
Fueling the Climate Crisis: South Korea's Public Financing for Oil and Gas



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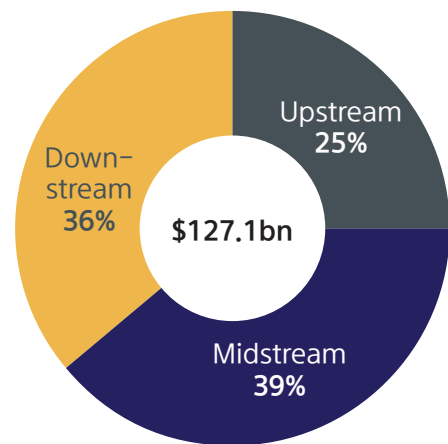
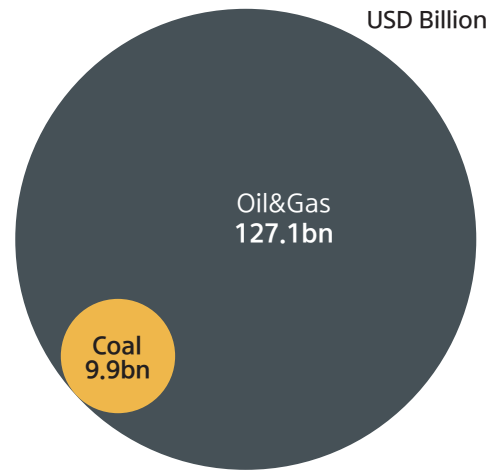
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Executive Summary

- For the past few years, there has been a growing awareness across society that public financial institutions' financing of coal-fired power generation accelerates the climate crisis, but problems with their support for other fossil fuels - including oil and gas - have yet to become well known. Solutions for Our Climate (hereinafter, "SFOC") is publishing this report to shed light on the current status of financing provided for overseas oil and gas projects by major Korean financial institutions, as well as to present the issues with, and propose ways of improving, such public financing.
- SFOC's analysis has revealed that the Export-Import Bank of Korea (KEXIM), Korea Trade Insurance Corporation (K-SURE), and Korea Development Bank (KDB), the Korean public financial institutions under investigation, have been providing colossal sums - amounting to \$127.1bn in total - in financing for overseas oil and gas projects over the past ten years (2011-2020). This is almost 13 times the public financial support provided for coal-fired power generation projects in the same period, which stood at \$9.9bn.
- When this support is examined by oil and gas project segments, financing of nearly \$32.2bn was provided for the upstream segment, which includes oil and gas field development projects, and approximately \$49.7bn was deployed in the midstream segment, which is associated with the transportation of oil and gas. Finally, \$45.2bn was provided to the downstream segment, where the finished products are made. It was also possible to see that financing of around \$57.7bn, which accounted for 46% of total amount, was provided in relation to construction of offshore plants and shipbuilding, which is analyzed separately.
- Carbon dioxide emissions from oil and gas amount to half of global emissions, and in order to achieve the temperature



Executive Summary

goals of the Paris Agreement, swiftly reducing production and consumption of these fossil fuels is essential. The International Energy Agency (IEA) has also predicted that, to achieve carbon neutrality by 2050, the demand for oil and gas would fall by 75% and 55% respectively, and that new development of oil and gas would be unnecessary after 2021.

- Oil and gas-related industries take up a significant portion of the Korean economy. Further, it is possible that if coal were to be replaced with gas in the power generation sector, the demand for gas would increase even more. However, considering the threat from the climate crisis, it is inappropriate for public financial institutions to provide public funds to oil and gas projects, and it will increase the transition risk for the domestic industries and stranded asset risk for the financial institutions if it continues.
- SFOC will continue to analyze the financial and environmental problems of Korean public financial institutions' investment in oil and gas.

I . Introduction

In 2018 and 2019, SFOC analyzed the current status of financing provided by Korean public financial institutions in relation to the construction of new coal power plants and presented issues and measures for improvement. Subsequently, as the awareness of the financial risks involved in new coal power plants and the need to respond to the climate crisis grew, issues were raised both domestically and overseas about the construction of new coal power plants. Finally, at the Leaders Summit on Climate hosted by President Biden of the United States in April this year, President Moon declared an end to all public financing of new overseas coal power plants, thus officially terminating the public financing of coal-fired power generation.

However, the awareness of issues with the financing of oil and gas - the other fossil fuels - has yet to spread in Korea. When international environmental organizations, including Oil Change International, examined the breakdown of fossil fuel project support provided by public financial institutions in the G20 countries (2016-2018), the results showed that Korean public financial institutions' support to oil and gas projects was nearly five times that provided to coal-related projects.¹ Financial support for coal power plants was indeed merely a tip of the iceberg in the country's fossil fuel financing.

In its *Net Zero by 2050: A Roadmap for the Global Energy Sector* report published in May ("Net-Zero Roadmap"), the IEA emphasizes that no further development of oil and gas fields is needed if carbon neutrality is to be achieved by 2050. However, the Korean government is planning to introduce large-scale LNG power generation through its Ninth Basic Plan on Electricity Demand and Supply, and state-owned enterprises and private corporations are continuing their investment in resource development projects.

1. Oil Change International et al. Still Digging: G20 Governments Continue to Finance the Climate Crisis, 2020.

I . Introduction

This report ① examines the issues with greenhouse gas emissions caused by oil and gas, as well as the types of oil and gas projects pursued by Korean corporations, ② looks into the ways in which Korean public financial institutions are providing support to these projects, ③ analyzes the current status of Korean public financial institutions' financing of overseas oil and gas projects, and ④ investigates the problem of public financing of oil and gas projects and presents measures for improvement at a policy level.

II. Current Status and Outlook of Oil and Gas

1. Oil and Gas and Greenhouse Gas Emissions

Share of Greenhouse Gas Emissions from Oil and Gas

According to Climate Watch, a data platform overseen by the World Resources Institute (WRI), as of 2018, global greenhouse gas emissions² reached approximately 47,552 MtCO₂eq in total and, of these, carbon dioxide (CO₂) accounts for 74.1% of greenhouse gas emissions as a whole, at approximately 35,249 MtCO₂eq.

Most carbon dioxide emissions come from the combustion of fossil fuels. Coal, which is widely known as the main culprit behind climate change, emits approximately 14,619 MtCO₂eq (40.3%) of carbon dioxide, accounting for the biggest share among fossil fuels. Next, oil and gas account for more than half of global emissions, with oil emitting 12,252 MtCO₂eq (33.8%) and gas emitting 7,489 MtCO₂eq (20.6%) of carbon dioxide.³

Such shares of greenhouse gas emissions are similar in the Republic of Korea. As of 2018, domestic greenhouse gas emissions (excluding LULUCF) were at 719 MtCO₂eq⁴ and, of these, 87.8% - 631 MtCO₂eq - were emitted as carbon dioxide. Of the carbon dioxide emitted, about 50% - approximately 315 MtCO₂eq - were generated by the combustion of coal, and the amounts generated from oil and gas consumption were 181 MtCO₂eq (28.5%) and 115 MtCO₂eq (18.2%), respectively. In other words, greenhouse gas emissions caused by the consumption of fossil fuels amount to approximately 85% of the greenhouse gas emissions generated in the Republic of Korea as a whole, and the aggregate share of greenhouse gas emissions caused by oil and gas is approximately 41.2%, which is almost at an equal level to coal.

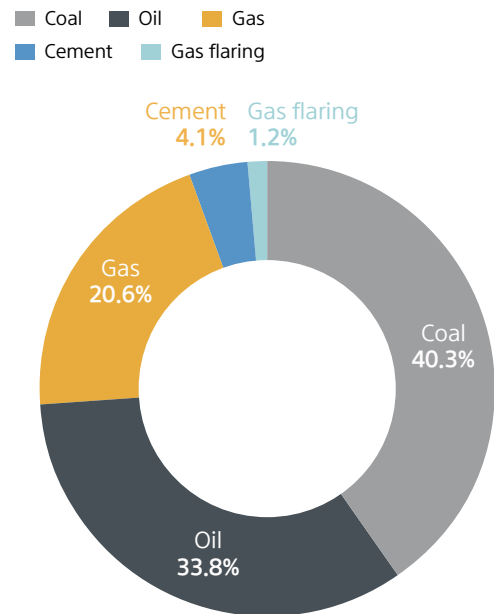


Figure 1. Global CO₂ Emissions by Source
Source: Climate Watch

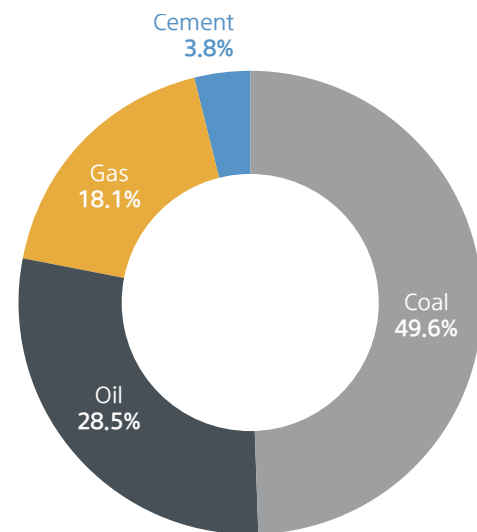


Figure 2. CO₂ Emissions in Republic of Korea by Source
Source: Climate Watch

II. Current Status and Outlook of Oil and Gas

Gas - a “Bridge” or an “Obstacle” to Energy Transition?

Gas is perceived as ‘bridge fuel,’ a less carbon-intensive source of energy that could play a role in energy transition in response to climate change. In particular, planned capacity for gas combined-cycle generation increased significantly in the recent years on the grounds that replacing coal-fired power with gas combined-cycle generation would reduce both greenhouse gas emissions and air pollution, considering that not all energy demand can immediately be met with renewables.

However, the ‘bridge fuel’ theory underestimates the actual greenhouse gas emissions from gas. Unlike coal, gas emits large volumes of greenhouse gases during the production process. In order to properly assess the greenhouse gas reduction achieved by replacing coal with gas, the comparison must be made on the basis of the emissions from the entire production cycle of gas, not just the emissions from fuel combustion. This is particularly important in the Korean context because gas cannot be transported through pipelines but only in the form of liquefied gas (LNG). As additional emissions occur in the processing and transportation of LNG, the greenhouse gas reduction benefits could be even lower with LNG.

In its 2020 report⁵, the Natural Resources Defense Council (NRDC) revealed that greenhouse gas emissions from LNG power plants account for only 55%–66% of the total life-cycle emission of LNG. As shown in <Figure 3> below, the remainder of greenhouse gas emissions are produced over the course of exploration and mining, refinement and liquefaction, transportation, storage, and regasification.

2. This is based on sectoral emissions including energy, industrial processes, agriculture, waste, and excludes the land use, land-use change and forestry (LULUCF) sector.

3. This excludes gas flaring.

4. According to the National Greenhouse Gas Inventory Report of Korea, as of 2018, greenhouse gas emissions (excluding LULUCF) generated in Korea were at approximately 727 MtCO₂eq in aggregate, which is somewhat different from the above figure. However, for the purpose of comparing the share accounted for by each source of CO₂ emissions on a consistent basis, we used the figure from the Climate Watch database, which is the source for the global statistics.

5. Natural Resources Defense Council, *Sailing to Nowhere: LNG is Not an Effective Climate Strategy*, 2020.

II. Current Status and Outlook of Oil and Gas

Emissions during the production process are fugitive emissions and reservoir carbon dioxide emissions. Unlike oil in its liquid state or coal in its solid state, gas, a fuel in gaseous state, cannot be captured fully during the extraction process, and some of it is discharged into the atmosphere in the process. Such fugitive emission is a significant contributor to climate change because methane (CH₄), the main component of gas, is 28 times as potent as carbon dioxide in terms of global warming potential over a 100 year period. Furthermore, a significant amount of carbon dioxide is captured with methane in the gas field. Carbon dioxide extracted with methane in the production process gets separated and discharged into the air in the processing facility. According to NRDC's analysis, greenhouse gases emitted in this process account for 16-34% of those emitted over the course of the entire production cycle.

A large amount of energy is required to remove impurities such as water, carbon dioxide, and hydrogen sulfide, from gas extracted from the reservoir, and to convert it into a liquid state through cooling and compression. Gas production facilities usually operate such refining and liquefaction facilities using the gas extracted from the gas field as an energy source, and 6-10% of greenhouse gas emissions are estimated to be produced from such facilities.

Gas is liquefied when cooled to -163°C, and then the liquid gas is transported in LNG carriers, which are special vessels equipped with distinct refrigeration facilities; 2-11% of total lifecycle greenhouse gas emissions are generated in this process. When the LNG carrier arrives at the place of demand, LNG is unloaded onto an LNG terminal. Then, the LNG terminal turns LNG into gas again using a regasification facility and supplies it to the consumer via pipelines; it is estimated that 1-3% of lifecycle greenhouse gas emissions are generated in this process.

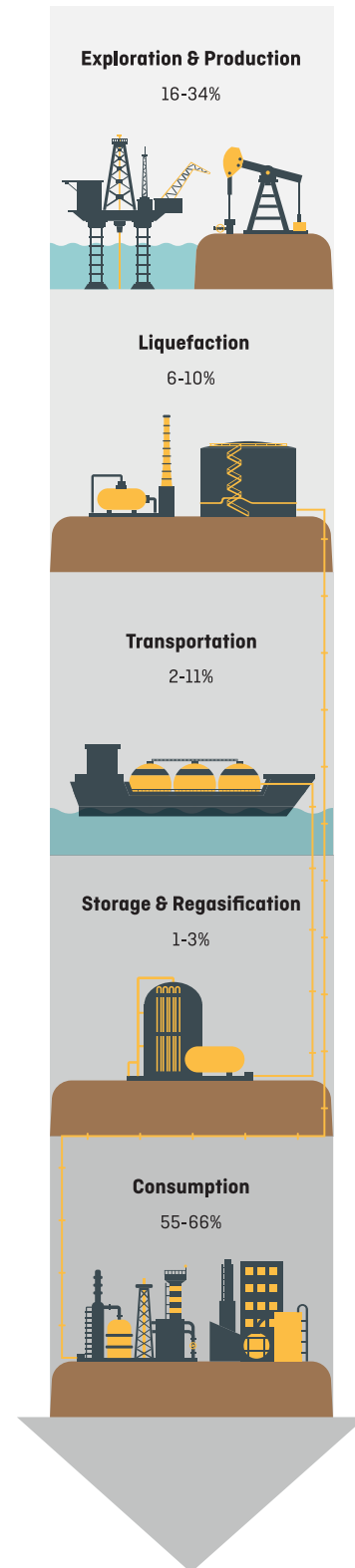


Figure 3. Composition of Greenhouse Gas Emissions in the LNG Production Cycle
Source: Sailing to Nowhere: LNG is Not an Effective Climate Strategy, NRDC (2020)

II. Current Status and Outlook of Oil and Gas

Ultimately, greenhouse gas emissions produced from combustion of LNG in power plants only account for 55-66% of the total greenhouse gas emissions throughout the entire LNG production cycle. According to research conducted by the National Energy Technology Laboratory, the life cycle carbon intensity of gas-fired power would amount to 688 g CO₂e/kWh⁶ for LNG produced in the United States and transported to Asia. This means a gas-fired power plant would produce 78% of the greenhouse gas emitted by a coal power plant in Korea, of which carbon intensity is estimated at 887 g CO₂e/kWh. Therefore, transitioning from coal to LNG would have very limited contribution in reduction of greenhouse gases.

