Reconsidering Korea's LNG Bunkering 100% Rebate Policy

° Issue Brief

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Executive Summary

Beset by increasingly stronger global greenhouse gas (GHG) restrictions, the shipping industry is changing course toward commissioning more liquefied natural gas (LNG)-powered vessels. In response, in order to boost its LNG bunkering industry, the South Korean government has been reimbursing all import levies imposed on LNG fueling by LNG-powered vessels since 2021, if the bunkering occurs within its territorial waters.

This report attempts to examine the challenges facing the LNG bunkering rebate policy and to reconsider the justification for its continuation. Although touted for its potential to mitigate GHG emissions and other air pollutants, LNG itself is a fossil fuel predominantly comprising methane, casting doubt on its viability as an alternative fuel for a net-zero future.

The rebates for LNG bunkering are financed from the Special Accounts for Energy and Resources (the "Special Energy Account"), which incurred a deficit of approximately KRW 3 trillion in 2023. If the current rebate system remains unchanged, the rebates are projected to increase from KRW 1.4 million in 2024 to KRW 16.9 billion in 2025 and to KRW 33.9 billion in 2030 (USD 140,000, USD 16.9 million, and USD 33 million, respectively (USD 1 : KRW 1,000)).

South Korea's small market share in LNG bunkering, compared to major global ports in other countries, underscores the realistic limitations on the country's aspirations to lead the international LNG bunkering industry.

Moreover, the misalignment between South Korea's LNG bunkering rebate policy and the IMO's stance on LNG and, along with the Korean Green Taxonomy (K-Taxonomy) — a green economic activity classification system espoused by the country's Ministry of Environment — merits attention.

Lastly, the rebate system for LNG bunkering may encumber the South Korean government with greater financial burden and potentially impede its commitment to achieving net-zero emissions in international shipping by 2050.

A. Introduction

- The shipping industry is commissioning an increasing number of vessels powered by liquefied natural gas ("LNG"), a fossil fuel, to meet the escalating greenhouse gas restrictions imposed by such entities as the International Maritime Organization ("IMO") and the European Union ("EU").
- In July 2023, the IMO unveiled a more ambitious GHG strategy, and projected that net-zero emissions in global maritime operations by 2050 would be a formidable task if the reliance on LNG and other fossil fuels persists.[1]
- From a Well-to-Wake perspective, which encompasses the entire lifecycle of fuel from production to consumption, LNG as a marine fuel generates approximately 80 percent of the emissions from traditional heavy fuel oil,[1] a reason for LNG's disqualification as a sustainable alternative for long-term use.[2]
- The South Korean government, however, has been providing 100% rebates on the charges levied for supplying LNG as fuel for ships ("LNG bunkering"), retroactively from 2021, in response to increasing fuel demand from LNG-powered vessels.
- Given the limited government funds from which these rebates are paid and South Korea's relatively minor presence in the global LNG bunkering market compared to major international ports, the fiscal prudence and suitability of these expenditures are called into question.

B. Background of Policy Introduction

- In November 2021, the South Korean Ministry of Trade, Industry and Energy ("MOTIE") announced a 100% rebate of the import levy on LNG, set at KRW 24,222 per metric ton, if used as fuel for ships navigating between the country and international destinations.
  - ※ The Enforcement Decree and the Enforcement Rule of the Petroleum and Alternative Fuel Business Act were amended to allow for the retroactive application of the initiative to such LNG usage, starting January 1, 2021.
- South Korea introduced the policy to bolster the economic viability of its LNG bunkering sector with two main objectives: (1) to become a major player in the global LNG bunkering market and (2) to further its transition to an eco-friendly economy by reducing air pollutants.[3]

1 LNG is predominantly composed of methane, which is a more potent greenhouse gas than carbon dioxide. According to the IMO, LNG releases methane into the atmosphere throughout its lifecycle, an occurrence termed "methane slip." Curtailing methane emissions is critical in assuaging the climate crisis, considering the gas contributes to 25 percent of global warming.

