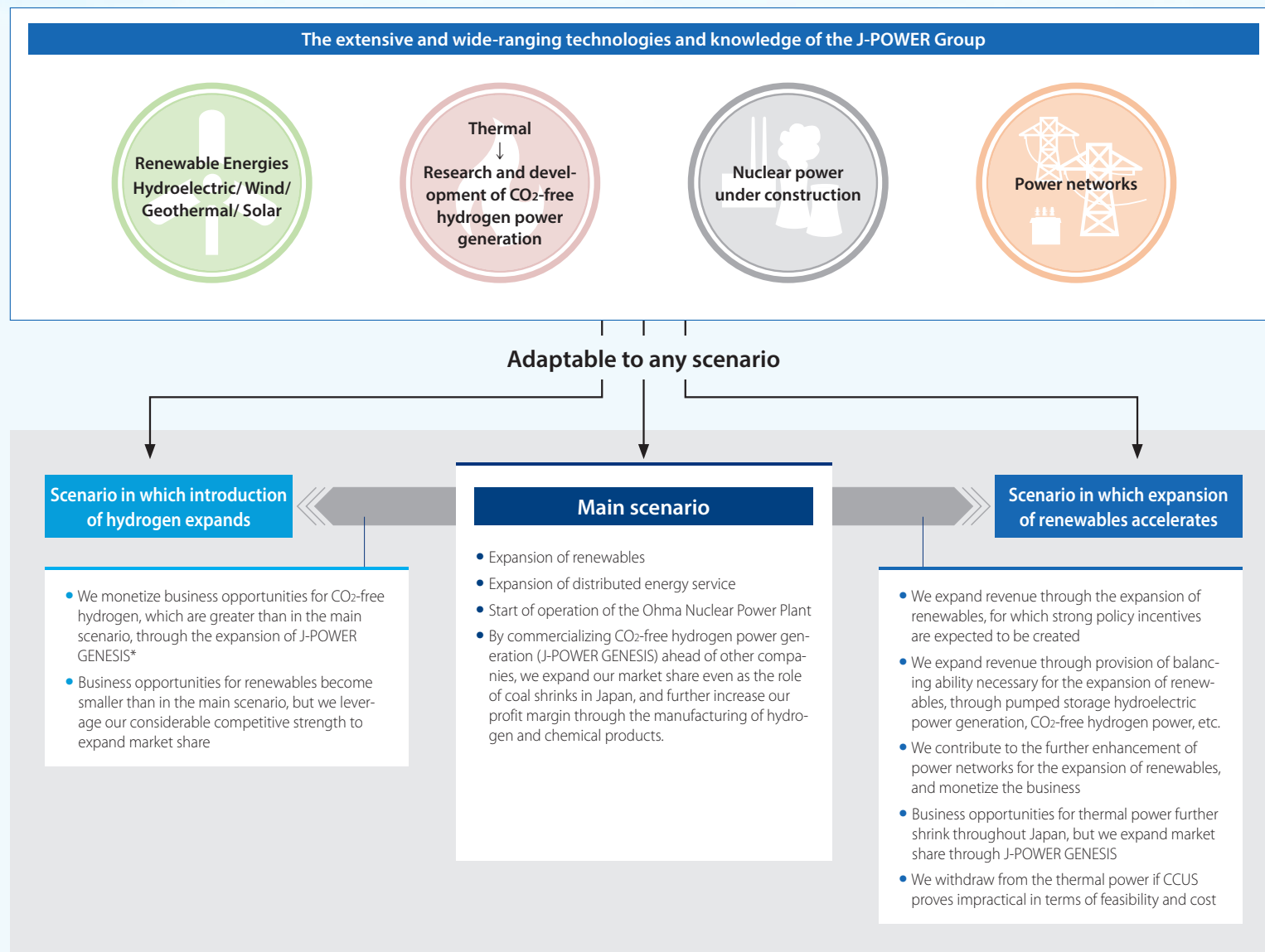
### Strategy: 2050 Scenario Analysis

By 2050, approximately 30 years from now, nearly all of Japan's existing power plants will experience difficulties and a drop in earnings power due to dilapidation. As such, companies that will continue their power generation operations with 2050 in mind, will need to abolish nearly all of their power sources and invest in new ones at some point. That goes for companies outside of the J-POWER Group as well.

Given that, the power source portfolio of each company will undergo a reassessment with a view to carbon neutrality by 2050 as a matter of course. However, as making the transition to CO<sub>2</sub>-free power sources from those that originate from fossil fuels and forming a balanced power source portfolio is a difficult task. That process will be considerably influenced by the technology and knowledge in each of those company's possession.

