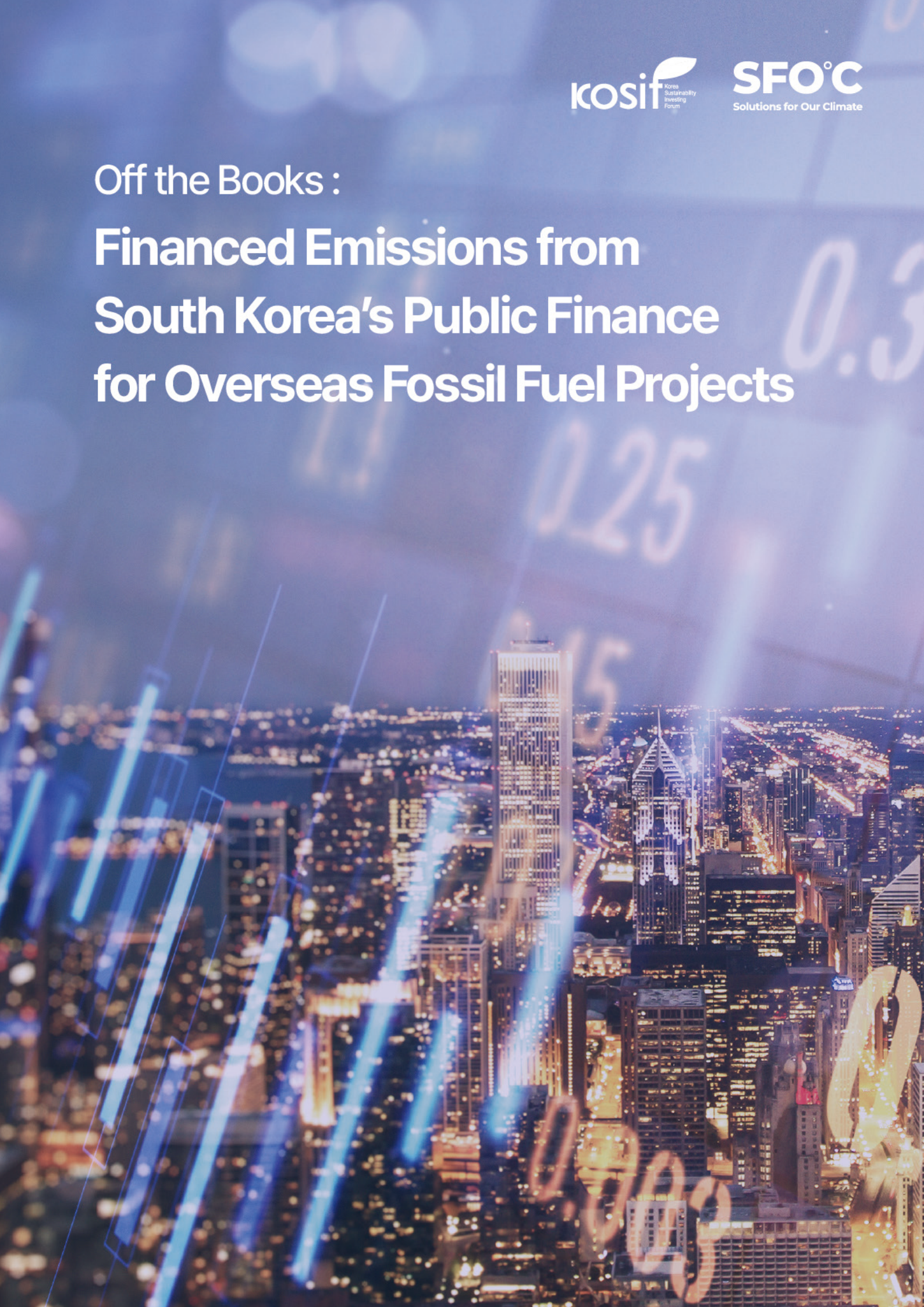
KOSIF Korea Sustainability Investing Forum

SFO°C Solutions for Our Climate

Off the Books :

Financed Emissions from South Korea's Public Finance for Overseas Fossil Fuel Projects



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FOREWORD

Finance does more than channel funds into economic activity. The industries and projects that financial institutions choose to support shape emissions trajectories and the future structure of the economy. Public finance, underpinned by government policy and public trust, bears particular responsibility for these choices.

Yet the climate impacts of public finance for overseas fossil fuel projects have not been adequately measured or disclosed. Emissions from the power plants, gas fields, vessels and terminals receiving this support have been recognized only as emissions of the countries or companies operating them, while the responsibility of the financial institutions that made those projects possible has received little attention. When financial institutions help enable substantial emissions, but those impacts remain absent from their accounts and disclosures, neither responsible finance nor effective climate policy is possible.

This report estimates financed emissions and committed emissions associated with overseas fossil fuel finance approved by the Export-Import Bank of Korea (KEXIM), Korea Trade Insurance Corporation (K-SURE) and Korea Development Bank (KDB) between 2020 and 2024. The analysis is conducted at the individual project finance and vessel level.

Even without including finance approved before 2020, the analysis finds annual financed emissions of 4.33 million tonnes of CO_2 equivalent (CO_2e) in 2024. The assets already approved are expected to emit more than 2.9 billion tonnes of CO_2e directly over their remaining lifetimes. Their impact is considerably greater when emissions embodied in the fossil fuels they transport are also considered. More troubling still, fossil fuel finance is expanding. New financing commitments increased 2.7-fold, from KRW 5.1 trillion in 2021 to KRW 13.5 trillion in 2024. Each financing decision taken today locks in emissions for decades to come. The expansion of fossil fuel finance therefore also shapes the climate and financial risks that future generations will face.

The "climate insurance dilemma" has attracted growing international attention. Insurers compensate for losses caused by climate disasters while underwriting fossil fuel projects that exacerbate the very risks they insure. Public finance faces the same contradiction. The government devotes substantial public resources to responding to climate disasters, achieving net zero and securing emissions reductions overseas. At the same time, through public financial institutions, it supports the expansion and prolonged operation of overseas fossil fuel projects, enabling cumulative emissions equivalent to several years of South Korea's domestic emissions. These emissions cannot be ignored simply because they occur abroad. The climate crisis does not stop at national borders, and neither does responsibility for the use of public funds.

The government and public financial institutions must resolve this contradiction. They should immediately end financial support for new fossil fuel projects and transparently disclose financed and committed emissions in line with international standards. Those disclosures should underpin financial portfolio emissions reduction targets aligned with the 1.5°C goal and South Korea's national emissions reduction pathway. Existing assets must also be managed, with credible strategies for their phase-out.

Ending fossil fuel finance is only part of the task. The expertise developed in assessing and sharing the risks of large, long-term projects should be directed toward renewable energy, industrial decarbonization, energy efficiency and a just transition.

We hope this report advances the debate on the climate responsibilities of public finance and prompts the government, the National Assembly and financial institutions to undertake meaningful institutional reform and action.

November 2026

Karl C. S. Yang
CEO, Korea Sustainability Investing Forum (KoSIF)

FOREWORD

Public finance draws on the state's creditworthiness to take on risks that private markets cannot bear alone. Where that credit is directed helps determine the course of a country's industries. Today, South Korea directs a substantial share of this capacity toward expanding overseas fossil fuel infrastructure. The resulting emissions, however, remain unaccounted for.

Public financial institutions fall outside several regulatory frameworks. They are not covered by the phased introduction of mandatory ESG disclosure for listed companies. Nor are they subject to the due diligence obligations envisaged in the proposed corporate human rights due diligence legislation, which would require human rights and environmental due diligence across business operations and supply chains. Emissions management is no different. Public-sector greenhouse gas target management guidelines cover only direct emissions (Scope 1) and indirect emissions from electricity and heat consumption (Scope 2), leaving institutions' reduction targets confined to their own operations. Yet the principal emissions associated with financial institutions arise from investments, loans and guarantees: Scope 3, Category 15, "Investments," or financed emissions.

In May 2021, the Financial Services Commission and major public financial institutions, including KDB, KEXIM and K-SURE, formally endorsed the Task Force on Climate-related Financial Disclosures (TCFD) and its recommendations. The TCFD's supplemental guidance for the financial sector explicitly addresses financed emissions disclosures. Five years later, no public financial institution has disclosed its financed emissions or set reduction targets based on them. Endorsement has not translated into implementation.

This report seeks to fill that gap. Applying international carbon accounting standards to South Korea's public finance, we estimate that overseas fossil fuel finance approved by the three institutions between 2020 and 2024 corresponds to 4.33 million tonnes of CO_2e in annual financed emissions in 2024. New financing commitments rose 2.7-fold, from KRW 5.1 trillion in 2021 to KRW 13.5 trillion in 2024. Committed emissions—the emissions that assets already approved are expected to produce over their remaining lifetimes—total 2.93 billion tonnes of CO_2e. From 2029, emissions from these facilities—all occurring outside South Korea—are projected to reach approximately three times the annual international mitigation target under South Korea's nationally determined contribution (NDC) every year for 15 years. Accounting for the production and combustion of the fuels transported over the lifetimes of vessels, terminals and pipelines—which account for 71% of approved commitments—makes the scale greater still. What is not measured cannot be managed, and what is not disclosed is difficult to hold to account.

South Korea's decisions can change the direction of public finance across Asia. Its 2021 announcement ending overseas coal finance helped pave the way for subsequent announcements by Japan and China. Ending fossil fuel finance could be another such turning point. If the public sector's expertise in assessing and sharing the risks of large, long-term projects is concentrated on renewable energy and other green sectors, South Korea's industrial competitiveness can help drive the expansion of clean infrastructure around the world.

An institutional response is now needed. First, financed emissions disclosure should be mandatory for public financial institutions. Second, each institution should use those disclosures to establish financed emissions reduction targets consistent with the 1.5°C goal and South Korea's NDC. Third, implementation should begin with an end to new fossil fuel finance, alongside climate criteria for maturity extensions and refinancing of existing assets.

We hope this report provides a starting point for holding public finance accountable for its climate impacts, and that the government, the National Assembly and financial institutions respond by embedding disclosure and emissions reduction targets in their institutional frameworks.

November 2026

Joojin Kim
Founder and CEO, Solutions for Our Climate (SFOC)

Glossary

Attribution factor

The proportion of a project's total emissions attributed to a particular financial institution.

Carbon lock-in

The long-term persistence of emissions when capital-intensive facilities, once built, continue operating throughout their economic lifetimes because of sunk costs, technological interdependencies and institutional inertia.

Committed emissions

Total greenhouse gas emissions expected over the remaining lifetime of a facility that has already been built or approved for financial support. This measures the potential emissions of the entire project, without applying an attribution factor.

Emissions embodied in transported fuels

Total greenhouse gas emissions expected from the production and combustion of fossil fuels transported over the remaining lifetimes of transport infrastructure, including vessels, terminals and pipelines.

Emissions intensity

Emissions divided by financial exposure, in tonnes of CO_2 equivalent (tCO_2e) per KRW billion. This metric controls for the scale of financial support when comparing the carbon intensity of supported assets. PCAF refers to this type of metric as economic emission intensity.

Financed emissions

Absolute greenhouse gas emissions from assets financed through loans and investments, attributed to a financial institution in proportion to its financing share (the attribution factor).

Financial portfolio emissions

Emissions attributed to a financial institution from assets it supports through lending, investment, guarantees or insurance, corresponding to Scope 3, Category 15 ("Investments") of the GHG Protocol. This report defines the term as an umbrella concept encompassing three separately calculated metrics: financed emissions, guarantee-associated emissions and insurance-associated emissions.

Guarantee-associated emissions

Project emissions attributed to a guarantor in proportion to its amount at risk (exposure). This is a study-specific metric outside the scope of the Partnership for Carbon Accounting Financials (PCAF) Standard.

Insurance-associated emissions

Emissions from insured assets, activities or companies attributed to an insurer using the ratio of insurance premiums to total project cost as the attribution factor.

National greenhouse gas inventory

National statistics compiling greenhouse gas emissions and removals by sector within a country's territory. As inventories are territorial, they do not include emissions abroad enabled by the country's finance.

Nationally determined contribution (NDC)

A country's emissions reduction commitment submitted to the United Nations under the Paris Agreement. South Korea's 2035 NDC targets a 53–61% reduction from 2018 net emissions, with part of the reduction to be met through international mitigation under Article 6 of the Paris Agreement.

Scope 1, 2 and 3 emissions

The GHG Protocol classifies emissions by their relationship to an organization. Scope 1 covers direct emissions from sources the organization owns or controls. Scope 2 covers indirect emissions from the generation of purchased electricity, heat and steam. Scope 3 covers all other indirect emissions across the organization's value chain, including upstream supply-chain emissions and downstream emissions from the use of products and services.

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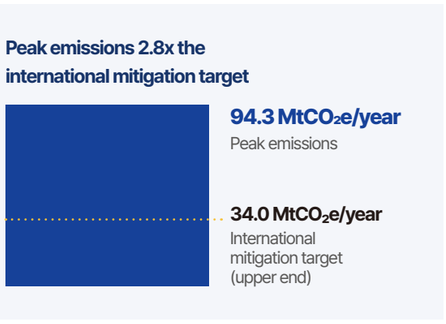
EXECUTIVE SUMMARY

Key findings

Where capital flows today shapes greenhouse gas emissions for decades. Public finance plays a particularly powerful role: it draws on the state's creditworthiness to take on risks in large projects and mobilize private investment. Yet while the government seeks to meet South Korea's nationally determined contribution (NDC) through domestic reductions and international mitigation, its public financial institutions finance overseas fossil fuel facilities whose emissions far exceed those reductions. These emissions appear only in the inventories of the countries hosting the projects. They are neither disclosed as financed emissions by the supporting institutions nor included in South Korea's NDC accounting. The Export-Import Bank of Korea (KEXIM), Korea Trade Insurance Corporation (K-SURE) and Korea Development Bank (KDB) endorsed the Task Force on Climate-related Financial Disclosures (TCFD) in 2021, but none has yet disclosed financed emissions or set reduction targets based on them. This study provides the first estimate of emissions associated with overseas fossil fuel finance approved by the three institutions from 2020 to 2024, applying the carbon accounting framework of the Partnership for Carbon Accounting Financials (PCAF).

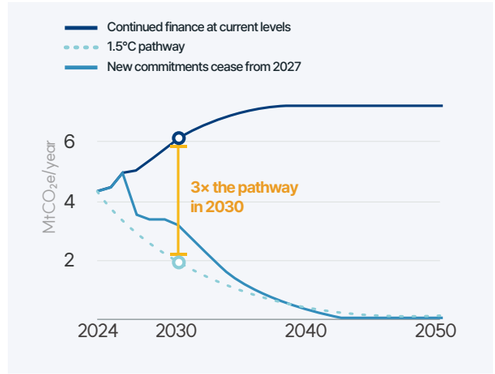
1. Facilities approved in just five years are expected to emit more than 2.9 billion tonnes of CO_2e—roughly equivalent to South Korea's total emissions over the past four years.

The 313 facilities approved for financial support by the three institutions between 2020 and 2024 have estimated lifetime committed emissions of 2.93 $GtCO_2e$. Annual emissions are projected to peak at 94.3 $MtCO_2e$ in 2029 and remain at a similar level through 2043. For 15 years, annual emissions abroad would therefore be approximately three times the international mitigation target of 29.8–34.0 $MtCO_2e$ per year under South Korea's 2035 NDC.



2. If new finance continues at current levels, financed emissions in 2030 will be three times the 1.5°C pathway.

Annual financed emissions attributed to the three institutions were 4.33 $MtCO_2e$ in 2024. New financing commitments increased 2.7-fold from KRW 5.1 trillion in 2021 to KRW 13.5 trillion in 2022, a level reached again in 2024. If this scale of finance continues, annual financed emissions will reach 6.12 $MtCO_2e$ in 2030, approximately three times the 2.03 $MtCO_2e$ consistent with the 1.5°C pathway. If new commitments cease from 2027, financed emissions decline as loans are repaid and fall below the pathway from 2040.



3. Emissions from the fossil fuels transported by 284 vessels over their lifetimes are equivalent to about 24 years of South Korea's annual emissions.

Transport assets—vessels, terminals and pipelines—account for 94% of the 313 assets assessed for committed emissions. The production and combustion of the fossil fuels to be carried over the lifetimes of the 284 vessels supported by the three institutions would generate 16.52 $GtCO_2e$: 3.47 $GtCO_2e$ from production and 13.05 $GtCO_2e$ from combustion. This is equivalent to approximately 24 years of South Korea's 2024 annual emissions of 691.6 $MtCO_2e$ and 12.7% of the remaining global carbon budget for 1.5°C.

Implications

Public finance is moving in the opposite direction to the government's mitigation efforts.

During 2029–2043, annual emissions from facilities supported by the three institutions are projected to be approximately three times the government's annual international mitigation target. Public finance is thus effectively counteracting the government's efforts to secure emissions reductions overseas.

Ending new commitments alone will not bring emissions onto a 1.5°C pathway.

If new commitments cease from 2027, financed emissions fall below the pathway from 2040. Committed emissions, however, would still be approximately 10 times the pathway in 2030. New finance and existing approved assets therefore require distinct policy responses.