⁶. Ibid, p. 11.

II. Current Status and Outlook of Oil and Gas

2. Oil and Gas Supply and Demand

Changes in Global Oil and Gas Production and Outlook

In its *Special Report: Global Warming of 1.5°C*, the Intergovernmental Panel on Climate Change (IPCC) revealed that average global warming can only be limited to 1.5°C if net-zero carbon emissions is achieved by 2050, and presented the total volume of carbon dioxide that can be emitted in this process as the so-called “carbon budget.”⁷ This means that the amount of fossil fuels that can be consumed going forward is limited. Oil Change International (OCI) compared the carbon budget calculated by the IPCC and the amount of fossil fuel reserves as per <Figure 4>.⁸

As illustrated in the figure below, estimated greenhouse gas emissions from the fossil fuel reserves in the developed coal mines, oil fields, and gas fields would exceed the carbon budget for the limit of 2°C, as well as the 1.5°C limit under the Paris Agreement. This means that development of new oil and gas resources, not only coal, is not justifiable at this point in time. Further, extraction of developed reserves should also be restricted.

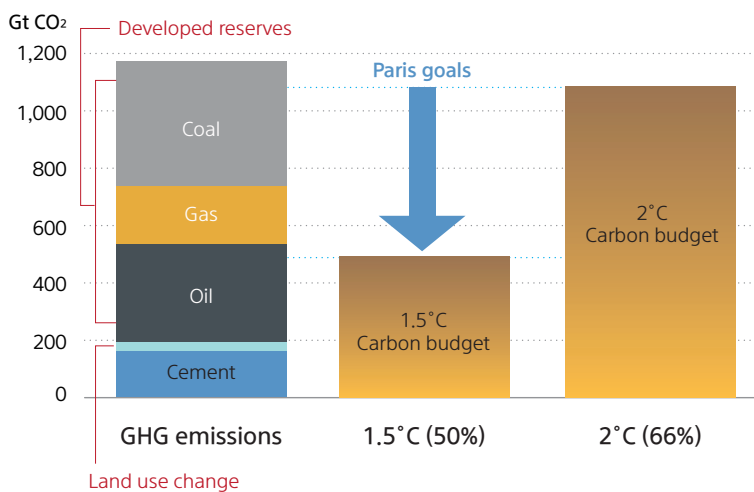


Figure 4. Comparison of Carbon Budget Against Developed Fossil Fuel Reserves

Source: Big Oil Reality Check, OCI (2020)

⁷ Intergovernmental Panel on Climate Change (IPCC), *Special Report: Global Warming of 1.5°C*, 2018.

⁸ Oil Change International (OCI), *Big Oil Reality Check*, 2020.

II. Current Status and Outlook of Oil and Gas

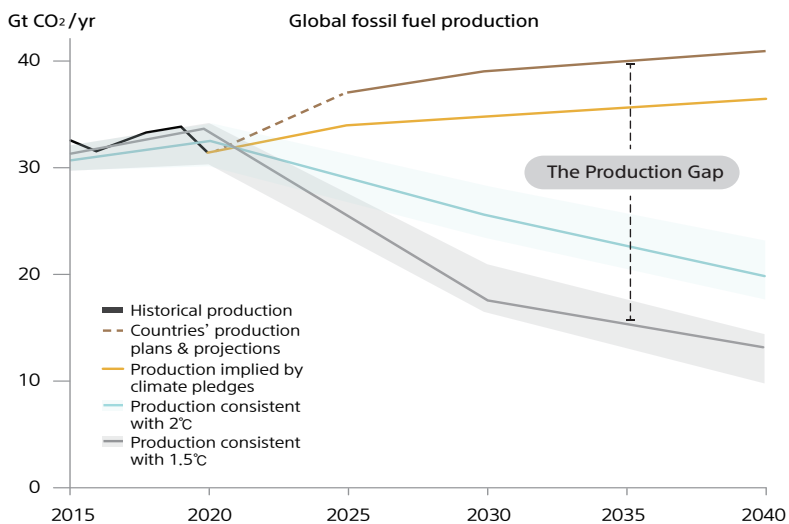


Figure 5. Fossil Fuel Production Gap from UNEP's Production Gap Report

Source: Production Gap Report, UNEP (2020)

Every year, the UN Environment Programme (UNEP) publishes *Production Gap Report*, which reveals the discrepancy between the reduced levels of fossil fuel production required for 1.5°C and 2°C temperature targets of the Paris Agreement and the actual fossil fuel production levels. According to the UNEP's 2020 report, to limit global warming to 1.5°C, global fossil fuel production will need to decrease by 6% per year from 2020 to 2030. However, under the current policy, production is actually projected to increase by 2% per year in the same period. The report found that, by 2030, such a rising trend would result in more than double the emissions volume consistent with the 1.5°C limit.⁹

⁹ United Nations Environment Programme (UNEP), *Production Gap Report: 2020 Special Report*, 2020, p.14.

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In the *Net-Zero Roadmap* released in May 2021, the IEA also revealed that it anticipates a rapid decrease in fossil fuel production. According to the IEA's outlook for 2050, the demand for oil is projected to be 24 mb/d (million barrels per day), which represents a fall of 75% from 88 mb/d in 2020, and the annual demand for gas is projected to be 1,750 bn m³, which represents a fall of 55% from 3,700 bn m³ in 2020.¹⁰

The scenario shows that while fossil fuel demand significantly decreases in the transport, industry, and building sectors, demand remains due to hydrogen production using carbon capture, utilization, and storage (CCUS) and long-distance transportation and petrochemical production, where current technology has not provided a clear alternative to fossil fuels. However, since there is considerable uncertainty around CCUS technology, actual fossil fuel demand is likely to fall more significantly.

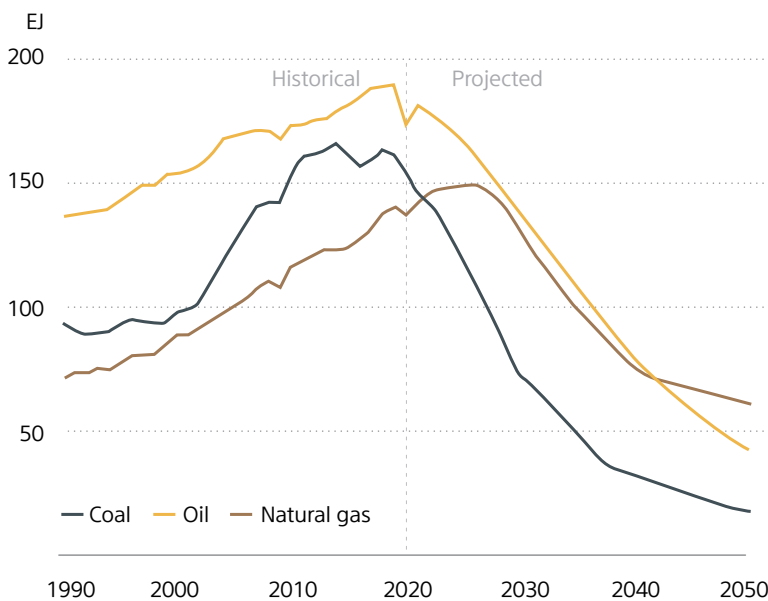


Figure 6. Projected Demand for Fossil Fuels under Net-Zero Roadmap
Source: Net-zero Energy Roadmap, IEA (2021)

¹⁰International Energy Agency (IEA), *Net Zero by 2050 : A Roadmap for the Global Energy Sector*, 2021, p.101.

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Changes in South Korea's Oil and Gas Imports and Outlook

Since Korea almost entirely relies on import for oil and gas, changes in the level of demand and consumption in Korea can be traced through the volume of import. According to Korea Energy Economics Institute's *Yearbook of Energy Statistics*, oil and gas import volumes increased steadily in the period between 2011 and 2019.¹¹

The volume of oil consumption in Korea was calculated by deducting the volume of petroleum product exports from the aggregate volume of crude oil and petroleum product imports. Between 2011 and 2019, crude oil was the most imported item in Korea based on the total value. In the same period, petroleum products were consistently among the top five exported items; this is because Korea has a large oil refining industry, which produces and exports petroleum products by refining imported crude oil.¹²

The volume of Korea's LNG imports has been increasing over the past five years. It is possible that consumption levels may increase to a greater degree in the future because, under the Ninth Basic Plan on Electricity Demand and Supply for 2020-2034, a large fleet of LNG combined-cycle generation units are planned to replace the retiring coal-fired power generation units. Such plan would increase the LNG generation capacity by 30%, and LNG consumption would also rise significantly.

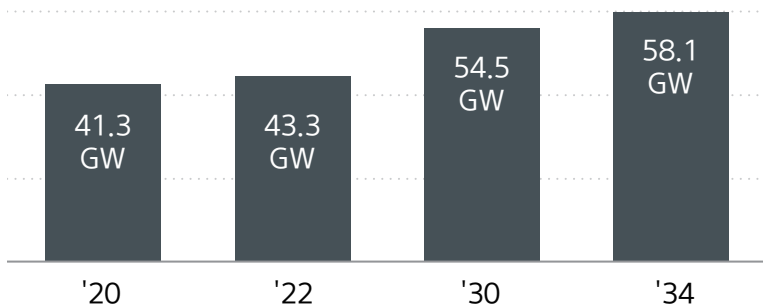


Figure 9. Projected LNG Generation Capacity under Ninth Basic Plan on Energy Demand and Supply

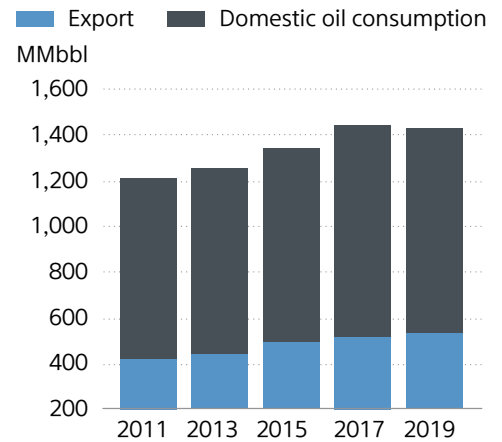


Figure 7. Domestic Oil Import and Export Volumes in 2011–2019

Source: Yearbook of Energy Statistics, Korea Energy Economics Institute (2020)

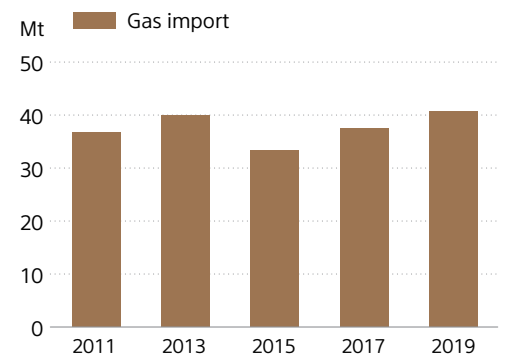


Figure 8. Domestic Gas Import Volumes in 2011–2019

11. Korea Energy Economics Institute (KEEI), *Yearbook of Energy Statistics*, 2020, p.45.

12. E-National Index, https://www.index.go.kr/potal/main/EachDtlPageDetail.do?idx_cd=2455

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3. Scope of Oil and Gas Projects

Oil and Gas Value Chain

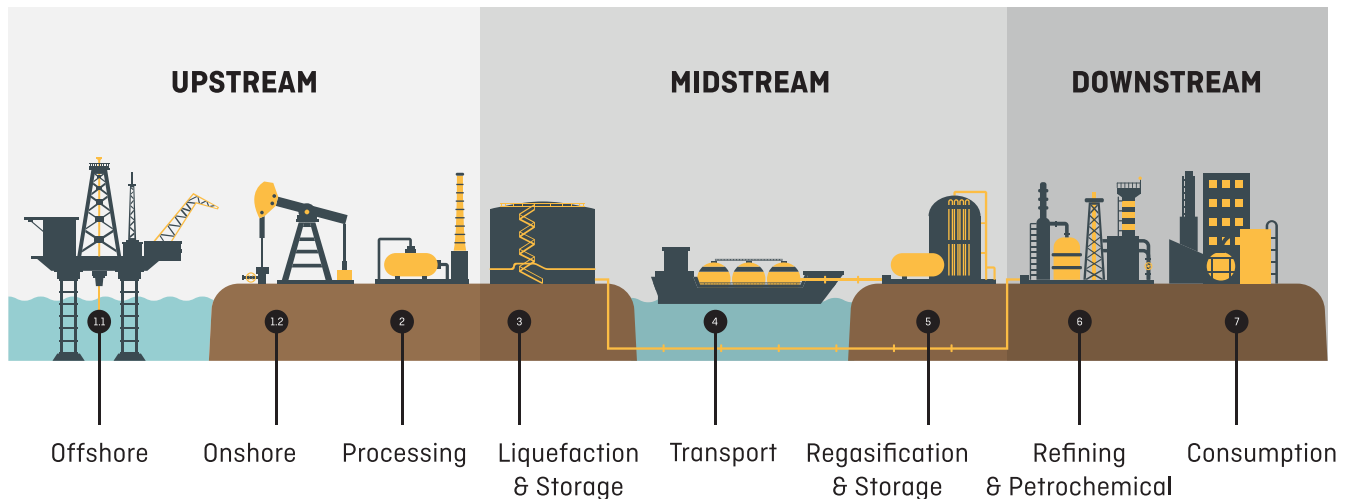


Figure 10. Oil and Gas Value Chain

Oil and gas projects can be classified into upstream, midstream, and downstream segments along the value chain, starting from exploration to final consumption.

The upstream segment is the production phase of oil and gas. The upstream segment includes exploration, drilling, extraction and production, which is often referred to as the “oil and gas development” project. For the purposes of this report, the processing carried out prior to the transportation/liquefaction of oil and gas in order to separate and remove impurities is also included in the upstream segment.

The midstream segment refers to the process of transporting the oil and gas to the place of demand, either by vessels or through pipelines. At this point, unlike oil, which is transported through pipelines or on crude oil carriers in its liquid state without a change of state, gas must be liquefied at -163°C to reduce its volume if it is to be transported on a ship. On arrival at the place of demand, the liquefied gas is converted into gas again

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at a regasification facility. For the purposes of this report, gas liquefaction and storage terminal, oil and gas carrier, oil and gas pipeline, land-based and offshore receiving terminal projects are included in the midstream segment.

Finally, the downstream segment refers to the final consumption phase in which the crude oil and gas that have arrived at the place of demand are consumed as fuel or are used as raw material to produce products. The downstream segment includes the oil refining business in which petroleum products such as gasoline, naphtha, and kerosine are produced by refining crude oil, the petrochemical business, in which petrochemical products are manufactured using naphtha and ethane as base, as well as the power generation business, in which electricity is produced using oil and gas as fuel. Since the ammonia production business - ammonia being the raw material for nitrogen fertilizer - also uses gas as raw material, it has been included in the downstream segment for the purposes of this report.

II. Current Status and Outlook of Oil and Gas

Korean Corporations in Oil and Gas Business

Korean corporations are participating in the oil and gas industry across the entire value chain, from the upstream segment to the downstream segment.

