

Japanese Oil Companies' Long-Term Strategies for the Paris Agreement: Comparison with the World Major Oil Companies

HiroYuki OKAMOTO, Ph.D., Specially Appointed Professor, Nagoya City University,
Reiji TAKEISHI, Ph.D., Honorary Professor, Tokyo International University

Abstract

With the Paris Agreement coming into effect, the decarbonization movement is gaining momentum worldwide, and all oil companies have begun to adopt strategies to shift their traditional core businesses into low-carbon businesses, renewable energy fields, hydrogen, and ammonia utilization. A comparison of the medium- and long-term plans of Japanese oil companies shows that ENEOS and Idemitsu which specialize almost exclusively in the downstream sector, and INPEX, which specializes in the upstream sector, have a limited degree of dynamism in their corporate strategies and business transformation, compared to the large-scale companies such as ExxonMobil, Shell, and BP, which are major global players. The strategy of Japanese oil companies in these times will be to secure markets for chemicals and high-performance products, while focusing on entering the power sector for downstream-centered companies (ENEOS, Idemitsu). On the other hand, upstream-oriented companies (INPEX) have a growth strategy of increasing oil and gas production. Japanese oil companies are now at a major turning point where they need to restructure their strategies and are facing an ever more challenging situation to survive.

1. Introduction

The Russian military invasion of Ukraine on February 24, 2022, created a crisis situation that halted oil and gas supplies to European countries that rely on large amounts of fossil fuel imports from Russia. World gas, oil, and coal prices all rose. Western countries have imposed economic sanctions on Russia and have adopted policies to reduce or stop imports of gas and oil from Russia.

With the Paris Agreement coming into effect, the decarbonization movement is gaining momentum worldwide, and all oil companies have begun to adopt strategies to shift their traditional core businesses into low-carbon businesses, renewable energy fields, hydrogen, and ammonia utilization. On the other hand, it is not easy

to replace the huge amount of energy supplied by hydrocarbons with renewable energy sources, and it is expected that the supply of hydrocarbon energy will continue to be stable for 10, 20, or even 30 years. In 2040 and 2050, however, the share of low-carbon or zero-carbon energy supply is expected to increase substantially, not only in developed countries but also in developing countries.

In light of the above situation, we will compare the medium- and long-term plans adopted by the world's major oil companies, such as ExxonMobil, Shell, and BP, with the medium- and long-term plans prepared by Japanese oil companies, such as ENEOS, Idemitsu, and INPEX, which are positioned as medium-sized companies in the world. By comparing the medium- and long-term plans of these companies with those of Japanese oil companies that are positioned as medium-sized companies in the world, it would be very meaningful to examine what kind of ideas the major and medium-sized companies have in mind to formulate their medium- and long-term strategies and which direction they are aiming to take. This is because if the business of each company is not seen to be sustainable, the supply of oil, gas, and other hydrocarbon resources will not be stable in the short to medium term, which could easily lead to global energy supply shortages, soaring and/or fluctuating energy prices, and dysfunction of the global energy resources market.

2. Target of Japan's Energy Policy

Japan is currently setting a goal of reducing greenhouse gas emissions by 46% in 2030 compared to 2013. In order to achieve this goal, it will be necessary to rapidly increase the introduction of renewable energy sources and significantly increase the operation of nuclear power, as well as reduce the consumption of fossil fuels such as natural gas (LNG), coal and oil.

Japanese oil companies are at the crossroads in terms of how they can either shift their core business of handling oil and gas to a low-carbon economy or transform their business.

Table 1 Japan's Energy mix plan for 2030

		(FY2019 ⇒ previous energy mix)	Energy mix in FY2030 (ambitious outlook)	
Energy efficiency improvement		(16.55 million kl ⇒ 50.30 million kl)	62 million kl	
Final energy consumption (without energy conservation)		(350 million kl ⇒ 377 million kl)	350 million kl	
Power generation mix Electricity generated: 1,065 TWh ⇒ Approx. 934 TWh	Renewable energy	(18% ⇒ 22-24%)	36-38%	<small>※If progress is made in utilization and implementation of R&D of renewable energy currently underway, 38% or higher will be aimed at.</small> <small>(details of renewable)</small> solar 14~16% wind 5% geothermal 1% hydropower 11% biomass 5%
	Hydrogen/Ammonia	(0% ⇒ 0%)	1%	
	Nuclear	(6% ⇒ 20-22%)	20-22%	
	LNG	(37% ⇒ 27%)	20%	
	Coal	(32% ⇒ 26%)	19%	
	Oil, etc.	(7% ⇒ 3%)	2%	
(+ non-energy related gases/sinks)				
GHG reduction rate		(14% ⇒ 26%)	46%	<small>Continuing strenuous efforts in its challenge to meet the lofty goal of cutting its emission by 50%</small>

12

Source: Ministry of Economy, Trade and Industry (METI), Japan.

The Japanese government stated that it will achieve carbon neutrality by 2050. Although CO₂ emissions will still be emitted in 2050, it is said that absorption and removal will achieve zero net emissions (Figure 1).

Japanese oil companies need to formulate future plans to achieve zero net emissions in 2050 as individual companies in accordance with this government goal.