[Table 1] Duties on LNG for Ships

Classification	Tax Rate	Account	Export Rebate	Remarks
Customs Duty	0-3% depending on the country of origin	National tax	Refundable	Article 3 of the Act on Special Cases Concerning the Refund of Customs Duties Levied on Raw Materials for Export
Individual Consumption Tax	KRW 42/kg	National Tax	Refundable	
Import Levy	KRW 24,242/ton	Special Energy Account	Refundable as of Jan. 1, 2021 or later	-
Safety Management Fee	KRW 3.9 /Nm3 (approx. KRW 4.9/kg)	Special Energy Account	Non-refundable	Exempted if a specific policy objective is met

<Source: MOTIE>

<Applicable Regulation>

Enforcement Decree of the Petroleum and Alternative Fuel Business Act (abbreviated as "Petroleum Business Act")

Article 27. Refund of Charges, Etc.

① "Uses or supplies for any purpose prescribed by Presidential Decree" as in Article 19, Paragraph 1 of the Act shall signify one of the following:

(…)

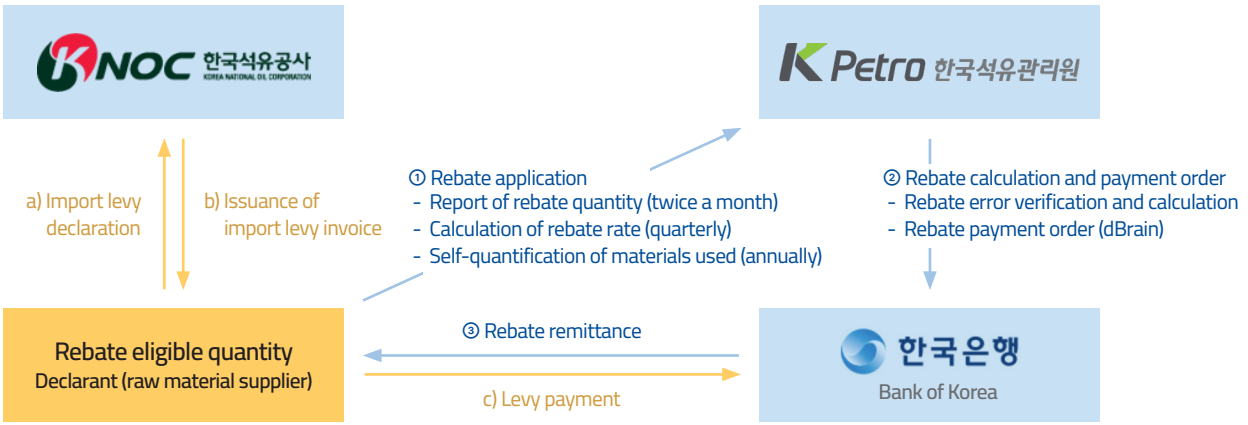
10. Where natural gas imported by a natural gas business entity for ships registered under Article 10-11, Paragraph 3 of the Urban Gas Business Act is supplied to vessels navigating between the Republic of Korea and foreign countries

<Background of the Petroleum and LNG Rebate Policy>

Petroleum Import Levy and Rebate Policy

- The petroleum import levy is imposed on entities involved in refining, importing, or exporting crude oil, petroleum, or natural gas products, as well as those importing, manufacturing, selling, or exporting alternative fuels to petroleum. The levy is applied at the rates of KRW 16 per liter for crude oil and petroleum products, KRW 3,800 per metric ton for natural gas for power generation, and KRW 24,242 per metric ton for non-power natural gas.[4]
- If petroleum products for which the levy has been collected are exported or used as industrial raw materials or other specific purposes designated by a MOTIE ordinance, the levy is rebated in whole or in part.[5]
- The rebate of the levy is managed by the Korea Petroleum Quality & Distribution Authority (the "K-Petro"), a quasi-governmental agency handling delegated governmental tasks under MOTIE.[6]