In the upstream segment, state-owned enterprises such as Korea National Oil Corporation and Korea Gas Corporation have traditionally led the resource development projects involving the development of oil and gas fields. At present, private energy companies such as SK innovation, SK E&S, GS Energy, and POSCO International are also participating in resource development projects.

The construction industry takes up a significant portion of Korea's overseas oil and gas business. Korean construction companies including GS E&C, Daewoo E&C, SK Ecoplant, Hyundai E&C, Samsung C&T, Samsung Engineering, have been expanding into overseas projects by taking charge of engineering, procurement, and construction (EPC) and technical support in large-scale infrastructure facilities necessary for the oil and gas value chain across the board, such as crude oil and gas processing facilities, oil refining plants, petrochemical plants, gas liquefaction plants, LNG terminals, and thermal power plants. In the power generation sector in particular, the Korea Electric Power Corporation (KEPCO), a state-owned utility, and its generation subsidiaries have a presence in the overseas gas combined-cycle generation industry as project developers.

Ships and offshore plants built by Korean shipbuilders are another pillar for Korea's oil and gas business. Korean shipbuilders such as Samsung Heavy Industries, Hyundai Heavy Industries, and Daewoo Shipbuilding & Marine Engineering (DSME), are major players in the global market for special vessels used in exploration, drilling, and production in the upstream segment, as

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well as oil tankers and LNG carriers used in transportation in the midstream segment.

Korean Public Financial Institutions in the Oil and Gas Business

Korean public financial institutions are providing financing to domestic corporations and financial institutions participating in overseas projects in the form of loans or guarantees. KEXIM participates in project financing deals as a lender and provides guarantees for loans made by other financial institutions as well as performance bonds¹³ for project operators. K-SURE carries out insurance and guarantee-related services, but not loans. K-SURE provides guarantees on debts and performance bonds to exporters through its business of guaranteeing investment risks related to overseas resources development projects and export credits. Meanwhile, KDB carries out both loan and guarantee-related work, including provision of financial advice and financing arrangements for overseas resource development project financing, and also provides financing indirectly through funds established for investment in overseas resource development.¹⁴

13. A contract under which, in the event of non-performance by a contractor, KEXIM pays a fixed amount to the project owner in place of the contractor.

14. Energy & Mineral Resources Development Association of Korea website, https://www.emrd.or.kr/overseas/company_04.jsp

III. Research Scope and Methodology

This report aims to analyze the details and the trend of the financing provided by Korean public financial institutions for overseas oil and gas projects over the past ten years (2011-2020).

1. Target Financial Institutions

The public financial institutions under analysis in this report are KEXIM and K-SURE, the export credit agencies (ECAs), and KDB, a development financial institution operated by the Korean Government.

2. Research Methodology

In order to identify the overseas oil and gas projects in which Korean corporations have taken part, we collated the following: (i) business reports¹⁵ published by major domestic state-owned enterprises, construction companies, energy companies, and shipbuilders in the period from January 1, 2011 - December 31, 2020; (ii) the resource exploration, development, drilling and operation, gas and oil processing, terminal and LNG liquefaction plant, ship, pipeline, power generation, oil refining, and petrochemical projects recorded in the Korea Plant Industries Association's (KOPIA) statistics on contract biddings; and (iii) the projects recorded in the "Shift the Subsidies" database of Oil Change International (OCI), an environmental organization in the United States. Through these sources, 631 overseas projects were identified for the target period.

15. Pursuant to Article 159 of the Financial Investment Services and Capital Markets Act, each year, listed corporations in Korea must submit and disclose their business reports to the Financial Services Commission. For the purposes of this report, we referred to nine annual business reports (2011-2019) of each of the following: **[Major Domestic State-owned Enterprises]** Korea Gas Corporation, Korea Electric Power Corporation, Korea National Oil Corporation, Korea Western Power, Korea East-West Power, Korea South-East Power, Korea Midland Power, Korea Southern Power **[Energy Companies]** POSCO International, SK innovation, GS Caltex, Hyundai Oilbank, DL Energy **[Construction Companies]** DL Construction, Daewoo E&C, Doosan Heavy Industries & Construction, Samsung C&T, Samsung Engineering, POSCO E&C, Hanwha E&C, Hyundai E&C, Hyundai Engineering, DL Holdings, GS E&C, SK Ecoplant **[Shipbuilders]** Samsung Heavy Industries, Hyundai Heavy Industries Holdings, Korea Shipbuilding & Offshore Engineering, Daewoo Shipbuilding & Marine Engineering, Hyundai Mipo Dockyard, Hyundai Samho Heavy Industries

III. Research Scope and Methodology

Requests were made to the three public financial institutions for financing details of the identified overseas oil and gas projects including : (i) details of the guarantees provided; (ii) details of the loans provided; (iii) details of the equity investments made; (iv) the parties to the contract; (v) project region; and (vi) resource type. They were also requested to submit details on support provided to projects that were not included in the list.

Based on the above investigation method, the Office of National Assembly Member Hyungbae Min and the Office of National Assembly Member Soyoung Lee requested that the institutions in question provide materials on the projects referred to above as per <Table 1>.

3. Analysis Methodology

In this report, based on the responses given by the KEXIM, K-SURE, and KDB, the details of support provided by Korean public financial institutions for overseas oil and gas projects were analyzed by year, project type, resource type, financial institution, financing type, and region.

The sums provided by public financial institutions for oil and gas projects were derived by uniformly converting the currencies indicated by the submitting institution into Korean won and US dollars. At this point, the won-dollar exchange rate was based on the information on exchange rates provided by the Ministry of Economy and Finance on e-National Index, applying the exchange rate as of the last day of each year. Other currencies were calculated as of the last month of each year on the basis of the information on exchange rates provided by Woori Bank's Foreign Currency Center.

Providing Institution	Date of Provision	Requesting Office
KDB	First: April 22, 2021	Hyungbae Min
	Second: May 21, 2021	
	Third: May 26, 2021	
KEXIM	April 14, 2021	Soyoung Lee
K-SURE	April 13, 2021	Soyoung Lee

Table 1. Details of Demands for Material Made to Public Financial Institutions

III. Research Scope and Methodology

Of the oil and gas projects, projects that straddled two types, out of the upstream, midstream, and downstream segments, were classified as a single, representative type based on the characteristics of the individual project.

In addition, financial support provided to domestic shipbuilders during drillship and production platform, offshore regasification facility, and oil and gas carrier construction projects are presented through separate analysis. This is because the ship financing accounts for a large part of the upstream and midstream segments, and specific characteristics of ship financing, such as refund guarantee practices, differentiate it from the general oil and gas-related project financing and corporate financing practices. Further, because the global shipbuilding market is controlled by Korea, China, and Japan, fossil fuel investments made through ship financing arises from Korea's unique industrial structure, and, for this reason, it was considered meaningful to analyze this sector separately.

IV. Current Status of Financing for Oil and Gas Projects

1. Total Amount of Financing Provided for Oil and Gas Projects

Financial support provided by KEXIM, K-SURE, and KDB for overseas oil and gas projects from January 2011 to December 2020 - a total of ten years - was found to amount approximately to \$127.1bn in aggregate. This is almost 13 times the total public financing provided for overseas coal-fired generation projects in the same period, which stood at \$9.9bn.¹⁶

The public financial institutions under investigation were found to have provided financing of at least \$12bn on average each year to oil and gas projects over the past ten years, and 2013 in particular, when the provision of financing was at its highest, set the record of \$20.4bn. This amounts to twice the size of public financial institutions' oil and gas investments estimated through the investigation¹⁷ of Oil Change International in the United States and Friends of the Earth US.¹⁸ We understand that this discrepancy is due to the limited access to information, as this report includes a wider range of projects that were not previously identified.

Under the estimations made in the previous report, public financing being provided by Korean ECAs for oil and gas projects was found to be the fourth largest among the G20 countries in terms of size, after China, Canada, and Japan. When the results gathered in this report are taken into account, it is possible that Korea would rank even higher as a financier for fossil fuels.

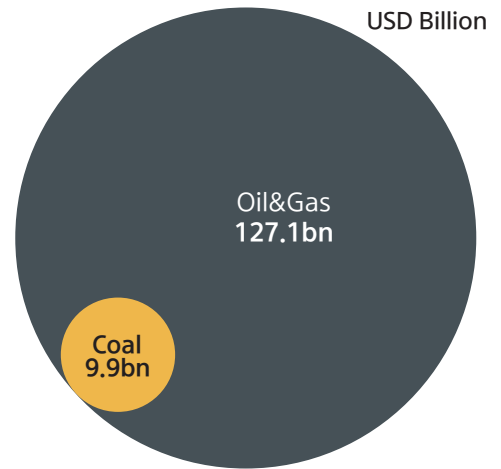


Figure 11. Comparison of Total Financing Provided for Oil&Gas and Coal in Period 2011-2020

¹⁶. In order to ascertain public financial institutions' total investment in coal-fired power generation, we utilized the material on public financial institutions' financial support identified through 「Tracing 12 Years of Korea's Coal Finance Addiction - 2020 Whitepaper on Korean Coal Finance」 prepared by Korea Sustainability Investing Forum (KOSIF), etc. and materials from the Office of National Assembly Member Dookwan Kim.

¹⁷. Oil Change International et al, *ibid*.

¹⁸. In the above report, the Korean ECAs' oil and gas-related investments were estimated to be around KRW 5-8tn per annum.

IV. Current Status of Financing for Oil and Gas Projects

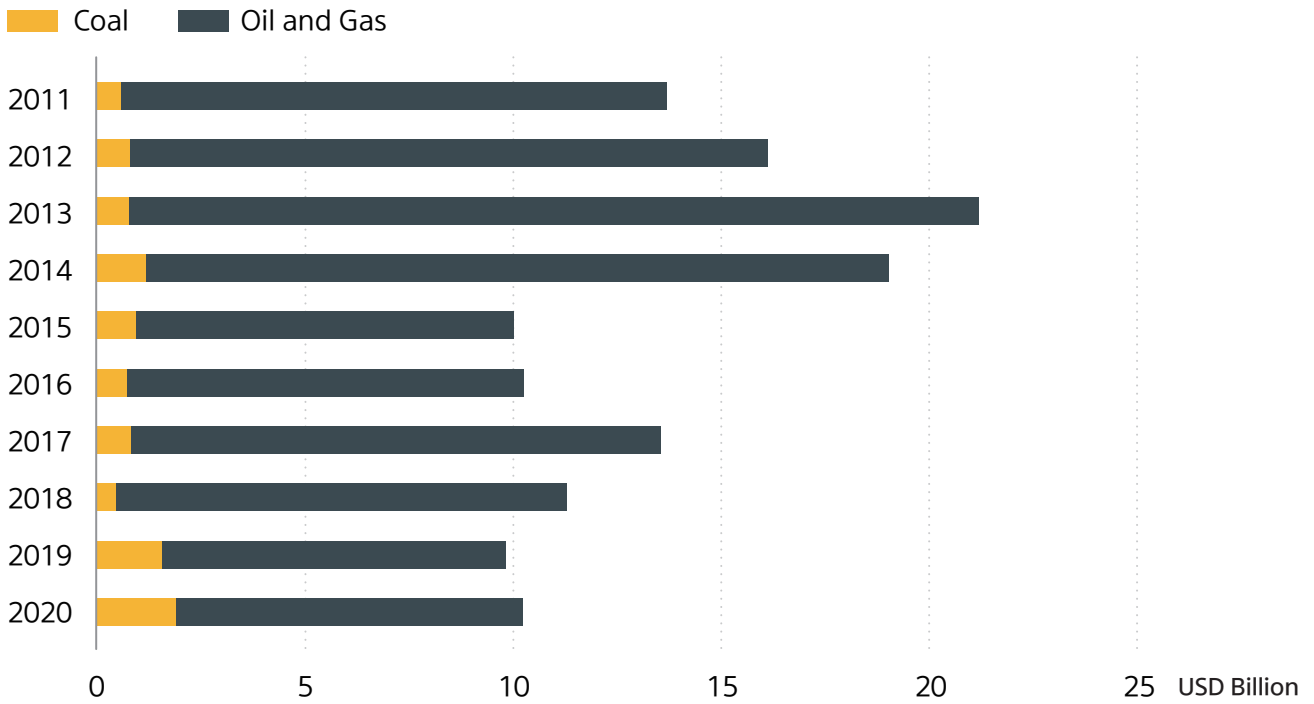


Figure 12. Breakdown of Public Financing Provided for Fossil Fuels by Year(SFOC, 2021)

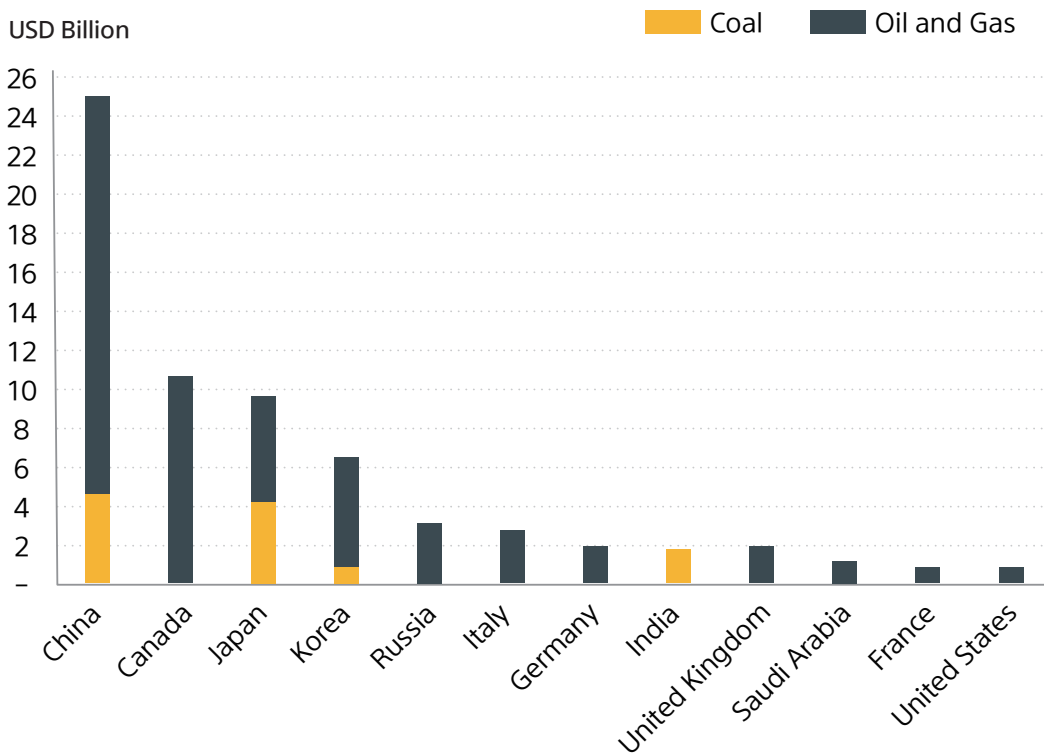


Figure 13. Previously Known Yearly Average of Support for Fossil Fuels Provided by G20 Public Financial Institutions (2016-2018)

Source: Oil Change International(2020)

IV. Current Status of Financing for Oil and Gas Projects

2. Analysis of Support for Oil and Gas Projects

1) Breakdown by Financial Institution

The breakdown of financial support provided by each public financial institution from 2011 to 2020 was found to be as follows. In the past ten years, KEXIM utilized public funds of \$80.6bn in supporting overseas oil and gas projects, and at 63% of the total, this is the largest amount out of the three institutions under investigation. K-SURE, which provided approximately \$37.4bn (29%), came next, and KDB provided public funds of approximately \$9.2bn (8%).