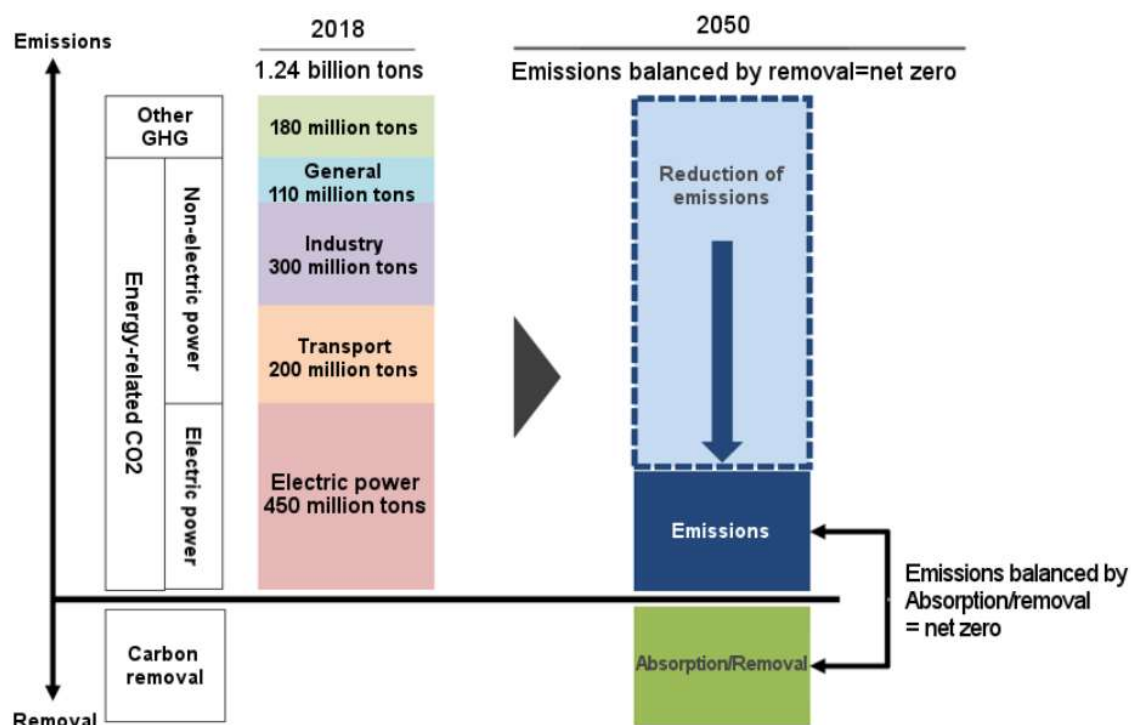


Figure1. Japan's Emissions reduction plan in 2050

Source: METI, Japan

3. Current status and future goals of major Japanese oil companies

The following is an analysis of the current situation and future efforts of major Japanese oil companies. Regarding oil sales, this paper covers two major companies in Japan, ENEOS and Idmitsu. In the field of oil and gas exploration development and production, INPEX is analyzed.

3.1 ENEOS

ENEOS can be described as a medium-sized oil company in the world, with sales of 63.8 billion US \$ and a profit after tax of 950 million US \$ for the financial year 2021 (converted to 120 yen per dollar). It is characterized by a low profit margin, and the profit margin on sales in the same year was only 1.5%.

The company has achieved high profits when the oil selling price rises, and the profit amount fluctuates greatly depending on the oil price. When oil prices fall in 2019, profits have fallen by a quarter of the previous year. It tends to be difficult to generate stable profits. Although material sales and electricity sales classified as other categories are increasing, oil sales, which are shown as Energy in Figure 2, are the most important source of income.

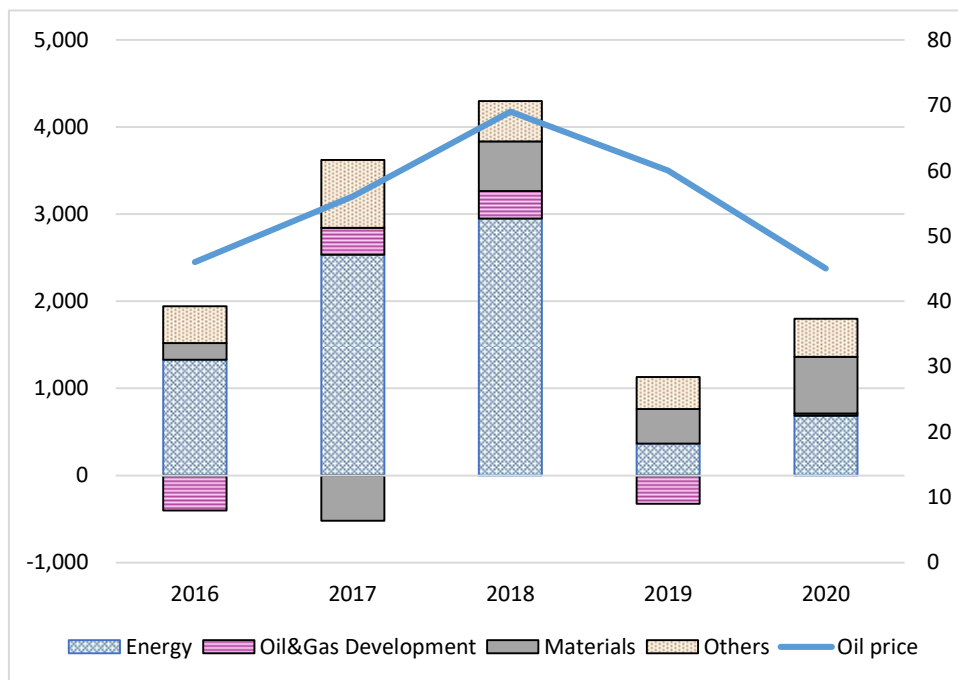


Figure 2. ENEOS's Operating Income by Business Segments (Oil price is on Right axis, others are on Left axis)

Unit: million US\$: Left axis, US\$/bbl: Right axis

Source : ENEOS financial data

As shown in Figure 3, the plan is to reduce the petroleum sector and grow the petrochemical sector, electronic materials, and renewable energy sectors. To achieve this objective, it is also attempting to make aggressive acquisitions.