Recommendations

END NEW FINANCE

End new finance and develop strategies for the early retirement of existing assets.

Immediately end new financial support for overseas fossil fuel projects, including loans, guarantees, insurance and loan arrangement. For assets already approved, identify and disclose remaining lifetimes and emissions trajectories, and apply climate criteria to maturity extensions, refinancing and drawdowns.

DISCLOSE EMISSIONS

Institutionalize financed emissions disclosure and set financial portfolio emissions reduction targets.

The three institutions endorsed the TCFD in 2021 but still do not disclose financed emissions five years later. They should calculate financed and committed emissions, include them in management disclosures, and use these estimates as the baseline for science-based reduction targets aligned with the Science Based Targets initiative's (SBTi) Financial Institutions Net-Zero (FINZ) Standard. Progress should be disclosed annually.

REDIRECT FINANCE

Redirect public finance toward green and low-carbon sectors and strengthen engagement with existing borrowers.

Public finance for overseas clean energy amounts to only about 8% of fossil fuel finance. Institutions should deploy their expertise in assessing and sharing the risks of large, long-term projects toward green activities and the low-carbon transition. Existing borrowers should be required to provide emissions data and transition plans, with implementation linked to financing terms.

I

Off the Books: Financed Emissions from
South Korea's Public Finance for Overseas Fossil Fuel Projects

Public Finance and Climate Accountability

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I. Public Finance and Climate Accountability

1. The role of public finance

Public financial institutions operate with the backing of state credit. The three institutions examined in this report—the Export-Import Bank of Korea (KEXIM), Korea Trade Insurance Corporation (K-SURE) and Korea Development Bank (KDB)—provide loans, guarantees and insurance for Korean companies' overseas projects. In doing so, they share the risks of large, long-term projects that individual companies would struggle to bear alone.

Their influence extends beyond direct support. For large energy infrastructure projects, public loans, guarantees and insurance can be instrumental in mobilizing private capital. The sectors public institutions choose to support therefore also influence the direction of private finance.

In recent years, South Korea's overseas public finance has been concentrated in fossil fuels. Analysis of Oil Change International's (OCI) Public Finance for Energy Database shows that Korean public financial institutions provided approximately USD 10 billion a year in overseas fossil fuel finance in 2020–2022, second only to Canada among G20 countries. This was approximately 13 times their annual support for clean energy over the same period (USD 805 million). Since Canada announced restrictions on overseas public fossil fuel finance in late 2022, South Korea has been the largest provider of such finance among countries without comparable restrictions. Yet the scale of emissions associated with this state-backed support remains insufficiently understood.[1]

2. International norms and South Korea's position

International norms on public finance for overseas fossil fuels have evolved rapidly in recent years. At the April 2021 Leaders Summit on Climate, the Korean government announced an end to public financial support for new overseas coal-fired power projects. Guidelines applying to central and local government and all public institutions took effect in October that year.[2] In the same month, participants in the OECD Arrangement on Officially Supported Export Credits agreed to prohibit export credit support for unabated coal-fired power plants.[3]

1 Oil Change International, Friends of the Earth US and Solutions for Our Climate, South Korea's International Public Finance Continues to Block a Just Energy Transition [issue brief], April 2024; Oil Change International, Public Enemies, 2024. Source data: Public Finance for Energy Database (energyfinance.org).

2 Korea Policy Briefing, "Public financial support for overseas coal-fired power projects to end from next month" [in Korean], Ministry of Economy and Finance, Ministry of Foreign Affairs and Ministry of Trade, Industry and Energy, September 24, 2021. The Leaders Summit on Climate announcement was made on April 22, 2021, and reported by Korea Policy Briefing on April 23, 2021.

3 OECD, "Agreement reached at OECD to end export credit support for unabated coal-fired power plants," October 22, 2021.

Restrictions that began with coal soon extended to oil and gas. At the 26th UN Climate Change Conference (COP26) in November 2021, 34 countries and five public financial institutions signed the Clean Energy Transition Partnership (CETP) statement, committing to end new direct public support for the international unabated fossil fuel energy sector by the end of 2022.[4] G7 leaders reiterated that commitment in their June 2022 communiqué.[5] The International Energy Agency (IEA) found that no new long-lead-time upstream oil and gas projects are needed in its 1.5°C-aligned Net Zero Emissions (NZE) Scenario.[6]

South Korea, however, has not joined the shift toward extending restrictions to oil and gas. As of August 2026, South Korea had not signed the CETP statement, which had around 40 country and institutional signatories. From 2023, the EU, the UK and Canada sought to extend restrictions under the OECD Arrangement to oil and gas, but negotiations broke down in December 2024 amid opposition from South Korea and Türkiye. The Arrangement's restrictions therefore remain limited to coal-fired power, while South Korea continues supporting oil and gas within this regulatory gap. Support from the three institutions has, in fact, increased. New financing commitments fell to KRW 5.1 trillion in 2021, then rose 2.7-fold to KRW 13.5 trillion the following year, and reached the same level in 2024 (Figure I-1). The year South Korea announced an end to public finance for new overseas coal-fired power marked a low point, followed by an expansion in support centered on oil and gas.[7]

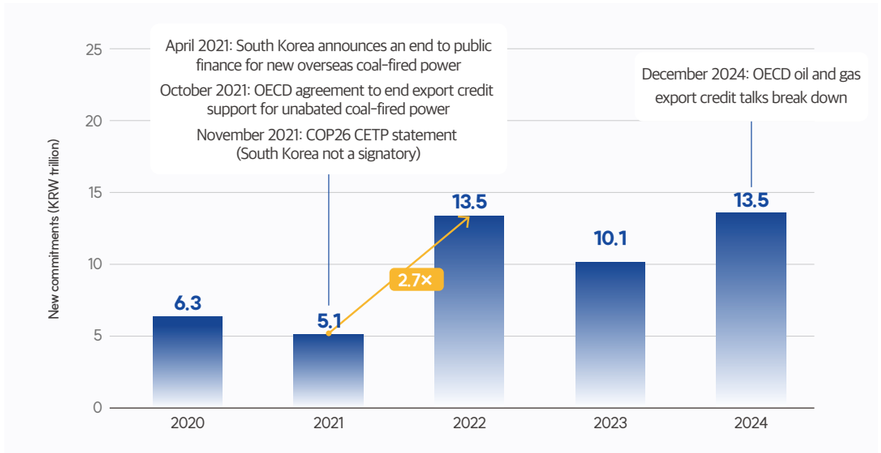


Figure I-1. New overseas fossil fuel commitments and international policy developments, 2020–2024 (KRW trillion)

4 Statement on International Public Support for the Clean Energy Transition (Glasgow Statement), November 4, 2021. The signatory list at cleanenergytransitionpartnership.org comprised 40 signatories as of August 30, 2026; South Korea was not among them.

5 G7 Leaders' Communiqué (Elmau), June 28, 2022.

6 IEA, Net Zero Roadmap: A Global Pathway to Keep the 1.5°C Goal in Reach — 2023 Update, 2023: "No new long-lead time upstream oil and gas projects are needed in the NZE Scenario."

7 Climate Home News, "Bid to end export credit help for oil and gas fails, with Korea and Türkiye opposed," January 14, 2025; Global Trade Review, December 23, 2024. In November 2025, the European Commission reported that agreement had been reached only on greater transparency for export credits in the energy sector.

3. Standards for financed emissions accounting

Financial institutions' funding decisions shape emissions for decades. Historically, however, those emissions were counted only against the companies operating the facilities, not the institutions financing them. The GHG Protocol first established a framework to address this gap in 2011. It attributes a share of emissions from financed projects to the financial institution in proportion to its financial contribution, under Scope 3, Category 15. These are known as financed emissions. In 2020, the Partnership for Carbon Accounting Financials (PCAF) established an international standard for calculating them. As of September 2026, approximately 780 financial institutions worldwide, including 23 in South Korea, had joined PCAF.[8]

Emissions measurement and disclosure requirements are becoming institutionalized. In South Korea, the Financial Services Commission finalized its plan for mandatory sustainability disclosure in July 2026, with large companies listed on the Korea Composite Stock Price Index (KOSPI) to begin climate reporting in 2028.[9] Public financial institutions are not covered and therefore require a separate disclosure framework. All three institutions endorsed the Task Force on Climate-related Financial Disclosures (TCFD) alongside the Financial Services Commission in May 2021, but none has yet disclosed financed emissions.[10] Without measurement and disclosure, it is impossible to assess whether financial portfolio emissions are consistent with South Korea's nationally determined contribution (NDC) or a 1.5°C pathway, let alone manage them.

Box I-1. Why Category 15 matters for financial institutions

Emissions from financial institutions' office electricity use and company vehicles are relatively small. Most of their climate impact arises from the activities they finance. Greenhouse gas accounting includes these emissions in Scope 3, Category 15, "Investments" (see the Glossary for definitions of the scopes). CDP's analysis of disclosures by 332 financial institutions worldwide found that Category 15 emissions averaged more than 700 times operational emissions and accounted for over 99% of total emissions. Assessing a financial institution's climate impact therefore requires a focus on its portfolio as well as its own operations. PCAF provides an international standard for this accounting.[11]

8 PCAF, "Signatories taking action," https://carbonaccountingfinancials.com/signatories (accessed September 20, 2026).

9 Financial Services Commission, "ESG Disclosure to be Required from 2028 for KOSPI-listed Companies with KRW10 Trillion or More in Total Consolidated Assets" [press release], July 8, 2026. Mandatory disclosures apply to KOSPI-listed companies with consolidated assets of at least KRW 10 trillion from 2028 (FY2027), expanding to companies with at least KRW 5 trillion from 2029.

10 Financial Services Commission, "Financial Authorities and Relevant Institutions Declare Support for TCFD and Its Recommendations" [press release], May 24, 2021. The 14 participating institutions include KDB, KEXIM and K-SURE.

11 CDP, The Time to Green Finance: CDP Financial Services Disclosure Report 2020, April 2021.

Table I-1. Climate disclosure by the three public financial institutions (2026)

Institution	TCFD report	Coverage of greenhouse gas reduction targets	Financed emissions disclosure
KEXIM	Published annually in English	Scope 1 & 2	Not disclosed
KDB	Published for the Hong Kong branch only	Scope 1 & 2	Not disclosed
K-SURE	Not published since 2021	Subject to the public-sector greenhouse gas target management scheme. No institution-specific quantitative target disclosed.	Not disclosed

Note: Based on each institution's disclosures. All three institutions' reduction targets remain limited to operational emissions (Scope 1 and 2); none has a target for financial portfolio emissions (Scope 3, Category 15).
Source: KoSIF and SFOC, based on institutional TCFD and ESG reports

4. About this report

While international norms have moved toward restricting fossil fuel finance, overseas fossil fuel finance from the three institutions has increased. The emissions from the projects they support, however, have never been disclosed. This study applies PCAF accounting principles to provide a quantitative basis for assessing the climate impacts of public finance. It examines overseas fossil fuel loans, guarantees and insurance approved by the three institutions in 2020–2024, focusing on three questions. First, what emissions are attributable to each institution based on its 2024 outstanding amounts, and how do those emissions evolve as financing is repaid? Second, what total emissions are expected over the remaining lifetimes of the facilities supported? Third, how would emissions change with the timing of an end to new commitments, how do they compare with South Korea's NDC, and are they aligned with a 1.5°C pathway?

Emissions were estimated for individual projects and vessels. Asset-level financing data are taken from the public export finance database compiled by Solutions for Our Climate and the Green Energy Strategy Institute (2025), which was built on the three institutions' submissions to the National Assembly and Oil Change International's (OCI) Public Finance for Energy Database, supplemented by desk research. Facility information and emissions data were obtained from external sources, including Global Energy Monitor, Climate TRACE, RMI's Oil Climate Index plus Gas (OCI+) and government greenhouse gas reporting programs—the US Greenhouse Gas Reporting Program (GHGRP), the EU Emissions Trading System (ETS) and Australia's Safeguard Mechanism. Where facility-level emissions were available from a government reporting program or Climate TRACE, those values were used in preference to estimates. Remaining assets were estimated by multiplying installed capacity by an emissions factor, with capacity inferred from the commitment amount where capacity data were unavailable. Each institution's share was then calculated as financial portfolio emissions using PCAF attribution principles. Gaps in publicly available information were filled using assumptions, all documented in Appendix 1. Because the analysis covers only part of the institutions' fossil fuel finance, actual emissions may exceed the figures presented here (see Box I-2).

Chapter II examines the outstanding amounts of financial support and the emissions attributed to them. Chapter III broadens the analysis to the lifetime emissions of supported facilities and the production and combustion emissions of the fossil fuels they transport. Chapter IV presents three scenarios showing how future emissions change with the timing of an end to new support. Chapter V sets out recommendations for the direction and reform of public finance.

Box I-2. Points to note in interpreting the results

First, all figures in this report are estimates. Missing information on total project costs, capacity and maturities required explicit assumptions for a substantial proportion of assets. The results should therefore be used to understand the approximate scale and composition of financial portfolio emissions, not cited as emissions estimates for individual assets.

Second, the study covers only part of the actual financing portfolio. According to the Fossil Fuel Finance White Paper, the categories examined here—overseas project finance (PF) and shipping finance—represent 33% of KDB's and KEXIM's outstanding fossil fuel finance for 2019–2024. Outstanding amounts of finance approved before 2020 and other co-financiers' shares are excluded. Actual emissions may exceed the estimates in this report. Conversely, some assumptions may lead to overestimation, including the use of fixed utilization rates based on design throughput capacity for midstream assets and residual double counting within supply chains (Appendix 1, Section 7).

Third, the report presents five metrics: financed emissions, guarantee-associated emissions, insurance-associated emissions, committed emissions, and emissions embodied in transported fuels. These are different measures of emissions associated with the same portfolio and must not be added together. The attribution bases and formulas for the first three differ because the institutions' roles differ: lending provides capital, guarantees assume credit risk, and insurance covers losses from non-payment. Adding values calculated on different bases would not produce a meaningful total and could double count projects supported by more than one instrument. PCAF likewise requires metrics with different characteristics, such as financed and insurance-associated emissions, to be reported separately. Committed emissions and emissions embodied in transported fuels measure whole-facility impacts without attribution factors and are therefore measured on a different basis from attributed emissions. The same cargo can also be counted at both terminals and vessels. These metrics must not be aggregated either.[12]

12 PCAF, Part C: Insurance-Associated Emissions (2nd ed., 2025), Chapter 6, Box 6-1: insurance-associated and financed emissions are not directly comparable because their attribution factors differ in nature; they must be reported separately and must never be aggregated under GHG Protocol Scope 3, Category 15. PCAF, Part B: Facilitated Emissions (2023), Box 4-1: although double counting occurs across Part A (financed), Part B (facilitated) and Part C (insurance-associated) emissions, it is not a concern when the metrics are reported separately, as the activities and their influence over decisions differ. PCAF, Part A: Financed Emissions (3rd ed., 2025), Box 6.1-2: double counting is unavoidable when financing several entities in the same value chain; transparency is maintained by reporting Scope 1 and 2 separately from Scope 3.

II

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Financial Portfolio Emissions of KEXIM, KDB and K-SURE

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II. Financial Portfolio Emissions of KEXIM, KDB and K-SURE

Most emissions associated with financial institutions arise from the assets and activities they support, rather than their own operations. The three institutions participate in overseas fossil fuel projects through loans, guarantees and insurance. Loans provide capital directly; guarantees promise repayment if the borrower defaults; and insurance protects lenders against losses from non-payment. Each instrument therefore entails a different form of involvement and risk. PCAF accordingly treats each instrument differently when calculating a financial institution's share of project emissions. Financed emissions from lending are included in the institution's Scope 3, Category 15, "Investments."