[Figure 1] Petroleum Import Levy Collection and Rebate Process

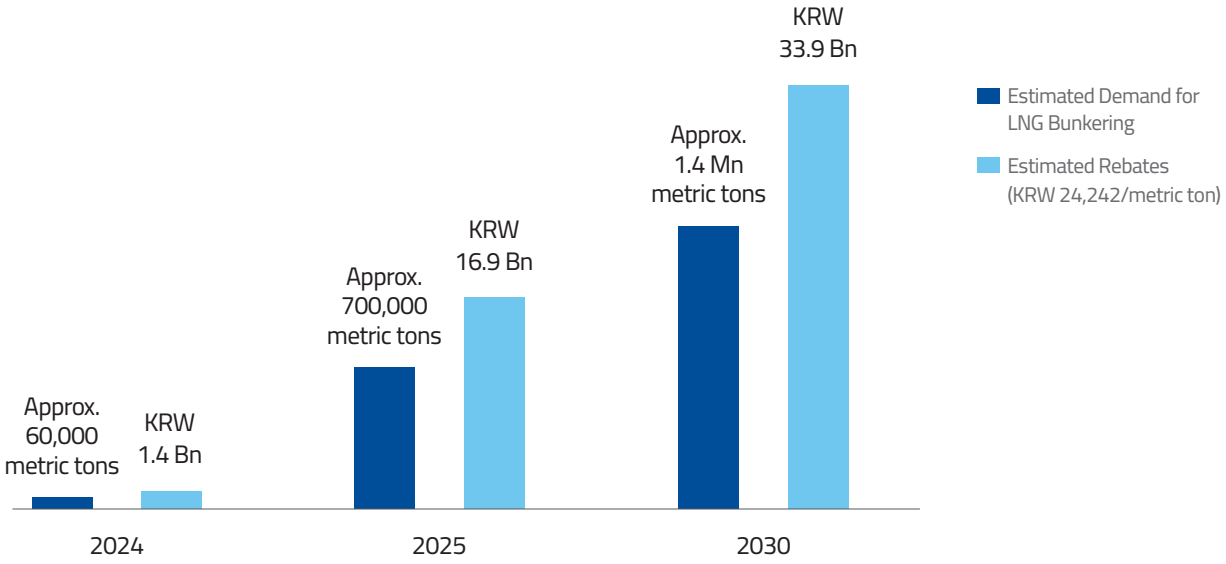


<Source: K-Petro>

C. How Much Is Rebated?

- The amounts of LNG bunkering rebates have not been disclosed. This report estimates the rebate amounts based on the sizes of the domestic and international LNG bunkering markets in reference to the relevant news reports.
  - ※ The information is not available on the K-Petro website. However, according to K-Petro, rebate was about KRW 0.9 million for both 2022 and 2023.[7]
- Drawing on data from multiple research sources, global consumption of natural gas for bunkering is projected to rise at an annual rate of 46.1 percent, from 1.71 million metric tons in 2021 to 7.78 million metric tons in 2025. By 2030, global demand for LNG bunkering is forecast to reach around 30 million metric tons.[8]
- According to the Korean government, the demand for LNG bunkering in South Korea is expected to grow from 60,000 metric tons in 2024 to 700,000 metric tones in 2025 and to roughly 1.4 million metric tons by 2030.[9]
- Assuming that MOTIE's non-power sector LNG import levy of KRW 24,242 per metric ton remains unchanged in 2030, the annual rebate payments are forecast to grow from KRW 1.4 million in 2024 to KRW 16.9 billion in 2025 and to KRW 33.9 billion by 2030 (USD 140,000, USD 16.9 million, and USD 33 million, respectively (USD 1 : KRW 1,000)).

[Figure 2] Estimated LNG Bunkering Rebates



* USD 140,000 (2024), USD 16.9 million (2025), and USD 33 million (2030) (USD 1 : KRW 1,000)