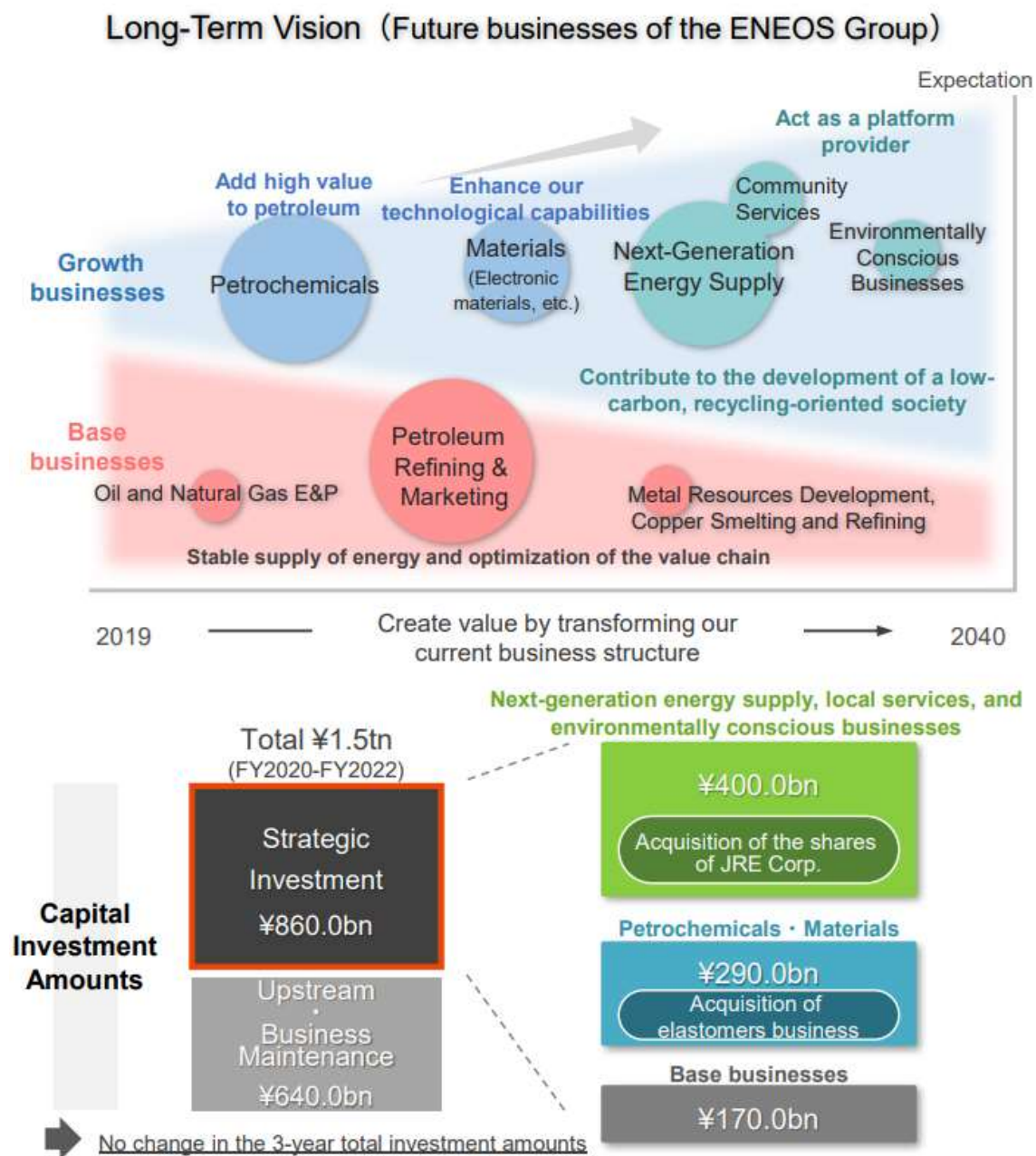


Figure 3. ENEOS Medium-term Management Plan in 2021

Source : ENEOS

3.2 Idemitsu

Idemitsu is the second largest oil company in Japan after ENEOS with sales of 38 billion US \$ and profit after tax of 291 million US \$ in Fiscal year 2021 (converted to 120 yen

per dollar). The profit margin is even lower than ENEOS, and the profit margin on sales in the same year is only 0.8%.

Sales of petroleum products play the most important role in Idemitsu's management. It also produces coal and crude oil, making great profits in 2018, when resource prices were high. The following year, in 2019, when oil prices fell, the company posted a significant loss (inventory loss), meaning that its profit structure is dependent on resource prices, with the amount of profit or loss depending on the price of oil and coal.

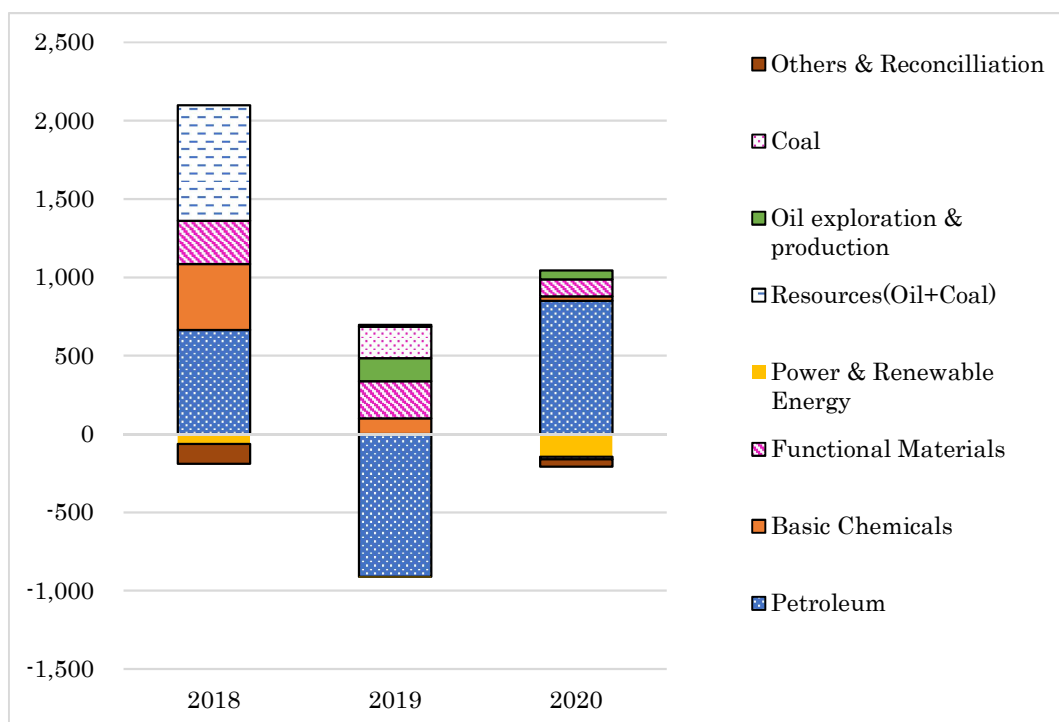


Figure 3. Idemitsu's Operating Income by Business Segments

Unit: million US\$

Source: Idemitsu financial data

Idemitsu's future focus is in the five areas listed in Table 2: petroleum products, basic chemicals, functional materials, power and renewable energy, and the petroleum marketing sector, which is currently the company's main focus. The plan is to transform from the existing petroleum refining and marketing business.

Table 2. Five main business sectors of Idemitsu company

Petroleum	Fuel products
Basic Chemicals	Basic Chemicals
	Lubricants - Performance chemicals
Functional Materials	Electronic materials - High-functional asphalt
	Agri-bio products
Power and Renewable	Power plants (thermal, solar, wind, biomass)
Energy	Supply and sales of electricity
	Next-generation CIS solar modules
	Oil exploration and production
Resources	coal, uranium
	geothermal resources

Source: Idemitsu

3.3 INPEX

INPEX is Japan's leading upstream petroleum company with sales of USD 10 bn and profit after tax of USD 1.9 bn in fiscal year 2021 (at USD 1:120). The company's return on sales has reached 17.9% in 2021 and it is well positioned to benefit from higher oil and gas prices.

Japan's largest oil and gas producing company INPEX solely depends on the production of oil and gas. In recent years, the company has succeeded in increasing its reserves, especially on oil reserves (Figure 6).