Through forming and operating a balanced power source portfolio up to this point as well as other means such as conducting research and development on CO<sub>2</sub>-free hydrogen manufacturing and power generation, the development of renewables and the building of nuclear power plants, the J-POWER Group has accumulated a wealth of wide-ranging technology and knowledge over time, and is capable of flexibly selecting investment targets.

Accordingly, as we have no need to emphasize specific power source categories, we are capable of adapting to any kind of scenario for the year 2050. We will aim to optimize our portfolio by investing in CO<sub>2</sub>-free power sources that are anticipated to produce the highest returns as they arise. Additionally, as nearly all existing facilities will be dilapidated by 2050 and we will have completed our return on those investments, no transformation of those facilities into stranded assets will take place either.



\* For J-POWER GENESIS, see p.24 of J-POWER GROUP Integrated Report 2022.



## Climate Change Scenario Analysis

### Strategy: 2030 Scenario Analysis

Up to this point, we performed scenario analysis in line with changes in the energy mix at the time carbon neutrality is achieved in 2050. However, a number of conceivable scenarios also exist regarding the question of on what basis do CO<sub>2</sub> emissions need to be reduced heading towards 2050, and the impact on the J-POWER Group will differ depending on the scenario at hand. Here, we cover the year 2030 as an example that falls under the stage prior to 2050 and analyze the impact of the CO<sub>2</sub> emission reductions asked of the J-POWER Group.

For the main scenario for our 2030 scenario analysis, we adopted the reduction of real CO<sub>2</sub> emissions by 40% in our domestic power generation business,\* which we presented in our J-POWER "BLUE MISSION 2050." Under this main scenario, reductions came to 44% in comparison

to those for FY2013, which is by and large conformant with the Japanese government's NDC. Additionally, a milestone under this main scenario is reductions of 7 million tons in CO<sub>2</sub> emissions by FY2025. Over the eight-year period leading up to 2030, time-based constraints are considerable, and we will have no choice but to limit our efforts to newly build or rebuild power sources, commercialize new technology, augment power transmission lines as infrastructure, and so forth. For that reason, our power source portfolio in 2030 will depend considerably on our current one.

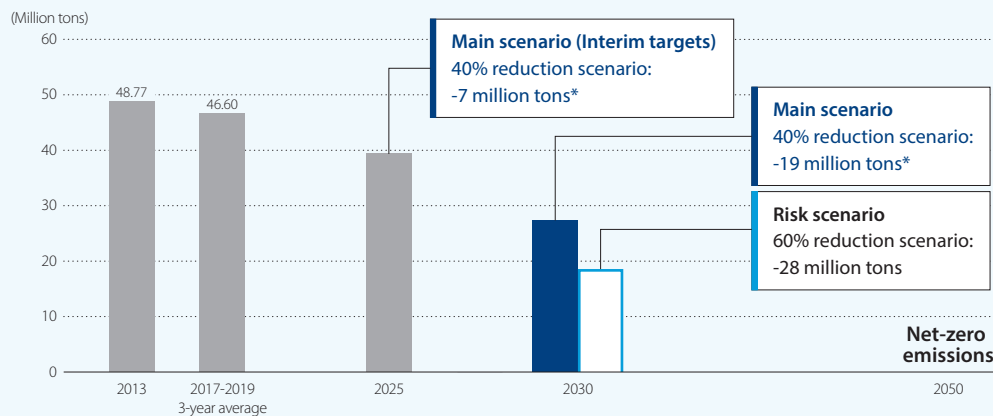
Meanwhile, we will also perform analysis on our risk scenario as one calling for greater CO<sub>2</sub> emissions while using the NZE scenario as a reference. Under this scenario, we would reduce real CO<sub>2</sub> emissions at J-POWER by 60%. The world in this risk scenario involves the introduction of renew-

ables to the maximum extent (slightly under 60% of share); progress in thermal power with CCUS, storage cells and other technological innovations; and the introduction of carbon pricing. This scenario assumes that a number of challenges, including the securing of inertia for systems as a whole and their economic efficiency, can be overcome in order to introduce all power sources. It is also estimated that should VRE be introduced in large quantities, electric power costs that include storage cell costs, adjustment costs for the likes of thermal power generation, and system integration costs such as the cost to augment those systems will increase over current levels. Increases in charges for electric power sold to a certain degree are therefore anticipated.