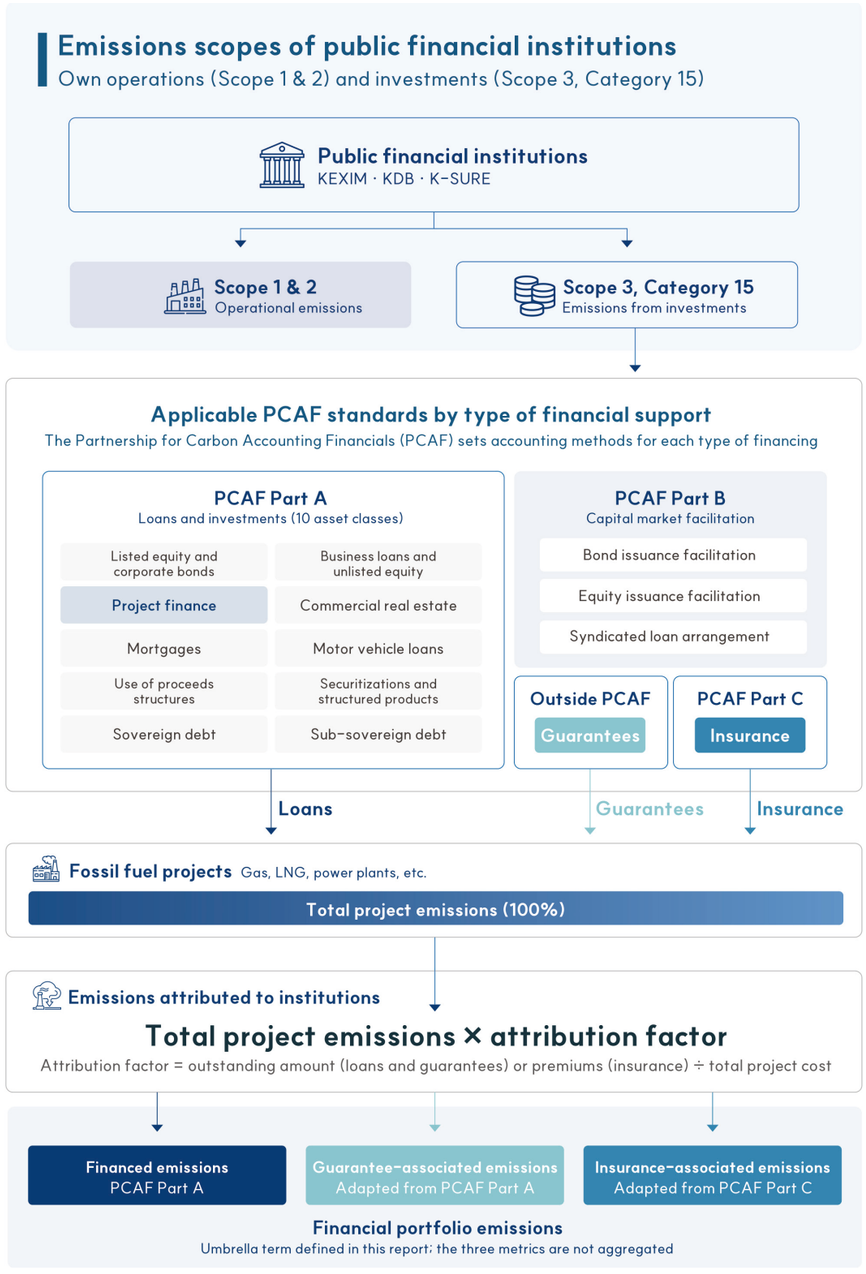
This study estimates emissions attributable to the three institutions' project finance loans, guarantees and insurance for overseas fossil fuel activities. It calculates financed emissions for loans, guarantee-associated emissions for guarantees and insurance-associated emissions for insurance. The report uses "financial portfolio emissions" as an umbrella term for these three metrics. The term follows the language of PCAF's portfolio greenhouse gas accounting, but PCAF does not define a single umbrella term covering all three metrics, so its use here is specific to this study.

All three metrics multiply total project emissions by an attribution factor to determine the institution's share. The factor expresses the relevant financial amount—outstanding amounts for loans and guarantees, and premiums for insurance—as a proportion of total project cost, which this study uses as a proxy for the project's total equity plus debt, the denominator specified in PCAF Part A. For example, a loan with KRW 1 trillion outstanding to a project costing KRW 10 trillion implies an attribution factor of 10%. If the project emits 1 million tonnes of CO_2 equivalent ($MtCO_2e$) annually, 0.1 $MtCO_2e$ is attributed to the lender.

For project finance loans, this study applies the project finance methodology in PCAF Part A. For insurance, this study adapts the project insurance methodology in Part C (Appendix 1).[13] PCAF attributes no emissions to guarantees until they are called and converted into loans; it provides no separate method for guarantee-associated emissions. To address this gap, UK Export Finance (UKEF) developed its own approach drawing on PCAF and discloses financed emissions associated with guaranteed assets. Following UKEF's approach, this study adapts the attribution principles in Part A to guarantees.[14]

13 PCAF Part C, Section 5.3, covers project-specific insurance policies, including construction all risks (CAR), erection all risks (EAR) and inherent defects insurance (IDI). Export credit insurance is outside its scope. However, because export credit insurance is also written for individual projects, this study applies the Section 5.3 attribution formula—insurance premiums divided by total project cost—by analogy. See Appendix 1 for detailed assumptions.

14 UK Export Finance, UKEF Financed Emissions 2025 Report: Basis of Reporting, July 2026. UKEF developed its own approach because PCAF does not provide a methodology for export credit insurance and guarantees. It reports both an Amount at Risk (AAR) approach, based on risk exposure, and an Expected Loss (EL) approach. This study adapts the attribution logic of the AAR approach, using the outstanding guarantee amount as the numerator of the attribution factor.



Note: PCAF Part A asset classes shown in gray are outside the scope of this study's calculations. Guarantee-associated emissions and financial portfolio emissions are terms defined in this report and are not specified in international standards. The three metrics are not aggregated. KDB = Korea Development Bank; KEXIM = Export-Import Bank of Korea; K-SURE = Korea Trade Insurance Corporation; LNG = liquefied natural gas.

Source: KoSIF and SFOC, based on PCAF (2023; 2025)

1. Exposure to fossil fuel finance

The three institutions' outstanding overseas fossil fuel finance is estimated at KRW 36.7 trillion in 2024 (Figure II-1). Even without new commitments, amounts from existing approvals remain outstanding into the early 2040s. These estimates cover KRW 48.5 trillion in fossil fuel commitments across 347 assets, out of KRW 61.3 trillion in overseas energy support approved in 2020–2024 and compiled by Solutions for Our Climate and the Green Energy Strategy Institute (2025). Outstanding amounts of finance approved before 2020 are excluded, so actual outstanding amounts are likely to be higher.

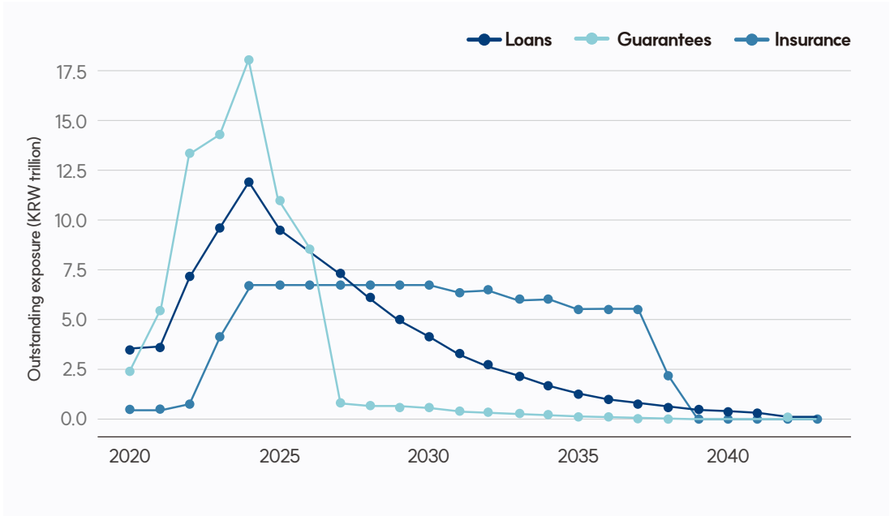


Figure II-1. Outstanding exposure by financial instrument (KRW trillion)

Note: Annual outstanding amounts are reconstructed using straight-line amortization. Insurance does not amortize, so the contract amount remains constant throughout the coverage period. Values are converted at nominal exchange rates for the approval year. New commitments after 2024 are excluded.

Exposure is the amount a financial institution has at risk in a project: the outstanding amount for loans and guarantees, and the contract amount for insurance. Figure II-1 shows how long exposure associated with commitments approved in 2020–2024 remains outstanding, assuming no new commitments.

The duration of exposure differs by instrument. Outstanding loan amounts decline gradually through repayment over long periods, so financed emissions remain attributable for longer. Most guarantees mature relatively early, leaving only KRW 0.8 trillion outstanding in 2027. Insurance does not amortize: the contract amount remains unchanged throughout the coverage period. Insurance exposure stays at KRW 6.7 trillion through 2030 and then falls in steps as contracts expire. More than KRW 5.5 trillion remains through 2037, with most coverage ending in 2038.

The study assumes straight-line amortization from approval, without a separate construction-period grace period. It may therefore underestimate how long amounts remain outstanding for loans with grace periods.

The composition of supported assets also differs by instrument (Figure II-2). Loans are spread across the value chain, including vessels (41%), processing (19%) and production (12%). Guarantees are overwhelmingly concentrated in vessels, which account for 99.7% of commitments. Insurance is concentrated in midstream facilities, particularly processing (68%) and refining (22%).

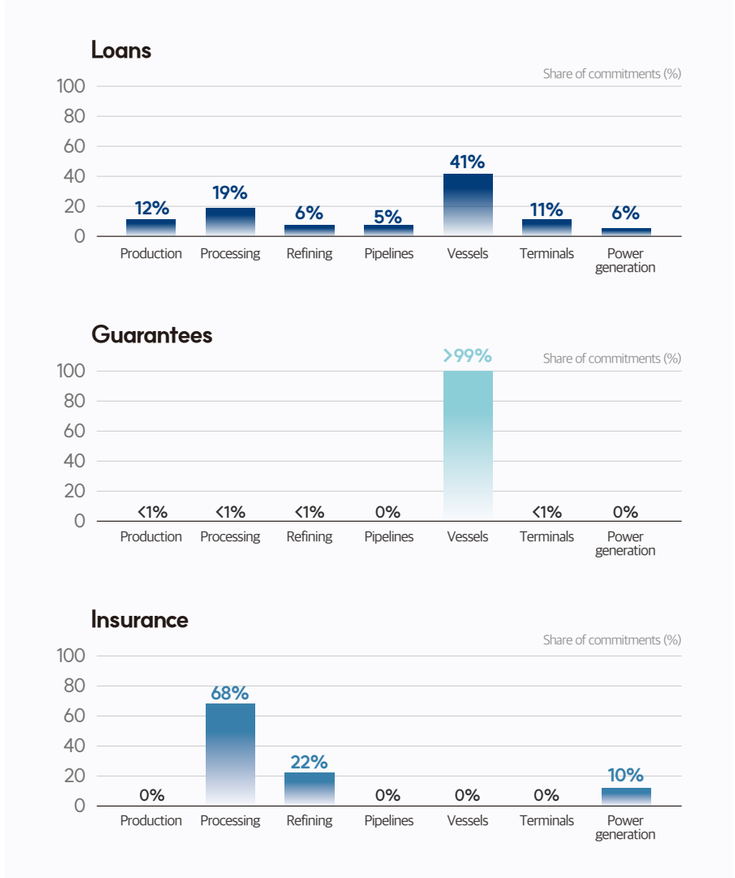


Figure II-2. Project types by financial instrument (share of commitments, %)

Note: Categories on the horizontal axis follow the value chain from upstream to midstream and downstream. Each panel shows the composition of that instrument's commitments, totaling 100%; panel heights should not be compared across instruments.

2. Financial portfolio emissions

This section presents the 2024 estimates and composition of financed, guarantee-associated and insurance-associated emissions. Here, Scopes 1, 2 and 3 refer to the supported facilities, not the financial institutions. Scope 1 comprises direct facility emissions, such as those from refinery combustion units and vessel engines. Scope 2 comprises indirect emissions from generating the electricity and heat purchased to operate the project or facility. Scope 3 encompasses indirect emissions across the facility's value chain, from crude oil extraction to the final combustion of products. From the financial institution's perspective, the share attributed to it falls within its own Scope 3, Category 15.

1) Emissions in 2024

Financed emissions associated with KRW 11.9 trillion in outstanding loans in 2024 amount to 4.33 $MtCO_2e$ a year on a Scope 1 and 2 basis, or 363.2 tonnes of CO_2 equivalent (tCO_2e) a year per KRW billion of lending. On the same basis, guarantee-associated emissions are 0.24 $MtCO_2e$ a year against KRW 18.1 trillion in outstanding guarantees, while insurance-associated emissions are 4,400 tCO_2e against KRW 6.7 trillion in insurance contract amounts. On a Scope 3 basis, annual emissions are 5.67 $MtCO_2e$ for financed emissions, 3.68 $MtCO_2e$ for guarantee-associated emissions and 0.06 $MtCO_2e$ for insurance-associated emissions.

Annual financed emissions of 4.33 $MtCO_2e$ are equivalent to 13–15% of the international mitigation target in South Korea's 2035 NDC: 29.8–34.0 $MtCO_2e$ a year to be secured overseas under Article 6 of the Paris Agreement.[15]

Table II-1. Emissions and emissions intensity by financial instrument (2024)

Metric	Scope 1 & 2 ($MtCO_2e$)	Scope 3 ($MtCO_2e$)	Exposure (KRW billion)	Scope 1 & 2 intensity (tCO_2e/KRW billion)	Scope 3 intensity (tCO_2e/KRW billion)
Financed emissions	4.33	5.67	11,933.1	363.2	475.4
Guarantee-associated emissions	0.24	3.68	18,063.0	13.1	204.0
Insurance-associated emissions	0.004	0.06	6,684.2	0.7	8.4

Note: Emissions intensity is emissions divided by exposure. Exposure is shown in KRW billion, rounded to one decimal place.
The three metrics use different accounting bases and methods and are not additive.

15 Presidential Commission on Climate Crisis Response, "Nationally Determined Contribution (NDC)" [in Korean] (accessed September 4, 2026).

2) Emissions by project type and country

Of the 4.33 $MtCO_2e$ of financed emissions, vessels account for the largest share at 1.68 $MtCO_2e$, followed by pipelines (0.97 $MtCO_2e$), power generation (0.90 $MtCO_2e$) and production (0.52 $MtCO_2e$) (Figure II-3). Vessel emissions arise from burning marine fuel, while pipeline, power generation and production emissions arise from facility operations.

Financed emissions are concentrated in a small number of assets. Refinancing of the Abu Dhabi National Oil Company (ADNOC) oil pipeline monetization transaction is the largest contributor, at 0.91 $MtCO_2e$. It is followed by the Riyadh PP11 combined-cycle gas-fired power plant in Saudi Arabia (0.37 $MtCO_2e$), the Jawa 1 combined-cycle power plant in Indonesia (0.27 $MtCO_2e$), Mozambique LNG (Area 1, 0.26 $MtCO_2e$), and the Balikpapan refinery expansion in Indonesia (0.20 $MtCO_2e$). These five assets account for 46% of total financed emissions.

By country, the largest shares are attributed to the United Arab Emirates (0.91 $MtCO_2e$), Greece (0.68 $MtCO_2e$), the United States (0.58 $MtCO_2e$), Saudi Arabia (0.55 $MtCO_2e$) and Indonesia (0.48 $MtCO_2e$). Together they account for 74% of the total (Figure II-4). All emissions attributed to the UAE arise from the single ADNOC pipeline monetization transaction. Vessels, however, are classified by the shipowner's country: emissions attributed to Greece do not necessarily occur within Greek territory.

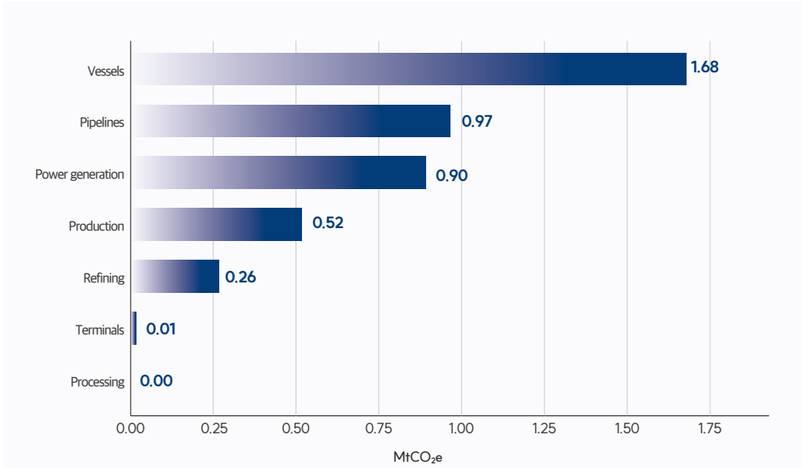


Figure II-3. Financed emissions by project type (2024, Scope 1 and 2, $MtCO_2e$)

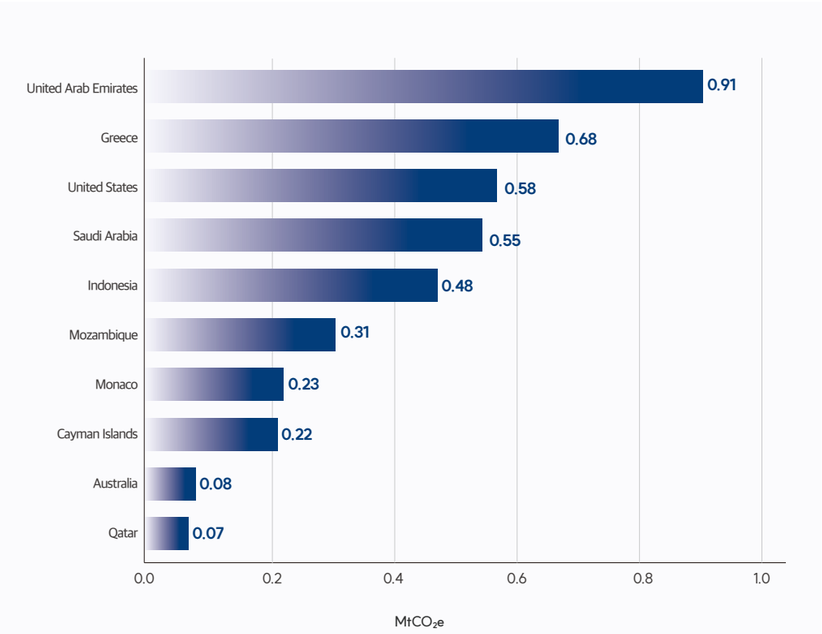


Figure II-4. Top 10 countries by financed emissions (2024, Scope 1 and 2, $MtCO_2e$)

Note: Facilities are assigned to their host country and vessels to the shipowner's country.