As a dedicated exploration and production company, INPEX's future plans are to become one of the top ten oil and gas exploration and development companies in the world, while at the same time investing in its own cash flow and expanding its revenue areas.

In addition to traditional oil and gas production, the company's strategic areas for 2050 include hydrogen / ammonia supply, CO₂ underground storage and utilization (CCUS), renewable energy, and methanation (Methane synthesis produced from CO₂ and hydrogen) and tree planting (Chart 7).

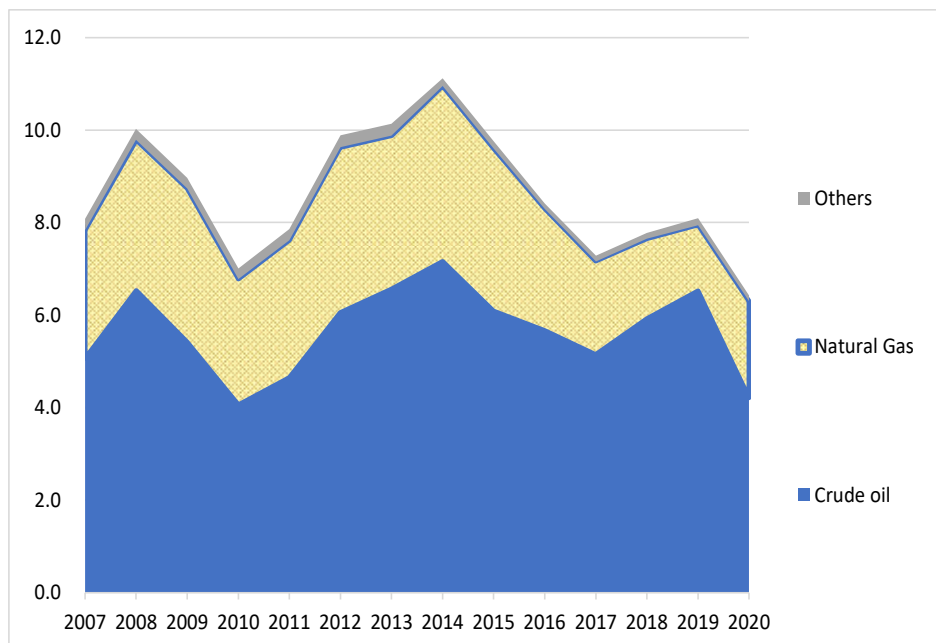


Figure 4. INPEX's Sales amount by products

Unit: billion US\$

Source: INPEX financial data

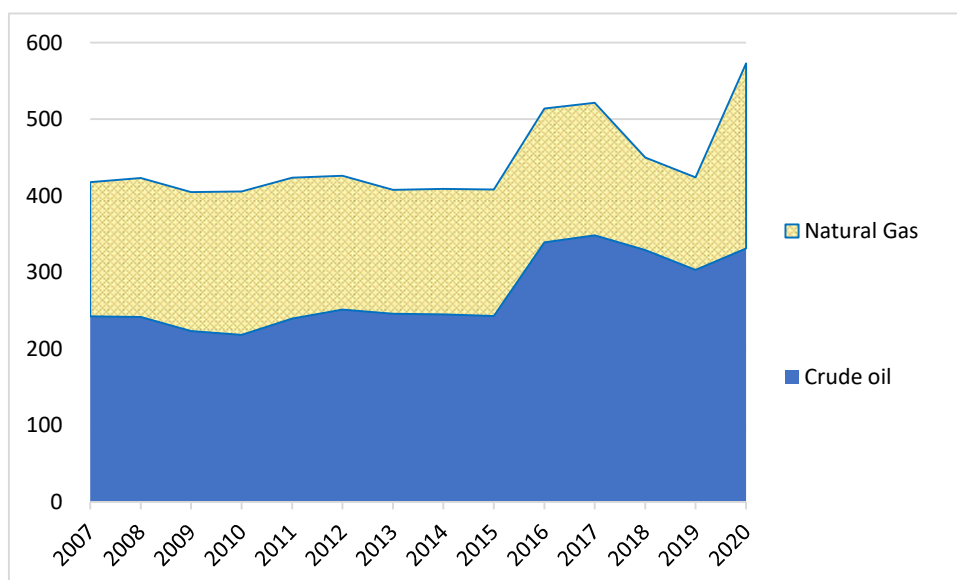


Figure 5. INPEX's Hydrocarbon Production (Unit: oil equivalent 1,000 barrels per day)