In each scenario heading towards 2030, coal-fired thermal power carries the risk of lower profits

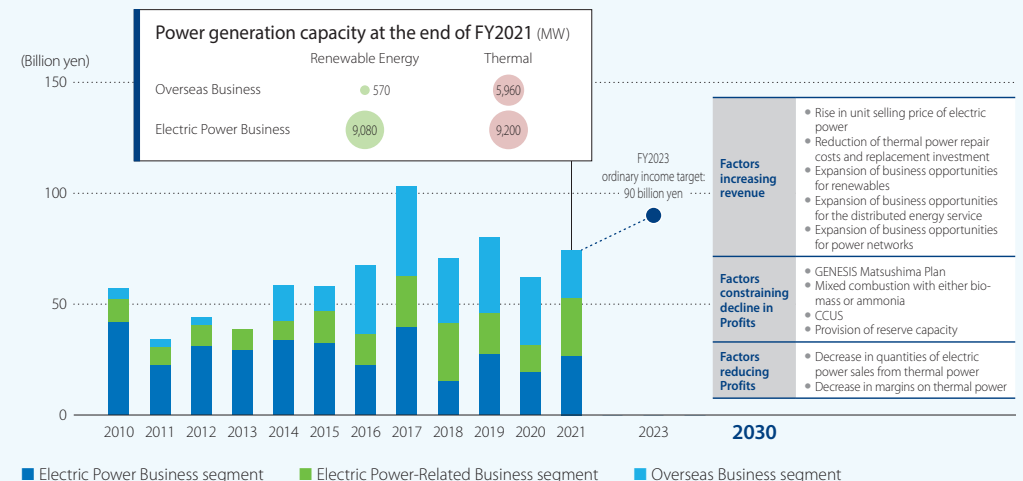
in line with reductions in CO<sub>2</sub> emission reductions. Still, we will aim to control increases in power generation costs (reductions in margins) caused by the introduction of carbon pricing by utilizing the likes of the GENESIS Matsushima Plan, mixed combustion of biomass or ammonia fuels, and CCUS. Additionally, should there be a movement across Japan to rapidly reduce CO<sub>2</sub> emissions, there is a possibility that the environment surrounding the Group's Electric Power Business will experience a secondary shift, which in turn may impact the bottom line of the J-POWER Group. Given that, the Group will aim to expand revenue by developing new renewables, acquiring electric power network augmentation projects, maximizing adjustment capability value, and expanding the distributed energy service business that it conducts through its equity-method affiliate.

### CO<sub>2</sub> emissions from the J-POWER Group's domestic power generation business



\* Compared to the 3-year average of actual emissions for FY2017-FY2019

### Ordinary income by segment



## Climate Change Scenario Analysis

### Strategy: 2030 Main Scenario (40% reduction in real CO<sub>2</sub> emissions) Financial impact

A world conforming to Japan's NDC has been assumed as a precondition.

	Factors	Impact in value	
Impact on thermal power	Decrease in quantities of electric power sales from thermal power	Decrease in profits of approx. 10 billion yen	Electric power sales from thermal power will decrease by approx. 40% mainly due to the temporary suspension of abolition of non-efficient coal-fired thermal power, resulting in an estimated decrease of approx. 10 billion yen in ordinary income from dilapidated electric power.
	Carbon pricing	—	No introduction of carbon pricing envisioned for 2030 profile under existing NDC.
	Biomass/ammonia mixed combustion	—	We will reduce emission intensity through mixed combustion with either biomass or ammonia, and will constrain the decrease in electric power sales. There are issues to be solved such as procurement of biomass and ammonia, but we will work on them as much as possible.
	Introduction of CCUS	—	We will take the initiative in tackling a feasibility study for domestic CCS and take on the challenge of commencing capture and storage from 2030.
	Impact in value due to fluctuations in charges for electric power sold	—	—
	GENESIS Matsushima Plan	—	Reduces CO <sub>2</sub> emissions by 10% by adding gasification facilities, and other measures to existing Matsushima thermal power to "upcycle" it. Eventually aims to realize CO <sub>2</sub> -free hydrogen power generation.
	Reduction in thermal power repair expenses and renewal investment	+α	Constraining repair expenses and renewal investment for thermal power plants prior to constraint of operations anticipated from 2030. Actual repair costs and replacement investment for coal-fired thermal power will be approx. 45 billion yen per year and investment for renewal will be about 20 billion yen per year, some of which can be reduced.
Impact on renewable energy	Expansion of revenues for renewable energy (Wind power)	Increase in profits of approx. 10 billion yen	As of March 31, 2022, the total output of wind power plants in operation and such plants on which we launched research for construction will increase by approx. 1.6 million kW from FY2017. Electric power generated in cases where all operations for wind power generation that have yet to enter operation commence in 2030 will come to approx. 3.5 billion kWh. The incremental revenue is based on the premise of the existing profitability of FIT power sources.
	Expansion of revenues for renewable energy (Hydroelectric)		For the electric power sales of approx. 9 billion kWh of hydroelectric power generation that is not subject to FIT, should sales prices rise by 0.1 yen due to sensitivity to factors such as a rise in contract sales prices and non-fossil fuel certificate sales prices, profits will increase by approx. 900 million yen (Sensitivity for each 0.1 yen/kWh increase in price).
		+0 million yen +α impact	The decrease in profit from coal power covered by expanded profits resulting from expansion in renewables.