3) Emissions by year

Financed emissions attributable to commitments approved in 2020–2024 peak at 4.33 $MtCO_2e$ a year in 2024 on a Scope 1 and 2 basis (Figure II-5). As loans are repaid, they fall to 2.96 $MtCO_2e$ in 2025, 1.86 $MtCO_2e$ in 2030 (43% of the 2024 level) and 0.62 $MtCO_2e$ in 2035 (14%), before reaching zero in 2043. Scope 3 financed emissions instead peak at 8.47 $MtCO_2e$ in 2026, as emissions from facilities entering operation after 2024 are brought into the calculation.

Guarantee-associated emissions fluctuate substantially from year to year. Although most outstanding guarantees expire by 2027 because of their short tenors, some guarantees for operating facilities remain. Annual guarantee-associated emissions therefore decline gradually from 0.54 $MtCO_2e$ in 2027 to zero in 2037. Insurance contract amounts remain constant while covered facilities enter operation in stages. Consequently, insurance-associated emissions rise from approximately 4,400 tCO_2e in 2024 to 21,000 tCO_2e in 2030, before largely disappearing when contracts expire in 2038.

These trajectories include only commitments approved through 2024. The decline after 2025 reflects repayment and expiry of existing commitments, not subsequent new commitments. As new commitments continue to be added in practice, this decline must not be interpreted as a reduction in fossil fuel financial support.

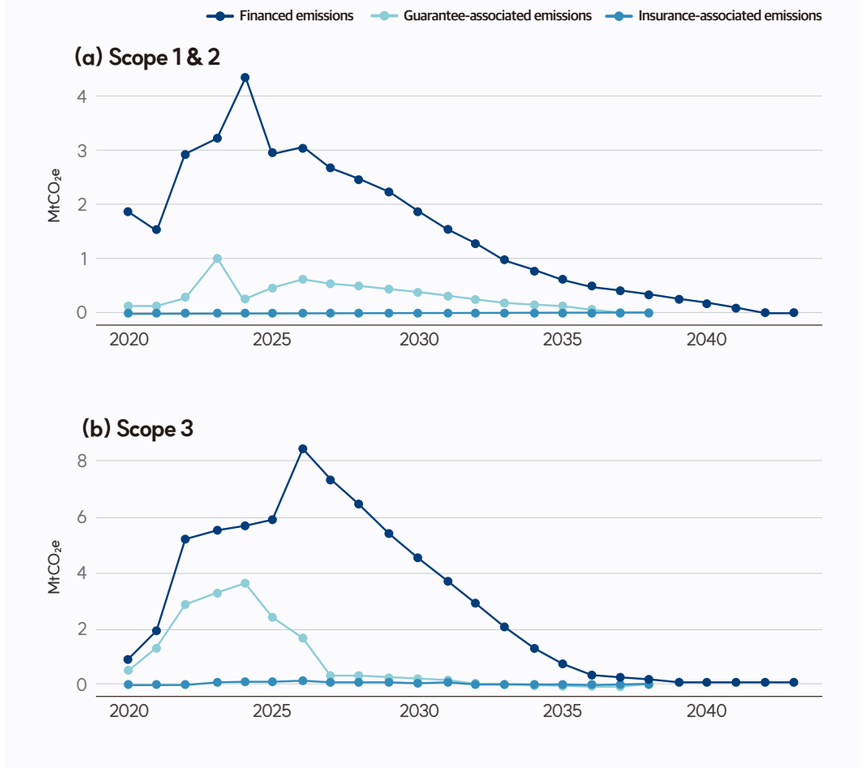


Figure II-5. Annual financial portfolio emissions by instrument and scope ($MtCO_2e$)

Note: The decline from 2025 onwards reflects repayment of existing commitments; no new commitments are included.

4) Emissions by institution

Annual financed emissions are 2.55 $MtCO_2e$ for KDB and 1.78 $MtCO_2e$ for KEXIM. No financed emissions are calculated for K-SURE because its portfolio in this study contains no loan assets. Emissions intensity is 439.3 tCO_2e per KRW billion for KDB and 291.2 tCO_2e for KEXIM, making KDB's intensity approximately 1.5 times higher (Figure II-6). Annual guarantee-associated emissions are 0.13 $MtCO_2e$ for KDB and 0.11 $MtCO_2e$ for K-SURE. Insurance-associated emissions are calculated only for K-SURE, at 4,400 tCO_2e a year.

The zero guarantee-associated emissions attributed to KEXIM reflect the structure of its support. Vessels represent 72.9% of its exposure, including KRW 12.6 trillion in guarantees covering only the shipbuilding period. Because these guarantees expire before delivery, emissions during vessel operations are not captured. Insurance accounts for 83% of K-SURE's exposure. The study assumes annual premiums equal to 1% of the insurance contract amount and divides those premiums by total project cost to obtain the attribution factor (Appendix 1, Section 4).

Institution-level estimates are therefore strongly influenced by instrument composition and accounting methods. They are better used as baselines for tracking each institution's emissions over time than for ranking institutions against one another.

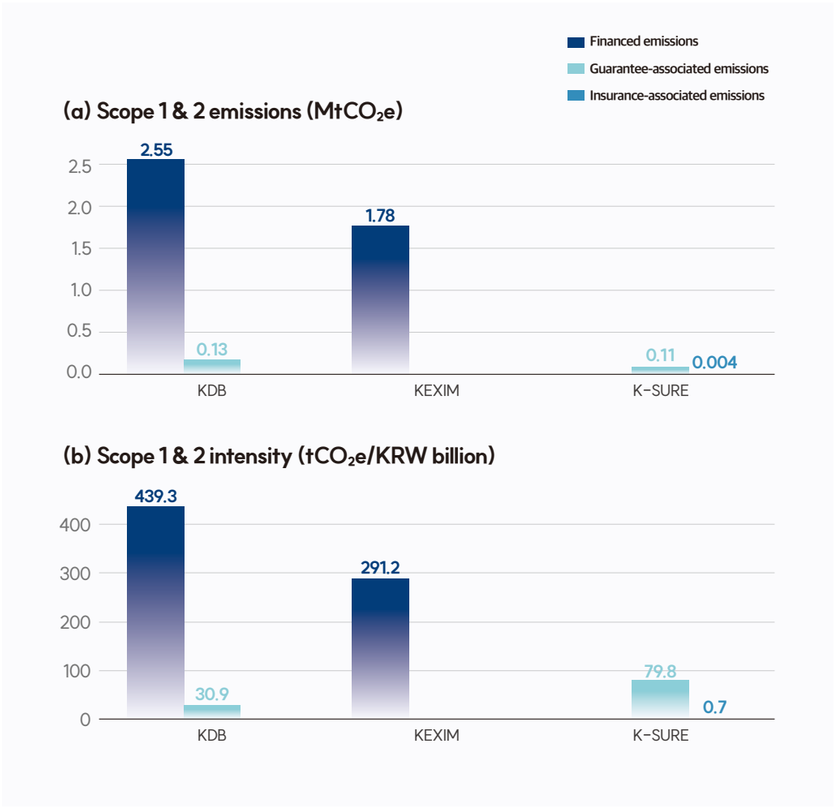


Figure II-6. Financed emissions and emissions intensity by institution (2024, Scope 1 and 2)

Table II-2. Emissions and emissions intensity by institution (2024)

Metric	Institution	Scope 1 & 2 ($MtCO_2e$)	Scope 3 ($MtCO_2e$)	Exposure (KRW billion)	Scope 1 & 2 intensity (tCO_2e/KRW billion)	Scope 3 intensity (tCO_2e/KRW billion)
Financed emissions	KDB	2.55	2.54	5,801.8	439.3	437.4
	KEXIM	1.78	3.14	6,131.3	291.2	511.3
Guarantee-associated emissions	KDB	0.13	1.07	4,132.0	30.9	260.0
	KEXIM	0.00	2.35	12,557.7	0.0	186.8
	K-SURE	0.11	0.26	1,373.3	79.8	193.2
Insurance-associated emissions	K-SURE	0.004	0.06	6,684.2	0.7	8.4

5) Emissions intensity by approval year

To assess whether more recently approved commitments are less carbon-intensive, this study compares emissions intensity by approval year. This metric sums all emissions attributable over the full financing period to assets approved in a given year and divides that total by the year's commitments. For example, the 2020 financed emissions intensity of 1,928 tCO_2e per KRW billion means that each KRW billion in loans approved that year is associated with 1,928 tCO_2e of attributed emissions over the period until repayment is complete.

The results show no clear improvement or deterioration in carbon intensity. Scope 1 and 2 financed emissions intensity rose from 1,927.7 tCO_2e per KRW billion in 2020 to 4,038.0 tCO_2e in 2022, fell sharply to 548.5 tCO_2e in 2023 and increased again to 942.3 tCO_2e in 2024 (Figure II-7). Because intensity varies markedly with the nature of large projects approved in each year, five years of observations are insufficient to establish a trend. New commitments, by contrast, showed a clear increase, rising approximately 2.7-fold from KRW 5.1 trillion in 2021 to KRW 13.5 trillion in 2024.

The instrument mix also changed between 2020 and 2024. Loans fell from 55.0% to 25.7% of total commitments, while guarantees rose from 37.9% to 55.6%. Most guarantees have short tenors and expire before facilities enter operation. As the guarantee share grows, a larger proportion of operational emissions therefore falls outside attribution to financial institutions. Low attributed emissions do not necessarily mean that the supported facilities emit little.

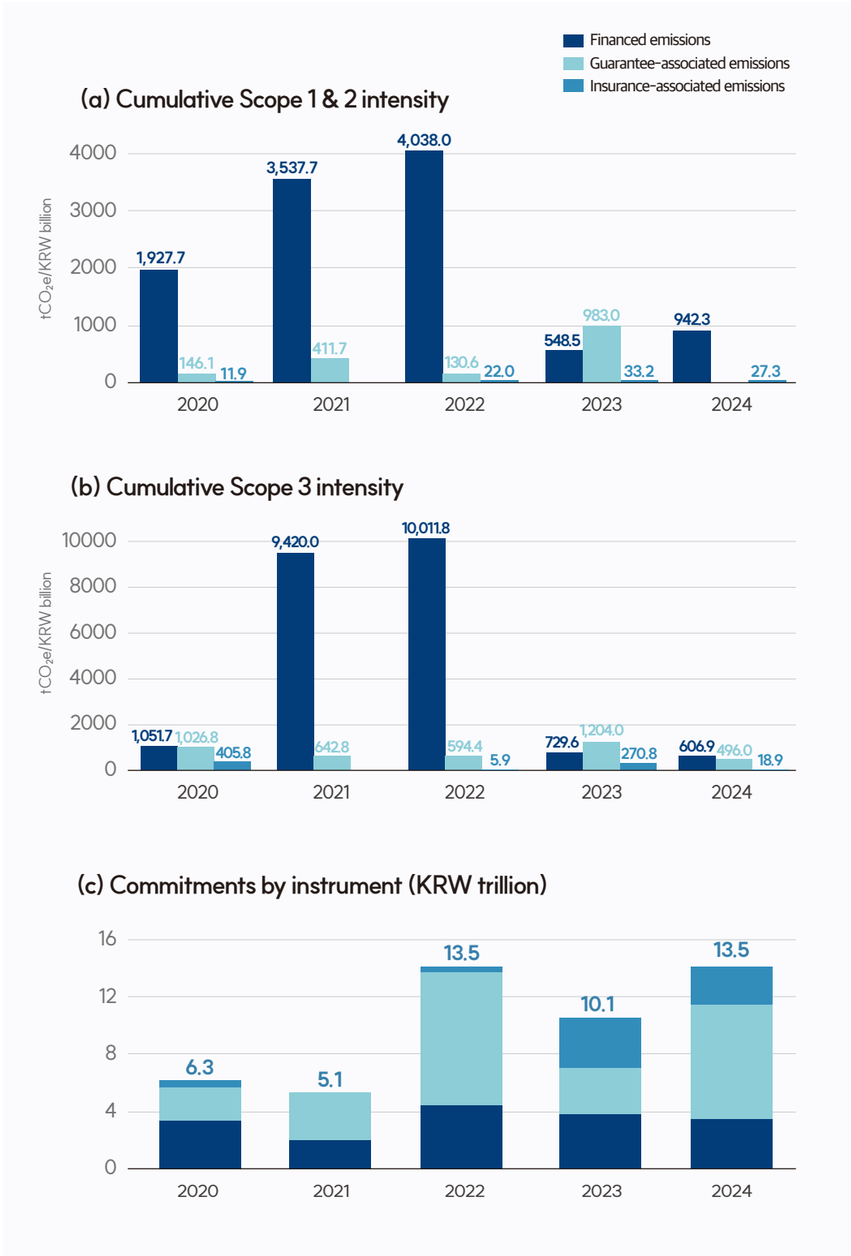


Figure II-7. Emissions intensity and commitments by approval year, 2020–2024 (tCO_2e per KRW billion; KRW trillion)

Note: Cumulative emissions attributable over the full financing period to assets approved in a given year are divided by that year's commitments. This controls for the volume of approvals when comparing the carbon intensity of supported assets.

Table II-3. Emissions intensity and commitments by approval year

Metric	Approval year	Assets	Commitment amount (KRW billion)	Cumulative Scope 1 & 2 ($MtCO_2e$)	Cumulative Scope 3 ($MtCO_2e$)	Cumulative Scope 1 & 2 intensity (tCO_2e/KRW billion)	Cumulative Scope 3 intensity (tCO_2e/KRW billion)
Financed emissions	2020	28	3,461.7	6.67	3.64	1,927.7	1,051.7
	2021	20	1,918.3	6.79	18.07	3,537.7	9,420.0
	2022	31	4,263.0	17.21	42.68	4,038.0	10,011.8
	2023	21	3,627.0	1.99	2.65	548.5	729.6
	2024	30	3,481.2	3.28	2.11	942.3	606.9
Guarantee-associated emissions	2020	30	2,385.5	0.35	2.45	146.1	1,026.8
	2021	32	3,154.7	1.30	2.03	411.7	642.8
	2022	73	8,893.4	1.16	5.29	130.6	594.4
	2023	20	3,062.8	3.01	3.69	983.0	1,204.0
	2024	53	7,518.6	0.00	3.73	0.0	496.0
Insurance-associated emissions	2020	1	442.5	0.01	0.18	11.9	405.8
	2021	0	-	-	-	-	-
	2022	1	310.6	0.01	<0.01	22.0	5.9
	2023	3	3,400.8	0.11	0.92	33.2	270.8
	2024	4	2,530.3	0.07	0.05	27.3	18.9

Note: Results are reported separately by instrument and must not be aggregated. Commitments are shown in KRW billion, rounded to one decimal place. All 53 guarantees approved in 2024 covered vessels and expired before delivery; no Scope 1 and 2 guarantee-associated emissions were therefore recorded.

III

Off the Books: Financed Emissions from
South Korea's Public Finance for Overseas Fossil Fuel Projects

Lifetime Emissions of Supported Projects

1. Committed emissions by project type and institution 37

2. Committed emissions by host country 40



III. Lifetime Emissions of Supported Projects

Emissions attributed to financial institutions represent only part of total project emissions. Attribution allocates emissions in proportion to financial support and therefore cannot, by itself, reveal the full emissions of supported facilities. Once built, large, capital-intensive infrastructure tends to operate throughout its economic lifetime because of sunk costs, technological interdependencies and institutional inertia. Today's financing decisions therefore shape emissions for decades.[16] Climate research has addressed this by estimating emissions assuming facilities operate throughout their lifetimes.[17] PCAF likewise recommends that initial sponsors or lenders report a project's total projected lifetime Scope 1 and 2 emissions separately, in the year of contracting.[18] A previous study of the Japan Bank for International Cooperation (JBIC) adopted the same approach.[19]

This chapter applies that approach to fossil fuel facilities supported by the three institutions using two metrics. The first is committed emissions: total emissions expected over the remaining lifetimes of approved facilities. The second is emissions embodied in transported fuels: emissions from the production and combustion of fossil fuels that transport infrastructure will carry over its lifetime. Both measure total emissions without applying financial attribution factors. They must not be added to each other or to the financial portfolio emissions presented in the preceding chapter.

