

# CLIMATE CHANGE



## Our Policy

INPEX recognizes that climate change is a critical business issue. To achieve the long-term goals of the Paris Agreement, an economy wide transition to a low carbon society is under way. Global climate change response requires action by all members of the international community; governments, businesses and civil society. Governmental policy measures, technology development, industry response, and other long-term initiatives are particularly pertinent. We are committed to fulfilling our role in addressing climate change as a responsible member of the oil and natural gas industry. Furthermore, we comply with national regulations of each country in which we operate business, including those introduced to support the Paris Agreement. Our businesses will work with governments and other stakeholders to address the two societal demands of meeting increasing

energy needs and reducing greenhouse gas (GHG) emissions; to achieve a balance between the two. In our actions towards achieving a low-carbon society, we will strengthen initiatives on promoting natural gas development and renewable energy as a means to reduce the emissions associated with INPEX's value chain. In addition, we will properly manage GHG emissions from our operations and proceed with technology development for practical application of Carbon dioxide Capture Storage<sup>1</sup> to capture and sequester GHG emissions. We shall also undertake analysis and initiatives in line with the Task Force on Climate-related Financial Disclosures (TCFD) recommendations and seek to complete disclosure of exposure to climate-related risks as well as information on climate related opportunities. INPEX has developed a position paper, "Corporate Position on Climate Change," (issued December 2015, last revised July 2018) which is available on our website.<sup>2</sup>



**Kimihisa Kittaka**  
 Director, Managing Executive Officer  
 in charge of Corporate Strategy & Planning

### MESSAGE FROM THE DIRECTOR IN CHARGE OF CLIMATE CHANGE RESPONSE

To advance our response to climate change as a responsible oil and natural gas company, we published our position paper, "Corporate Position on Climate Change" initially in December 2015 and subsequently revised in July 2018. As detailed in INPEX's "Vision 2040" and "Medium-term Business Plan 2018-2022" announced in May 2018, we are also enhancing our systems for addressing climate change and implementing ongoing measures to disclose climate-related information in line with the recommendations of the Task Force on Climate-related Financial Disclosures (TCFD). This aims to proactively contribute to a low-carbon society based on the long-term targets outlined in the Paris Agreement.

Specifically, our Board of Directors seeks to maintain its oversight and expand its involvement in governance. When developing our business strategies, we assess our ability to respond to a number of climate-related scenarios, including the IEA<sup>3</sup> WEO 2°C scenario, to examine our business portfolio. With regard to risk and opportunity assessment, we have an annual assessment and management cycle where risks and opportunities are explored in detail and implement measures and work plans developed out of that process. As for management of greenhouse gas (GHG) emissions, we are considering target setting methods in line with international standards whilst complying with each country's national regulations and GHG management frameworks. We are also improving information disclosure regarding exposure to climate change risks in line with the recommendations as set out by the TCFD. To reflect industry best practice in these activities in a timely manner, we participate as a member of the Executive Committee in IPIECA—the global oil and gas industry association for environmental and social issues to disseminate and collect relevant information.