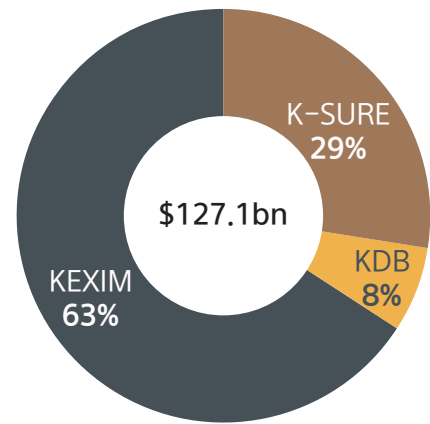


Figure 14. Financing of Oil and Gas by Financial Institution

2) Breakdown of Support by Financing Type

Provision of financing by the three public financial institutions for overseas oil and gas projects was found to have taken the form of guarantees and loans only. At \$78.7bn, guarantees accounted for 62% of the sum provided as a whole and, at \$48.4bn, loans made up the remaining 38%.

For both KEXIM and KDB, loans accounted for a higher share of financing than guarantees. KEXIM provided a sum equivalent to 53% (\$42.2bn) of its total support as loans for oil and gas projects. KDB also provided 68% (\$6.2bn) of its total support in the form of a loan. Lastly, K-SURE provided public financing of \$37.3bn solely in the form of guarantees.

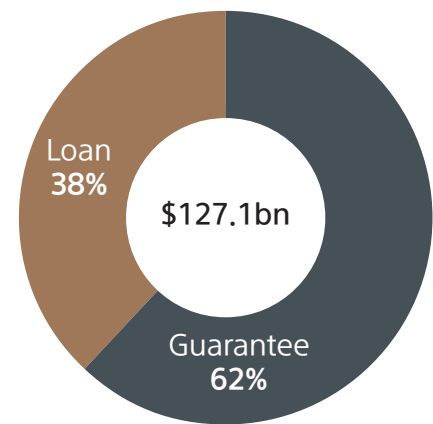


Figure 15. Breakdown of Support by Financing Type

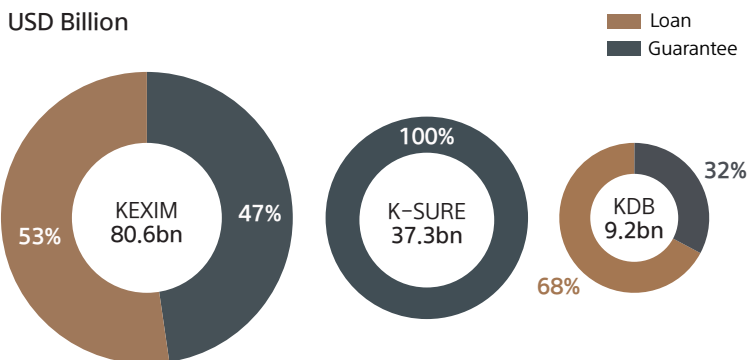


Figure 16. Details of Types of Financial Support Provided by Each Financial Institution

IV. Current Status of Financing for Oil and Gas Projects

3) Breakdown by Resource Type

Meanwhile, the total amounts of public support provided for oil and gas, respectively, were found to be similar. In the past ten years, around \$63.2bn was provided for oil-related projects, while a slightly smaller amount - \$57.5bn - was provided for gas-related projects. \$4bn of support was provided for mixed projects.¹⁹

However, meaningful differences emerge with the trend in public financing provided for oil and gas year over year. As shown in <Figure 18> below, in 2011, oil-related projects received \$8.3bn - twice the amount provided to gas-related projects. However, in the three years that followed, support to gas grew sharply and oil and gas-related investments showed a similar tendency.

Then in 2020, whereas oil-related investments fell sharply to \$0.7bn, investment in gas rose sharply to \$7.3bn. As will be discussed in the ship finance chapter, this is thought to be the outcome of a sharp drop in investments related to oil resulting from the effect of COVID-19 on the one hand, and an increase in investments related to gas centered around placement of orders for LNG carriers on the other.

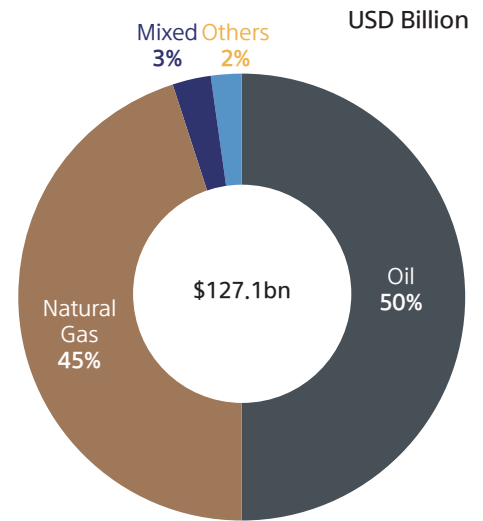


Figure 17. Breakdown of Financing Provided by Resource Type

19. Where KDB did not specify the guarantee amounts for individual ship projects on the grounds of confidentiality, or specific information on individual projects was not included in the written response provided by the financial institutions, the cases in question were marked as "Other."

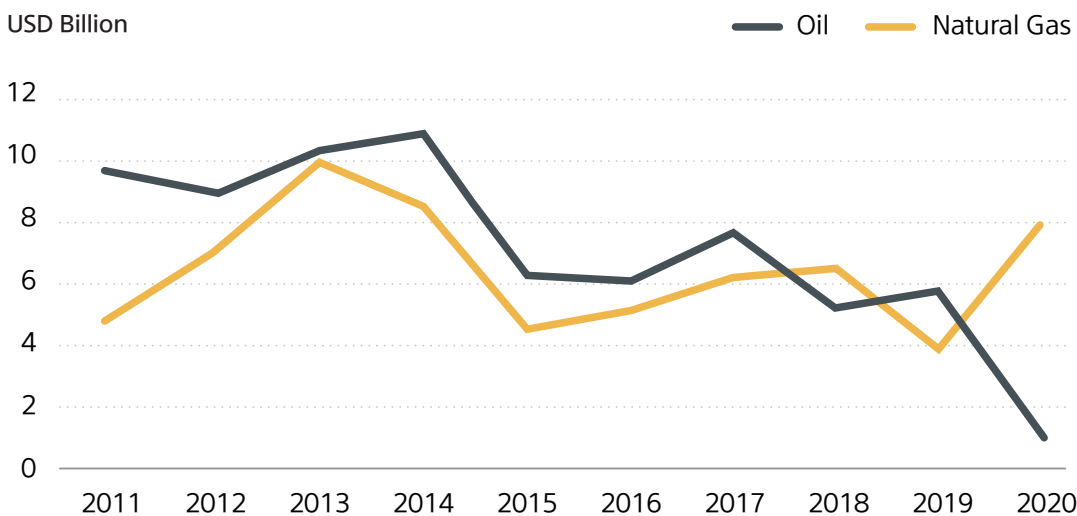


Figure 18. Breakdown of Financing Provided for Oil and Gas Projects by Year

IV. Current Status of Financing for Oil and Gas Projects

4) Breakdown by Region

Next, the breakdown of Korean public financial institutions' support for oil and gas projects was analyzed for each region. For this section, ship finance was excluded from the subject matter of regional analysis as it is difficult to specify the region for shipbuilding projects.

In terms of region, the Middle East received the most financing by Korean public financial institutions. In the past 10 years, financing of approximately \$35.3bn was provided to projects in the Middle East region, which exceeds half of the total amount. Next, financing of around \$10.1bn was provided to Central Asia, including Uzbekistan and Turkmenistan, as well as Russia, and this was followed by "Other Asia", which includes Southeast Asia, South Asia, and East Asia, and then by North America and Oceania. The characteristics of the types of projects in which public financial support was deployed in each region are described below.

Category	Total(\$bn)	Percentage(%)
Middle East	35.3	51
Central Asia Russia	10.1	15
Other Asia	6.8	10
North America	6.4	9
Africa	5.7	8
Oceania	3.9	5
South America	1.0	1
Europe	0.3	1
Total	69.5	100

Table 2. Breakdown of Financial Support by Region

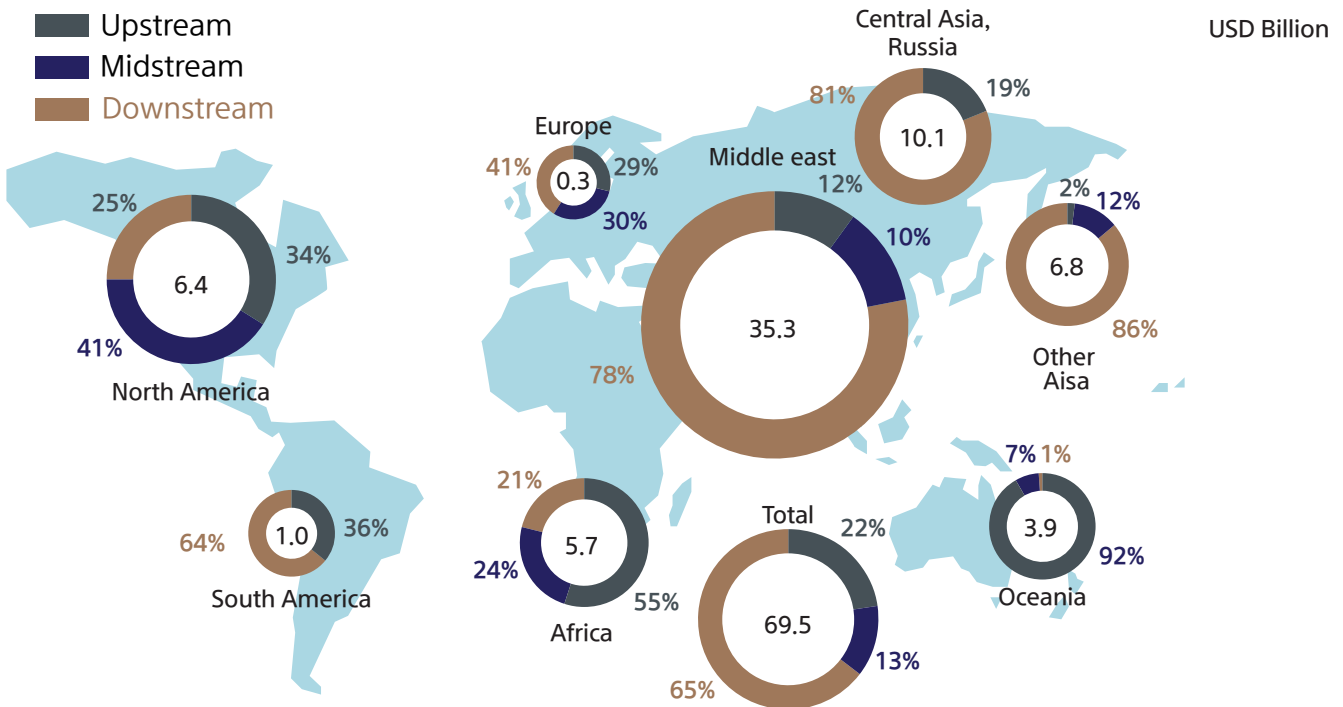


Figure 19. Breakdown of Financial Support by Region

IV. Current Status of Financing for Oil and Gas Projects

Middle East

The Middle East received the largest amount of public financing in the past ten years, at \$35.3bn. Particularly in this region, financing from public financial institutions is concentrated in the downstream segment; approximately 78% (\$27.6bn) was used in oil refining, power generation projects and petrochemical projects. In contrast, financial support for oil and gas field development projects, at around \$0.9bn, remained relatively small.

Middle East region is a major producer of oil and gas - and therefore hosts large number of upstream projects. The reason why public finance was concentrated in the downstream segment rather than the upstream segment can be found in the energy policies of the countries in the region. In the 2010s, concerned with excessive dependence on oil for the Middle Eastern economy, countries in the region planned a large-scale expansion of infrastructure aimed at diversification of raw materials and production of high value-added products and, accordingly, orders began to be placed for large-scale oil refining, petrochemical, and power generation facilities.²⁰ It appears that such initiatives increased Korean construction companies' presence in the region, along with the support of public financial institutions.

Further, it appears that the expansion of oil and gas projects in the downstream segment resulted in increased demand for LNG receiving terminals and storage facilities within the region. Midstream projects such as storage facility and LNG terminal construction are also notable in <Table 3>.

Category	Total(\$bn)
O&G field Development(Upstream)	0.9
Processing (Upstream)	3.3
Storage/terminal (Midstream)	3.1
Pipelines, etc. (Midstream)	0.5
Oil refining (Downstream)	12.7
Petrochemical (Downstream)	4.7
Power generation (Downstream)	10.2
Total	35.3

Table 3. Breakdown of Financial Support for the Middle East by Project Type

²⁰. KEXIM, Overseas Economic Research Institute, Current Status of Competitiveness of Petrochemical Industry in the Middle East and Implications, 2021.

IV. Current Status of Financing for Oil and Gas Projects

Central Asia and Russia

In Central Asia and Russia, 81% (\$8.3bn) of the investment is in the downstream segment, which is significantly higher than the overall portion of the downstream segment (66%). Particularly, major investment was made to petrochemical plant projects in Uzbekistan and Turkmenistan.

Following the financial crisis originating from the United States, the Central Asian nations, which had been concentrating on oil and gas extraction, turned to diversification towards production of high value-added products.²¹ Public financial support for the downstream segment seems to have been made in this context, particularly for the Korean construction companies. Investment in the petrochemical (\$6.7bn) sector was the largest, followed by investments in oil refining (\$1.4bn) and gas processing plants (\$1.3bn).

Category	Total(\$bn)
Petrochemical	6.7
Oil refining	1.4
Processing	1.3
O&G field Development	0.6
Power generation	0.1
Total	10.1

Table 4. Breakdown of Financial Support for Central Asia by Project Type

²¹. Korea Institute for International Economic Policy, "The Study of Characteristics of the Central Asian Plant Market and Korea's Strategy for Participation", 2010

IV. Current Status of Financing for Oil and Gas Projects

Other Asia

As with Central Asia, investment in the downstream segment was also apparent in the “Other Asia” region, which includes Southeast Asia, South Asia, and East Asia. 85.6% (\$5.8bn) of the total support amount was provided in relation to the downstream segment, and those investments in oil refining and petrochemical projects, at \$5.0bn, accounted for the majority portion of that sum.