D. Issues with the LNG Bunkering Rebate Policy

1) Funded by the Deficit-Ridden Special Energy Account

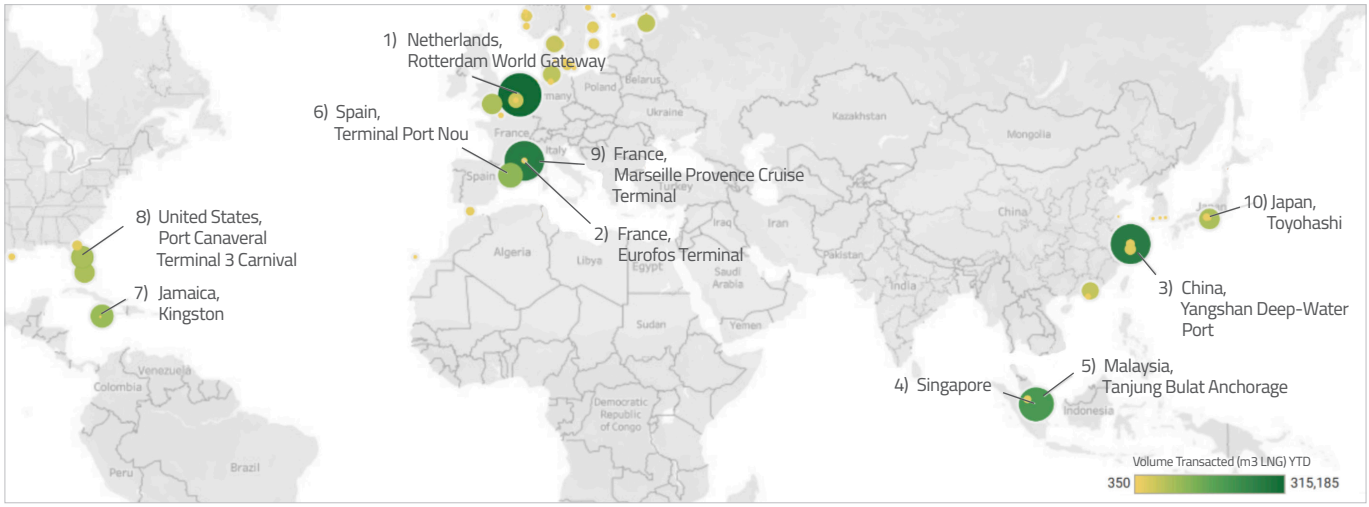
- LNG bunkering rebates are financed through the Special Energy Account, which has incurred a deficit of roughly KRW 3 trillion in 2023.[10]
  - ※ Established by the government back in 1995, the Special Energy Account receives petroleum import and sales levies and other charges to fund energy and resource development.[2] This account is the third largest among the 60 South Korean government budget funds.[11]
- Furthermore, MOTIE's documentation on government-funded initiative and projects does not disclose specific revenues and expenditures associated with LNG bunkering.

2 The Special Energy Account funds various initiatives such as the distribution of solar-powered homes, support for former mining areas, hosting of international energy conferences, supply of gas safety equipment, earthquake response costs for gas facilities, development of overseas oil fields, liquified petroleum (LP) gas quality inspections, and development of new and renewable energy technologies.

2) South Korea's Global and Domestic Impacts in LNG Bunkering

- Korea LNG Bunkering Co., Ltd., a wholly-owned subsidiary of Korea Gas Corporation that supplies LNG to vessels, unveiled its ambition to grow its global market share from 0.4 percent in 2021 to five percent by 2030.
- Despite these aspirations, South Korea's ports are non-competitive because of its transshipment characteristic, compared with leading foreign ports such as the Port of Singapore—the top bunkering port—and the Port of Rotterdam—the runner-up. This comparative disadvantage suggests that the Korea may continue to face limitations in achieving its goal in this sector by 2030.
- Moreover, a report entitled "A Study on the Economic Effect of LNG Bunkering and Related Infrastructure: Implication for Ship Finance" indicates that the economic impact of South Korea's LNG bunkering and related infrastructure are below the overall industry average.[12]

[Figure 3] Global Top 10 LNG Bunkering Ports



<Source: Kpler LNG Bunkering Report>

[Table 2] Production Inducement, Value-Added Inducement, Hiring Inducement, Employment Inducement, Impact, and Sensitivity Coefficiences Across 35 Industries (2019)