<sup>1</sup> CCS

Carbon dioxide Capture and Storage



<sup>2</sup> Corporate Position on Climate Change

<sup>3</sup> International Energy Agency

## Sustainability Initiatives on the TCFD Recommendations

### Disclosure in Line with TCFD Recommendations

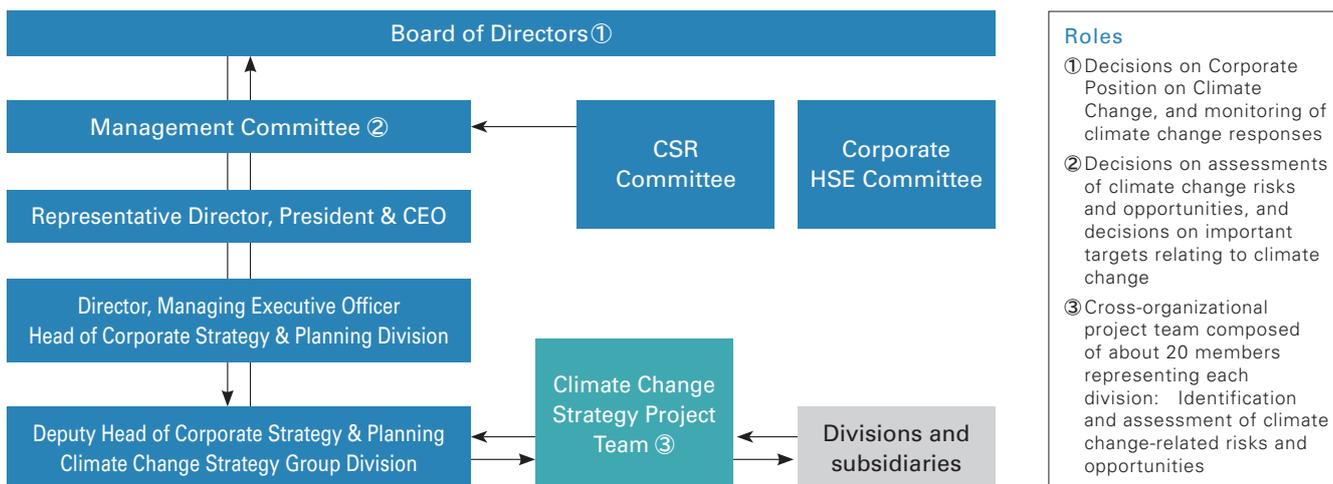
Overview of the TCFD Recommendations		Relevant section	location
<b>Governance</b>		<b>Disclose the organization's governance around climate-related risks and opportunities.</b>	
1	Describe the board's oversight of climate-related risks and opportunities.	<ul style="list-style-type: none"> <li>Governance framework for climate change</li> </ul>	P45
2	Describe management's role in assessing and managing climate-related risks and opportunities.	<ul style="list-style-type: none"> <li>Message from the director in charge of climate change response</li> <li>Governance framework for climate change</li> </ul>	P43 P45
<b>Strategy</b>		<b>Strategy Disclose the actual and potential impacts of climate-related risks and opportunities on the organization's businesses, strategy, and financial planning where such information is material.</b>	
1	Describe the climate-related risks and opportunities the organization has identified over the short, medium, and long term.	<ul style="list-style-type: none"> <li>Climate change-related risks and opportunities</li> </ul>	P47
2	Describe the impact of climate-related risks and opportunities on the organization's businesses, strategy, and financial planning.	<ul style="list-style-type: none"> <li>Low-carbon transition plan</li> <li>Initiatives on renewable energy</li> </ul>	P50 P51-52
3	Describe the resilience of the organization's strategy, taking into consideration different climate-related scenarios, including a 2°C or lower scenario.	<ul style="list-style-type: none"> <li>The INPEX low-carbon society scenarios</li> <li>Assessment of financial impacts of climate change risks</li> <li>Application of internal carbon price</li> </ul>	P49 P48 P48
<b>Risk Management</b>		<b>Risk Management Disclose how the organization identifies, assesses, and manages climate-related risks.</b>	
1	Describe the organization's processes for identifying and assessing climate-related risks.	<ul style="list-style-type: none"> <li>Process for the Assessment and Management of Climate Change Risks and Opportunities</li> </ul>	P46
2	Describe the organization's processes for managing climate-related risks.	<ul style="list-style-type: none"> <li>Process for the Assessment and Management of Climate Change Risks and Opportunities</li> </ul>	P46
3	Describe how processes for identifying, assessing, and managing climate-related risks are integrated into the organization's overall risk management.	<ul style="list-style-type: none"> <li>Risk Management System</li> </ul>	P21-22
<b>Metrics and targets</b>		<b>Disclose the metrics and targets used to assess and manage relevant climate-related risks and opportunities where such information is material.</b>	
1	Disclose the metrics used by the organization to assess climate-related risks and opportunities in line with its strategy and risk management process.	<ul style="list-style-type: none"> <li>Managing greenhouse gas emissions</li> </ul>	P50-51
2	Disclose Scope 1, Scope 2, and, if appropriate, Scope 3 greenhouse gas (GHG) emissions, and the related risks.	<ul style="list-style-type: none"> <li>Performance Data: GHG Emissions Management</li> </ul>	Performance Data (WEB P62)
3	Describe the targets used by the organization to manage climate-related risks and opportunities and performance against targets.	<ul style="list-style-type: none"> <li>Targets of the Japan Petroleum Development Association</li> <li>Efforts to reduce greenhouse gas emission</li> </ul>	P50-51 P51

## Governance Framework for Climate Change Response

As we recognize that climate change is a critical business issue, the Board of Directors seeks to maintain its oversight and expand the Company's involvement. Specifically, our "Corporate Position on Climate Change" was resolved by the Board of Directors and then published in 2015, with a revision in July 2018. As a rule, the Board will review this

corporate position on a yearly basis. We revised the relevant rules in the 2018 financial year and created a system where assessment of climate change risks and opportunities is completed on a regular basis. The outcome of this assessment and the following target settings relating to climate change are approved by the Management Committee and then reported to the Board of Directors. Finally, we have tasked the Climate Change Strategy Group, within the Corporate Strategy & Planning Unit of the Corporate Strategy & Planning Division, to address climate change issues across the entire company.

### Governance Framework for Climate Change Response



### Climate Change Action and Director Compensation

Our "Medium-term Business Plan 2018-2022" sets out a number of climate-related targets in the areas of governance,

business strategies, risk and opportunity assessment, GHG management and disclosure. These targets are integrated into executive bonuses.