## Climate Change Scenario Analysis

### Strategy: 2030 Risk Scenario (60% reduction in real CO<sub>2</sub> emissions) Financial impact

A world conforming to the NZE scenario has been assumed as a precondition.

Carbon pricing (developed countries): \$130/tCO<sub>2</sub> (Highest value among prices in the year 2030 as estimated within the IEA WEO2021)

Electric power charges: Increase of 0-10 yen/kWh

	Factors	Impact in value	
Impact on thermal power	Decrease in quantities of electric power sales from thermal power	Decrease in profits equivalent to approx. 10 billion yen	Regarding amounts for which CO <sub>2</sub> emission reductions are in excess of 40%, because emissions will be reduced using the likes of CCUS or mixed combustion using low-carbon fuels, there will be no decrease in electric power sales equal to 40% of more. (Electric power sales for thermal power are assumed to be 60% of the record years of FY2017-FY2019: 55 billion kWh×0.6=33 billion kWh)
	Carbon pricing	Increase in costs equivalent to approx. 260 billion yen	Impact in value accompanying the 40% in emissions for which measures could not be taken, after the reduction of 60%. Remaining CO <sub>2</sub> emissions 0.4×\$130/tCO <sub>2</sub> The 20% reduction in addition to the main scenario (40% decrease) will be covered based on the assumption of using CCS and other measures.
	Biomass/ammonia mixed combustion	Increase in costs equivalent to approx. 50 billion yen to 100 billion yen	Mixed combustion with either biomass or ammonia, CCUS and other measures will be taken for 20% reduction in CO <sub>2</sub> emissions. Total incremental cost when various measures are taken → Calculated by J-POWER using Cost Review Sheet by Power Generation Cost Verification Working Group (2021) as a reference
	Introduction of CCUS		
	Impact in value due to fluctuations in charges for electric power sold	0-330 billion yen in revenues	Revenues in cases where estimated electric power of sales of 33 billion kWh for thermal power generation undergoes an increase of 0-10 yen/kWh in electric power prices.
	GENESIS Matsushima Plan	—	Aiming of negative emissions by gasifying coal together with biomass fuels in GENESIS Matsushima Plan.
Reduction in thermal power repair expenses and renewal investment	+α	Constraining repair expenses and renewal investment for coal-fired thermal power plants prior to constraint of operations anticipated from 2030. Actual repair costs and replacement investment for coal-fired thermal power will be approx. 45 billion yen per year and investment for renewal will be about 20 billion yen per year, some of which can be reduced.	
Impact on renewable energy	Expansion of revenues for renewable energy (Wind power)	Increase in profits/revenues of approx. 20 billion yen	Under the risk scenario, around 60% of electric power supplied in 2030 will be done so using renewables. Wind power generation will require approx. 5 times of existing supply power. It is assumed that new wind power facilities at J-POWER are successfully developed in a similar fashion through measures to accelerate the introduction of renewables, etc.
	Expansion of revenues for renewable energy (Hydroelectric)	Increase in profits of approx. 0-90 billion yen	Incremental revenues when electric power sales for hydroelectric power are 9 billion kWh and electric power prices have increased by 0-10 yen/kWh.
		Impact of -350*~+120 billion yen <small>* Should the impact in value from the decrease in profits exceed that for the Electric Power Business under segment profit, said impact can be lessened by suspending the operation of thermal power.</small>	Under the risk scenario, it is assumed that power generation costs will rise due to the introduction of carbon pricing and CO <sub>2</sub> emission reduction technology. However, the overall timeframe for carbon neutrality will likely differ depending on the degree to which society at large tolerates rises in electric power prices. Assets with financial impact on J-POWER businesses also change considerably according to this timeframe.