Given that Korean corporations are actively pursuing LNG infrastructure projects in Southeast Asia, it is possible that investments in the downstream and midstream segments in the “Other Asia” region will continue to grow. In the first half of 2021, after winning the order for a 3GW combined-cycle power plant in the Long An region of Vietnam, GS Energy announced that it is also planning the construction of regasification and storage facilities,²² while Korea Western Power and Korea Gas Corporation are making arrangements with a local power generation company for a 1.7GW combined-cycle power plant and infrastructure construction project in the Songkhla region of Thailand.²³ KEPCO submitted its proposal for the \$4.5bn Vung Ang 3 LNG power generation project in Vietnam in July.²⁴

Category	Total (\$bn)
Downstream (oil refining and petrochemical)	5.0
Downstream (power generation)	0.8
Midstream	0.9
Upstream	0.2
Total	6.8

Table 5. Breakdown of Financial Support for Other Asia by Project Type

²². Seoul Economic Daily, GS Energy, the first Korean corporation to conduct LNG power generation project in Vietnam...3.5tn in terms of size, article dated March 22, 2021

²³. Today Energy, Western Power to build 1.7GW gas combined-cycle power plant in Thailand, article dated March 24, 2021

²⁴. The Guru, [Exclusive] KEPCO throws its hat into the ring for '5.2tn' Vung Ang LNG power generation project in Vietnam...Seungil Cheong's first overseas project, article dated July 16, 2021

IV. Current Status of Financing for Oil and Gas Projects

Oceania

In Oceania, public financing was dominantly provided in upstream projects, in relation to the gas field development projects in Australia. As shown in <Table 6>, \$3.1bn was provided for the Ichthys Gas Field Development Project, \$74mn for the Prelude FLNG Project, and \$212mn for the Gladstone LNG Project. \$196mn was provided for SK E&S's Barossa-Caldita Project, which is still in its development phase.

If KEXIM and K-SURE decide to provide additional support for SK E&S's Barossa-Caldita Project, which has become controversial since SK E&S's final investment decision (FID) in March 2021, the proportion of upstream segment investment in Oceania may grow even larger going forward.

North America

In North America, investments in the upstream and midstream segments took up 34% (\$2.2bn) and 42% (\$2.7bn), respectively. The public financing provided in the region mostly went into development of shale gas in the United States which hit its stride in the 2010s.

IV. Current Status of Financing for Oil and Gas Projects

Institution	Project	Participating Company	Year of Support	Investment Amount(\$mn)
KEXIM, K-SURE	Ichthys LNG Project	Samsung Heavy Industries, DSME	2012, 2013	3,071.5
KEXIM	Prelude FLNG Project	KOGAS	2013	73.8
KEXIM	Gladstone LNG Project	KOGAS	2013, 2019	212.3
KEXIM	Barossa-Caldita Gas Field Project	SK E&S	2017, 2018	196.4

Table 6. Breakdown of Public Financing Provided for Gas Field Development Projects in Oceania

Institution	Project	Company	Resource Type	Project Type	Year	Investment Amount(\$mn)
K-SURE	Sabine Pass LNG Train	KOGAS	Gas	Midstream	2013	1,552
KDB	Sabine Pass LNG Train	Cheniere Energy Partners LP	Gas	Midstream	2015	400
KEXIM	Eagle Ford Shale Gas development	KNOC	Oil and Gas	Upstream	2011	387
KEXIM	Eagle Ford Shale Gas development	KNOC	Oil and Gas	Upstream	2020	410
KEXIM	SK Nemaha	SK Innovation	Oil and Gas	Upstream	2018	269
KEXIM	Cardinal Gas Services Refinancing 2017	Samchully, E1	Gas	Upstream	2017	236
KEXIM	Eagle Ford Shale Gas development	KNOC	Oil and Gas	Upstream	2018	138
KDB	US Freeport LNG Train	SK E&S	Gas	Midstream	2015	112
KEXIM	Woodford Shale Gas JV Project	SK E&S	Gas	Upstream	2018	110
K-SURE	Nemaha Oil Field Development	GS Global, GS Energy	Oil	Upstream	2012	106
KEXIM	Canada Harvest	KNOC	Oil and Gas	Upstream	2012	106
KEXIM	Canada tight oil/gas development	POSCO International	Oil and Gas	Upstream	2017	103
KEXIM	Canada LNG	KOGAS	Gas	Midstream	2020	102

Table 7. Details of Major Upstream and Midstream Projects in North America

IV. Current Status of Financing for Oil and Gas Projects

Africa

Oil and gas projects in Africa received approximately \$5.7bn over the past ten years. In this region, a single iconic project received half of the entire amount. The “Area 4 Rovumba Basin Development Project” in Mozambique, in which Korea Gas Corporation has participated since 2007 through its acquisition of a 10% stake, is that symbolic project. At present, final investment decision is pending for the Rovuma Basin Development Project within Area 4.

To date, KEXIM and K-SURE have poured \$2.7bn into Mozambique’s Area 4 Rovuma Basin Development Project. If, as has been reported in the media, the Rovuma Basin Development Project begins in earnest early next year, even more public financing could be provided for this project going forward.²⁵

Country	Total(\$bn)
Mozambique	3.3
Algeria	0.9
Nigeria	0.8
Egypt	0.5
Libya	0.2
Total	5.7

Table 8. Breakdown of Support for Oil and Gas in Africa by Country

²⁵. Energy Newspaper, Mozambique LNG - making a start on resuming the project?, article dated January 14, 2021

IV. Current Status of Financing for Oil and Gas Projects

5) Financing Trend by Project Type

The breakdown of financing provided for oil and gas projects into upstream, midstream, and downstream segments shows that support from Korean public financial institutions was provided quite evenly across the entire value chain. Specifically, investment in the midstream segment accounted for 39% (\$49.7bn), followed by investments in the downstream segment (\$45.2bn) and the upstream segment (\$32.2bn), which accounted for 36% and 25%, respectively.

Below, we will examine the analysis results of the oil and gas industry projects by project type, as well as the characteristics of public support provided in relation to each business segment.

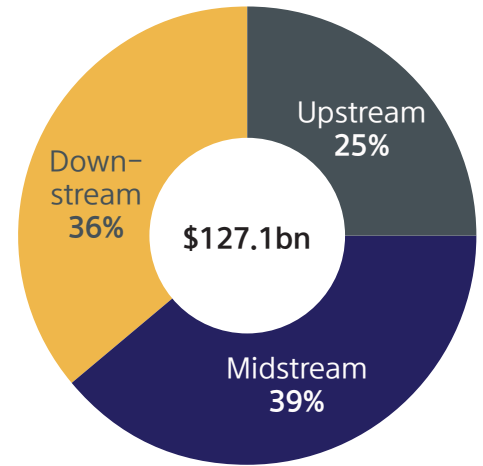


Figure 20. Support for Oil and Gas Projects by Project Type

Upstream

The upstream segment of the oil and gas industry includes matters ranging from resource exploration to drilling, development and production. For the purposes of this report, oil and gas processing facilities that remove impurities from the extracted oil and gas are also categorized as upstream segment.

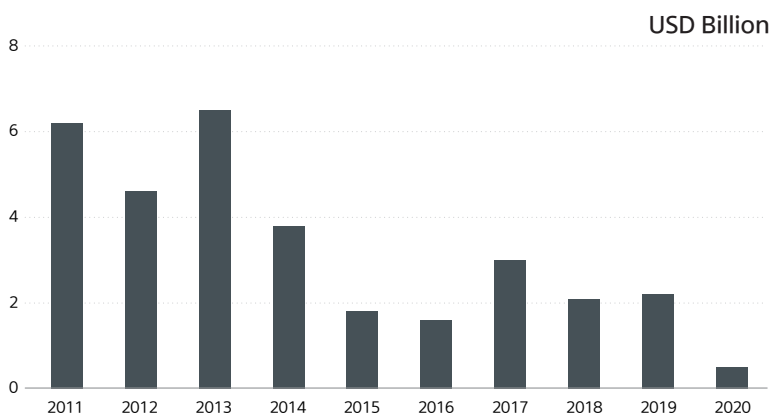


Figure 21. Support Provided by Public Financial Institutions for Upstream Segment by Year

As examined earlier, in the past ten years, public financial institutions provided financing of around \$32.2bn in total to the upstream segment. As shown in <Figure 21>, public financial support was particularly large during the period between 2011-

IV. Current Status of Financing for Oil and Gas Projects

2013, when overseas resource development was pushed as a government policy. Provision of financial support for the upstream segment was maintained at a steady level until 2020, when the economy as a whole came to a lull due to the impact of COVID-19.

On a country-by-country basis, the largest financial support was provided to Australia as KEXIM and K-SURE provided \$3.6bn for Australia's resource development projects, followed by Mozambique (\$2.7bn) in Africa, the United States (\$2bn), and Qatar (\$1.2bn).

As the Barossa-Caldita Gas Field Project in Australia (SK E&S) and the Area 4 Rovuma Basin Project in Mozambique (KOGAS) are currently under development, additional public financing could be provided to these upstream projects at a later date.

Considering the nature of resource development projects where large capital investment is made at the initial phase and the investment has to be recovered over a long period of time, new upstream projects are exposed to significant financial risk, particularly "stranded asset risk." Because oil and gas production must be cut down in order to reduce greenhouse gases, new development projects at this point are unlikely to fulfill their production plan going forward, and the profitability of these projects is likely to be adversely affected by an increase in carbon pricing and the decreasing cost of renewable energy.

Further, there is a legitimate need to limit investment in the upstream segment because development of additional sources is likely to become an obstacle to climate mitigation. The carbon budget available under the Paris Agreement temperature goal may be fully exhausted just through oil and gas reserves that have already been developed. In its *Net Zero Roadmap*, the IEA also recommended that approval of new oil and gas fields for development be stopped immediately from 2021 onwards, as one of the main milestones that needs to be implemented to attain carbon neutrality in the energy sector by 2050.²⁶

Rank	Country	Total(\$bn)
1	Australia	3.6
2	Mozambique	2.7
3	United States	2.0
4	Qatar	1.2
5	UAE	1.0
6	Iraq	0.9
...	Total	14.8

Table 9. Top 6 Countries of Location for Korean Export Credit Agencies' Upstream Investments

26. IEA. *ibid*, p.152.

IV. Current Status of Financing for Oil and Gas Projects

Box - 1 Barossa-Caldita Gas Development Project, Australia

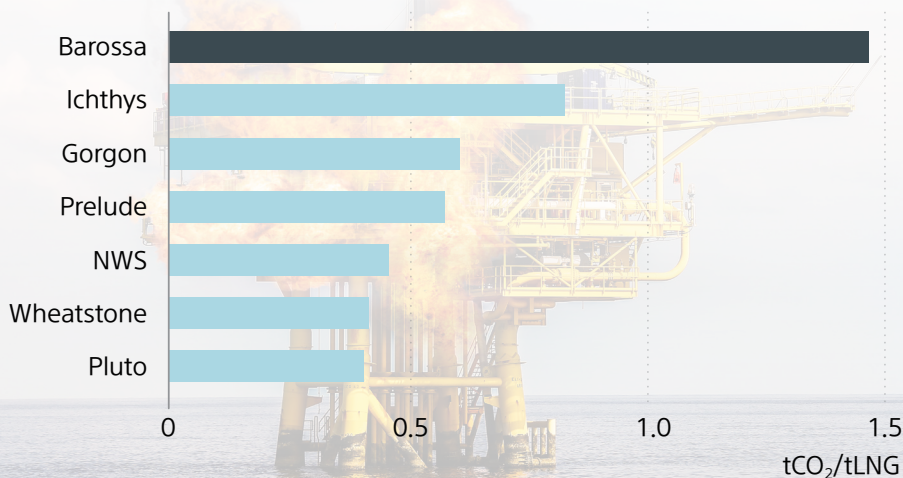
The \$5.6bn Barossa-Caldita Gas Field Project, located in the Timor Sea off the northern coast of Australia, is considered to be one of the most problematic gas development projects that is exacerbating the climate crisis. SK E&S, which currently holds a 37.5% stake in the project, is developing the projects with Santos, an Australian energy company. The project arrived at a final investment decision (FID) in March 2021.

It is feared that the Barossa-Caldita Gas Field Project will produce huge amounts of greenhouse gases due to the high carbon dioxide (CO₂) content - an impurity - in the gas reservoir. According to the data submitted by the developer to the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA) of Australia, the Barossa Gas Field Project would emit 5.4 million tons of greenhouse gases each year in the process of producing 3.7 million tons of LNG, which is twice the amount of greenhouse gas emissions from other gas fields in Australia. Even more greenhouse gas will be emitted through transportation and final consumption once the project commences production.

In 2017 and 2018, KEXIM provided a total of USD 196mn to SK E&S for the Barossa-Caldita Gas Field Project. As of July 2021, as the development of the Barossa Gas Field Project progresses, it is understood that both KEXIM and K-SURE are considering financing for this project.

Australia's LNG Carbon Intensity

Barossa gas field will emit twice as much carbon dioxide as other gas fields



Source: BoilingCold/CCWA, IEEFA

IV. Current Status of Financing for Oil and Gas Projects

Midstream

The midstream segment of the oil and gas industry includes gas liquefaction terminal and storage facilities, gas and oil pipeline construction, LNG and crude oil carriers, receiving terminals, and regasification facilities. As mentioned in the opening part of this section, public financial institutions' financing of the midstream segment comes close to \$49.7bn, which is the largest of the project types.

Notably, public financial institutions' support for the midstream segment is mostly made up of ship-related finance. As shown in <Figure 22> below, changes in the amount of financial support provided for the midstream segment parallel the fluctuations in midstream ship finance, and most of this is driven by the market for LNG carriers and oil tankers. Relative to the amount provided for the midstream segment in 2019 (\$3.6bn), the amount provided for the midstream segment in 2020 (\$7.4bn) grew twofold, which is mostly due to the large LNG carrier orders won by the shipbuilding industry in 2020.

The majority of financing related to ships takes the form of guarantees that are provided to the shipbuilders. Under this arrangement, public financial institutions are not exposed to a long-term stranded asset risk related to the assets themselves. However, given that the shipbuilding market is greatly affected by fluctuation in oil prices, and that volatility in oil prices is predicted to increase in the future, financial risk associated with ship finance could also increase.

IV. Current Status of Financing for Oil and Gas Projects

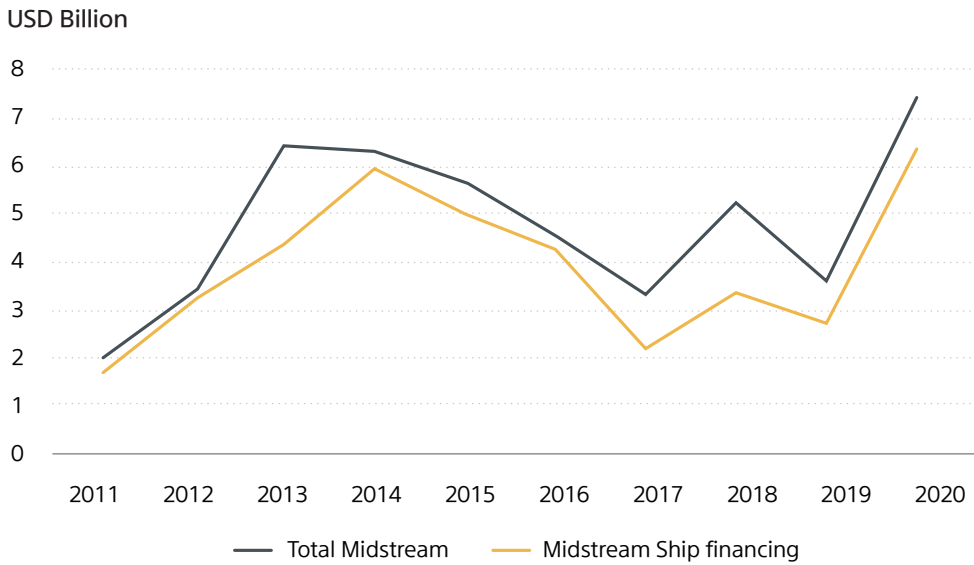


Figure 22. Breakdown of Financial Support for Midstream Segment by Year

Downstream

The downstream segment involves the process by which oil and gas that have arrived at the final place of consumption are turned into the final product or consumed. The downstream segment includes the oil refineries, petrochemical plants, and the power plants. Public financing is provided for construction projects for such facilities by Korean construction companies and engineering companies.