Sector	Production Inducement	Value-Added	Hiring Inducement	Employment Inducement	Impact	Sensitivity
Agriculture, Forestry, and Fisheries	1.89	0.851	26.091	4.377	1.025	0.963
Mining Products	1.937	0.857	9.187	7.386	1.05	0.617
Food and Beverage	2.201	0.758	13.079	5.957	1.193	1.189
Textiles and Leather	1.866	0.544	8.487	6.295	1.012	0.876
Wood Products, Etc.	2.049	0.732	9.02	6.741	1.111	1.013
Coal and Petroleum	1.262	0.353	1.289	0.996	0.684	1.153
Chemical Products	1.895	0.601	5.375	4.273	1.027	1.857
Non-Metallic Minerals	2.134	0.743	8.199	6.252	1.157	0.778
Primary Metals	1.883	0.496	4.471	3.577	1.021	1.4
Metal Processing	2.095	0.745	7.897	6.356	1.136	1.171
Computers, Etc.	1.554	0.624	3.571	2.933	0.843	1.038
Electrical Equipment	2.065	0.667	6.537	5.338	1.12	1.022
Machinery and Equipment	2.069	0.699	7.452	6.073	1.122	0.887
Transportation Equipment	2.44	0.691	7.326	6.084	1.323	1.07
Other Manufacturing	2.128	0.711	11.905	8.477	1.154	0.641
Contract Manufacturing, Etc.	1.831	0.857	12.375	10.652	0.993	1.156
Power, Etc.	1.651	0.535	2.835	2.365	0.895	1.09
Water Supply, Etc.	1.767	0.873	10.299	8.34	0.958	0.704
Construction	2.009	0.823	11.104	8.726	1.089	0.634
Wholesale, Retail, and Merchandise Brokerage	1.756	0.877	16.487	10.375	0.952	1.678
Transportation	1.772	0.656	13.075	8.116	0.961	1.498
Restaurants and Accommodations	2.16	0.824	19.011	10.214	1.171	1.141
Information & Communications and Broadcasting	1.625	0.86	8.516	7.023	0.881	1.094
Finance and Insurance	1.643	0.924	7.224	6.24	0.891	1.305
Real Estate Services	1.441	0.96	4.985	3.563	0.781	1.001
Professional Services, Etc.	1.814	0.864	11.071	9.128	0.984	1.518
Business Support	1.523	0.916	15.251	13.474	0.826	1.189
Public Administration, Etc.	1.365	0.922	9.279	8.689	0.74	0.914
Education Services	1.501	0.926	14.952	11.4	0.814	0.562
Health and Social Welfare	1.747	0.837	14.79	12.938	0.947	0.603
Arts, Etc.	1.769	0.884	14.471	9.227	0.959	0.64
Other Services	2.001	0.833	24.64	14.966	1.085	0.672
Others	2.56	0.855	9.914	8.159	1.388	0.595
LNG Bunkering Infrastructure	2.051	0.717	8.487	6.901	1.112	0.542
LNG Bunkering Operations	1.097	0.231	1.221	1.086	0.595	0.787
LNG Bunkering (Average)	1.574	0.474	4.854	3.994	0.865	0.665
All Industries (Average)	1.844	0.75	10.282	7.22	1	1
Total	64.551	26.246	359.873	252.697	35	35

<Source: "A Study on the Economic Effect of LNG Bunkering and Related Infrastructure: Implication for Ship Finance">

3) Misalignment With IMO's Stance and MOE's K-Taxonomy

- LNG bunkering operates through three primary methods: Truck-to-Ship, involving LNG transfer from liquid-carrying tanker trucks; Ship-to-Ship, where LNG is transferred from bunker vessels to client vessels; and Port-to-Ship, using port pipelines.[13] Methane slip, an unintended release of methane into the atmosphere, is unavoidable even during bunkering.[14]
- In July 2023, the IMO declared its aim to achieve net-zero emissions in international shipping by 2050, but at the same time, it noted the challenges of accomplishing the goal if the use of LNG and other fossil fuels continues.[15]
- The K-Taxonomy, a set of guidelines published by the South Korean Ministry of Environment in 2021, states, "*Transition sectors are not the ultimate destination for carbon neutrality. They comprise transitional economic activities on the interim pathways leading to carbon neutrality, rather than true green economic activities.*" Included in these transitional economic activities are the construction and operation of eco-friendly vessels.[16]
- The K-Taxonomy limits the use of LNG and other fossil fuels to a grace period ending in 2030.[17] Therefore, maintaining the LNG bunkering rebate policy beyond this timeframe would be in contradiction with the IMO's stance and the South Korean Ministry of Environment's guidelines.

[Table 4] GHG Reductions in Transition Sectors Expected by the K-Taxonomy

Area (Paragraph)	Economic Activities (Item)		Details
Section 2. Transition Sectors: 1. GHG Reductions			
A. Industry	(1)	GHG Reduction Initiatives at SME Sites	Initiatives at small- and medium-sized enterprise (SME) sites that involve the installation and operation of facilities dedicated to fuel transition, energy savings, and resource efficiency improvements, all aimed at curtailing GHG emissions ※ The transitional grace period ends in 2030.
B. Power Generation and Energy	(1)	Energy Production from LNG and Mixed Gases	Initiatives that involve the construction and operation of power generation facilities, combined heat and power (CHP) facilities, and heat production facilities utilizing LNG or mixed gases* to generate and supply electricity and/or heat * Mixed gases are mixtures of two or more gases including biogas, hydrogen, ammonia, off-gases, and LNG. ※ The transitional periods of grace for these initiatives span into 2030 – 2035, taking into account the 2030 Nationally Determined Contribution (NDC), the 2050 Carbon Neutrality Scenarios, and technological advancements in such areas as carbon-free cofiring and carbon capture and storage (CCS).
	(2)	Blue Hydrogen Production from LNG	Initiatives that involve the construction and operation of facilities designed to produce hydrogen from LNG ※ The transitional grace period ends in 2030.
C. Transport	(1)	Eco-Friendly Ship Construction	Initiatives that involve eco-friendly ship building and the construction and operation of facilities required for that ※ The transitional grace period ends in 2030.
	(2)	Eco-Friendly Ship Operation	Initiatives that involve introducing eco-friendly vessels into the fleet or rendering existing vessels more eco-friendly for the transportation of passengers or cargo, as well as establishing and operating facilities for maintenance of eco-friendly ships ※ The transitional grace period ends in 2030.