These metrics do not test the counterfactual proposition that the facilities would not have been built without Korean public finance. Such a test is outside the scope of this study. They should be interpreted as measures of the emissions associated with supported activities, not as estimates of causal responsibility.

16 Unruh, G. C. (2000), "Understanding carbon lock-in," Energy Policy 28(12); Seto, K. C. et al. (2016), "Carbon lock-in: Types, causes, and policy implications," Annual Review of Environment and Resources 41.

17 Davis, S. J. et al. (2010), "Future CO_2 emissions and climate change from existing energy infrastructure," Science 329; Tong, D. et al. (2019), "Committed emissions from existing energy infrastructure jeopardize 1.5°C climate target," Nature 572, 373–377.

18 PCAF, The Global GHG Accounting and Reporting Standard Part A: Financed Emissions (3rd ed.), 2025, p. 74. The standard recommends that initial sponsors or lenders separately report a project's total projected lifetime Scope 1 and 2 emissions in the year of contracting, using the normative term "should."

19 FoE Japan, Climate Impacts of Japan's Public Finance, 2025.

Box III-1. Committed emissions

Committed emissions are the total greenhouse gas emissions expected over the remaining lifetimes of facilities already built or approved. Capital-intensive facilities such as power plants and refineries tend to operate throughout their lifetimes because of sunk costs and institutional inertia, including long-term contracts and the policies and regulations built around them. This is known as carbon lock-in.[20] Studies have found that committed emissions from existing and planned energy infrastructure exceed the carbon budget for 1.5°C.[21] Committed emissions cover the entire project without an attribution factor. They are potential emissions, not inevitable emissions, and can change through early retirement or adjustments to utilization rates.[22]

Box III-2. Emissions embodied in transported fuels

Emissions from the fossil fuels carried by transport infrastructure are not captured in emissions attributed to the institutions supporting those transport assets, because the borrowers do not own the cargo. Emissions from producing and burning that cargo are therefore included in neither financed emissions nor committed emissions.

Excluding these emissions, however, leaves an incomplete picture of the climate impact of transport infrastructure. Liquefaction and transport facilities connect fossil fuel production and consumption. Expanding those connections extends the life of the wider fossil fuel supply chain. Approving finance for a vessel or terminal also enables the flow of fuels it will carry for decades.

This study estimates emissions embodied in transported fuels to make that scale visible. Accounting for the emissions of the fuels a facility handles—not only its own operations—is already reflected in industry practice and case law. In 2021, the International Group of Liquefied Natural Gas Importers (GIIGNL) published a framework for calculating emissions from individual cargoes of liquefied natural gas (LNG), covering gas production, liquefaction, shipping, regasification and final combustion, and recording them in independently verified statements. The framework is being used in actual transactions.[23] In 2024, the UK Supreme Court held that an environmental impact assessment for an oil extraction project was unlawful because it failed to assess emissions from burning the extracted oil.[24] Both examples support looking beyond facility operations to the production and combustion of the fuels handled.

20 Unruh, G. C. (2000), "Understanding carbon lock-in," Energy Policy 28(12); Seto, K. C. et al. (2016), "Carbon lock-in: Types, causes, and policy implications," Annual Review of Environment and Resources 41; Davis, S. J. et al. (2010), "Future CO_2 emissions and climate change from existing energy infrastructure," Science 329.

21 Tong, D. et al. (2019), "Committed emissions from existing energy infrastructure jeopardize 1.5°C climate target," Nature 572, 373–377.

22 Davis, S. J. and Socolow, R. H. (2014), "Commitment accounting of CO_2 emissions," Environmental Research Letters 9(8).

23 GIIGNL, Monitoring, Reporting and Verification (MRV) and GHG Neutral Framework, November 17, 2021. The framework requires cargo-level calculation of greenhouse gas emissions from natural gas extraction, liquefaction, shipping, regasification and final combustion, with the results recorded in an independently verified cargo statement. Methane is reported separately.

24 R (on the application of Finch) v Surrey County Council [2024] UKSC 20, June 20, 2024.

1. Committed emissions by project type and institution

The three institutions approved KRW 48.5 trillion in overseas fossil fuel commitments across 347 assets in 2020–2024. Committed emissions were estimated for 313 of these assets. Their projected emissions over their design lifetimes total 2.93 billion tonnes of CO_2 equivalent ($GtCO_2e$) on a Scope 1 and 2 basis and 10.95 $GtCO_2e$ on a Scope 3 basis, including fuel extraction and combustion. These emissions are expected from existing commitments even if no further commitments are approved.

Scope 1 and 2 committed emissions total 2.08 $GtCO_2e$ from 111 loan-supported facilities, 731.3 $MtCO_2e$ from 198 guarantee-supported facilities and 293.9 $MtCO_2e$ from eight insurance-supported facilities. These totals differ sharply from attributed emissions: emissions from the supported facilities over their lifetimes are 58 times lifetime attributed emissions for loans, 126 times for guarantees and 1,514 times for insurance (Table III-1). Although guarantees and insurance have relatively small attributed emissions, the facilities they support are projected to emit hundreds of millions of tonnes of CO_2e over their lifetimes.

Separately estimated emissions embodied in transported fuels total 16.52 $GtCO_2e$ for vessels, 8.14 $GtCO_2e$ for terminals and 2.07 $GtCO_2e$ for pipelines. These are the expected production and combustion emissions of the fossil fuels each type of infrastructure will transport over its lifetime.

Table III-1. Lifetime attributed emissions and committed emissions by financial instrument

Instrument	Lifetime attributed Scope 1 & 2 emissions ($MtCO_2e$)	Committed Scope 1 & 2 emissions ($MtCO_2e$)	Committed Scope 3 emissions ($MtCO_2e$)	Committed / attributed emissions (ratio)	Facilities
Loans	35.9	2,080.5	9,105	58	111
Guarantees	5.8	731.3	1,000.5	126	198
Insurance	0.2	293.9	1,758.4	1,514	8

Note: Committed emissions cover whole-facility lifetime totals; attributed emissions are cumulative amounts allocated over the full financing period to assets supported by the same instrument. Both are lifetime measures, but they must not be added together. A facility supported by two instruments is counted under both, so instrument-level facility counts exceed the overall total of 313.

South Korea's 2035 NDC envisages meeting part of its emissions reduction commitment through international mitigation under Article 6 of the Paris Agreement. This involves securing mitigation outcomes from projects abroad and counting them toward national reductions, with a 2035 target of 29.8–34.0 $MtCO_2e$ a year. The three institutions' 2024 Scope 1 and 2 financed emissions of 4.33 $MtCO_2e$ are equivalent to approximately 13–15% of that target. The comparison becomes far starker when the boundary is widened from attributed emissions to whole-facility emissions. Annual committed emissions from supported facilities are projected to peak at 94.3 $MtCO_2e$ in 2029, approximately 2.8–3.2 times the international mitigation target. Estimated lifetime production and combustion emissions from fuels transported by vessels are greater still, at 16.52 $GtCO_2e$. This is equivalent to

approximately 12.7% of the remaining global carbon budget for 1.5°C (Forster et al., 2026: 130 billion tonnes of CO_2 ($GtCO_2$) at the beginning of 2025, for a 50% probability).[25]

Even as the government secures mitigation outcomes overseas, supported facilities are expected to produce substantially greater emissions. At their 2029 peak, emissions exceed three times the lower bound of the international mitigation target (29.8 $MtCO_2e$). Facilities approved in 2020–2024 continue emitting into the 2060s under their assumed design lifetimes. Five years of financing approvals thus shape emissions for almost four decades afterwards (Figure III-1).

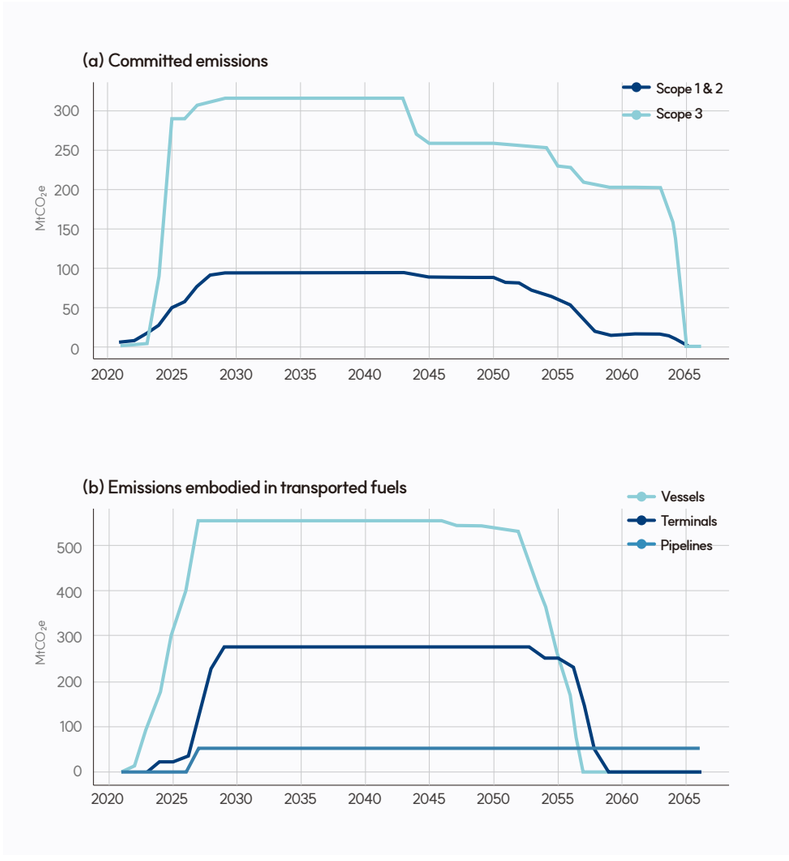


Figure III–1. Future emissions trajectories of assets already approved ($MtCO_2e$)

Note: Trajectories apply default asset-type lifetimes from the year emissions begin. They represent potential emissions without early retirement or changes in utilization. Scope 1 and 2 and Scope 3 emissions in panel (a) and emissions embodied in transported fuels in panel (b) must not be aggregated.

25 Article 6 of the Paris Agreement—Article 6.2 on cooperative approaches and Article 6.4 on the sustainable development mechanism—allows Parties to count internationally transferred mitigation outcomes (ITMOs) toward their NDCs. South Korea's 2035 NDC, approved by the Cabinet on November 11, 2025, targets a 53–61% reduction from 2018 levels. Its international mitigation component is 29.8 $MtCO_2e$ under the 53% target and 34.0 $MtCO_2e$ under the 61% target. Presidential Commission on Climate Crisis Response, "Nationally Determined Contribution (NDC)" [in Korean] (accessed September 20, 2026).

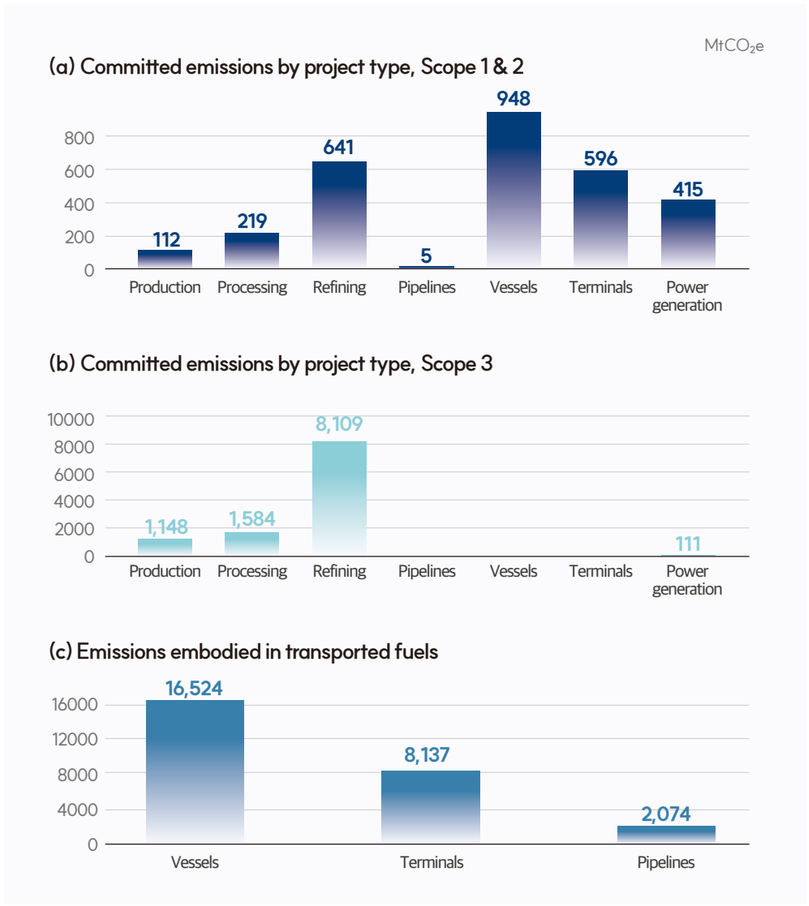


Figure III–2. Committed emissions and emissions embodied in transported fuels by project type ($MtCO_2e$)

Note: Values are not additive across asset types or with other metrics because the same fuel may pass through a terminal and then be loaded onto a vessel.

Committed emissions are concentrated in a small number of facilities. Refining accounts for only four of the 313 assets, yet contributes 640.6 $MtCO_2e$ of Scope 1 and 2 committed emissions—approximately 22% of the 2.93 $GtCO_2e$ total. Refining's Scope 3 committed emissions reach 8.11 $GtCO_2e$, or 74% of the 10.95 $GtCO_2e$ total (Figure III-2).

Transport assets—vessels, terminals and pipelines—account for 294 of the 313 assets (94%) and 1.55 $GtCO_2e$ of committed Scope 1 and 2 emissions, more than half the total. However, the borrowers associated with these assets do not own the cargo they transport, so emissions from the production and combustion of that cargo are not included in the assets' Scope 3 emissions. This study estimates these emissions separately as emissions embodied in transported fuels over the infrastructure's lifetime. The 4.83 billion tonnes of fossil fuels to be carried by the 284 vessels would generate 16.52 $GtCO_2e$ when produced and burned; the 2.56 billion tonnes handled by the nine terminals would generate 8.14 $GtCO_2e$; and the 610 million tonnes carried by the pipeline would generate 2.07

$GtCO_2e$ (Figure III-2). Compared with the remaining global carbon budget for a 50% chance of limiting warming to 1.5°C—130 $GtCO_2$ at the beginning of 2025, according to Forster et al. (2026)—these amounts represent 12.7%, 6.3% and 1.6%, respectively.

The institutional breakdown reflects these project and instrument characteristics (Table III-2). KEXIM's 1.57 $GtCO_2e$ of committed emissions are associated mainly with its guarantees for vessel construction and its loans to refineries. Vessels account for 72.9% of KEXIM's exposure, but its guarantees cover only construction and expire before delivery. Operational vessel emissions are therefore absent from annual guarantee-associated emissions, while the vessels' full lifetime emissions are included in committed emissions.

US LNG export terminals account for a substantial share of KDB's 1.29 $GtCO_2e$ of committed emissions. KDB is the only one of the three institutions financing terminals. Emissions embodied in fuels transported through terminals and pipelines are also recorded only under KDB.

K-SURE has the lowest Scope 1 and 2 committed emissions of the three institutions, at 353.6 $MtCO_2e$. Its Scope 3 committed emissions total 1.76 $GtCO_2e$, all from eight insured assets. Annual insurance-associated emissions are only 4,400 tCO_2e when the premium-to-project-cost ratio is used for attribution, yet the facilities supported by that insurance are projected to generate approximately 1.8 $GtCO_2e$ of Scope 3 emissions over their lifetimes.

Table III-2. Committed emissions and emissions embodied in transported fuels by institution

Institution	Committed Scope 1 & 2 emissions ($MtCO_2e$)	Committed Scope 3 emissions ($MtCO_2e$)	Emissions embodied in transported fuels ($MtCO_2e$)
KEXIM	1,570.4	8,494.6	Vessels 10,628.3
K-SURE	353.6	1,758.4	Vessels 1,018.2
KDB	1,291.7	1,925.0	Vessels 4,877.5; terminals 8,137.3; pipelines 2,074.4

Note: Facilities supported by more than one institution are counted under each, so institutional totals exceed the overall total of 2,934.6 $MtCO_2e$. Emissions embodied in transported fuels are reported separately by infrastructure type and not aggregated, because the same fuel passes through terminals and vessels in sequence.

2. Committed emissions by host country

Scope 1 and 2 committed emissions from facilities supported by Korean public finance are concentrated in US LNG export infrastructure and refining and power generation facilities in the Middle East (Figure III-3). The United States has the largest total, at 589 $MtCO_2e$, 88% of which comes from five LNG export terminals, including Rio Grande (152 $MtCO_2e$), Plaquemines (112 $MtCO_2e$) and Port Arthur (108 $MtCO_2e$). Kuwait's 366 $MtCO_2e$ arise entirely from the Al-Zour refinery complex. In Saudi Arabia, 77% of the 273 $MtCO_2e$ total comes from the Jazan integrated gasification combined-cycle (IGCC) plant attached to a refinery complex (209 $MtCO_2e$).