### Climate Change Milestones

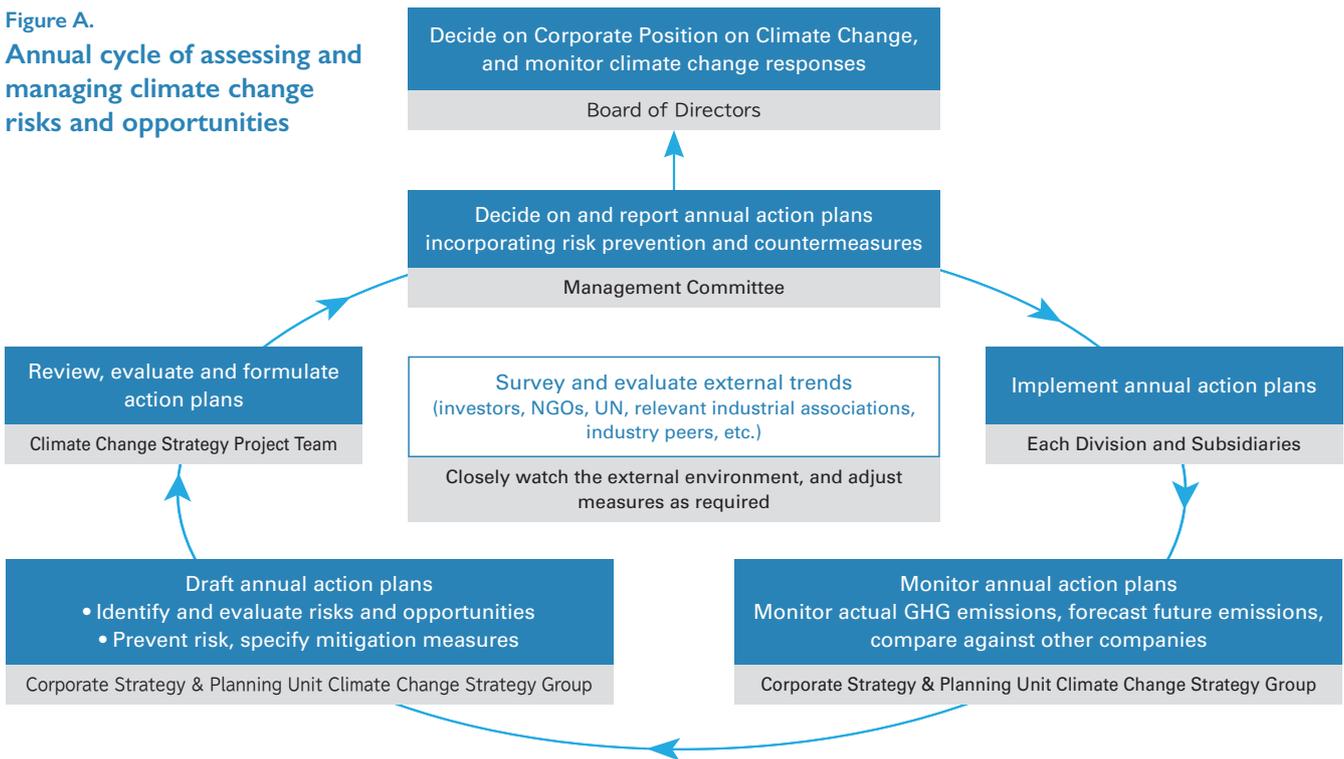


## Process for the Assessment and Management of Climate Change Risks and Opportunities

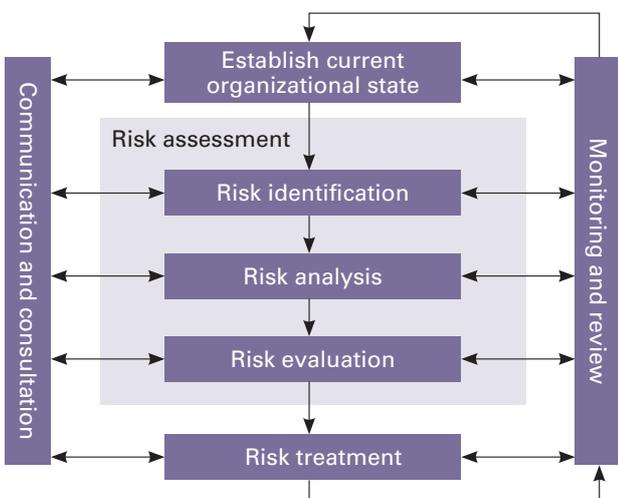
Annually, we assess and manage climate change risks and opportunities (Figure A). During the 2018 financial year, the Climate Change Strategy Group prepared a draft action plan against climate change related risks and opportunities, and the Climate Change Strategy Project Team discussed and

evaluated it. The revised action plan was reported to the Management Committee and Board of Directors. The Climate Change Strategy Project Team is a cross-organizational project team composed of about 20 members from each division. This process is planned to evolve and increase the involvement of the Management Committee during the 2019 financial year. Our risk assessment process follows the international risk management standard, ISO 31000:2009 (Figure B); identifying risks, and analyzing the causes, preventive measures, mitigation measures and the results (Figure C).