An oil refinery turns crude oil into various petroleum products through fractional distillation. This includes the crude distillation unit, which separates crude oil into petroleum products such as liquefied petroleum gas (LPG), gasoline, kerosene, and heavy oil, according to their boiling points, as well as the unicracking unit, which breaks down heavy oil such as Bunker C oil to produce lighter oil with higher value. For the purposes of this report, the GTL (Gas to Liquids) projects, which chemically synthesize gas into petroleum products such as kerosene, diesel, and naphtha, have

IV. Current Status of Financing for Oil and Gas Projects

been categorized as an oil refining business.

The petrochemical industry refers to the process of producing petrochemical products using refined petroleum products such as naphtha as the main raw material. Base chemicals, which is the raw material for plastic, is the main product of this industry. Naphtha that has been produced through the oil refining process is broken down into base chemicals such as ethylene and butadiene at a naphtha cracking center (NCC), and the base chemicals produced then undergo processing into various petrochemical products, such as polyethylene and polypropylene.

Finally, in the power generation business, electricity is produced using oil and gas as fuel. Examples include oil-fired power plants, which use heavy oil and diesel as fuel, and gas-fired power plants, which use gas as fuel.

Korean public financial institutions' total investment in the downstream segment is approximately \$45.2bn, which amounts to approximately 36% of the financing provided for oil and gas as a whole. In the downstream segment, public funds provided for oil refining projects, at 38% (\$16.8bn), were the largest in size, followed by petrochemical projects and power generation projects, which account for 30% (\$13.7bn) and 29% (\$13.2bn) of the investment, respectively.

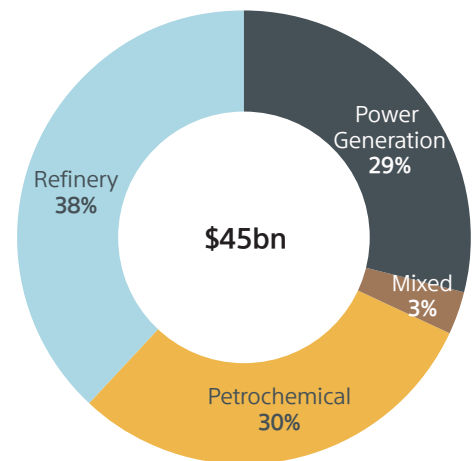


Figure 23. Breakdown of Financial Support for Downstream Segment by Project Type

IV. Current Status of Financing for Oil and Gas Projects

- Oil refining and petrochemicals

Of the total of \$32bn provided in public support for oil refining and petrochemical projects in the past ten years, 79% (\$25.5bn) was located in the Middle East and Central Asia. This can be explained as the outcome of an expansion in the 2010s of the oil refining and petrochemical businesses - both high value-added industries - in the Middle East and Central Asia, where there are ample oil and gas resources. On a country basis, Kuwait ranked first with funds of \$7.6bn being provided, followed by Saudi Arabia (\$4.3bn) and Uzbekistan (\$3.7bn).

- Power generation

Public support of a total of \$13.2bn was provided for overseas oil and gas power generation projects in the past ten years. This is larger than the \$9.9bn provided for overseas coal-fired power generation projects by the Korean public financial institutions, which was heavily criticized both domestically and internationally until the Korean Government officially announced an end to coal financing in April 2021.

Recent trends indicate that public financial support related to gas power generation may increase even more going forward. That is, now that the coal-fired power generation market has collapsed with the Korean government's pledge to end coal financing on top of KEPCO's "coal phase-out" declaration last year, Korean public utilities and EPC companies may proactively pursue LNG power plants projects in developing countries.

For example, in July 2021, KEPCO announced its intention to participate in the \$4.5bn Vung Ang 3 Combined-cycle Power Generation Project located in the Han Tinh Province of Vietnam and is promoting plans to expand in overseas LNG power generation market.

Rank	Country	Investment Amount(\$bn)
1	Kuwait	7.6
2	Saudi Arabia	4.3
3	Uzbekistan	3.7
4	Turkmenistan	3.0
5	Oman	2.7
6	Indonesia	1.2
...	Total	32

Table 10. Details of Financial Support Provided to Each Major Country in Oil Refining and Petrochemical Sectors

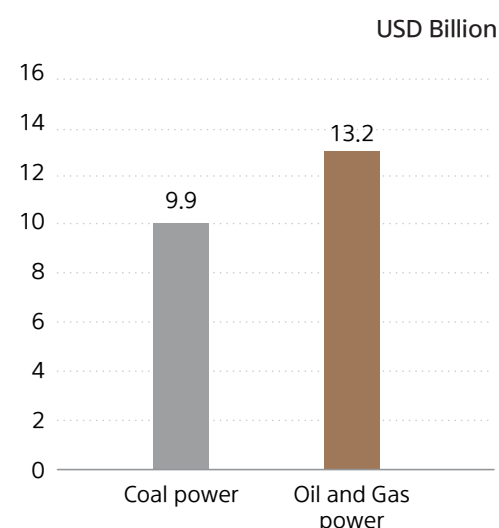


Figure 24. Breakdown of Financial Support for Power Generation Sector by Fossil Fuel Type

IV. Current Status of Financing for Oil and Gas Projects

However, as with coal-fired power generation projects, gas combined-cycle power generation is also exposed to significant stranded asset risk. Power generation projects also require large investment at the initial stage, with a long-term repayment schedule. Considering the greenhouse gas reduction pathway required for the climate targets, any new gas combined-cycle power plants at this point is unlikely to fulfill its 25 to 30-year lifespan.

V. Public Financing for Shipbuilding Industry

\$57.7bn was provided to the shipbuilding industry in the form of ship finance out of the total \$127.1bn public financing for oil and gas projects over the last decade, meaning that shipbuilding industry received 46% of the entire oil and gas financing

Public financing for the shipbuilding industry deserves a separate analysis for two main reasons: 1) Korea is a dominant player in the global shipbuilding market, and the public financing for oil and gas through shipbuilding industry reflects such feature of the Korean industry structure 2) The shipbuilding industry accounts for a large proportion of the Korean economy and therefore, significant transition risk.

1. Oil and Gas Industry and Ship and Offshore Plant Industry

The shipbuilding industry plays a crucial role in the production and transportation of oil and gas. This is because exploration, drilling and production in offshore oil fields and gas fields are carried out using special vessels and offshore plants, and also because, in cases where crude oil and gas cannot be transported via pipelines, transportation takes place via marine vessels.

1) Vessels and Offshore Plants Types

Types of vessels and offshore plant facilities related to the oil and gas industry can be divided according to their function, i.e., exploration, drilling, and production facilities and carriers. The types of facilities typically manufactured by Korean shipbuilders are as follows:²⁷

27. See product information on the Samsung Heavy Industry website: http://www.samsungshi.com/Kor/Product/ship_prd01.aspx

V. Public Financing for Shipbuilding Industry

Exploration & Drilling

Drill Ship

A drillship is a vessel, which explores and drills oil fields and gas fields offshore.



Semi-Submersible Rig

A semi-submersible rig is a drilling facility designed so that only half of the facility is submerged in water in order to maximize stability against high waves.



Jack-Up Rig

A jack-up rig is a drilling facility used to develop oil fields in the continental shelf where the sea is shallow. A jack-up rig lowers its legs onto the seabed and supports the facility above the surface of the water.



Production & Storage

Fixed Platform Production Unit (FPPU)

A FPPU is a production facility with bottom structure installed on the seabed in shallow seas and the production facilities are fixed at the topside.



Floating Production Unit (FPU)

A FPU is a production facility that floats on water without a fixed bottom structure to be deployed in deep sea. Depending on the design, this includes semi-submersible units, tension leg platforms (TLP), and SPAR platforms.



Floating, Production, Storage and Off-loading Vessel (FPSO)

A FPSO is a facility in the form of a vessel, which has facilities capable of drilling for and processing crude oil and gas, as well as storage and offloading to carrier vessels, all out at sea.



V. Public Financing for Shipbuilding Industry

Floating LNG (FLNG)

FLNG is an offshore plant facility that can drill for gas, store it after refining and liquefying it, and offload it onto LNG carrier vessels, all out at sea.



Transportation

Oil Tanker

Oil tankers are vessels that transport petroleum products in tanks installed in the hull. Oil tankers include crude oil tankers that transport crude oil, product tankers that transport refined petroleum products, shuttle tankers that transport crude oil produced at an offshore production facility to a facility on land, and arctic shuttle tankers equipped with special functions for transportation of crude oil through the polar regions.



LNG Carrier (LNGC)

A LNGC is a vessel that transports liquefied gas (LNG), which is gas that has been liquefied by cooling it to -163°C .



Liquefied Petroleum Gas Carrier (LPGC)

A LPGC is a vessel that transports liquefied petroleum gas (LPG), which is obtained by liquefying petroleum gas produced in the oil refining process.



Very Large Ethane Carrier (VLEC)

A VLEC is a vessel that liquefies and transports ethane produced in the process of gas extraction.



Floating Storage, Regasification Unit (FSRU)

A FSRU is a vessel that performs the function of an LNG terminal; while anchored offshore at the place of demand, it receives and stores the LNG supplied by LNG carriers, re-gasifies it, and supplies to users onshore through pipelines.



V. Public Financing for Shipbuilding Industry

2) Korean Shipbuilders in the Global Market

Shipbuilding market is operated as a single global market, and most of the global shipbuilding market is shared by three countries: South Korea, China, and Japan. As of 2018, Korea took the largest share of the global shipbuilding market at 44.2%, with China coming second with 32.0% and Japan coming third with 12.6%.²⁸ As of the same year, of the top ten largest shipyards in the world, the 1st to 4th and the 8th were in Korea. As Hyundai Heavy Industries is going through acquisition of DSME, it is about to become the largest shipbuilding group in the world.²⁹

The shipbuilding industry is a leading exporter in the Korean economy. “Ships, offshore structures and parts” have consistently been included in Korea’s top ten export items for the past ten years along with semiconductors, petroleum products, cars, and wireless communication devices. Ship export recorded the highest in 2017 at \$42.18mn, which was the second largest export item in terms of value, coming after semiconductors (\$97.94mn).³⁰

The Korean shipbuilding industry also accounts for a large proportion of the global ship and offshore plant market related to oil and gas projects. Korean shipbuilders hold a dominant position in relation to LNG carriers and very large crude oil carriers (VLCC). Korea’s top three shipyards won 73% of the global orders for large LNG carriers and 81% of VLCCs in 2020.³¹ In particular, LNG carriers accounted for 40% of all the orders won by Korean shipbuilders between 2018-2020.³²

In the offshore plant sector, 90% of the global market is held by three countries: China, Korea, and Singapore. Korea’s share of the market is estimated to be around 15-25%.³³ Because the offshore plant sector relates to drilling and production of oil and gas, the market is very sensitive to oil prices. The market grew rapidly up until the early 2010s when high oil prices were sustained, and this is

28. Ministry of Trade, Industry and Energy, “Reclaimed top position for ship orders won worldwide in 2018,” press release dated January 24, 2019

29. Korea SMEs and Startups Agency, Convergence Finance, “Industry Analysis Report 2019-7 - Shipbuilding Industry,” 2019.

30. e-National Index, Top 10 Export and Import Items (as of July 29, 2021)

31. HelloT “Korea’s “Big 3” shipbuilders’ share of orders won globally reach 73% this year,” article dated December 24, 2020

32. Export-Import Bank of Korea, Overseas Economic Research Institute, “Q1 2021 Trends in Shipping and Shipbuilding Industries,” p.28

33. Ministry of Oceans and Fisheries, Report on Offshore Plant Market Trend, 2020, p. 13

V. Public Financing for Shipbuilding Industry

when the Korean shipbuilders actively expanded their business into the offshore market. However, since 2013, when the historic high was recorded with offshore plant orders at 792, oil prices fell with the introduction of shale gas, and the offshore plant market stands at 10-20% of its peak.³⁴

2. Ship Finance and Public Financial Institutions

Shipbuilding and offshore plant construction projects are large-scale projects for which the contract price ranges from several hundred million dollars to billions of dollars. Therefore, financial institutions play a very important role in financing of the project and in managing the project's financial risks.

Ship finance can be divided into shipbuilding loans involving lending of funds necessary for shipbuilding, and various guarantees necessary for the performance of the project. A guarantee is an agreement under which the financial institution undertakes to bear the risk of non-performance by the shipbuilder, who is obliged to perform its obligations under the shipbuilding contract, and the typical guarantees related to shipbuilding are as follows:³⁵

Bid Bond: a guarantee that must be deposited by the bidder in order to prevent any loss in the event that the bidder does not accept the successful bid or fails to fulfill the bidding conditions.

Refund Guarantee or Advanced Payment Bond: a bank guarantee provided to guarantee the refund of any advance payment made by the owner to the shipbuilder for the construction of the vessel, in the event that the shipbuilder is in breach of, or is unable to perform, the shipbuilding contract.

Performance Bond: a guarantee provided to ensure the availability of funds for the compensation of damages to make

³⁴. Ibid.

³⁵. Jinyong Kim, A Study on Refund Guarantees in Shipbuilding Contracts (2012), Korea Maritime University, A Dissertation for Master's Degree

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good any losses that result in the event that the shipbuilder is in breach of the terms and conditions of the shipbuilding contract.

Warranty Bond: a guarantee that is provided to ensure the availability of funds for the cost of any repair that is required in the event that a defect appears within a fixed period after the completion of construction and delivery of the vessel.

The refund guarantee is particularly important in ship financing. The general practice in shipbuilding is that the contract price is paid in installments for each phase consisting of steel cutting, keel laying, launching, and delivery, and for this reason, a significant portion of the contract price is paid to the shipbuilder prior to the delivery of the vessel. This poses significant financial risk to the owner because if, for any reasons such as finances, labor, and supply of materials, the shipbuilder fails to complete the construction of the vessel, the owner may not be able to collect the contract price that has already been paid in advance. In order to resolve this issue, the owner requires the shipbuilder to obtain a guarantee from a bank with a solid credit rating that it would refund the “advance payment” in place of the shipbuilder in the event of any failure to perform an obligation under the shipbuilding contract.³⁶

Refund guarantees play a central role in ship financing because it is required as a condition precedent that must be met in order for a shipbuilding contract to take effect. In practice, the refund guarantees are issued at a very large amount because it often amounts to 40-50% of the contract price,³⁷ and in Korea, ECAs and public financial institutions with high credit ratings as state institutions have been leading the refund guarantee issuance.

³⁶. Ibid.