<Source: Ministry of Environment>

E. Policy Recommendations

1) Transparent Disclosure of LNG Bunkering Rebates

2) Discontinue the LNG Bunkering Rebate Policy no later than 2030

1) Transparent Disclosure of LNG Bunkering Rebates

MOTIE and the K-Petro have not disclosed the amount of LNG bunkering rebates from the public. Transparent disclosure of these figures would enable informed decision to when to phase out the rebate system.

2) Discontinue the LNG Bunkering Rebate Policy no later than 2030

In light of both the deficit-ridden Special Energy Account and South Korea's lack of competitiveness in the global LNG bunkering market projected, the rationale for continuously providing rebates on increasing amounts of LNG levies diminishes. Therefore, the viability of this rebate system beyond 2030 must be reassessed.

F. Conclusion

- The continuation of the rebate system for LNG bunkering levies, in effect since 2021, could potentially impede South Korea's efforts to achieve net-zero emissions in the international shipping by 2050.
- As demand for LNG bunkering grows, the financial strain on the Special Energy Account, which is already in deficit, will intensify, thereby hampering the account's ability to adequately and timely fund critical areas such as green fuels.
- Given the divergence from the K-Taxonomy, as well as from international decarbonization goals for shipping, it is imperative to reevaluate the continuation and legitimacy of the LNG bunkering rebate system.

References

1 IMO, 2023 IMO Strategy on Reduction of GHG Emissions from Ships, https://www.imo.org/en/OurWork/Environment/Pages/2023-IMO-Strategy-on-Reduction-of-GHGEmissions-from-Ships.aspx (retrieved on May 5, 2024)

2 Clarksons Research, Fuelling Transition: Tracking the Economic Impact of Emission Reductions & Fuel Changes, April 8, 2024.

3 Republic of Korea Policy Briefing: "Reduction in Natural Gas Tariffs for Hydrogen Production and Refunds on Import Levies for Liquefied Natural Gas (LNG) Bunkering," November 1, 2021, https://www.korea.kr/briefing/pressReleaseView.do?newsId=156478121#pressRelease (retrieved on May 5, 2024)

4 National Archives of Korea under Ministry of the Interior and Safety, "Petroleum Import and Sales Levies Policy," https://www.archives.go.kr/next/newsearch/listSubjectDescription.do?id=009875&sitePage= (retrieved on May 5, 2024)

5 Korea Petroleum Authority's webpage on "Petroleum Import Levy Verification," https://www.kpetro.or.kr/lay1/S1T169C170/contents.do (retrieved on May 5, 2024)

6 Korea Petroleum Authority's webpage on "Petroleum Import Levy Verification," https://www.kpetro.or.kr/lay1/S1T169C170/contents.do (retrieved on May 5, 2024)

7 SFOC inquired and received the relevant information.

8 PARK Byeong-in, "Initiatives to Expand Global Penetration of Eco-Friendly Fuels," *Today Energy* , January 2, 2023, https://www.todayenergy.kr/news/articleView.html?idxno=256234#:~:text=%EC%A0%84%EC%84%B8%EA%B3%84%20%EC%97%B0%EA%B0%84%20LNG%20%EB%B2%99%EC%BB%A4%EB%A7%81%EC%9A%A9,%EB%8A%94%20%EB%8D%94%20%EB%8A%98%EC%96%B4%EB%82%A0%20%EC%A0%84%EB%A7%9D%EC%9D%B4%EB%8B%A4 (retrieved on May 5, 2024)

9 CHOI In-soon, Slow Local LNG Bunkering... Require Competitive Pricing, *Energy Newspaper*, May 21, 2024, https://www.energy-news.co.kr/news/articleView.html?idxno=202820 (retrieved on May 23, 2024)