Source: INPEX

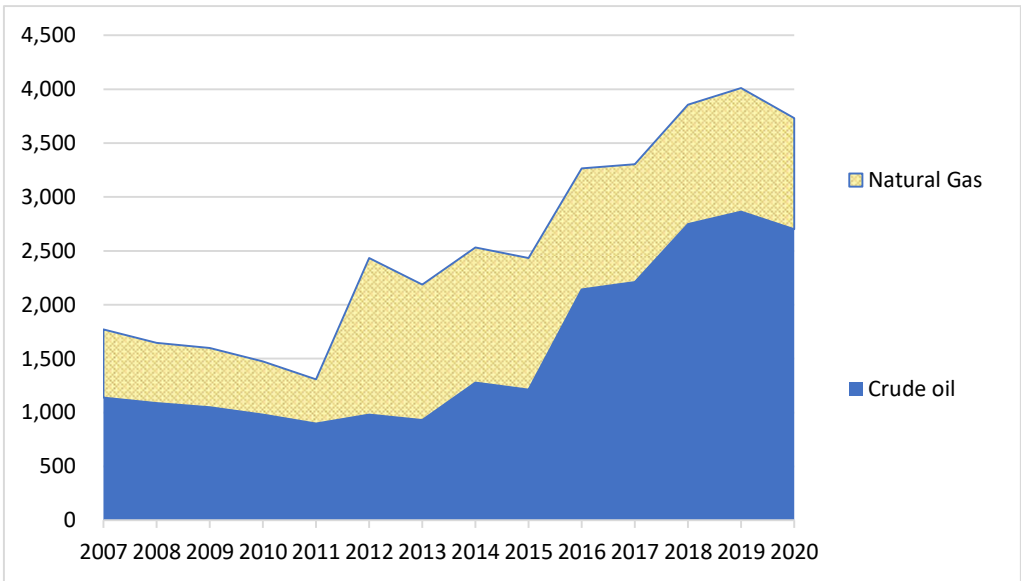


Figure 6. Proved Reserves of oil and gas

Unit: million barrel of oil equivalent

Source: INPEX

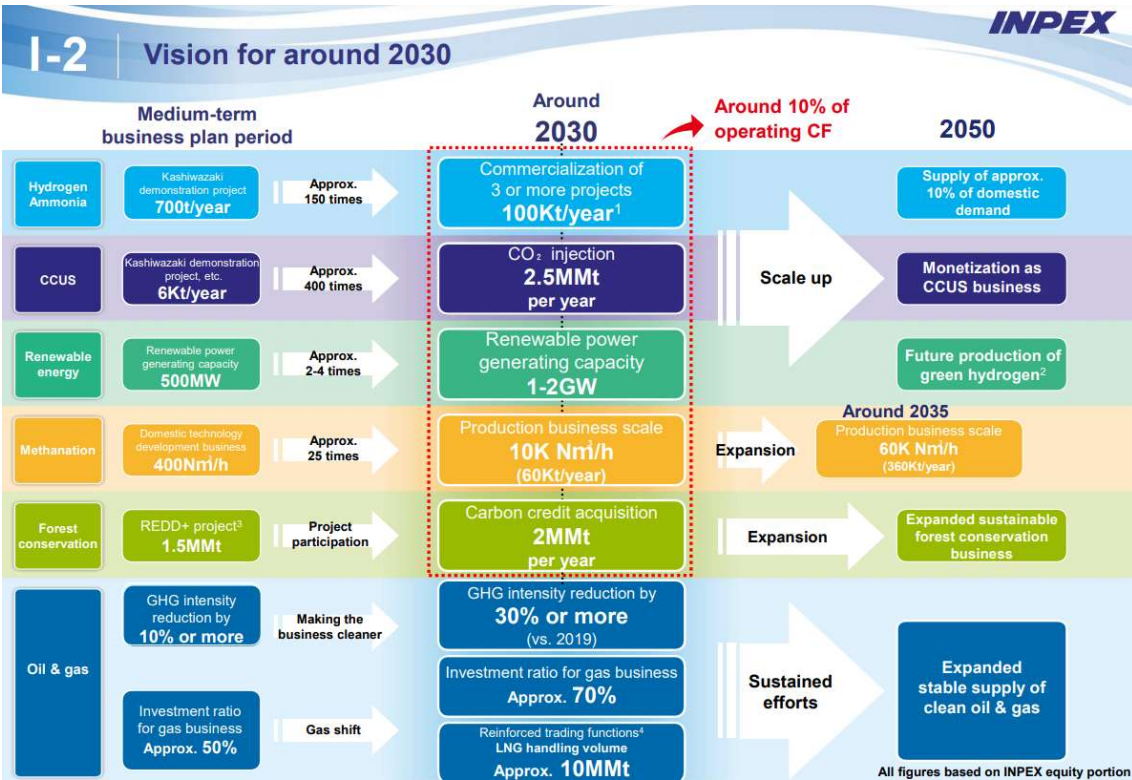


Figure 7. INPEX's corporate plan for 2030

Source: INPEX, Vision for around 2030

4. World Major companies' position and future goals

ExxonMobil, Shell, and BP are listed and analyzed by this paper as World leading oil companies, and their efforts toward 2050 will be analyzed.

4.1 ExxonMobil

According to ExxonMobil's March 2022 data, 64% of ExxonMobil's profits come from the upstream sector, followed by the chemical sector at 28%. The downstream oil sector only accounts 8%.

The company's cash flow is also 68% from the upstream, indicating that the upstream is a company with an important role (Figure 8).

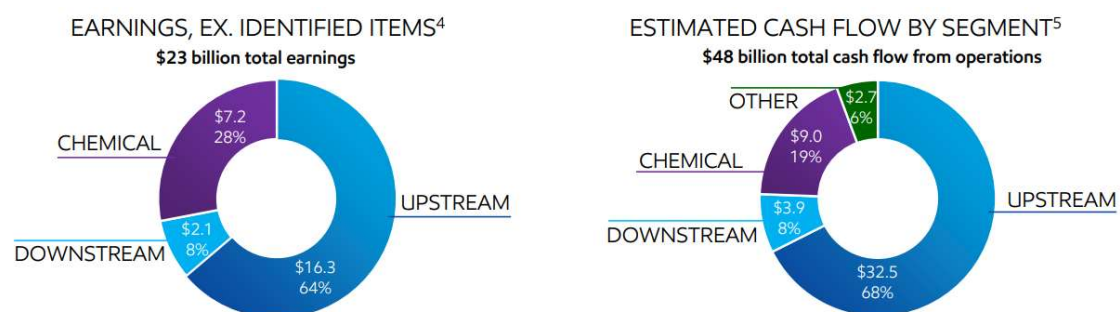


Figure 8. ExxonMobil earnings and Cash Flow in 2020

Source: ExxonMobil

Figure 9 shows the direction ExxonMobil should take to achieve net-zero CO₂ emissions by 2050. The company has laid out a plan to reconfigure its existing oil and gas production sector into a low-carbon emission sector.

The chemical sector will only play a complementary role compared to the existing oil and

gas sector, but its role will expand in terms of maintaining traditional levels and generating cash flow.