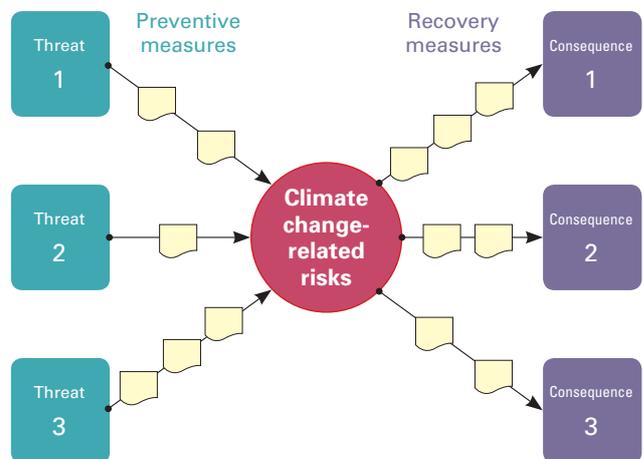
**Figure A.**  
Annual cycle of assessing and managing climate change risks and opportunities



**Figure B.**  
ISO 31000 Process



**Figure C.**  
Risk Analysis Process



## Fiscal 2018 Status of Climate Change Risks: Assessment Coverage, Expected Timing and Solutions

	Risk category	Risk description	Expected Risk Timing	Action plan
Transition risks	<b>Policies and regulations</b> (Scope 1 emissions)	Potential for increased costs as a result of regulation that applies a direct or indirect price on carbon	Medium-term	<ul style="list-style-type: none"> <li>Monitor policy frameworks in the countries in which INPEX operates business</li> <li>Include internal carbon pricing in economic evaluation of projects</li> </ul>
	<b>Reputation</b> (Scope 1 emissions)	Stakeholder concerns about increasing Scope 1 emissions	Short-term	<ul style="list-style-type: none"> <li>Ongoing management of GHG emissions and identification of emissions reduction activities</li> </ul>
	<b>Reputation</b> (Scope 3 emissions)	Stakeholder concerns and a deteriorating image of the oil and gas industry due to emissions associated with the use of key industry products by customers	Medium-term	<ul style="list-style-type: none"> <li>Promote development of natural gas as an energy source for customers as the low carbon energy option for customers</li> <li>Increasing levels renewable energy in the company energy portfolio</li> <li>Promote development of technologies for practical application of carbon capture and storage</li> </ul>
	<b>Reputation</b> (Financial impact)	Potential downside impacts on access to credit and/or equity due to a perception of insufficient information disclosure from investors and financial institutions	Medium-term	<ul style="list-style-type: none"> <li>Disclose information on climate related risks and opportunities in accordance with the recommended framework by the TCFD</li> </ul>
	<b>Market and technologies</b> (Decrease in oil and gas demand and prices)	<ul style="list-style-type: none"> <li>Continuous decrease in demand and prices for oil and gas due to changing market preference to low-carbon energy</li> <li>Decrease in the cost of renewable energy, electric vehicles or battery storage</li> </ul>	Long-term	<ul style="list-style-type: none"> <li>Conduct scenario-based monitoring of market and technology trends</li> <li>Maintain a framework enabling stable operations even in the lower oil-price environment with \$50/bbl.</li> <li>Assess financial impact of portfolio with oil prices and carbon prices according to the IEA WEO 2°C scenario.</li> <li>Conduct economic evaluation of projects using the supply cost curves.</li> </ul>
Physical risks	<b>Acute risks</b>	Risk of adverse effect on operating facilities by extreme weather events	Long-term	<ul style="list-style-type: none"> <li>Assess impacts on operating facilities due to increasing average temperatures, changing precipitation patterns, rising sea levels and other climate change factors up to the mid-21st century according to the RCP8.5 scenario in the Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report</li> </ul>
	<b>Chronic risks</b>	Risk of adverse effect on operating facilities by long-term increasing average temperatures, changing precipitation patterns, and rising sea levels	Medium-term	

## Fiscal 2018 Status of Climate Change Opportunities: Assessment Coverage, Expected Timing and Solutions

	Opportunities	Opportunities covered	Expected opportunity timing	Action plan
Opportunities	<b>Resource efficiency</b> (Energy conservation)	Energy efficiency improvements in production processes	Short-term	<ul style="list-style-type: none"> <li>Design facilities with high energy efficiency and follow through maintenance plan to improve energy efficiency on a routine basis</li> </ul>
	<b>Energy sources</b> (Utilization of renewable energy sources)	Utilization of renewable energy sources in production processes	Long-term	<ul style="list-style-type: none"> <li>Consider the potential of solar power generation for projects established in sunbelt regions of the world that receive high amounts of sunshine</li> </ul>
	<b>Low-carbon products</b> (Expansion of renewable energy businesses)	Enhancement of initiatives for renewable energy businesses: Increase to 10% of portfolio by 2040	Long-term	<ul style="list-style-type: none"> <li>Survey geothermal resources in Hokkaido, Akita and Fukushima Prefectures and develop investment cases for prospective resources where appropriate</li> <li>Currently participating in the Sarulla Geothermal IPP Project in Indonesia, the world's largest geothermal power generation business with an installed capacity 330 MW.</li> </ul>
	<b>Markets</b> (Expansion of natural gas sales)	Building a global gas value chain	Medium-term	<ul style="list-style-type: none"> <li>Signed Memorandum of Understanding for an LNG bunkering partnership with ADNOC Logistics &amp; Services in United Arab Emirates (December 2018)</li> </ul>
	<b>Products and services</b> (R&D and innovation)	Research and development of technologies that contribute to building electricity, hydrogen and methane value chains	Long-term	<ul style="list-style-type: none"> <li>Conduct joint industry-academia research into a Sustainable Carbon-Cycle System that converts carbon dioxide to methane for reuse as an energy source</li> <li>Participate in the Research Association of Artificial Photosynthetic Chemical Process (ARPCHEM), a joint industry-academia-government project that uses hydrogen produced from sunlight and water using photocatalysts with the aim of manufacturing core chemical products from carbon dioxide, and promoting development of artificial photosynthesis technologies</li> </ul>