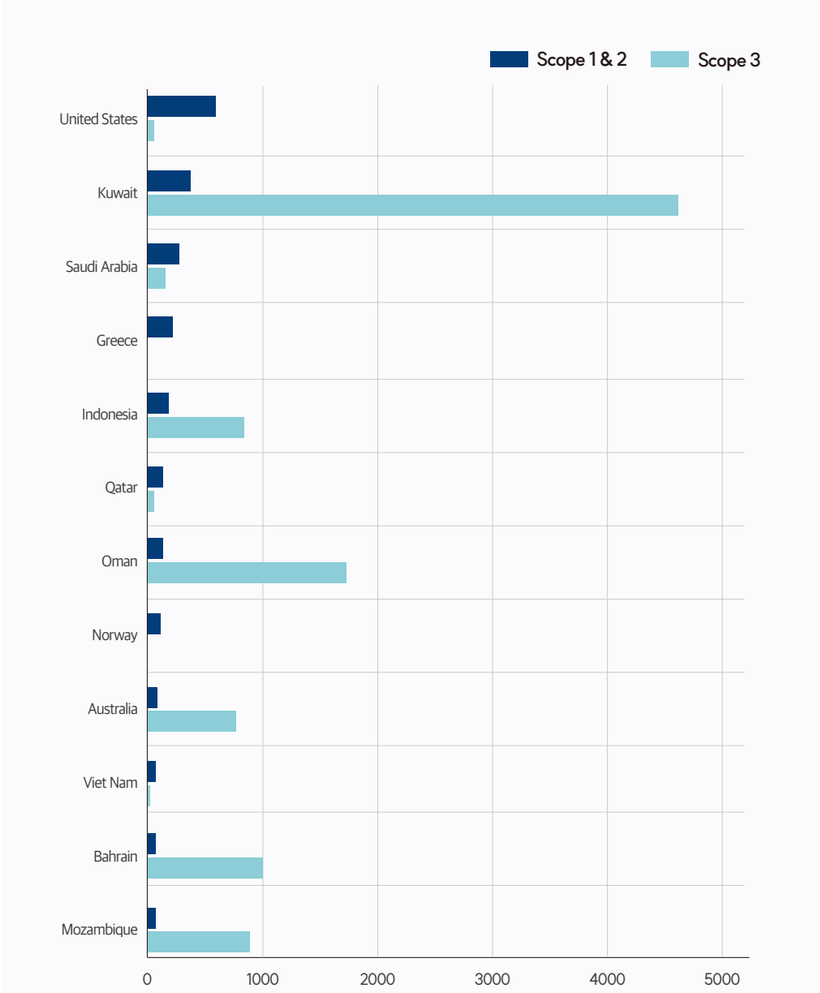


Figure III-3. Committed emissions by country ($MtCO_2e$)

Note: Facilities are assigned to their host country and vessels to the shipowner's country.

In countries with relatively low emissions, a single large fossil fuel facility can account for a substantial share of national emissions. Comparing peak annual emissions from Korean-supported facilities with annual host-country fossil fuel and power-sector emissions gives the highest ratios for Mozambique (26.5%) and Guam (25.9%), followed by Kuwait (6.5%), Bahrain (3.5%) and Oman (3.2%) (Figure III-4 and Table III-3). In Mozambique and Guam, a single facility supported by Korean public finance would, at its peak, emit the equivalent of approximately one-quarter of the country's or territory's fossil fuel and power-sector emissions.

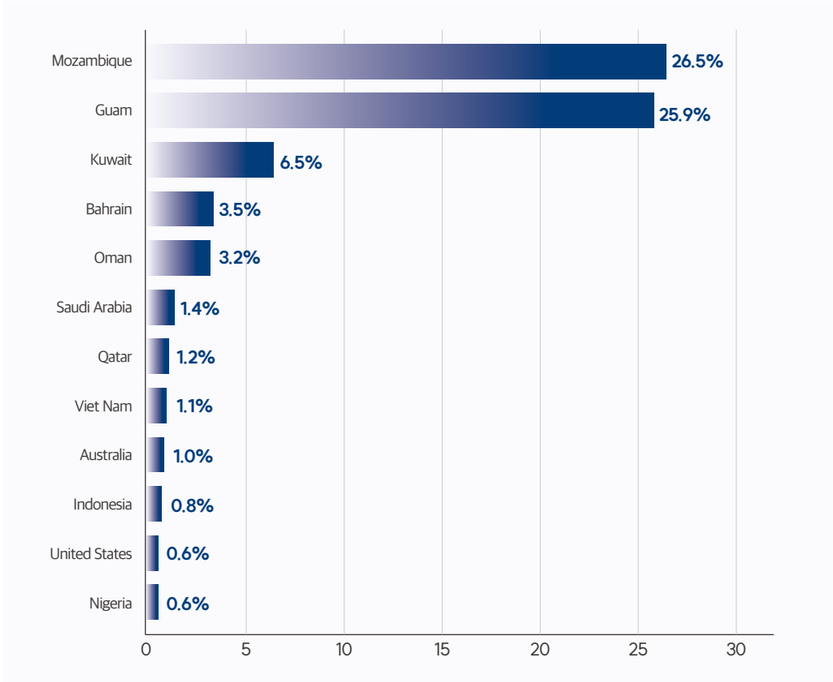


Figure III-4. Peak annual committed emissions relative to host-country fossil fuel and power-sector emissions (%)

Note: Share (%) = peak annual committed emissions from supported facilities in each country (Scope 1 and 2) ÷ the host country's annual emissions from fossil fuel operations and power generation in 2024 × 100. Vessels are excluded because they require a different basis of comparison.

Table III-3. Peak annual committed emissions relative to host-country fossil fuel and power-sector emissions (top 10 countries)

Country	Study peak annual Scope 1 & 2 ($MtCO_2e$/year)	Host-country fossil fuel and power sectors ($MtCO_2e$/year)	Share (%)
Mozambique	3.91	14.74	26.52
Guam	0.36	1.40	25.85
Kuwait	9.14	140.97	6.48
Bahrain	1.98	57.19	3.46
Oman	3.42	105.33	3.24
Saudi Arabia	9.10	625.56	1.45
Qatar	2.19	177.16	1.24
Viet Nam	2.75	239.25	1.15
Australia	3.57	365.01	0.98
Indonesia	5.94	715.08	0.83

IV

Off the Books: Financed Emissions from
South Korea's Public Finance for Overseas Fossil Fuel Projects

Scenario Analysis: Timing an End to New Commitments

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IV. Scenario Analysis: Timing an End to New Commitments

Continued new overseas fossil fuel commitments by the three institutions would add further emissions. This chapter compares emissions pathways through 2050 under different timings for ending new commitments.

Three scenarios are constructed for new commitments from 2025 onwards. Business as usual (BAU) assumes that new commitments continue at their 2020–2024 annual average level through 2050. The Immediate Cessation scenario ends all new commitments from 2027, while the Delayed Transition scenario does so from 2031 (Table IV-1). Financed and committed emissions are calculated separately for each scenario, and compared in terms of annual trajectories and cumulative emissions over 2026–2050.[26]

Table IV–1. Scenario definitions

Scenario	Assumption
BAU	Annual new commitments remain at their 2020-2024 average through 2050
Immediate Cessation (from 2027)	New commitments cease across all sectors from 2027
Delayed Transition (cessation from 2031)	New commitments continue at BAU levels through 2030 and cease across all sectors from 2031

Note: The 2030 cut–off for Delayed Transition follows the policy–delay assumption shared by the Network for Greening the Financial System (NGFS) Delayed Transition scenario and the IEA's Delayed Action Case. Emissions from new commitments use the average emissions profile of the five approval–year cohorts from 2020 to 2024. Using a single year could allow one large transaction to dominate the results.[27]

26 Of the three attributed portfolio emissions metrics, the scenario analysis covers only financed emissions from lending. Guarantee–associated emissions (240,000 tCO_2e/year in 2024) and insurance–associated emissions (4,400 tCO_2e/year) differ in order of magnitude from financed emissions (4.33 million tCO_2e/year), making them difficult to read on the same axis. PCAF principles also preclude combining the three metrics into a single trajectory. Guarantees mainly cover short–term pre–delivery construction finance, so changes in new commitments have a limited effect on attributed emissions over the scenario period. Insurance has a small attribution factor, calculated as estimated premiums divided by total project cost, and consequently low attributed emissions; differences between scenarios are therefore small.

27 NGFS, NGFS Climate Scenarios for Central Banks and Supervisors, Phase V, November 2024, Delayed transition ("Global annual emissions do not decrease until 2030"); IEA, Net Zero Roadmap: A Global Pathway to Keep the 1.5°C Goal in Reach — 2023 Update, 2023, Delayed Action Case.

1. Emissions pathways

Financed emissions decline gradually as loans are repaid. Ending new commitments in 2027 reduces annual emissions to below 0.1 $MtCO_2e$ by 2043. Delaying cessation by four years, to 2031, pushes that point back by the same four years, to 2047. In both cases, emissions attributed to the financial institutions have effectively disappeared by the mid-to-late 2040s.

Emissions from supported facilities persist much longer. Even if new commitments end in 2027, annual committed emissions remain at approximately 132 $MtCO_2e$ in 2031–2043 and 124 $MtCO_2e$ in 2050, and do not disappear until 2070. If commitments end in 2031, annual emissions remain around 207 $MtCO_2e$ from 2035, with approximately 200 $MtCO_2e$ still emitted in 2050, and do not disappear until 2074. The supported fossil fuel facilities thus continue emitting for more than 20 years after emissions cease to be attributed to the institutions.

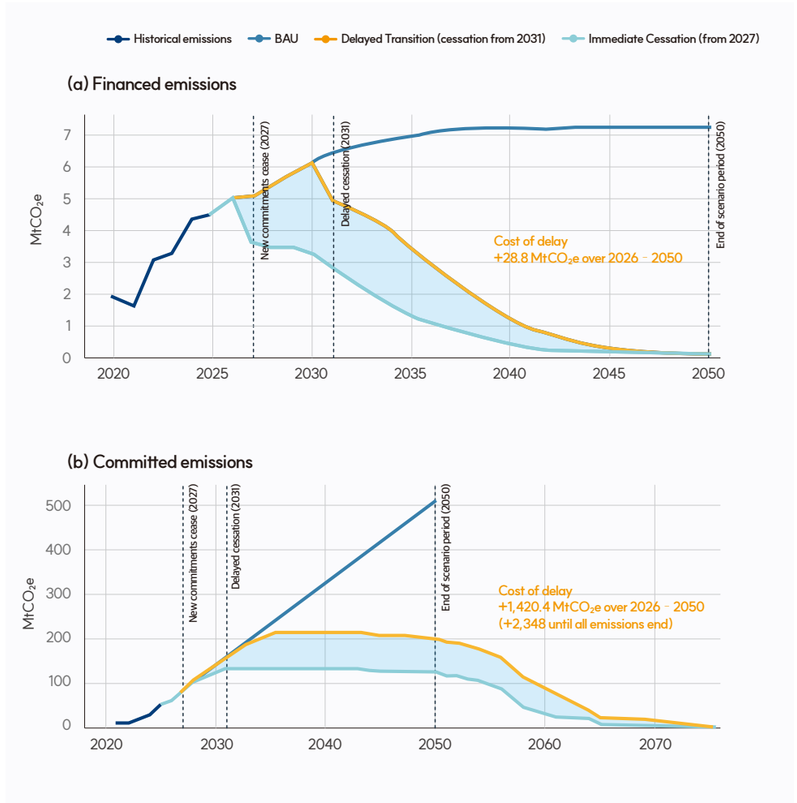


Figure IV–1. Annual emissions pathways by scenario ($MtCO_2e$)

Note: Both (a) financed emissions and (b) committed emissions refer to Scope 1 and 2. The panels measure different quantities, use different axis scales and must not be aggregated. Shading indicates the additional emissions under Delayed Transition relative to Immediate Cessation—the cost of delay. Vertical dotted lines indicate the cessation years (2027 and 2031) and the scenario horizon (2050). Panel (b) extends to 2075, by which time emissions in both cessation scenarios have ended. BAU is shown only to 2050, the end of the period during which new commitments are assumed to continue.

Cumulative emissions over 2026–2050 vary substantially with the timing of cessation (Table IV-2). BAU produces 168.6 $MtCO_2e$ of cumulative financed emissions. Ending all new commitments in 2027 avoids 136.7 $MtCO_2e$, or 81.0%, of that total.

Scope 1 and 2 committed emissions are much larger. Under BAU, they total 7.19 $GtCO_2e$ over 2026–2050—approximately 10 times South Korea's annual emissions in 2024 (691.6 $MtCO_2e$).

Immediate cessation in 2027 reduces cumulative committed emissions over 2026–2050 to 3.08 $GtCO_2e$, avoiding 4.11 $GtCO_2e$ (57.2%) relative to BAU. That reduction is approximately 5.9 times South Korea's annual emissions in 2024. Averaged over the period, the emissions avoided by ending finance for new overseas emissions sources amount to approximately 164.4 $MtCO_2e$ a year, or about five times the 2035 international mitigation target of 29.8–34.0 $MtCO_2e$ annually.

Delaying cessation by four years, from 2027 under Immediate Cessation to 2031, adds 28.8 $MtCO_2e$ of cumulative financed emissions and 1.42 $GtCO_2e$ of cumulative committed emissions over 2026–2050. These additional emissions are termed the "cost of delay."

For committed emissions, this cost is 2.1 times South Korea's annual emissions in 2024. Facilities approved during the delay continue emitting into the 2070s. Accumulated until all emissions end, the cost of delay therefore rises to 2.35 $GtCO_2e$.

Table IV-2. Cumulative emissions by scenario, 2026–2050

Metric	Scope	Scenario	Existing book ($MtCO_2e$)	New business ($MtCO_2e$)	Cumulative total ($MtCO_2e$)	Avoided relative to BAU ($MtCO_2e$)	Reduction from BAU (%)
Committed emissions	Scope 1 & 2	BAU	2,261.8	4,927.3	7,189.1	0	0
		Immediate Cessation (from 2027)	2,261.8	818.5	3,080.3	4,108.8	57.2
		Delayed Transition (cessation from 2031)	2,261.8	2,238.9	4,500.7	2,688.5	37.4
	Scope 3	BAU	7,490.5	15,371.5	22,862.1	0	0
		Immediate Cessation (from 2027)	7,490.5	2,629.9	10,120.4	12,741.6	55.7
		Delayed Transition (cessation from 2031)	7,490.5	7,199.4	14,690.0	8,172.1	35.7
Financed emissions	Scope 1 & 2	BAU	19.1	149.5	168.6	0	0
		Immediate Cessation (from 2027)	19.1	12.9	32.0	136.7	81.0
		Delayed Transition (cessation from 2031)	19.1	41.6	60.7	107.9	64.0
	Scope 3	BAU	43.9	286.8	330.7	0	0
		Immediate Cessation (from 2027)	43.9	26.3	70.2	260.5	78.8
		Delayed Transition (cessation from 2031)	43.9	81.6	125.5	205.2	62.1

Note: Committed emissions and financed emissions measure different quantities. Their reduction rates are not directly comparable, and the two metrics are not additive. Existing book refers to commitments approved through 2024; new business refers to commitments from 2025 onwards.

2. Gap to the 1.5°C pathway

To assess whether the scenario trajectories align with a 1.5°C pathway, the analysis uses the IEA's Net Zero Emissions by 2050 (NZE) Scenario as a benchmark. NZE is designed to bring global energy-sector net emissions to zero by 2050 while limiting warming to 1.5°C, with sector-specific pathways for electricity, oil and gas supply, and other energy activities. The analysis applies its annual reduction rates to each metric's 2024 baseline to derive the emissions pathway required for alignment, referred to below as the aligned pathway. Both financed and committed emissions use the NZE Scope 1 and 2 reduction rates for oil and gas supply. Deviations are expressed as excess emissions and the percentage reduction required to bring each scenario into alignment.

Whether financed emissions align with the 1.5°C pathway depends on when new commitments cease. Even with cessation in 2027, the earliest date examined, annual emissions in 2030 exceed the aligned pathway of 2.03 $MtCO_2e$ by 1.17 $MtCO_2e$, requiring a further 36.6% reduction. Emissions do not fall below the pathway until 2040. If cessation is delayed to 2031, emissions remain above it in 2040 and fall below only in 2050. Under BAU, with new commitments continuing at current levels, emissions remain above the pathway through 2050. The excess rises from 4.09 $MtCO_2e$ in 2030 to 7.08 $MtCO_2e$ in 2050, and the required reduction increases from 66.8% to 98.4%. The longer alignment is delayed, the greater the problem: the 1.5°C goal depends on cumulative emissions, not emissions in a single year. A longer period above the pathway allows more excess emissions to accumulate, further depleting the remaining carbon budget.

Committed emissions follow a different pattern. Ending new commitments does not bring them into alignment. The aligned pathway requires a 53.1% reduction from 2024 levels by 2030. Even with cessation in 2027, however, annual committed emissions under the Immediate Cessation scenario reach 123.9 $MtCO_2e$ in 2030—4.5 times the 2024 level. This exceeds the aligned pathway of 12.85 $MtCO_2e$ by 111.0 $MtCO_2e$. Closing the gap requires an 89.6% reduction in the scenario's 2030 emissions.