³⁷. Newspim, “100 LNG carriers an impossibility without KRW 10tn RG from banks: joint ship finance needed”, article dated June 5, 2020

V. Public Financing for Shipbuilding Industry

3. Breakdown of Public Financing Provided for Shipbuilding Industry

Breakdown by Public Financial Institutions

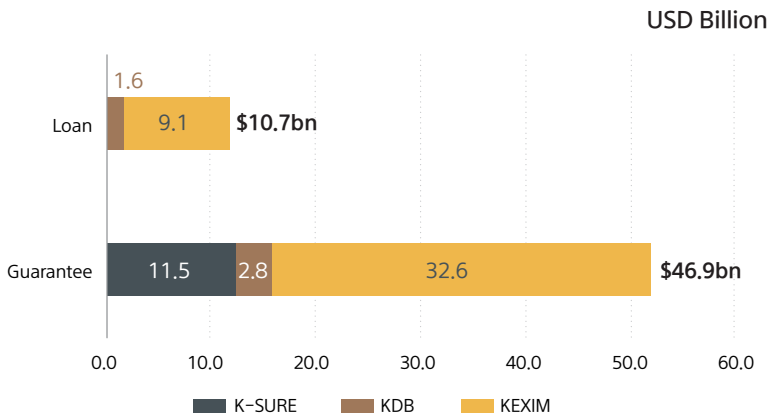


Figure 25. Breakdown of Ship Finance Provided by Public Financial Institutions by Financing Type

Oil and gas-related financing provided to shipbuilders by KEXIM, K-SURE, and KDB during the target period consisted of \$46.9bn in guarantees and \$10.7bn in loans. That the ratio of guarantees is particularly high in relation to the shipbuilding industry because of the presence of refund guarantee in ship financing practice.

On an institution-by-institution basis, KEXIM was found to have provided the largest amount, with \$32.6bn in guarantees and \$9.1bn in loans. K-SURE, which does not have a loan function, provided \$11.5bn just in the guarantee segment, and KDB was found to have provided approximately \$1.6bn in loans and \$2.8bn in guarantees.

V. Public Financing for Shipbuilding Industry

Breakdown of Financing by Vessel and Offshore Plant Type³⁸

The breakdown of financing provided by public financial institutions in the target period can be categorized by project type as follows. As shown in <Figure 26>, \$40.9bn, equivalent to 71% of ship finance, was concentrated in the midstream segment, or transportation, while \$16.7bn, or 29% of ship finance, was provided in the upstream segment, or to exploration, drilling, and production.

The financing details can also be broken down by vessel type. As shown in <Figure 27>, over \$23bn was provided for gas carriers, making up almost half of overall ship finance. This reflects the large share of the LNG carrier and crude oil carrier for the Korean shipbuilding industry, as well as the contraction of the upstream market since 2013.³⁹

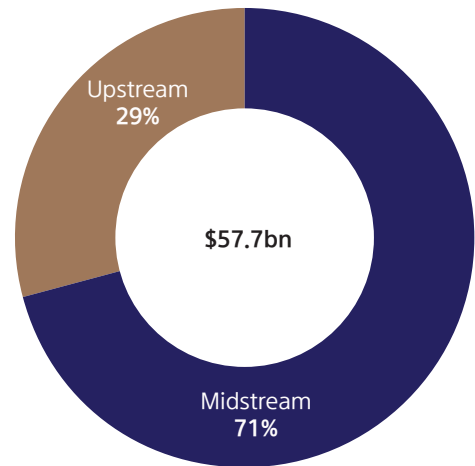


Figure 26. Ship Finance by Segment

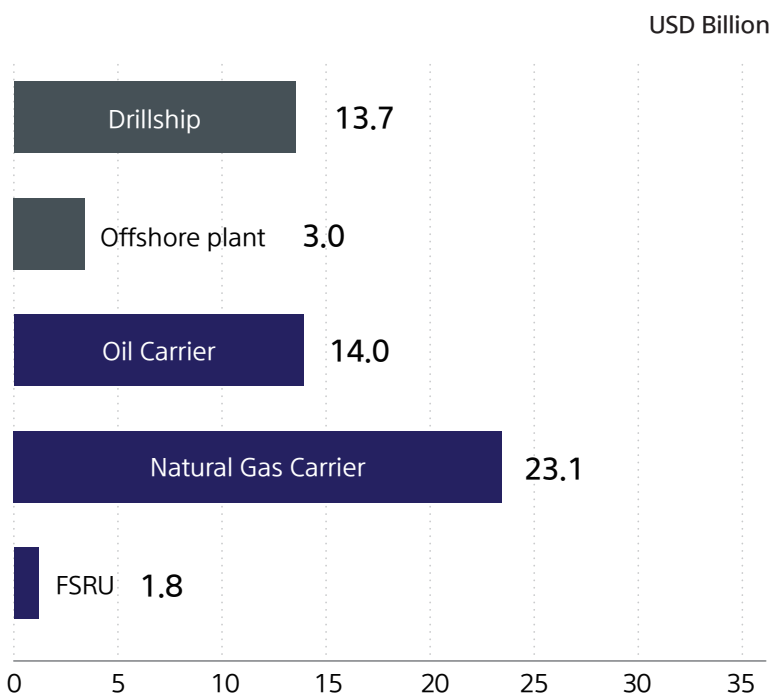


Figure 27. Breakdown of Financing by Vessel and Offshore Plant Type

³⁸. The graph was composed by excluding one project (a guarantee contract worth KRW 55.9bn) for which no information was provided on the vessel type.

³⁹. Of the details of ship finance provided by KDB, the Bank did not provide any detailed information in relation to guarantees on the grounds that it included information constituting a business secret, and only submitted the total amount provided in the period under investigation as guarantees. Therefore, the amount provided by KDB as guarantees has been excluded from the statistics on the detailed breakdown.

V. Public Financing for Shipbuilding Industry

Breakdown of Financing by Resource Type

Looking at the breakdown of public financing provided for the shipbuilding industry by resource type, approximately \$29.5bn (51%) was provided in relation to oil facilities, and \$25.5bn (44%) in relation to gas facilities. It was found that, of the production facilities, approximately \$0.5bn (0.8%) was provided in relation to facilities that produce oil and gas at the same time.

Examining the breakdown of financing provided in the period under investigation by year, it is possible to see that, up to 2013–2014, when orders for offshore plants were actively being placed with the rise in oil prices, both oil and gas maintained their upward trend, only to enter a downtrend subsequently with a drop in oil prices. What is especially noteworthy is the explosive rise in ship finance related to gas in 2020, which can be explained as being due to the concentration of contract awards for LNG carriers in 2020.

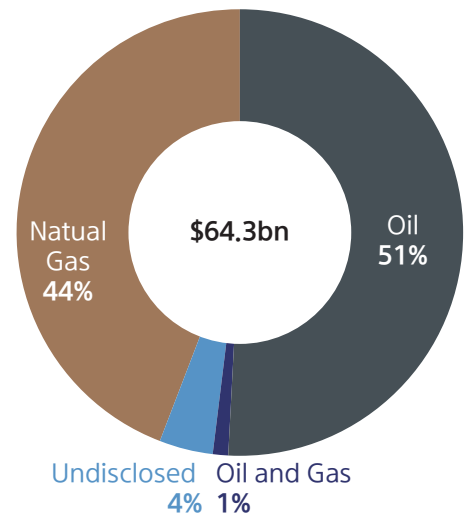


Figure 28. Breakdown of Ship Finance by Resource Type

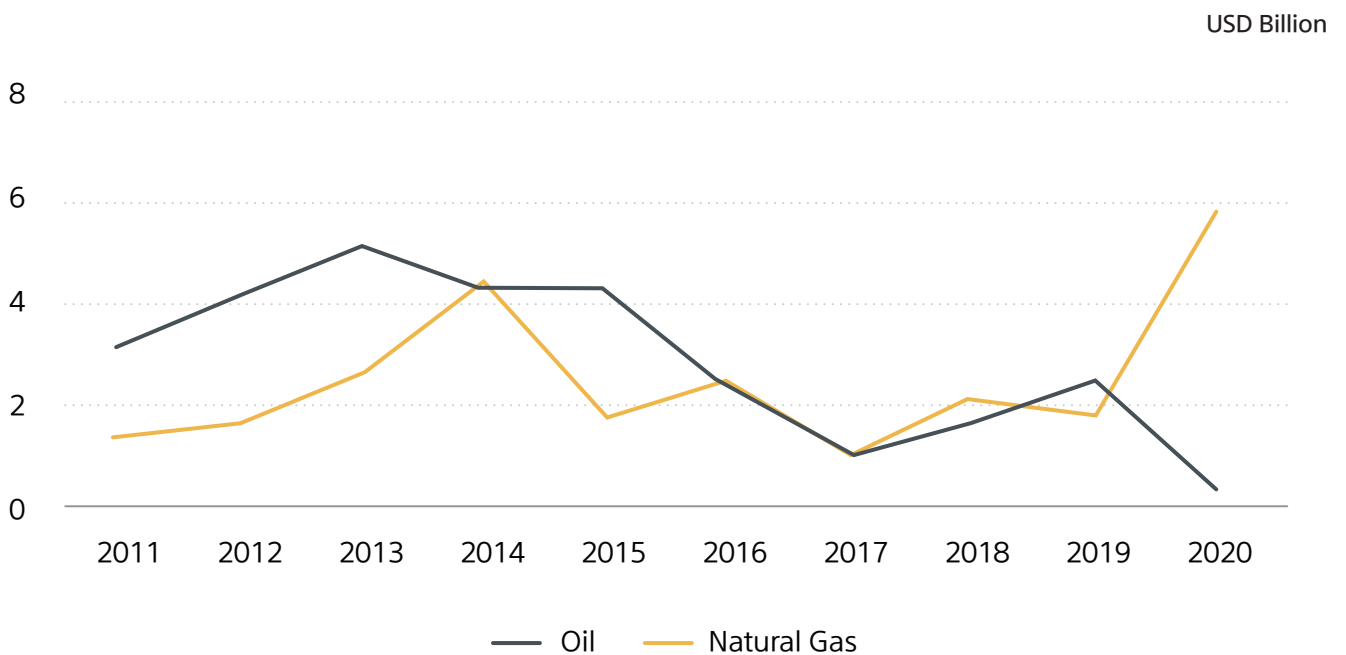


Figure 29. Breakdown of Ship Finance by Resource Type and Year

V. Public Financing for Shipbuilding Industry

Breakdown of Financing by Shipbuilder

The details of financing provided in the period under investigation to DSME, Hyundai Heavy Industries, and Samsung Heavy Industries respectively, as the top three Korean shipbuilders, are as follows. Although Korea Shipbuilding & Offshore Engineering has been established in connection with Hyundai Heavy Industries' acquisition of DSME and reorganization of governance is under way, given that for most of 2011-2020, the period under investigation, the three shipbuilders were maintained as separate entities, for the purposes of this report, performance recorded by Hyundai Heavy Industries, Korea Shipbuilding & Offshore Engineering, Hyundai Mipo Dockyard, and Hyundai Samho Heavy Industries, were categorized as Hyundai Heavy Industries' performance.

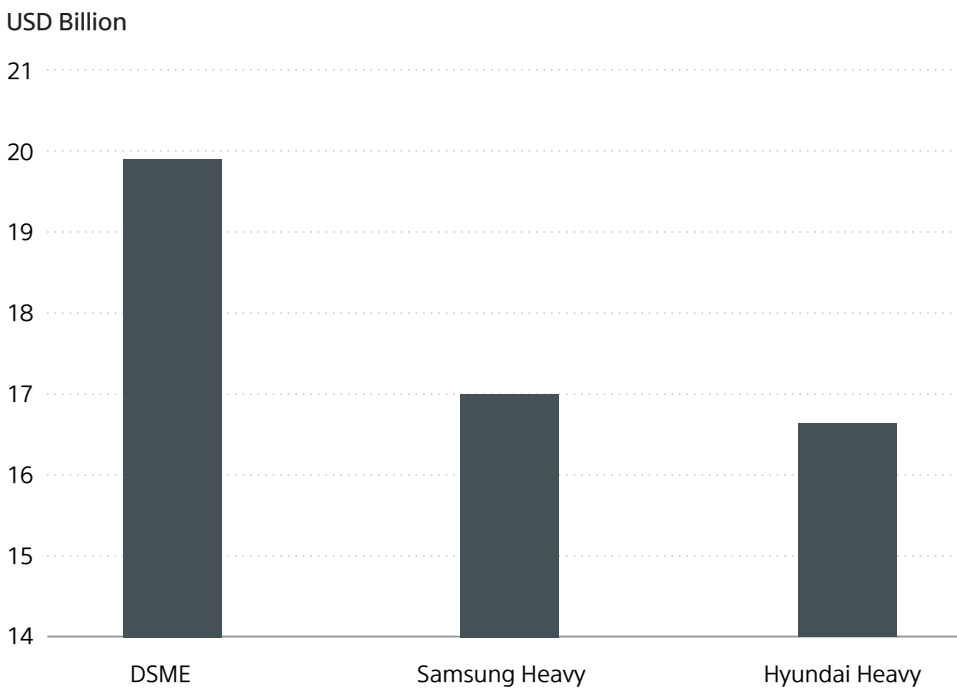


Figure 30. Breakdown of Financing by Shipbuilder

V. Public Financing for Shipbuilding Industry

4. Transition Risk for Shipbuilding Industry and Public Financing

A large proportion of public financing is provided in relation to the shipbuilding industry because the global shipbuilding market is being operated as an oligopolistic market and Korean shipbuilders hold a large share of that market. In other words, this can be interpreted as an outcome that stems from the structural characteristic of the industry, whereby the ship finance market and demand are both larger and higher than those of other countries.

The problem is that the scale of public financing being provided for ships and offshore plants related to oil and gas is very large. Construction of offshore facilities and crude oil and gas carriers intended for the production of crude oil and gas is a classic business that is exposed to transition risk from climate change. This is because, if, in order to respond to climate change, the demand for and supply of fossil fuels were to decrease, the market would inevitably become smaller in size, which in turn would lead to contraction and stagnation of that industry.

In fact, by around 2015, the Korean shipbuilding industry had already experienced a crisis that began in the offshore plant - oil and gas production facility - sector. In early 2010, as oil companies' exploration and drilling for deep sea oil and gas became active as a result of the impact of high oil prices, Korean shipbuilders leapt into the offshore plant market in order to cultivate a new market. However, with oil prices plummeting from 2015 onwards as a result of the price competition policy adopted by Middle Eastern oil producers, which was in turn triggered by the development of shale gas in the United States, drilling companies and oil companies that had placed orders for offshore plants unilaterally revoked their contracts or delayed delivery of the vessels, resulting in huge losses for Korean

V. Public Financing for Shipbuilding Industry

shipbuilders. Losses incurred by Hyundai Heavy Industries, Samsung Heavy Industries, and DSME at the time in 2010-2014 are known to have exceeded KRW 8tn in the offshore plant sector alone,⁴⁰ and DSME ended up in a state of capital impairment, receiving financial support of KRW 7.7tn from KDB and the creditors in 2015-2016; the company is proceeding with procedures for its merger with Hyundai Heavy Industries.

Transition risk from climate change is likely to come as a risk that is more long-term and structural compared to the 2015 offshore plant crisis. This is because, unlike the 2015 offshore plant crisis, which was caused by a short-term volatility in oil prices, transition risk from climate change is expected to play out in a long-term and irreversible direction. At present, the shipbuilding industry is experiencing a boom as placement of orders for vessels that had been delayed due to COVID-19 is starting all at once, and also as a result of Korean shipbuilders' position of advantage in LNG carrier technology. However, assessments are emerging from the industry that such a boom is likely to be temporary, and that there is no plan in place for what comes next.⁴¹

Rather, in circumstances where a reduction in the demand for and supply of fossil fuels is unavoidable, the current structure of Korea's shipbuilding industry, which largely depends on the demand for vessels related to oil and gas, is likely to face a more fundamental crisis. In these circumstances, the fact that 45.5% of public financing was provided to the shipbuilding industry could scarcely avoid criticism that, rather than enhancing the competitiveness of Korean industries and fostering a sustainable growth engine, changing public funds have been bent on making short-term profit.