Short-term up to one year    
 Medium-term one to five years    
 Long-term longer than five years

## Assessment of Financial Impacts of Climate Change Risks

We use three methods to assess the potential financial impact of climate change risks. The first method is to assess the financial impact of relevant policy and regulatory risk that the introduction and enhancement of carbon pricing policies poses to our projects. According to a report from the World Bank<sup>4</sup>, 96 of the countries participating in the Paris Agreement report using or considering the introduction of carbon pricing policy (such as cap-and-trade or a carbon tax) for their Nationally Determined Contributions (NDCs). We are applying an internal carbon price (US\$35/t CO<sub>2</sub>-e) as part of the economic assessment of existing and potential future projects. The internal carbon price is applied on a project by project basis to the direct emissions from that project. The level of internal carbon price used is reviewed each year in line with IEA WEO carbon prices.

The second method is to analyze the financial impact of potential changes in oil and carbon prices resulting from the various climate scenarios and the impact those changes may have on our portfolio. By applying changes in oil and carbon prices, as presented in the IEA WEO Sustainable Development Scenario, to the net present value (NPV) formula for all projects, we can determine the overall impact to company NPV from the Sustainable Development Scenario. We have been trialing this method since 2018.

The third method is to assess financial impact of market risk that oil and LNG supply/demand forecasts according to the 2°C scenario pose to our projects. To assess this

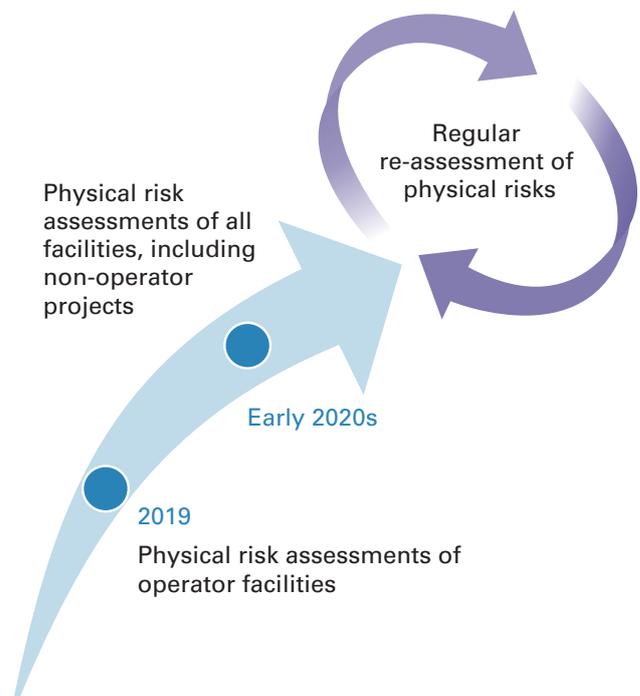
risk, We apply a supply cost curve method to predict oil and LNG supply volumes in the future impacts on oil and LNG demand resulting from climate scenarios to assess our project's competency in the future. The cost curve is drawn with 'future supply by project' on the horizontal axis and 'economic efficiency (cost) by project' on the vertical axis. The supply cost curve is a global indicator, so it is also necessary to consider the actual geopolitics, government policies, technical capabilities, commercial practices and other factors of each region. We are discussing our assessment methods, including how we take each of these factors into account.

## Development of a Physical Risk Assessment Process

During the 2018 financial year, we have examined assessment processes of our physical risks and established a road map for both operator and non-operator projects. We will undertake assessments of all facilities by the early 2020s. During the 2019 financial year, we are conducting physical risk assessments of our operator facilities. As preparation, we used external data<sup>5</sup> to specify climate variables including mid-21st century's average temperature, precipitation pattern, and sea level rises for Niigata Prefecture in Japan and Darwin in Australia. We followed the RCP8.5 (Representative Concentration Pathways 8.5) scenario in the IPCC fifth Assessment Report (AR5), which is a "Business as usual" scenario.

### Three Approaches to Financial Assessment Response

	Risks assessed		
	Policy and regulatory risks that carbon pricing policies pose to projects	Market risks that 2°C scenario index prices pose to portfolio	Market risks that 2°C scenario supply/demand forecasts pose to projects
Financial assessment method	Economic assessment of projects using internal carbon price (US\$35/t CO <sub>2</sub> -e)	Financial assessment of portfolio using oil and carbon prices according to the IEA WEO 2°C scenario	Economic assessment of projects using supply cost curves for oil and LNG
Metric	Change in company NPV (against base NPV)	NPV rate of change (against base NPV)	Break-even cost
Status	Method used since October 2017	Method trialed in 2018 and used since March 2019	Examining method during the 2019 financial year