The gap widens thereafter. Annual emissions remain around 132 $MtCO_2e$ in 2031–2043, increasing the required reduction to 95.5% in 2035 and 97.9% in 2040.

Alignment therefore requires not only an end to new commitments, but direct measures—early retirement and lower utilization—to reduce the Immediate Cessation scenario's 2030 emissions by approximately 90%. This is consistent with climate science findings that emissions from existing fossil fuel infrastructure alone exceed the 1.5°C carbon budget, making early retirement unavoidable.[28]

28 Tong, D. et al. (2019), "Committed emissions from existing energy infrastructure jeopardize 1.5°C climate target," Nature 572, 373–377. https://doi.org/10.1038/s41586-019-1364-3

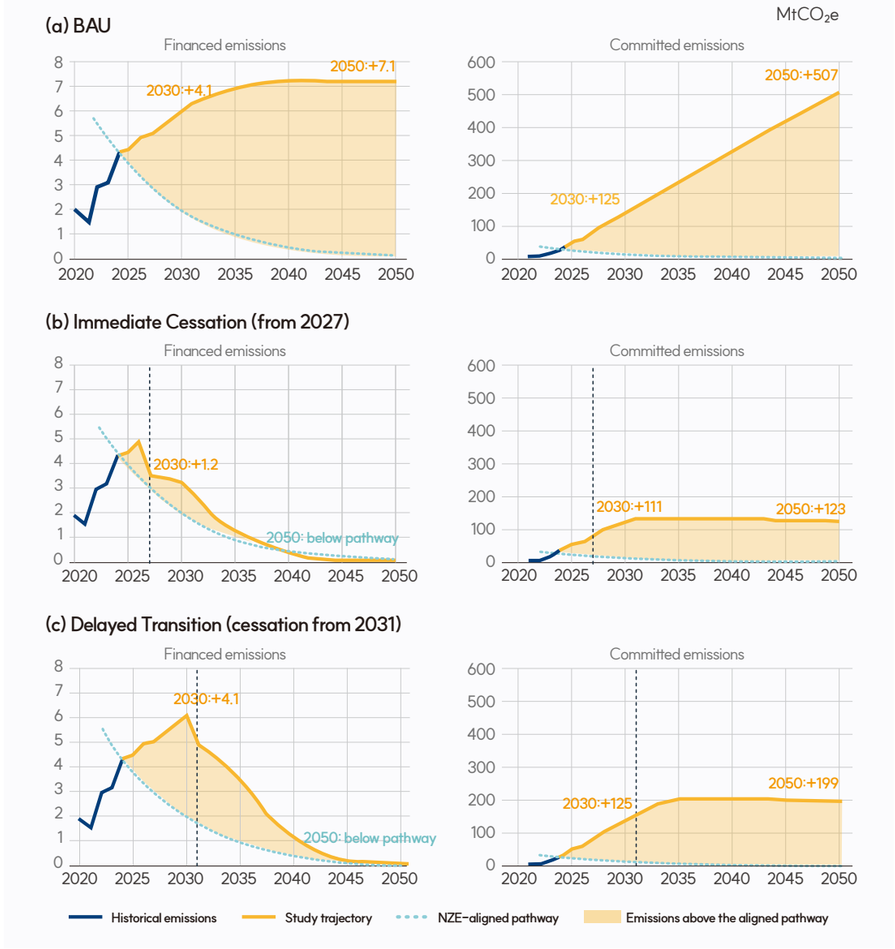


Figure IV-2. Gaps relative to the IEA NZE-aligned pathway by scenario and metric ($MtCO_2e$)

Note: Aligned pathways apply annual IEA NZE reduction rates to each metric's 2024 baseline. Both financed and committed emissions use Scope 1 and 2 reduction rates for oil and gas supply. Shading indicates emissions above the aligned pathway; labels show the excess in 2030 and 2050. Vertical dotted lines mark the end of new commitments. Axis scales differ by row, and the two metrics must not be aggregated.

Source: KoSIF and SFOC, based on IEA (2023)

Public financial institutions must both end new commitments and reduce emissions from existing assets to align with a 1.5°C pathway. Immediate cessation eventually brings financed emissions below the aligned pathway and prevents additional committed emissions from newly supported assets. Aligning committed emissions under that scenario, however, requires early retirement and lower utilization to cut its 2030 emissions by approximately 90%. Financial institutions should use borrower contractual terms, refinancing assessments, and green and transition finance to achieve this.

V

Off the Books: Financed Emissions from
South Korea's Public Finance for Overseas Fossil Fuel Projects

Recommendations

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V. Recommendations

The longer new commitments continue, the more emissions are locked in for the long term. Ending new support alone does not reduce emissions from assets already approved. This report therefore makes five recommendations. Immediately ending new support (Recommendation 1) should be the top priority, pursued alongside financed emissions disclosure (Recommendation 2) and reduction targets (Recommendation 3) so that implementation can be verified. These should be accompanied by systematic management of existing assets (Recommendation 4) and a reallocation of capital toward green and transition finance (Recommendation 5).

Recommendation 1.
Immediately end financial support for new fossil fuel projects

The three public financial institutions should immediately end new financial support for overseas fossil fuel projects, including loans, guarantees, insurance and loan arrangement. There are three reasons for immediate action.

First, the IEA stated as early as 2021 that a 1.5°C pathway requires no new oil and gas fields beyond projects already committed at that time. Yet the three institutions' new overseas fossil fuel commitments rose from KRW 5.1 trillion in 2021 to KRW 13.5 trillion in 2022, followed by KRW 10.1 trillion in 2023 and KRW 13.5 trillion in 2024 (Figure I-1).[29]

Second, delay reduces the emissions that can be avoided. The years 2027 and 2031 in this report are not target dates; they are reference points for measuring the cost of postponement. A four-year delay adds 2.35 $GtCO_2e$ of committed emissions over the period until emissions cease. This is 3.4 times South Korea's annual emissions in 2024 and 59% of cumulative emissions under cessation in 2027 (4.00 $GtCO_2e$). Each additional year of approvals locks in roughly 30 years of emissions after the newly approved facilities begin operating, depending on their lifetimes.

29 IEA, Net Zero by 2050: A Roadmap for the Global Energy Sector, May 2021: "Beyond projects already committed as of 2021, there are no new oil and gas fields approved for development in our pathway, and no new coal mines or mine extensions are required." The 2023 update retains this conclusion (IEA, Net Zero Roadmap — 2023 Update, 2023). The report also states that continued investment in existing assets and already approved projects remains necessary. The basis for a comprehensive end to support, including mid-stream and downstream assets, is the CETP and G7 statements, rather than the IEA.

Third, assets already approved will emit for decades. Commitments approved in 2020–2024 alone are projected to generate annual committed emissions that peak at 94.3 $MtCO_2e$ in 2029 and remain near that level for approximately 15 years, through 2043. Immediately ending new support is the minimum action needed to avoid adding further emissions to this long-lasting legacy.

The international community has already agreed on this direction. At COP26 in 2021, 34 countries and five public financial institutions committed to end new direct public support for the international unabated fossil fuel energy sector by the end of 2022; the number of signatories stood at 40 in August 2026.[30] G7 leaders reiterated the commitment in their 2022 communiqué.[31] South Korea has not signed the CETP statement, and negotiations to extend OECD export credit restrictions to oil and gas collapsed in December 2024 amid opposition from South Korea and Türkiye.[32]

Some public financial institutions in other countries have already ended fossil fuel support. From March 2021, the UK ended overseas fossil fuel energy support in principle, including support through UKEF.[33] Following its 2019 decision, the European Investment Bank (EIB) stopped financing unabated fossil fuel projects, including gas, from the end of 2021.[34] These examples demonstrate that fossil fuel restrictions can be implemented while maintaining the core functions of public finance and provide precedents for institutional design. Even where exceptions are allowed, they should, as stipulated in the Glasgow Statement, be limited to narrowly and clearly defined circumstances consistent with a 1.5°C limit, with eligibility conditions disclosed in advance.[35]

30 Statement on International Public Support for the Clean Energy Transition (Glasgow Statement), November 4, 2021. The exception in the original text reads: "except in limited and clearly defined circumstances that are consistent with a 1.5°C warming limit and the goals of the Paris Agreement." The number of signatories is based on cleanenergytransitionpartnership.org (accessed August 30, 2026).

31 G7 Leaders' Communiqué (Elmau), June 28, 2022.

32 Climate Home News, January 14, 2025; Global Trade Review, December 23, 2024.

33 UK Government, Aligning UK International Support for the Clean Energy Transition, March 2021 (updated December 2023). The policy applies to government aid, investment, finance and trade promotion support, including UKEF and British International Investment (BII). Exceptions are limited to efficiency and safety improvements to existing facilities; decommissioning; gas-fired power subject to conditions, including credible NDC and net zero pathways and no delay to the renewable energy transition; standalone generators and liquefied petroleum gas (LPG) for cooking and heating; and carbon capture and storage (CCS) for gas-fired power. Support for Mozambique LNG, committed before the policy took effect, was withdrawn on December 1, 2025 (UK Parliament, Hansard, December 1, 2025).

34 European Investment Bank, "EU Bank launches ambitious new climate strategy and Energy Lending Policy," November 14, 2019. The original states that the EIB will "no longer consider new financing for unabated, fossil fuel energy projects, including gas, from the end of 2021 onwards." The EIB defines unabated projects using emissions criteria. Power generation must emit less than 250 gCO_2/kWh, assessed as a lifetime average where low-carbon gas blending is planned; gas infrastructure is eligible only when intended for low-carbon gases. Exceptions include highly efficient gas boilers within energy efficiency projects and LPG for cooking outside the EU. The EIB reaffirmed these principles in October 2025 (European Investment Bank, EIB Energy Lending Policy, 2019, annexes updated May 2023; EIB Group, Energy Sector Orientation, October 2025).

35 Statement on International Public Support for the Clean Energy Transition (Glasgow Statement), November 4, 2021. The exception in the original text reads: "except in limited and clearly defined circumstances that are consistent with a 1.5°C warming limit and the goals of the Paris Agreement."

Box V-1. A changing legal context: statutory emissions pathways and state responsibility

The legal context for the climate responsibilities of public finance has changed over the past year. In South Korea, an amendment to the Framework Act on Carbon Neutrality and Green Growth for Coping with Climate Crisis passed the National Assembly on August 26, 2026, establishing in law the national emissions reduction pathway for 2031–2049, which had previously been left unspecified. It requires reductions from 2018 levels of 53–61% by 2035, 69–80% by 2040 and 84–90% by 2045.[36] The amendment follows the Constitutional Court's ruling of August 29, 2024, that the absence of a post-2030 reduction pathway in the Act was incompatible with the Constitution.[37] Once the national reduction pathway is a statutory obligation, public financial support that runs counter to it becomes increasingly difficult to justify. Internationally, in its advisory opinion of July 23, 2025, on states' obligations in respect of climate change, the International Court of Justice (ICJ) stated that a state's failure to take appropriate action to protect the climate system—including through fossil fuel production, fossil fuel consumption, the granting of fossil fuel exploration licenses or the provision of fossil fuel subsidies—may constitute an internationally wrongful act.[38] Although the advisory opinion is not legally binding, the interpretation by the principal judicial organ of the United Nations provides a basis for addressing public funding of fossil fuel expansion as a question of state responsibility.

Recommendation 2.
Institutionalize financed emissions disclosure

Verifying commitments to end fossil fuel support requires disclosure of both financing and emissions. The three institutions endorsed the TCFD alongside the Financial Services Commission in May 2021, yet five years later none discloses financed emissions.[39] In 2022, the climate disclosure gap among public financial institutions was also raised in the National Assembly.[40] The experience of the past five years shows that voluntary endorsement has not led to implementation.

36 Amendment to the Framework Act on Carbon Neutrality and Green Growth for Coping with Climate Crisis, passed by the National Assembly on August 26, 2026. It establishes statutory upper and lower bounds for emissions reductions at five-year intervals after 2030, with specific targets within those bounds to be set by Presidential Decree (based on Energy Daily and Kyunghyang Shinmun reports of August 26, 2026).

37 Constitutional Court, decision of August 29, 2024, 2020Hun-Ma389 et al., finding Article 8(1) of the Framework Act on Carbon Neutrality and Green Growth for Coping with Climate Crisis incompatible with the Constitution. The ruling found that failing to set reduction targets for 2031–2049 transfers an excessive burden to the future.

38 ICJ, Obligations of States in respect of Climate Change, Advisory Opinion, July 23, 2025, para. 427. The Court held that failure to take appropriate measures to protect the climate system, including through fossil fuel production, fossil fuel consumption, the granting of fossil fuel exploration licenses or the provision of fossil fuel subsidies, may constitute an internationally wrongful act.

39 Financial Services Commission, "Financial Authorities and Relevant Institutions Declare Support for TCFD and Its Recommendations" [press release], May 24, 2021.

40 Green Post Korea, "Only KDB and IBK measure financed emissions among public financial institutions" [in Korean], October 5, 2022.

The private-sector framework has already advanced to the next stage. In July 2026, the Financial Services Commission finalized its plan for mandatory sustainability disclosure, under which KOSPI-listed companies with consolidated assets of at least KRW 10 trillion will include climate disclosures in business reports under the Financial Investment Services and Capital Markets Act from 2028, covering FY2027. Scope 3 reporting, which includes financed emissions, is deferred for three years and applies from 2031. Qualifying listed financial institutions will be subject to Scope 3 disclosure requirements from 2031, while state-backed public financial institutions remain outside the framework.[41]

A legal basis for public institutions' climate responsibilities already exists. Article 5 of the Framework Act on Carbon Neutrality and Green Growth for Coping with Climate Crisis requires public institutions to endeavor to minimize their climate impacts across budgeting, expenditure, project selection and implementation. Article 26 provides the basis for public-sector greenhouse gas target management. What is missing is not a legal foundation, but explicit requirements to measure and disclose emissions.[42]

Some overseas export credit agencies already measure and disclose financed emissions. UKEF has published annual financed emissions reports since 2022. In the absence of a PCAF methodology for export credit guarantees and insurance, it developed its own approach and reports both an Amount at Risk (AAR) measure and an Expected Loss (EL) measure. UKEF's 2025 financed emissions (borrowers' Scope 1 and 2) were 4.8 $MtCO_2e$ on an AAR basis and 0.88 $MtCO_2e$ on an EL basis; upstream Scope 3 emissions were 10.32 $MtCO_2e$ and 1.39 $MtCO_2e$, respectively.[43] JBIC joined PCAF in 2025 and first disclosed financed emissions from its loan and investment portfolio in its 2026 Integrated Report. For an outstanding portfolio of JPY 15.6894 trillion at the end of March 2025, it reported financed emissions of 80.8 $MtCO_2e$ (Scope 1 and 2) and 155.7 $MtCO_2e$ (Scope 3), together with sector-level results and PCAF data quality scores.[44]

As a first institutional step, this report recommends adding financed emissions to the management disclosure requirements under Article 11 of the Act on the Management of Public Institutions. This would apply to all three institutions and use the existing All Public Information In-One (ALIO) disclosure system. In parallel, the Korea Sustainability Standards Board (KSSB) disclosure framework could be extended to public financial institutions. The rules should specify internationally recognized PCAF accounting standards to ensure comparability across institutions and countries.

41 Financial Services Commission, "ESG Disclosure to be Required from 2028 for KOSPI-listed Companies with KRW10 Trillion or More in Total Consolidated Assets" [press release], July 8, 2026.

42 Framework Act on Carbon Neutrality and Green Growth for Coping with Climate Crisis, Articles 5(1) and 26(1).

43 UK Export Finance, UKEF Financed Emissions 2025 Report and Basis of Reporting, July 2026.

44 JBIC, JBIC Integrated Report 2026, 2026, pp. 82–83. Covered assets comprise loans (project and corporate finance) and equity investments across 18 sectors identified under the TCFD recommendations. For projects, the attribution factor is JBIC's outstanding loans and investments divided by the project's equity plus interest-bearing debt; for companies, enterprise value including cash (EVIC) is used as the denominator. Data quality scores are 2.8 for Scope 1 and 2 and 3.1 for Scope 3, with 100% measurement coverage.

PCAF advises institutions not to delay emissions accounting because data are incomplete. Instead, they should begin with estimates and improve data quality over time, disclosing data quality scores alongside emissions to make their reliance on estimates transparent. This study's outstanding-amount-weighted average data quality score is 4.43 (1 = highest data quality; 5 = lowest data quality), indicating relatively poor data quality and a heavy reliance on estimates. The main reason, however, is that information institutions obtain during the financing process, such as total project costs and maturities, was not publicly available. Total project costs are undisclosed for 300 assets representing 68.7% of commitments. Standard maturities were applied to 213 assets representing 59.9% of commitments because maturity information was unavailable. Incorporating this basic information alone could improve the score to 2.87. Improving accuracy requires institutions to disclose information they already hold, rather than adopt a new methodology. A practical approach is therefore to begin by disclosing emissions estimates together with data quality scores, then improve those scores each year.