40. NB Journal, Real reason for DSME's major weakness and measures to prevent recurrence, article dated May 28, 2020

41. Seoul Economic Daily, Unease for Korean shipbuilding industry despite ranking top for cumulative number of orders won in April... nothing in the pipeline after LNG carriers, article dated April 28, 2021

VI. Risk of Public Financing for Oil and Gas

1. Financial Risk

The first issue with public financial institutions' investment in oil and gas projects is financial risk. Public financial institutions, operated with a government budget made with taxpayer money, must maintain financial soundness as a key management objective. It should be noted that the strong driver behind the coal divestment trend both in private and public financial sector in the past few years was the high financial risk of coal investment.

Financial risk involved in investment in coal applies to investment in oil and gas. The majority of investments in oil and gas-related projects are infrastructure projects that require a large capital investment in the early stages, and takes several years of development until operation. Such large-scale projects are designed to operate for decades, and the initial investments are also designed to be recovered over a long period. However, as with coal, in circumstances where the demand for and supply of oil and gas must be swiftly reduced, oil and gas projects are also exposed to significant "stranded asset risk" because it is likely that the operation of these projects would be substantially limited by climate mitigation targets.

Where a public financial institution makes direct investment in a project through a long-term loan, a direct exposure to stranded asset risk arises. Such a form of investment typically appears where a project financing loan or equity investment is made in a resource development project or an infrastructure project.

In the case of guarantees for EPC projects or the shipbuilding projects, the financial risk exposure of the financial institutions is limited to the guarantee period, and is often terminated by the completion of construction. For this reason, exposure to long-term risk is relatively small. However, an increase in the stranded asset risk for the oil and gas-related industry is linked to the demand for

VI. Risk of Public Financing for Oil and Gas

construction and shipbuilding projects, and changes in the market environment can always lead to increased financial risk even in the short-term.

Volatility in oil and gas prices is the most prominent trigger for such short-term risk. Fluctuation in prices tends to affect the entire oil and gas value chain. For example, if prices were to fall, revenue for the upstream segment would drop, and the demand for infrastructure and facilities related to drilling and transportation, including shipbuilding, would decrease. Conversely, if increase in oil price would affect the downstream segment: for example, the rate of operation of power plants may fall due to a fall in price competitiveness of oil and gas as fuel, which may in turn lead to a decrease in revenue for power generation projects.

Volatility of oil and gas prices are likely to increase in the coming years, as regulation of carbon emission is strengthened and the energy market structure continues to change with the falling cost of renewables.⁴² As can be seen in the example of the shipbuilding industry crisis in the mid-2010s covered earlier in Section 6, the construction and shipbuilding industries associated with oil and gas react sensitively to changes in oil price. Less predictability in oil price is very likely to increase the financial risk of the oil and gas related investments. Recently in Bangladesh, Pakistan, and Vietnam, plans for gas infrastructure projects worth US \$50bn were cancelled due to concerns over the price volatility.⁴³

42. Institute for Energy Economics and Financial Analysis(IEEFA), Gas and LPG Price Volatility to increase in 2021, 2021

43. Ibid.

VI. Risk of Public Financing for Oil and Gas

Historic Rally

Asian LNG spot price jumps to highest on record amid winter supply crunch

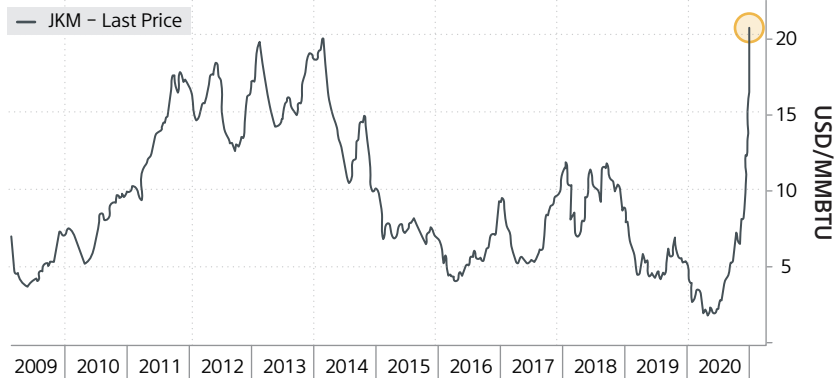


Figure 31. Price Fluctuation in Asian LNG Spot Market in 2009–2020 ⁴⁴

Furthermore, an increase in extreme weather events and a decline in the predictability of the climate caused by climate change are factors that may heighten the volatility in oil prices. For example, in the winter of 2020, extreme cold wave struck North America which led to explosive increase in demand for gas. This, on the other side of the world, led to record-high price spike in the Asian spot market as the Asian countries are the major importers of LNG. ⁴⁵

Ultimately, investments in oil and gas can severely damage the financial stability of financial institutions, and the risk is expected to grow as climate change progresses. Since the scale of Korean public financial institutions' investment in fossil fuels is already one of the largest in the world, in order to ensure their financial soundness, a concrete plan is needed for limiting and reducing fossil fuel investments aligned with climate targets.

⁴⁴. Bloomberg, Asian Spot LNG Hits Record on Cold Winter Supply Crunch, (2021. 1. 7.)

⁴⁵. Ibid.

VI. Risk of Public Financing for Oil and Gas

2. Climate Change and the Responsibility of Public Finance

Financing of oil and gas projects inevitably leads to added production and consumption of fossil fuels and accelerates climate change. In addition, investments in oil and gas infrastructure projects that require large initial capital investment effectively “locks-in” massive amount of greenhouse gas emissions because the investment becomes a legal and financial justification to maintain and operate the infrastructure to allow recovery of the investment. It is for this reason that the IEA pointed out in its *Net-Zero Roadmap* that stopping new investments in oil and gas development is the most immediate step to achieve energy system compatible with the net-zero 2050 target.⁴⁶

Much discussion has been made around the public financial institutions’ violation of public duty in relation to investments that accelerate climate change, particularly around overseas coal financing. The international community strongly criticized the Korean government when the KEXIM, K-SURE, and KDB decided to invest in new coal power plants located in Indonesia and Vietnam in 2020. In July 2020, legislative bills were proposed to the Export-Import Bank of Korea Act, the Korea Development Bank Act, and the Trade Insurance Act at the National Assembly, seeking exclusion of coal power business from their legal mandate of business.⁴⁷

Public financial institutions’ investment in overseas fossil fuels has also been criticized for constituting a breach of state’s obligations under international law. According to OCI’s legal opinion authored by University of Cambridge Professor Jorge Viñuales and Kate Cook, Matrix Chambers, public financing from ECAs contributes significantly to greenhouse gas emissions through fossil fuel project investments. The contribution to greenhouse gas emissions may be in breach not only of the principles of customary international law that a state shall not inflict harm on another state, but also of international treaties on

⁴⁶. IEA, *ibid.*

⁴⁷. The Hankyoreh, Bill introduced to ban KEPCO, KEXIM, etc. from investing in overseas coal-fired power generation, article dated July 28, 2020

VI. Risk of Public Financing for Oil and Gas

international human rights and the UN Framework Convention on Climate Change.⁴⁸

As pointed out both in the UNEP's *Production Gap Report* and the IEA's *Net-Zero Roadmap*, in reaching the goal under the Paris Agreement, there is immediate need to cut down on the production and consumption of fossil fuels, including oil and gas. However, the actual production of fossil fuels is continuously increasing, and massive support from the public financial institutions is driving this problem.

3. Role of Public Financing in Sustainable Transition of the Economy

The three public financial institutions under analysis are all established by legislation – the Export-Import Bank of Korea Act, the Korea Development Bank Act, and the Trade Insurance Act respectively – and these statutes prescribe contribution to “sound development of the national economy” as the purpose of the institutions’ establishment.⁴⁹ However, the public financial institutions’ financing of oil and gas identified in this report impedes stable development of the economy by locking the Korean economy into fossil fuel-related industry and increasing overall transition risk of the economy.

Public financial institutions’ support for private corporations is a form of state support. Since public financial institutions are run through state budget, their credit in the capital market is equivalent to the credit rating of the state itself. Because public financial institutions are highly trusted institutions, and the very fact that a public financial institution is participating in a project improves the credibility and feasibility of the project in the market. Furthermore, public financial institutions reduce the financing cost for the project by providing favorable terms compared to

48. Jorge Viñuales, Kate Cook, Legal Opinion: International Obligations Governing the Activities of Export Credit Agencies in Connection with the Continued Financing of Fossil Fuel-Related Projects and Activities (2021)

49. Export-Import Bank of Korea Act, Article 1 (Purpose) The purpose of this Act is to promote the sound development of the national economy by providing finance required for the overseas economic cooperation, such as export and import, overseas investment and exploitation of overseas resources or such through the incorporation of the Export-Import Bank of Korea.

Korea Development Bank Act, Article 1 (Purpose) The purpose of this Act is to contribute to sound development of the financial industry and national economy, by establishing the Korea Development Bank which supplies and manages funds necessary for the development and fostering of industries, expansion of infrastructure, regional development, stabilization of the financial market, facilitation of sustainable growth, etc.

Trade Insurance Act, Article 1 (Purpose) The purpose of this Act is to encourage trade and overseas investment, thereby to enhance national competitiveness and to contribute to growth of the national economy, through efficient operation of the trade insurance system designed to cover risks arising in connection with trade or other foreign transactions.

VI. Risk of Public Financing for Oil and Gas

the private financial institutions, or assuming the project's risk by providing guarantees to loans made by private financial institutions. In other words, public financing functions as a de facto subsidy provided by the state to the project.

Therefore, the question of which industry is to be provided with public financing is closely connected to the question of which industry is to be promoted and supported as a government policy. As stated in the founding statutes for the public financial institutions, this is also an issue of which industry contributes to the "sound development of the national economy."

Considering that major economies around the world, including Korea, have adopted carbon neutrality by 2050 as national climate goal, and are strengthening their climate mitigation measures, it is highly likely that the fossil fuel industry, including coal, oil, and gas, would decline at an increasing pace. Accordingly, it would be appropriate for a government to aim at downsizing the fossil fuel-related industry at a policy level. However, as shown in the analysis of this report, the construction of infrastructure and production of facilities related to fossil fuels still account for a large portion of the Korean construction and shipbuilding industries, and the public financial institutions have been providing continuous support for this industry.

Governmental support for a declining business is not what the Korean economy and corporations need. Rather, the government must seek to promote transition to sustainable fields of business and provide support minimize the impact of such transition. Korean economy is already exposed to massive transition risk because oil refining, shipbuilding, and construction industries take up large part of the national economy. This also means the country is likely to suffer huge losses if the transition is not made in a timely manner.

The Korean economy has already witnessed the inherent transition risk of the industrial structure through the coal-fired power

VI. Risk of Public Financing for Oil and Gas

generation industry. Until last year, Korea was one of the few countries in the world, alongside China and Japan, that provided public financing to overseas coal-fired power generation projects. As a result, when energy companies in Europe and the United States were transitioning to renewable energy, Korean players insisted on staying with coal-fired power generation projects. Doosan Heavy Industries & Construction, Korea's leading manufacturer of coal-fired power facilities, ended up submitting a bail-out request in 2020 after years of financial troubles, and public funds amounting to KRW 3.6tn was injected to the company.⁵⁰

The coal industry was the first to fall into decline because it is the most carbon-intensive fuel among fossil fuels. New investments in coal projects have almost disappeared with the “coal divestment” trend among the major financial institutions across the world in the span of few years. Oil and gas are likely to follow the same steps. Given that a considerable part of the Korean economy is dependent on oil and gas, the industrial structure needs to be rapidly decarbonized, and to this end, public financial institutions' support for fossil fuel projects must be limited and instead be channeled to sustainable transition.

Public financial institutions around the world are making progress on their approach to oil and gas. In December 2020, the UK government announced its policy that it will end the public financing of fossil fuel projects, including those provided through UK Export Finance (UKEF).⁵¹ The European Investment Bank also announced its plan in January 2021 to end all investments in fossil fuel projects, including gas, by the end of the year.⁵² Swedish ECAs, SEK (Svensk Exportkredit) and EKN (Exportkreditnämnden), decided to stop financing exploration and drilling for fossil fuel by 2022.⁵³ In April 2021, countries including the United Kingdom, Sweden, France, Denmark, Germany, and Spain, formed the “Export Finance for Future Coalition” (E3F) and began discussions on limiting public financing of fossil fuels.

50. Yonhap News, “Doosan Group receives 3.6tn - the Group will “swiftly implement plan to secure funds of at least KRW 3tn”, article dated June 1, 2020

51. UK Government, PM Announces the UK will end support for fossil fuel sector overseas, press release dated December 12, 2020

52. Climate Home News, “Gas is Over”: EU bank chief signals phaseout of fossil fuel finance (January 21, 2021)

53. EKN, EKN submits report to the Swedish Government: An export finance system that contributes to climate transition (September 4, 2020); SEK, Sustainability Notes (2020)

VII. Recommendations

For the past ten years, Korean public financial institutions have provided massive financial support to oil and gas projects, almost thirteen times the sum provided to coal. Considering that a rapid reduction in the production and consumption oil and gas is inevitable, financial support for oil and gas makes little sense in terms of both economy and environment.

Public financing to fossil fuels must be limited in order to effectively mitigate climate change and to transition the fossil fuel-dependent economy into a sustainable one. In conclusion, we propose the following for the Korean public financial institutions:⁵⁴

1. Stop financing new fossil fuel-related projects or increasing financing for existing projects
2. Recover existing investments in fossil fuels within a concrete timeline that is consistent with the reduction pathway based on climate science
3. Establish standards for assessing the climate change impact, including greenhouse gas emissions, of any projects for which public financing is being provided, and reflect the result of such assessment in the investment decision
4. Assess the carbon footprint and climate change impact of the institution's portfolio and disclose climate-related risks of the institution in a transparent manner

54. Policy proposals are based on the recommendations made in Jorge Viñuales, Kate Cook, Legal Opinion: International Obligations Governing the Activities of Export Credit Agencies in Connection with the Continued Financing of Fossil Fuel-Related Projects and Activities (2021).

VII. Recommendations

Changes are happening inside Korean public financial institutions. In May 2021, KEXIM, KDB, and K-SURE announced that they support the guidelines issued by the Task Force on Climate-Related Financial Disclosures (TCFD). The TCFD, a consultative body established by the G20's Financial Stability Board (FSB), has drawn up standards to include climate change-related risks in the disclosure of financial information, and at present, public institutions and corporations in various countries have voluntarily committed to disclosing climate change-related information based on these guidelines. The framework offered by the TCFD guidelines can be used to formulate the standards for reflecting climate change risk in investment decisions and provide the basis to continually assess the level of public financial institutions' climate response through transparent disclosure.

Going forward, SFOC plans to continue monitoring the public financial institutions' response to climate change, including financing of fossil fuels and the climate-related disclosure, and to continue making suggestions to improve sustainability of public finance sector.



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