## Risk Management

Based on its crisis management framework, the J-POWER Group accurately predicts and prevents disasters, facility accidents and other critical events as well as swiftly and adequately responds to and manages those events when they manifest themselves.

Additionally, the Group analyzes and evaluates risk and opportunities related to climate change at meetings of the Sustainability Promotion Board, where it examines relevant measures.

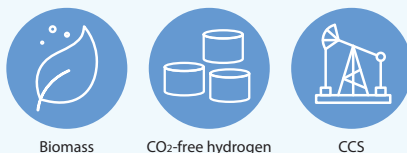
## Climate Change Scenario Analysis

### Indicators and Targets

J-POWER Group is taking on the challenge of realizing a carbon-neutral and hydrogen society based on the J-POWER "BLUE MISSION 2050."

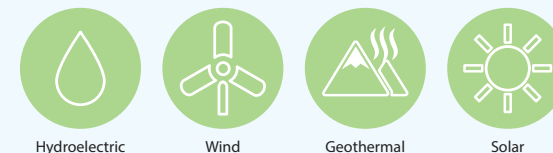
**Targets**  
Promotion of zero emissions from power sources

**Indicators**  
FY2025: Reductions of **9.2 million tons** of emissions from domestic power generation business  
2030: Reductions of **46%** (22.5 million tons) of emissions from domestic power generation business  
(In comparison to FY2013)

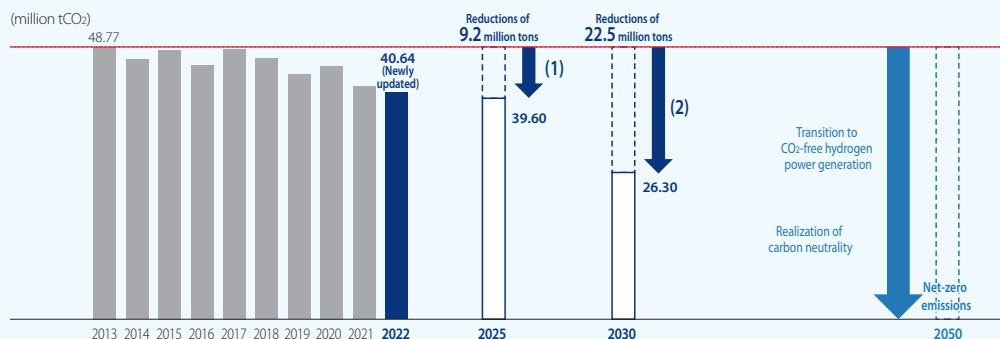


**Targets**  
Expansion of CO<sub>2</sub>-free power sources

**Indicators**  
New development of **1.5 million kW** by FY2025  
(In comparison to FY2017)



### Movements in CO<sub>2</sub> emissions in domestic power generation business



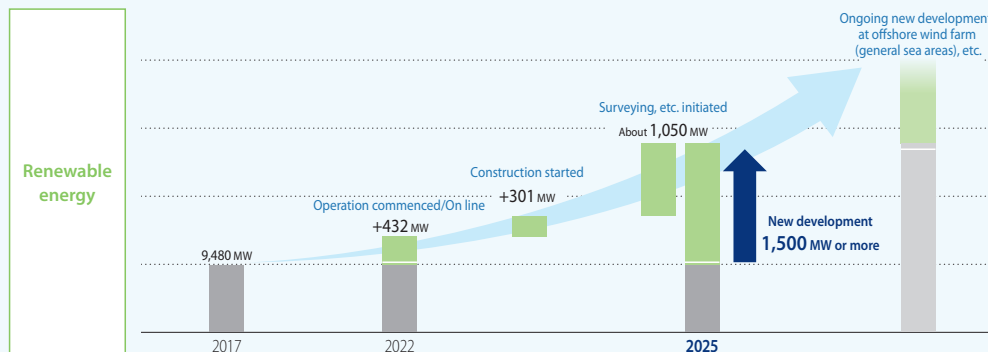
#### (1) Efforts to achieve the target for FY2025 (-9.2 million tons)

- Reduction in amount of electricity to be generated at the Matsushima Thermal Power Plant during construction related to GENESIS Matsushima
- Expansion of mixed combustion with biomass (mixed combustion at a weight ratio of 10% at Takehara Thermal Power Plant New Unit No. 1)
- Withdrawal from three thermal power projects (Ichihara, Shinminato and Itoigawa)
- Restrained operation of aged coal-fired thermal power plants (Takasago Thermal Power Plant and Takehara Thermal Power Plant Unit No. 3)