10 PARK Se-hwan, "Crumpled Special Energy Account of MOTIE to See Its Deficit to Inflate to KRW 3 This Year," *Kukmin Ilbo*, May 15, 2023, https://www.kmib.co.kr/article/view.asp?arcid=0924301889 (retrieved on May 5, 2024)

11 PARK Se-hwan, "Crumpled Special Energy Account of MOTIE to See Its Deficit to Inflate to KRW 3 This Year," *Kukmin Ilbo*, May 15, 2023, https://www.kmib.co.kr/article/view.asp?arcid=0924301889 (retrieved on May 5, 2024)

12 Mun Seong CHOI, "A Study on the Economic Effect of LNG Bunkering and Related Infrastructure : Implication for Ship Finance," The Korean Academy for Trade Credit Insurance, *Journal of International Trade and Insurance, vol. 24, no.* 4, Aug. 2023, pp. 57-71. (https://www.bing.com/ck/a?!&&p=8e4337ecd9727c38JmltdHM9MTcxNDAwMzIwMCZpZ3VpZD0yMjhkYjY2Zi03N2Y4LTYyZjYtMTRlYy1hNzhhNzZlZDYzYzkmaW5zaWQ9NTE3OQ&ptn=3&ver=2&hsh=3&fclid=228db66f-77f8-62f6-14eca78a76ed63c9&psq=%22LNG+%eb%b2%99%ec%bb%a4%eb%a7%81+%eb%b0%8f+%ea%b4%80%eb%a0%a8+%ec%9d%b8%ed%94%84%eb%9d%bc+%ec%82%b0%ec%97%85%ec%9d%98+%ea%b2%bd%ec%a0%9c%ec%a0%81%22&u=a1aHR0cHM6Ly93d3cuZGJwaWEuY28ua3Ivam91cm5hbC9hcnRpY2xlRGV0YWlsP25vZGVJZD1OT0RFMTE3MzQ0NTQ&ntb=1)

13 YEON Seon-ok, "Amidst Winds of Energy Transition on the High Seas, Companies Hurry to Surf on the Waves of LNG Bunkering," *The Chosun Ilbo*, July 17, 2020, https://biz.chosun.com/site/data/html_dir/2020/07/17/2020071701649.html (retrieved on May 5, 2024)

14 Corbett, Thomson, Winebrake, "Methane Emissions from Natural Gas Bunkering Operations in the Marine Sector: A Total Fuel Cycle Approach," November 21, 2015, https://www.google.co.kr/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&ved=2ahUKEwjGhea0496FAxUsVPUHHdnAAGQQFnoECBkQAQ&url=https%3A%2F%2Fwww.maritime.dot.gov%2Fsites%2Fmarad.dot.gov%2Ffiles%2Fdocs%2Finnovation%2Fmeta%2F9596%2Fmethane-emissions-lngbunkering-20151124-final.pdf&usg=AOvVaw1V0LLAV552C6s-B9SqBQBn&opi=89978449 (retrieved on May 5, 2024)

15 Original text: "*Research and development will be crucial, as the targets agreed in the 2023 IMO GHG Strategy will not be met using fossil fuels.*" IMO, 2023 IMO Strategy on Reduction of GHG Emissions from Ships, https://www.imo.org/en/OurWork/Environment/Pages/2023-IMO-Strategyon-Reduction-of-GHG-Emissions-from-Ships.aspx (retrieved on May 5, 2024)

16 Ministry of Environment, K-Taxonomy, Dec. 30, 2022, https://www.me.go.kr/home/web/policy_data/read.do;jsessionid=6kx0h2E92-uX+EsIoXDmi43a.mehome1?pagerOffset=0&maxPageItems=10&maxIndexPages=10&searchKey=&searchValue=&menuId=10263&orgCd=&condition.orderSeqId=7854&condition.rnSeq=43&condition.deleteYn=N&seq=7853 (retrieved on May 5, 2024)

17 SHIN & KIM LLC, K-Taxonomy: Content and Implications, Jan. 12, 2022, https://www.shinkim.com/kor/media/newsletter/1685 (retrieved on May 5, 2024)

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Solutions for Our Climate (SFOC) is an independent nonprofit organization that works to accelerate global greenhouse gas emissions reduction and energy transition. SFOC leverages research, litigation, community organizing, and strategic communications to deliver practical climate solutions and build movements for change.