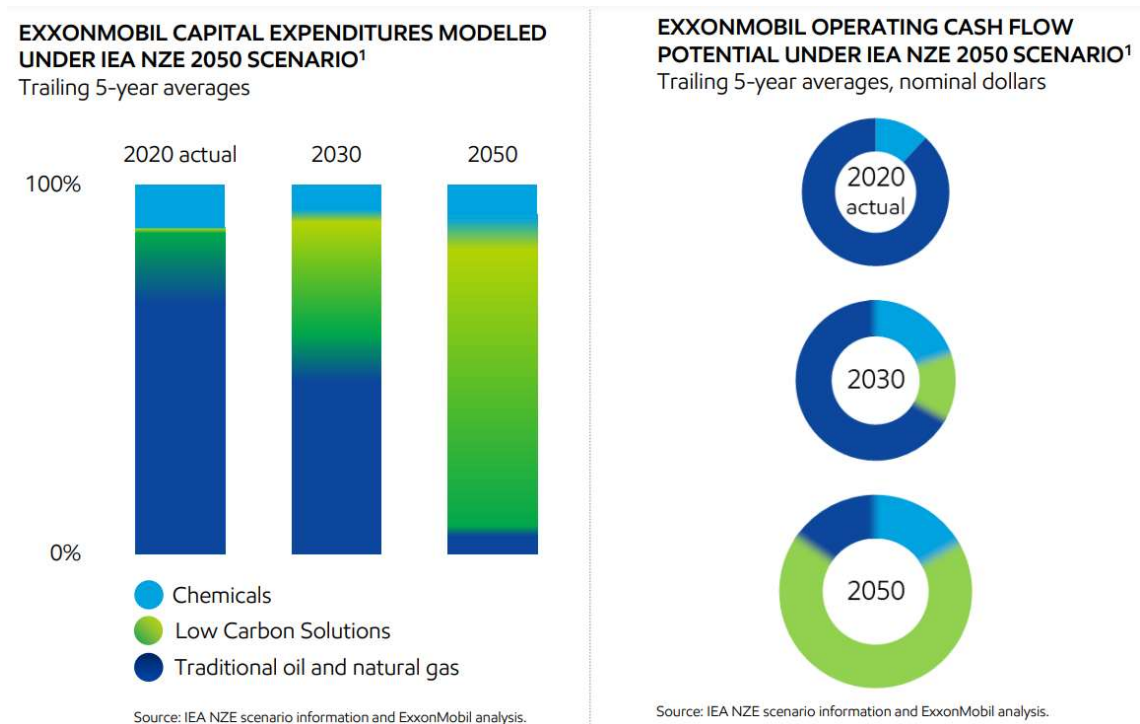


Figure 9. ExxonMobil's earnings and Cash Flow forecast till 2050

Source: ExxonMobil

ExxonMobil plans to expand its low-carbon emissions sector towards 2050, with new technologies used for this, including CCS, which are CO₂ underground storage, biofuels and hydrogen (Figure 10).

LEVERAGING OUR STRENGTHS

Applying our core capabilities to high-growth segments in the energy transition

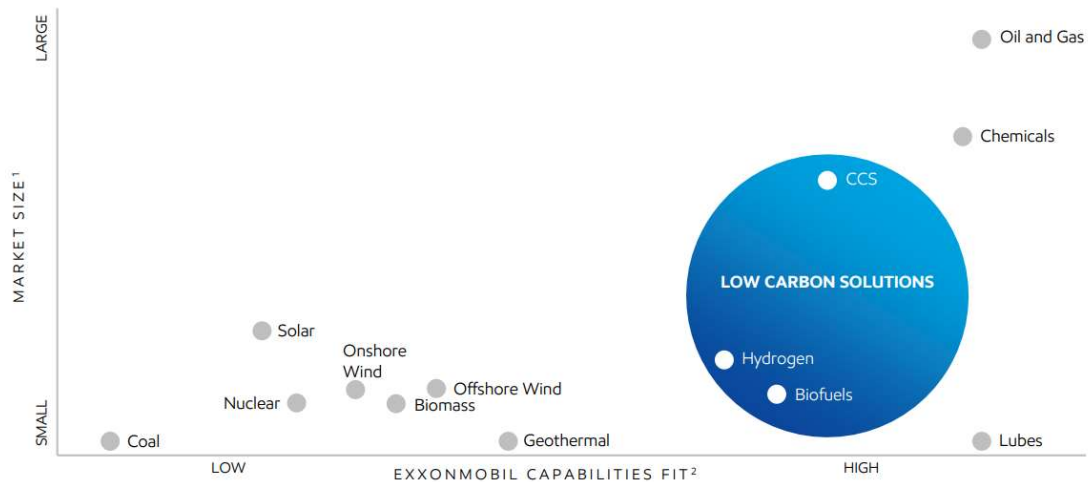


Figure 10. ExxonMobil's Strength analysis

Source: ExxonMobil

4.2 Shell

Looking at the 2021 results announced by Shell and the target values for 2025 to 2030, the most important area in 2021 is the Upstream sector, which accounts for 48% of cash flow. The ratio is expected to decrease from 30% to 35% from 2025 to 2030. On the other hand, it is estimated that the gas and chemical sectors will account for 40% to 45%.

The upstream sector generally has a high rate of return (IRR) of 20% to 25%, but in order to establish a position for Shell to consider the environment and provide cleaner energy in the future, it will be a priority area in the future. It is trying to convert.

Shell's more detailed efforts by sector to achieve net zero in 2050 have been drafted as shown in Figure 11.

Table 3. Shell's plan to the year till 2030

2021 delivery and outlook

	Cash capital expenditure		Operating expenses		Total expenditure		Cash flow from operations (CFFO)		Target internal rate of return (IRR)
	2021	2025-2030	2021 [A]	2025-2030	2021	2025-2030	2021 [B]	2025-2030 [C]	
Net debt end 2021 \$53 billion									
Marketing									15-25%
Renewables and Energy Solutions	24%	45-50%	28%	40-45%	27%	40-45%	12%	25-30%	>10% [D]
Integrated Gas	44%	30-35%	40%	35-40%	42%	35-40%	38%	40-45%	14-18% [E]
Chemicals and Products									10-15% [E]
Upstream	32%	20%	32%	20-25%	31%	20-25%	48%	30-35%	20-25%

Source: Shell company

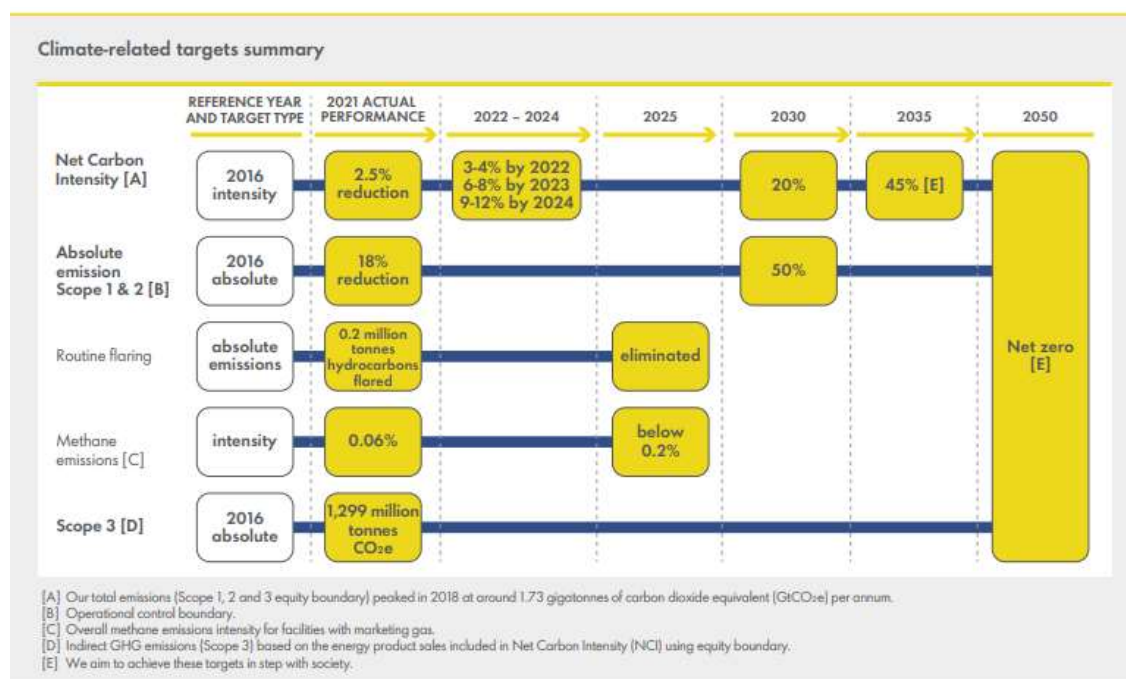


Figure 11. Shell's Climate-related targets till 2050

Source: Shell Annual Report and Accounts 2021, p. 89

4.3 BP

BP aims to reduce total oil and gas production and refined oil, but significantly increase gas handling volume (especially LNG) and also significantly increase biofuels toward 2030. It is supposed to be achieved. As for petroleum products, the sales volume of