#### (2) Efforts to achieve the 2030 target (-22.5 million tons)

- Expansion of mixed combustion with biomass
- Introduction of mixed combustion with ammonia
- Realization of domestic CCS
- Restrained operation and phase out of aging coal-fired thermal power plants

### Nature of renewable energy initiatives (As of April 30, 2023)



## Climate Change Scenario Analysis

### Categories of Indicators Related to Climate Change

<p><b>GHG emissions</b></p>	<p>Scope 1: 47.95 million tCO<sub>2</sub>*    Scope 2: 0.14 million tCO<sub>2</sub>*    Scope 3: 13.60 million tCO<sub>2</sub>*                      The ★ mark indicates data subject to certification by third parties (Results for FY2021)                      Official certification report: Supplementary Materials &lt;E: Environment&gt; <a href="https://www.jpower.co.jp/english/ir/library/report.html">https://www.jpower.co.jp/english/ir/library/report.html</a></p>	
<p><b>Transition risk</b></p>	<p>Thermal power plants are assumed to be exposed to transition risk.                      Non-current assets for thermal production facilities: 379.7 billion yen. Of which, the book value of inefficient coal-fired thermal power plants totaled approximately 64 billion yen*                      * Total book value of Matsushima Thermal Power Plant, Takasago Thermal Power Plant, Takehara Thermal Power Plant No. 3, Matsuura Power Station No. 1 and Ishikawa Coal Thermal Power Plant as of the end of March 2023 (excluding land, including facilities shared with other units).</p>	
<p><b>Physical risk</b></p>	<p>Assumed that impact of droughts, torrential rains and rises in sea surface is conceivable at nearly all of J-POWER's power plants. Insufficient water supply at hydroelectric power plants, impact on coolant or equipment at thermal power generation facilities, etc.                      Non-current assets for thermal production facilities: 379.7 billion yen; non-current assets for hydroelectric production facilities: 374.4 billion yen</p>	
<p><b>Opportunities</b></p>	<p>New development of 1.5 million kW in renewables in comparison to FY2017 by FY2025</p>	
<p><b>Capital allocation</b></p>	<p>700 billion yen in strategic investments planned for FY2023-2030, including renewable energy development, etc.                      Distributing recent investment funds with a view to realizing J-POWER "BLUE MISSION 2050."                      (Renewables, electric power networks, upcycling aimed at hydrogen power generation, and nuclear power generation)                      FY2022 results: Invested 36% of about 160 billion yen in investment funds                      FY2023 forecast: Plan to invest 49% of about 160 billion yen</p>	<p><b>Investment Performance and Outlook</b></p> <div style="display: flex; justify-content: space-around;"> <div data-bbox="1256 815 1688 1070"> <p><u>FY2022</u></p> <p><b>About 160 billion yen</b> 36% Renewable Energy, Power Networks, Nuclear Energy</p> </div> <div data-bbox="1688 815 2145 1070"> <p><u>FY2023 Outlook</u></p> <p><b>About 160 billion yen</b> 49% Renewable Energy, Power Networks, Nuclear Energy, CCS</p> </div> </div>
<p><b>Internal carbon prices</b></p>	<p>Standard case: \$40/tCO<sub>2</sub>    Risk case: \$90/tCO<sub>2</sub>    (Estimated amounts for 2030; utilized upon making investment judgment)</p>	
<p><b>Compensation</b></p>	<p>The Company's executive compensation consists of 70% monthly, 20% performance-linked* and 10% stock-based remuneration.                      Performance-linked compensation is determined by consolidated ordinary income and materiality (supply of energy, response to climate change, respect for people, engagement with local communities, and enhancement of our business foundation), which are initiatives aimed at increasing corporate value over the medium to long term, and is evaluated in terms of both financial and non-financial indicators. KPIs for climate change response include targets for new renewable energy development, CO<sub>2</sub> reduction targets, etc. A summary of the calculation formula is as follows.                      (1) First Indicator    Index coefficient: consolidated ordinary income achievement    Range: 0% to 200%                      (2) Second indicator    Index coefficient: Overall evaluation of materiality target [KPI]    Range: 0% to 120%                      (3) Calculation of payment amount    Payment rate: First index coefficient×90%+Second index coefficient×10%                      Note: This executive compensation structure is scheduled to be applied after the Ordinary General Meeting of Shareholders in June 2023.</p>	