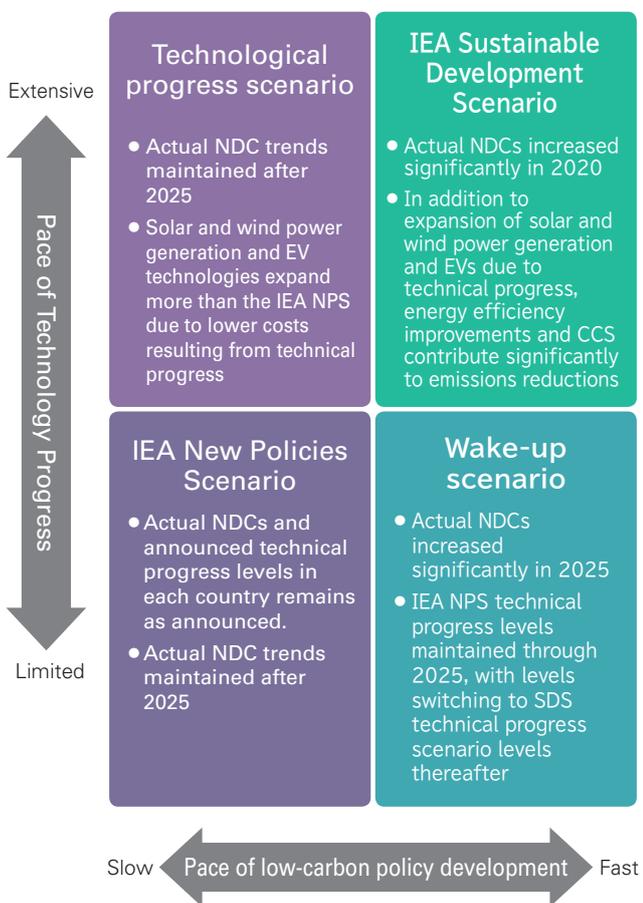


<sup>4</sup> World Bank – State and Trends of Carbon Pricing 2019 (June 2019)

<sup>5</sup> Climate in Japan at the End of 21st Century, Ministry of the Environment (2015); Global Warming Projection Volume 9, Japan Meteorological Agency (2017); Monsoonal North Cluster Report, Climate Change in Australia (2015)

## The INPEX Low-carbon Society Scenarios

We are conducting scenario analysis using four different scenarios to reflect climate-related trends in our strategy and business planning. Our base case assumptions are derived from the New Policy Scenario (NPS) of the International Energy Agency's World Energy Outlook (IEA WEO). In the "Technological progress scenario", we assume a rapid growth in demand for renewables and electric vehicles (EV), spurred by cost reductions around the globe. In the "Wake up scenario" the frequent occurrence of climate-related disasters pushes governments to address climate change more seriously, then society switches to low-carbon economy after 2025.



The IEA WEO revises the scenarios once a year to reflect changes in society. We conduct a signpost analysis regarding the main indicators of the IEA scenarios and actual events as signposts<sup>6</sup> to assess which one of our scenarios has already started to play out. The outcome of this analysis is used to review the consistency of our future strategic direction with society.

### 6 Signposts

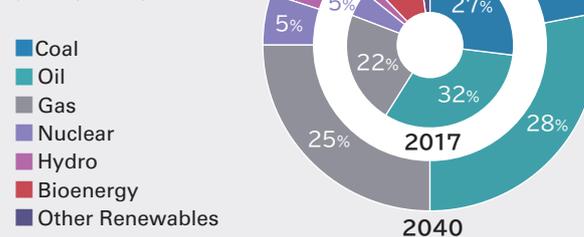
Signposts are early indicators of future scenario directions. INPEX identifies multiple elements as signposts including the energy mix, advances in electrification, and the spread of EV and low-carbon technologies. We closely watch these trends and the likelihood of certain developments.

## • Overview of IEA scenarios

### IEA WEO New Policies Scenario (NPS)

The NPS is the central scenario of the International Energy Agency's World Energy Outlook, which assumes implementation of all currently announced policies. According to the NPS in WEO 2018, world's primary energy demand will continue to grow through 2040, with oil and natural gas together accounts for 53% of the total demand. Although the share of renewables (excluding hydropower and biomass) in the energy mix is smaller than that of oil and natural gas, they grow five-fold in the period from 2017 to 2040.

IEA WEO New Policies Scenario Energy Mix (2017 / 2040)

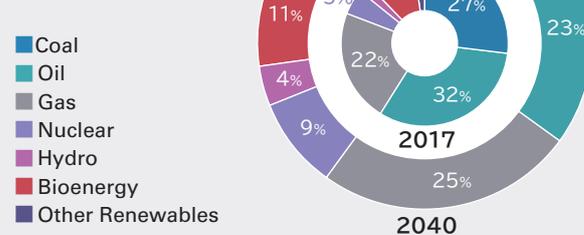


### IEA WEO Sustainable Development Scenario (SDS)

The Sustainable Development Scenario is the IEA's most rigorous low-carbon scenario which integrates the objectives of three Sustainable Development Goals (SDGs). Under this scenario, electrification and steep reductions of GHG emissions contribute to achieve the Paris Agreement's target (average global temperature rise kept below 2 degrees Celsius and efforts pursued to limit temperature increase to 1.5 degrees Celsius).