lubricating oil will increase, the number of charging stations for electric vehicles will be significantly expanded, the number of convenience stores will be increased, and the ratio of margin share will be increased, including the sales of electricity by charging for EVs. It also plans to significantly increase sales of electricity from renewable energy sources and play a role in electricity trading.

Table 4. BP company's efforts toward 2030

		2021	2025 target	2030 aim
Hydrocarbon sector	Upstream production	2.2mmboe/d	~2mmboe/d	~1.5mmboe/d
	Refining throughput	1.6mmb/d	<1.5mmb/d	~1.2mmb/d
	LNG	18Mtpa	25Mtpa	30Mtpa
	Bioenergy production	26kb/d	50kb/d	>100kb/d
Convenience and Mobility	Castrol lubricant oil sales	\$6.8bn	~\$7.5bn	>\$8bn
	Electric vehicle charge points	13,100	>40,000	>100,000
	Margin share from convenience and electrification	29.10%	~35%	~50%
Low carbon energy	Developed renewables to final investment decision	4.4GW	20GW	50GW
	Traded electricity	202TWh	350TWh	500TWh

Source: BP Annual Report and Form 20-F 2021

5. Analysis

According to a paper by Edwards et. al., published in 2000, it is certain that oil companies had the power to suppress the market by achieving vertical integration and incorporating pipelines and shipping into the companies.

However, as many countries (especially developed countries) have announced carbon-neutral targets with 2050 as the target year, it is necessary to change the future policy that oil companies should adopt.

According to Pickl (2019), eight major oil companies around the world (BP, Shell, Total, Eni, Equinor, ExxonMobil, Chevron and Petrobras) are picked up and analyzed, and five companies have made significant investments in renewable energy. They are adopting the direction of aiming for a wider range of "energy companies" from oil and gas

companies. Companies focused on investing in renewable energy include BP, Shell, Total, Eni and Equinor, while ExxonMobil, Chevron and Petrobras invest in renewable energy in total stays below 20%. In addition to ExxonMobil, Chevron and Petrobras, BP has more oil reserves than the remaining four, but companies with more reserves than others are investing more in renewable energy. This paper sees a diminishing incentive to increase reserves when they have rather small ones.

This is also pointed out by Gajfullina et.al. (2017) that oil companies amount of fixed production assets has the tendency to decide their position and strategy. that oil companies should have.

From the author's point of view, BP is headquartered in Europe, where is most enthusiastic area about global environmental issues. So, BP has to change its business model centered from oil and gas production to diversification, despite its relatively large reserves.

If the stock price cannot be maintained for a listed company, it will be difficult for the company to survive. As Borodin et.al. (2021) points out, it is essential to have a financial strategy that emphasizes stake-holder relations.

Bradshaw et.al. (2020), comparing Saudi Arabia and Russia, discusses whether an economy that depends on oil exports (Russia also has gas) can transform quickly. It is predicted that the electrification of automobiles will progress and the electricity conversion rate will surely increase in the future, and the peak of oil consumption will come. There is no doubt that it is necessary to think about when it will peak and what will happen after that time, and take appropriate measures.

The decline in demand that will occur in the future and the need to prepare for the conversion of business formats are essential issues for oil-producing countries, and also for the survival of oil and gas companies.

Jaber et.al. (2020) emphasizes that the term Sustainability will become more and more important in the future.

Fattouh et.al. (2018) state that it is important for oil companies to have an integrated portfolio which includes both hydrocarbons and low carbon assets in a situation where

energy conversion is unavoidable. They point out that if a company takes a waiting stance, it will lose a lot in the meantime. This is a major issue not only for oil companies but also for oil-producing countries. However, investing in renewable energy in oil-producing countries has no particular obstacles and should be done quickly, the paper said.

Zimm et.al. (2019) are optimistic that renewable energy can be introduced more and more early in the future. Moinuddin et.al. (2019) states that many renewable energies can be introduced in Japan as well.

6. Conclusion

Richman et.al. (2019), a paper written prior to Russia's invasion to Ukraine, analyzed whether Europe could reduce its dependence on Russia by increasing imports from the United States and whether Europe could prevent Russia use gas exports for political bargaining.

As Western countries tighten economic sanctions on Russia as a move to blame Russia's invasion of Ukraine, global oil companies will lose global coordination in addition to the major challenge of aiming for carbon neutrality in 2050. We also faced another major challenge: increasing the likelihood that the oil trading market will be disrupted.

Dias et.al. (2019) is considering the possibility that energy conversion will not proceed due to budget constraints on the consumer side. Even if governments declare a carbon-neutral target for 2050, it will not be possible to achieve it unless investment and consumption in each household on the consumer side progress.

It can be seen that oil companies need to shift from the traditional business method of selling out fuel to the job of providing services to consumers and following them.

Whether green growth will occur smoothly in the future or whether the energy conversion will proceed smoothly while maintaining sufficient economic growth is various because there has never been such a large energy sector conversion. It is controversial (Capellán-Pérez et.al., 2019).

It is also important to point out Griffiths (2019) that the traditional relationship between

oil and gas exports and imports has played a very important role in security. It is expected that the provision of a sense of security that interdependence has been maintained between Japan and the Middle East, for example, will have to change with the significant introduction of renewable energy in the future.

As Junne et.al. (2019) and Gaura et.al. (2019) point out, even if 2050 carbon neutrality is aimed at by governments, the process leading up to that stage is currently very vague. The path followed by each country remains unclear. For this reason, there is no doubt that many challenges will arise in the future, and to oil companies, such as ignoring their important contributions without understanding how they play a major role in supporting people's lives in the energy industry. There is concern that a one-sided increase in burden will occur.

Therefore, as stated by Löffler et.al. (2019), it is considered that the government's decision on a clearer policy will have a certain effect on the effective use of existing resources and the reduction of stranded assets. However, as with Russia's invasion of Ukraine, unexpected events are occurring one after another in the world, and it is not easy to clarify the scheduling toward the achievement of carbon neutral in 2050.

The Russian invasion to Ukraine created a crisis in which the supply of oil and gas to European countries, which rely on the import of large amounts of fossil fuels from Russia, would stop. Global gas, oil and coal prices have all risen. Western countries have come to impose economic sanctions on Russia and take policies to reduce or stop imports of gas and oil from Russia.

If the supply from Russia, which is responsible for 10% of the world's oil and gas exports, is reduced, an economic crisis may occur in Europe due to a shortage of energy supply.

In Europe, it is a serious issue whether the energy supply crisis can be avoided in the next one or two years.

Regarding the movement toward carbon neutrality in 2050, the policy is that it is important to secure energy supply for one year and two years for the time being, so the operation of power plants using existing fossil fuels is being maintained.

With the above security crisis in Europe, countries around the world are reaffirming the

importance of energy security and feeling the need to work on economic security, and after World War II. The peaceful era of Japan is over, and we are heading toward protecting our own country. The progress of globalism has stopped, and companies need to find a way to survive in a limited market.

The strategy of Japanese oil companies in such an era is to secure markets for chemicals, high-performance products, etc., while focusing on expanding into the electric power field for downstream-centered companies (ENEOS, Idemitsu). On the other hand, upstream-centered companies (INPEX) have a growth strategy of increasing oil and gas production.

The Japanese oil companies are now at a major turning point where they need to restructure their strategies, and it will be interesting to see how they implement their strategies and the results they achieve in the future.

This article first appeared in the on-line proceedings of the 43rd IAEE Conference held in Tokyo for 31 July – 4 August, 2022.

References

- Borodin, Alex, Natalia Natocheeva, Irina Khominich, Andrey Kulikov and Natalia Shchegolevatykh (2021) “The Impact of the Business Environment on the Effectiveness of the Implementation of the Financial Strategy of the Oil and Gas Company.” *International Journal of Energy Economics and Policy*, 2021, 11(5), 13-21.
- Bradshaw, Michael, Thijs Van de Graaf and Richard Connolly (2019) “Preparing for the new oil order? Saudi Arabia and Russia.” *Energy Strategy Reviews*, 26 (2019) 100374.
- Capellán-Pérez, Iñigo, Carlos de Castro and Luis Javier Miguel González (2019) “Dynamic Energy Return on Energy Investment (EROI) and material requirements in scenarios of global transition to renewable energies.” *Energy Strategy Reviews*, 26 (2019) 100399.
- Dias, L.P., S. Simões, J.P. Gouveia and J. Seixas (2019) “City energy modelling - Optimising local low carbon transitions with household budget constraints.” *Energy Strategy Reviews*, 26 (2019) 100387.
- Edwards, Kenneth, John D. Jackson and Henry L. Thompson. 2000. ‘A Note on Vertical Integration and Stock Ratings of Oil Companies in the U.S.’ *Energy Journal*, Volume 21, 600-614. Number 2.

- Fattouh, Bassam, Rahmatallah Poudineh and Rob West, (2018). "The rise of renewables and energy transition: what adaptation strategy for oil companies and oil-exporting countries?" Oxford Institute for Energy Studies, OIES PAPER: MEP 19.
- Gajfullina, Marina M., Dilara R. Musina, Gyl'nara Z. Nizamova and Olga A. Alexandrova (2017) "Formation of strategy of effective management of fixed production assets of oil company." *Advances in Economics, Business and Management Research*, volume 38. pp.185-190.
- Gaura, Ankita Singh, Partha Dasa, Anjali Jaina, Rohit Bhakara and Jyotirmay Mathur (2019) "Long-term energy system planning considering short-term operational constraints." *Energy Strategy Reviews*, 26 (2019) 100383.
- Griffiths, Steven (2019) "Energy diplomacy in a time of energy transition." *Energy Strategy Reviews*, 26 (2019) 100386.
- Jaber, Tahrir and Elin M. Oftedal (2020) "Legitimacy for Sustainability: A Case of A Strategy Change for An Oil and Gas Company." *Sustainability* 2020, 12, 525; doi:10.3390/su12020525.
- Junnea, Tobias, Mengzhu Xiaoa, Lei Xub, Zongfei Wangc, Patrick Jochemc and Thomas Pregger (2019) "How to assess the quality and transparency of energy scenarios: Results of a case study." *Energy Strategy Reviews*, 26 (2019) 100380.
- Löffler, Konstantin, Thorsten Burandt, Karlo Hainsch and Pao-Yu Oei (2019) "Modeling the low-carbon transition of the European energy system - A quantitative assessment of the stranded assets problem." *Energy Strategy Reviews*, 26 (2019) 100422.
- Moinuddin, Mustafa and Akihisa Kuriyama (2019) "Japan 2050 Low Carbon Navigator: Possible application for assessing climate policy impacts." *Energy Strategy Reviews*, 26 (2019) 100384.
- Pickl, Matthias J. (2019) "The renewable energy strategies of oil majors – From oil to energy?" *Energy Strategy Reviews*, 26 (2019) 100370.
- Richman, Jesse and Nurullah Ayyilmaz (2019) "Can the US and Europe contain Russian power in the European energy market? A game theoretic approach." *Energy Strategy Reviews*, 26 (2019) 100393.
- Zimma, Caroline, José Goldemberg, Nebojsa Nakicenovica and Sebastian Busch (2019) "Is the renewables transformation a piece of cake or a pie in the sky?" *Energy Strategy Reviews*, 26 (2019) 100401.
- Mid-term and long-term business plan of Japanese oil companies: ENEOS, Idemitsu and Inpex, and world major oil companies: Shell, BP and ExxonMobil.
Shell: <https://www.shell.com/sustainability.html>

<https://www.shell.com/investors.html>

BP: <https://www.bp.com/en/global/corporate/investors/results-and-presentations/2q-presentation-2020.html>

ExxonMobil: Outlook for Energy, through 2050,

<https://corporate.exxonmobil.com/Energy-and-innovation/Outlook-for-Energyj0>

Correspondence to: Hiroyuki Okamoto

22nd Century Institute, Nagoya City University

1 Kawasumi, Mizuho-cho, Mizuho-ku, Nagoya, Aichi 467-8601 JAPAN

e-mail: okamoto.hiroyuki2020 @ gmail.com (remove space characters when using)

Published online; August 17, 2022