Energy efficiency will be improved significantly with broad implementation of strong low-carbon policies as its backdrop. Primary energy demand will decrease by about 10% towards 2040. On the other hand, the share of oil and natural gas in the total demand will remain at 48%. Also, demand for renewable energies will increase about eight times the 2017 level by 2040.

IEA WEO Sustainable Development Scenario Energy Mix (2017 / 2040)



## Low-carbon Transition Plan

For this scenario entailing a further shift from the IEA New Policies Scenario to a low-carbon society, we acknowledge the uncertain prospects for a large increase in oil prices. Under these conditions, we assume in the Medium-term Business Plan 2018-2022 that oil prices will trend within the \$50 to \$70/bbl range with a gradual increase to \$70/bbl. During this time, our target is to reduce production costs to \$5/bbl (excluding royalties) for oil and natural gas upstream businesses, and we maintain financial and corporate resilience even if the crude oil price drops to US\$50/bbl.

Meanwhile, we aim to reduce our carbon footprint. In addition to manage emissions from our operations appropriately, promoting the development of natural gas, for which robust demand is anticipated under both the NPS and the SDS, is an important mean to drive down the emissions. In parallel, we enhance renewable energy initiatives and participate in Proof of Concept trials for CCS, which captures and stores CO<sub>2</sub>.

In Vision 2040 we will further promote a low-carbon footprint in operations. We aim to be a key player in natural gas development and supply, mainly focusing on Asia and Oceania, as well as Japan to expand the company's domestic gas supply chain, on which our development and supply of natural gas has so far been focused, and create

a global gas value chain. In the field of renewable energy, we aim for renewable energy projects to account for 10% of our project portfolio in the long term. For CCS, we will develop technologies for the practical application of CCS. Accordingly, while reducing our carbon footprint in each of our business activities, we will work to continuously increase corporate value by maintaining a business portfolio with the flexibility to respond to changes in the business environment towards 2040.

## Supply Chain Initiatives

In our Health, Safety and Environmental (HSE) Policy, we have pledged that we will pursue every effort to reduce our carbon footprints and adhere to the GHG emissions management process. In our Contractor HSE Management Manual and Domestic Procurement Guidelines, we have included articles requiring compliance with this pledge in both work and procurement contracts, with compliance extending to the contractors and suppliers as well.

For example, we are tracking emissions from LNG carriers, chartered by our wholly-owned subsidiary INPEX Shipping for better understanding of our overall emissions and future improvement, and disclose the information as our Scope 3 emissions<sup>7</sup>. These carriers are used primarily for shipping LNG from Ichthys LNG project.

# Managing Greenhouse Gas Emissions

## Efforts to Reduce Greenhouse Gas Emissions

Our overall GHG emissions in fiscal 2018 were approximately 5.091 million tons-CO<sub>2</sub>e, increasing approximately 4.462 million tons-CO<sub>2</sub>e from the previous fiscal year. This change is attributed to increased fuel consumption of offshore and onshore production facilities for the Ichthys LNG Project. Another factor in increasing GHG emissions has been the flaring<sup>8</sup> of natural gas that cannot be processed during the commissioning and start-up period to confirm the

operation of facilities and equipment properly when starting production. About half of the increase in fiscal 2018 is attributable to this flaring, and while overall emission amounts will increase along with the increase in production, we estimate that the amount of flaring will decrease as operations stabilize.

While our overall GHG emissions will increase as LNG production of the Ichthys Project proceeds, 70 percent of the LNG produced from the Ichthys Project will be supplied to Japanese electricity or gas providers as an energy source supporting a stable energy supply in Japan.

When used as an energy source, natural gas emits less GHG during its lifecycle than other fossil fuels. Natural gas is also recognized as an excellent energy source for serving as a backup during fluctuations in power generation by renewable energy, and can contribute to global GHG reductions.

Our actions to manage methane emissions of the Ichthys LNG Project are as follows:

- Selection of equipment/facility that avoids methane leaks as much as possible
- Regular inspection for leaks from equipment/facility
- Vent gas recovery and recycling
- Zero routine flaring during normal operations

In our Health, Safety and Environmental Policy, we have declared that we will pursue every effort to reduce GHG emissions and adhere to the GHG emissions management process. To achieve the goals of this declaration, we were involved in the following programs in fiscal 2018.

- Compilation, analysis, and reporting of GHG emissions
- Construction of an aggregation and reporting framework for methane loss

In addition to GHG emissions compilation, we started to collect and report statistics on methane fugitives from domestic and overseas business sites in fiscal 2018 based on international methods. We will continue to carry on the emission management in accord with international practice.

We participate in the Japan Business Federation's (Nippon Keidanren) "Commitment to a Lower Carbon Society Plan" as a member of the Japan Petroleum Development Association (JPDA). In this commitment, JPDA has set targets of reducing GHG emissions by 5% from the fiscal 2005 level by 2020 and by 28% from the fiscal 2013 level by 2030. These 2020 and 2030 reduction targets exceed the most recent reduction target indicated by the Japanese government.

As of fiscal 2017, JPDA GHG emissions were reduced by 9.0% compared to the fiscal 2005 level and by 20.3% compared to the fiscal 2013 level. We will continue to cooperate with other JPDA members and undertake further GHG emissions reduction to achieve the 2020 and 2030 targets.

## Initiatives on Renewable Energy

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### Initiatives on Domestic Geothermal Power Business

Japan's geothermal resources are the third largest in the world after those of the US and Indonesia, so there are high expectations for geothermal power generation in Japan from the perspectives of clean, home-grown energy and base-load power. However, it takes a considerable amount of time and investment to assess development risks specific to geothermal resources, in addition to the required coordination with onsen (hot spring) operators and other interest groups, complex licensing procedures and environmental assessments. Construction of geothermal power plants is a long-term proposition, so the speed of commercialization is an issue.

Since 2011, we have been working with Idemitsu Kosan on geothermal resource exploration in the Amemasudake region in Hokkaido and the Oyasu region in Akita Prefecture. For Fukushima Prefecture, we are currently working with 10 other companies on geothermal resource exploration. After conducting geological surveys, gravity surveys, and electromagnetic surveys in the Amemasudake and Oyasu areas, we drilled geothermal exploratory wells and confirmed steam and hot water production through flow tests, and we began an environmental assessment of the Oyasu region in 2018.

Given the expectations of a transition to a low-carbon society in the future, we see opportunities to improve our corporate value while fulfilling our corporate social responsibilities through initiatives to develop geothermal power generation in Japan. Going forward, we will seek to become a geothermal development operator in Japan and help tackle a variety of challenges.

## Initiatives in Overseas Geothermal Power Production

### (Sarulla Geothermal IPP)

In June 2015, we joined the Sarulla Geothermal Independent Power Producer (IPP) Project, in the Sarulla district in North Sumatra Republic of Indonesia. This operation will sell electricity over a span of 30 years to Perusahaan Listrik Negara, Indonesia's government-owned electricity company (PLN). Power will be generated from a 330 MW geothermal plant, among the world's largest. Plant construction started in 2014. In 2017, Unit 1 (110 MW) came online in March, Unit 2 (110 MW) in October, and finally Unit 3 (110 MW) in May 2018.

This project is also one of our CSR initiatives: we are making contributions in response to the needs of the local community by building infrastructure for the region, including roads, bridges, and waterworks, introducing English classes for local students, and supporting the lifestyles of local residents. This project contributes to meeting the electric power demands of Indonesia, which has achieved remarkable economic development and is expected to make a significant contribution to the growth of the Indonesian economy.

## Solar Power

INPEX Mega Solar Joetsu is a solar power generation facility with a maximum output of approximately 2,000 kW (2 MW). The facility, which started generating electricity in March 2013, occupies a part of wholly owned subsidiary INPEX Logistics (Japan) Co., Ltd., located in Joetsu City, Niigata Prefecture. Our second 2 MW solar power generation facility, located on a neighboring site, started operation in July 2015. These two solar power facilities are expected to annually generate electricity equivalent to the electricity consumption of approximately 1,600 households.

## Wind Power Generation Initiatives

In 2015, the annual volume of electricity generated throughout the world from renewable energies exceeded that which was generated from fossil fuels and nuclear power. Wind power generation is also becoming the lowest cost choice for many regions adopting new power sources over recent years, largely due to the increased size and efficiency of wind generators. Despite the Japanese market facing many challenges, including site restrictions, wind power generation is being promoted through feed-in tariff system with conditions

that are competitive by international standards.

At the end of 2017, we took our first step toward developing a wind power generation business in Japan to help address local needs and challenges. We are currently building experience in this business field, and by giving our utmost focus to developing our offshore wind power business, we will work towards developments that contribute to Vision 2040.

## Low-carbon Technology

In our efforts toward achieving a low-carbon society, we are participating in an artificial photosynthesis project and technology development projects for utilization of CO<sub>2</sub> being run by the New Energy and Industrial Technology Development Organization (NEDO). The artificial photosynthesis project is one of revolutionary R&Ds that contributes to a reduction in CO<sub>2</sub> emissions via a basic chemical manufacturing process using CO<sub>2</sub> and clean hydrogen converted from water through photocatalysis using solar energy. This project involves the three R&D steps, and of these three R&D steps, we have been participating in the development of photocatalysts that produce hydrogen by water splitting with sunlight, with the aim of achieving a solar energy conversion rate of 10% by the end of fiscal 2021.

The technology development projects for utilization of CO<sub>2</sub> aim to convert CO<sub>2</sub> into fuel, chemical raw materials, and other valuable materials to reduce CO<sub>2</sub> emissions. Among these efforts, our company is engaged in technological development of methanation, which causes CO<sub>2</sub> and hydrogen to react to generate methane. Starting this fiscal year, we plan to start a testing operation that uses the raw CO<sub>2</sub> gas to be removed at the Koshijihara plant at our Nagaoka Field in Niigata. To convert CO<sub>2</sub> to methane as a energy resource and make a sustainable recycling-oriented society a reality, we are working towards future commercialization.



CO<sub>2</sub> methanation test facility currently under construction