Reporting also needs a broader scope. If export credit agencies whose portfolios are concentrated in shipping finance and short-term guarantees disclose only financed emissions, most emissions from the facilities they support remain outside their accounts. Lifetime emissions attributed through guarantees total just 5.8 $MtCO_2e$, whereas the facilities supported by those guarantees are projected to emit 731.3 $MtCO_2e$ over their design lifetimes. PCAF recognizes this limitation and recommends that initial sponsors or lenders separately report a project's total projected lifetime Scope 1 and 2 emissions in the year of contracting. A complete account of public finance's climate impacts should report both attributed financed emissions and whole-facility committed emissions, supplemented for transport infrastructure by the production and combustion emissions embodied in the fuels transported.[45]

Recommendation 3.
Set financial portfolio emissions reduction targets

Disclosure measures the current position; reduction targets commit to a future trajectory. The three institutions' existing targets cover only operational emissions (Scope 1 and 2), with none addressing financial portfolio emissions. Once disclosure under Recommendation 2 establishes the baseline, institutions should set reduction targets for financial portfolio emissions under Scope 3, Category 15.

Reduction targets should be set using internationally verifiable methodologies, such as the Science Based Targets initiative's (SBTi) Financial Institutions Net-Zero (FINZ) Standard, with annual disclosure of performance against those targets. Targets without disclosure cannot be verified; disclosure without targets does not ensure emissions reduction. Disclosure and target-setting must therefore proceed together.

45 PCAF, Part A: Financed Emissions (3rd ed.), 2025, p. 74.

Recommendation 4.
Manage existing assets and establish early-retirement strategies

Ending new commitments alone will not align existing asset emissions with a 1.5°C pathway. As Chapters III and IV show, even without further commitments, emissions from approved assets are projected to peak at 94.3 $MtCO_2e$ a year in 2029, remain near that level through 2043 and continue into the 2060s. Facility emissions persist after loans are repaid or guarantees expire, making management of existing assets a task distinct from ending new commitments. Even with cessation in 2027, annual committed emissions reach 123.9 $MtCO_2e$ in 2030. Aligning them with the IEA NZE benchmark of 12.85 $MtCO_2e$ requires a reduction of approximately 90% (Chapter IV). Climate research concludes that committed emissions from existing energy infrastructure alone would exceed the remaining 1.5°C carbon budget, making early retirement or retrofitting with emissions abatement unavoidable.[46]

This is both a climate issue and a financial soundness issue. Fossil fuel assets that lose value before the end of their expected lives create stranded asset risk and, ultimately, asset-quality risks for public financial institutions. Three actions are needed: first, identify and disclose the remaining lifetime and emissions trajectory of each existing portfolio asset; second, establish climate-based review procedures for maturity extensions, refinancing and drawdowns; and third, extend reduction targets beyond operational emissions (Scope 1 and 2) to financial portfolio emissions (Scope 3, Category 15), as set out in Recommendation 3.

Recommendation 5.
Redirect public finance toward green and low-carbon sectors and strengthen engagement with existing borrowers

Ending new support is the starting point for transition. Capital and expertise previously devoted to fossil fuel projects should be redirected toward renewable energy and other green activities, as well as the low-carbon transition of emissions-intensive industries. Strict criteria are needed to ensure that transition finance does not become a means of prolonging fossil fuel facilities' operating lives. The three institutions have developed expertise in assessing the risks of large, long-term projects and sharing those risks through state credit. The same capabilities can support green and transition finance. South Korea's overseas public clean energy finance averaged USD 805 million annually in 2020–2022, only about one-thirteenth of fossil fuel finance, leaving considerable scope for reallocation.[47]

For existing exposures that cannot be withdrawn immediately, borrower engagement is essential: requiring emissions data and reduction plans, and linking their implementation to financing terms. Contractual practice at public financial institutions already offers a precedent. Under the Paris Alignment of Counterparties (PATH) framework announced at COP26 in 2021, the EIB has, since 2022, contractually required corporate borrowers deriving more than 20% of revenue from high-emitting sectors—including steel, cement, chemicals, fossil fuels

46 Tong, D. et al. (2019), Nature 572.

47 Oil Change International et al., issue brief, April 2024.

and transport—to develop and disclose Paris-aligned transition plans.[48] Borrowers must submit plans within 12 months of signing the finance contract, or up to 24 months where justified, including interim quantitative reduction targets and a pathway to net zero by 2050. Failure to comply constitutes a breach of contract. As a rule, finance is not provided to companies continuing activities incompatible with the Paris Agreement, such as unconventional oil development, Arctic drilling, expanded oil production or new coal investment. The framework's defining feature is engagement grounded in contractual obligations and exclusion criteria, rather than voluntary dialogue alone.[49]

The three Korean institutions could adopt a similar framework by incorporating emissions disclosure and the submission and implementation of transition plans into loan agreements and guarantee and insurance terms, and considering compliance in refinancing and maturity-extension reviews. Applying green and transition finance criteria to new projects, while using borrower engagement to drive reductions in existing projects, would support a portfolio-wide shift toward a 1.5°C pathway.

48 PATH (Paris Alignment of Counterparties) is a framework introduced by the EIB Group in October 2021 as part of its Climate Bank Roadmap 2021–2025. Moving beyond the eligibility of individual projects, it assesses whether the overall activities of high-emitting corporate borrowers and financial intermediaries align with the Paris Agreement, and requires the preparation and disclosure of decarbonization and climate resilience plans. Version 1.2, revised in November 2023 following the mid-term review, extended the deadline for compliance with reporting requirements. European Investment Bank, The EIB Group PATH Framework: Version 1.2, November 27, 2023, https://www.eib.org/en/publications/20230343-the-eib-group-path-framework-v1-2 (accessed September 20, 2026).

49 European Investment Bank Group, The EIB Group PATH Framework: Supporting counterparties on their pathways to align with the Paris Agreement, Version 1.2, November 2023 (first announced on November 4, 2021, at COP26). High-emitting companies are defined as deriving "more than 20% of annual turnover from one or more of the following high-emitting sectors" (para. 4.4). Alignment plans must be submitted "within 12 months of the EIB finance contract signature," and "failure to comply with this contractual obligation would constitute a breach of contract" (para. 4.18). Activities incompatible with the Paris Agreement include unconventional oil development, such as oil sands and oil shale; new Arctic oil and gas drilling; expansion of oil production from existing assets and routine flaring; new coal mines and coal-fired power plants; and destruction of high-carbon sinks (para. 4.24). Companies continuing these activities are, in principle, ineligible for support (para. 4.25).

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Appendix

Appendix 1. Methodology

1. Metrics and attribution methods

This study assesses a single portfolio using five metrics. Financed emissions, guarantee-associated emissions and insurance-associated emissions represent emissions attributed to each financial institution in proportion to its support. Committed emissions represent lifetime emissions from the facilities supported, while emissions embodied in transported fuels represent the production and combustion emissions of the fossil fuels carried by the transport infrastructure.

Table A1-1. Definitions of the five metrics

Metric	Attribution method	Coverage	Basis
Financed emissions	Outstanding amount ÷ total project cost	Loans and project finance	PCAF Part A (2025)
Guarantee-associated emissions	Outstanding guarantee amount ÷ total project cost	Guarantees	No attribution under PCAF until called; adapted from UKEF's AAR approach
Insurance-associated emissions	Insurance premiums ÷ total project cost	Insurance	PCAF Part C (2025), Section 5.3, applied by analogy
Committed emissions	None (whole project)	All assets	PCAF Part A, p. 74; Davis et al. (2010)
Emissions embodied in transported fuels	None (whole project)	Midstream (vessels, terminals and pipelines)	Study-specific metric

Source: KoSIF and SFOC, based on PCAF (2023; 2025) and UKEF (2026)

Financed emissions, guarantee-associated emissions and insurance-associated emissions are not aggregated. This follows PCAF's principle that metrics with different characteristics should be reported separately. PCAF states that financed emissions, facilitated emissions (associated with arranging capital market transactions) and insurance-associated emissions shall not be aggregated, because they reflect different channels of contribution

to emissions and different forms of influence over decisions.[50] Although guarantee-associated emissions are a study-specific metric not separately attributed under PCAF, the same principle is applied here. Guarantees are not a separate accounting category under PCAF because the standard does not attribute emissions to a guarantee until it is called and converted into a loan.[51] However, guarantees account for most transactions in this portfolio and cannot be omitted. They are assessed separately using a study-specific metric adapted from UK Export Finance's Amount at Risk approach.

Committed emissions and emissions embodied in transported fuels are not added to the other metrics because doing so would double count emissions. Committed emissions cover the whole project without an attribution factor; adding them to attributed emissions would count the same emissions twice. Emissions embodied in transported fuels also overlap with emissions already recorded for upstream and downstream assets handling the same fuel.

2. Scope and coverage

The analysis covers overseas fossil fuel finance approved by KEXIM, K-SURE and KDB between 2020 and 2024. Asset-level financing data are taken from the public export finance database compiled by Solutions for Our Climate and the Green Energy Strategy Institute (2025), which was built on the three institutions' submissions to the National Assembly and Oil Change International's (OCI) Public Finance for Energy Database, supplemented by desk research. Emissions were then calculated individually for each asset for which estimation or approximation was feasible.

The study captures only part of the overall financing activity. Overseas project finance and shipping finance—the categories covered here—account for 33.0% of KDB's and KEXIM's outstanding fossil fuel finance for 2019–2024, according to KoSIF's Fossil Fuel Finance White Paper. Even within these categories, the analysis excludes outstanding amounts from finance provided before 2020 and the shares provided by other co-financiers. The overall scale may be underestimated. However, some calculation assumptions may lead to overestimation, so the results require careful interpretation (Section 7).

The sample for committed emissions was reduced from 347 to 313 assets in four stages. Exclusions comprised: (1) three assets for which emissions could be estimated only from economic-activity data using sector emissions intensities, so no annual emissions trajectories could be constructed; (2) three monetization transactions whose capacity data represented throughput across an entire national network and could not be attributed to a single financing transaction; (3) 10 duplicate entries arising from multiple financing transactions for the same facility; and (4) 18 transactions that did not create new lock-in—six refinancing transactions, seven involving partial supply of equipment or individual process units, and five involving existing operating facilities without capacity expansion.

50 PCAF Part B (2023), p. 40; Part C (2025), p. 24.

51 PCAF Part A (2025), p. 68: "Guarantees have no attribution until they are called and turned into a loan."

Table A1–2. Items calculated separately from the headline totals

Reason for separate calculation	Assets	Commitment amount (USD million)	Scope 1 & 2 ($MtCO_2e$)	Scope 3 ($MtCO_2e$)	Scope 1 & 2 as a share of the headline total (%)
Network monetization transactions	3	590.0	884.6	-	30.1
Partial supply (equipment or process units)	7	26.1	239.6	1,184.0	8.2
Refinancing	6	374.6	250.9	2,020.3	8.5

Note: Transactions that did not support an entire facility or create new lock-in were calculated separately and excluded from the headline totals. The five existing facilities without capacity expansion are omitted from this table because they do not create newly committed emissions.

3. Emissions estimation methods

Wherever possible, emissions were estimated using physical activity data, with the necessary facility information supplemented from external sources. The analysis drew on Global Energy Monitor for facility identification, capacity and start-up year; RMI OCI+ for emissions intensities for oil and gas fields; and the EU THETIS-MRV database for vessel specifications. Where facility-level emissions were available from a government greenhouse gas reporting program (the US GHGRP, the EU ETS or Australia's Safeguard Mechanism) or from Climate TRACE, those values were used in preference to estimates. Remaining assets were estimated by multiplying installed capacity by an emissions factor, with capacity inferred from the commitment amount where capacity data were unavailable. For the small number of assets where that inference was also not possible, country- and sector-specific emissions intensities from the IMF Climate Change Indicators Dashboard were applied. Assets assessed using installed capacity and emissions factors account for 71.2% of total exposure.

Table A1–3. Emissions estimation methods by asset (number of assets)

Estimation method	Scope 1 & 2	Scope 3
Physical estimate based on design capacity	20	34
Physical estimate using inferred capacity	12	18
Standard vessel assumptions	288	288
Physical estimate for pipelines	4	4
Facility-level emissions data applied	20	0
Country- and sector-specific emissions intensity	2	0

4. Key assumptions

Gaps in the source data were filled using explicit assumptions. Three have the greatest influence on the results. First, total project costs were undisclosed for 300 assets, representing 68.7% of commitments, preventing precise calculation of attribution factors for most assets. Second, standard vessel capacities—174,000 m³ for LNG carriers and 150,000 deadweight tonnes for oil tankers—were assumed for 185 assets, representing 40.3% of commitments; vessel emissions depend on these assumptions. Third, missing maturities were replaced with the median for each asset type for 213 assets, representing 59.9% of commitments. This assumption determines the shape of their repayment profiles.

The low estimate of insurance-associated emissions may reflect the assumptions used. Because transaction-level premiums were not disclosed, annual premiums were assumed to equal 1% of the contract amount. The attribution factor was calculated by dividing this premium by total project cost. Disclosure of actual premiums could change the order of magnitude of this metric.[52]

Table A1–4. Key assumptions and their coverage

Code	Assumption	Parameter affected	Assets affected	Share of commitments (%)	Current score	Potential score	Disclosure required from
D1	Total project cost not disclosed	Attribution denominator	300	68.7	5	3.11	Borrowers and financial institutions
D3	Maturity imputed using median by asset type	Outstanding amount (attribution numerator)	213	59.9	5	2.88	Financial institutions
D4	Premiums not disclosed (assumed at 1% of contract amount)	Attribution factor	9	13.4	5	2.73	Insurers
D5	Standard vessel capacity assumed	Activity data	185	40.3	5	3.00	Financial institutions and classification societies
D7	Capacity from external databases (Global Energy Monitor and Climate TRACE)	Activity data	111	26.5	4.94	2.70	Borrowers

Note: The table presents the five most widely applied assumptions out of 13 (D1–D13). An asset may be subject to several assumptions, so the sum of asset counts exceeds the total number of assets. The potential score is the PCAF data quality score that could be achieved if the missing information were disclosed.

52 OECD, Arrangement on Officially Supported Export Credits, TAD/PG(2024)6, Article 21. Minimum Premium Rates (MPRs) depend on the borrower country's risk classification (1–7), horizon of risk (HOR), buyer risk category, percentage of cover and other factors. They are expressed as a percentage of principal, assuming that the premium is collected in full on the date of first drawdown (Article 21(b)). As a participating institution, K-SURE applies rates at or above the MPR to medium- and long-term insurance. For example, the MPR for a country in risk category 5 with a five-year horizon is approximately 4.7% of principal (countryrisk.io, "Country risk: the hunt for premia"), or about 0.9% on an annualized basis. Countries in this study range from category 2, including the United Arab Emirates and Qatar, to category 7, including Mozambique. Annualized MPRs therefore range approximately from 0.4% to 1.3%; an annual rate of 1% was selected as a central assumption within that range. Annual premiums were estimated by multiplying each contract amount by 1%, and the attribution factor was calculated as premiums divided by total project cost, applying PCAF Part C, Section 5.3, by analogy. Estimated premiums may therefore differ from actual premiums, and attribution factors may be higher or lower than the actual values for individual transactions.

5. Data quality

PCAF provides a five-point data quality scale, from 1 (highest quality) to 5 (lowest quality), and recommends disclosing a score weighted by outstanding amount. The portfolio's outstanding-amount-weighted average score is 4.43, indicating that most of the current calculations rely on estimates.

This score can be improved. Replacing the assumptions above with disclosed data would improve the weighted average to 2.87 and increase the share of assets scoring 3 or better from 27.0% to 97.8%, measured by outstanding amount. Most of this improvement could be achieved simply through disclosure of total project costs and maturities by borrowers and financial institutions.

Table A1–5. Distribution of PCAF data quality scores

Score	Current assets	Current share (%)	Assets after data gaps are closed	Share after data gaps are closed (%)
Score 1	2	0.5	2	0.5
Score 2	4	1.8	18	15.8
Score 3	26	24.7	324	81.5
Score 5	314	73.0	2	2.2
Total	346	100.0	346	100.0
Outstanding-amount-weighted average	4.43		2.87	

Note: Shares are measured by outstanding amount (PCAF Part A, third edition, p. 167). The population of 346 assets in this table comprises assets assessed for data quality and differs from the 313 assets assessed for committed emissions. No assets have a score of 4.

6. Scenario design

The scenarios in Chapter IV combine two components: emissions trajectories from already approved commitments, and additional emissions from new commitments made from 2025 onwards.

The emissions profile for new commitments is the average across the five approval-year cohorts from 2020 to 2024. Using a single year would allow one large transaction in that year to dominate the results. The only difference between the three scenarios is how long this profile continues to be applied: through 2050 under BAU, through 2026 under Immediate Cessation, and through 2030 under Delayed Transition.

7. Limitations and interpretation

First, all figures are estimates. Total project costs, capacities and maturities are widely missing from the source data, so emissions for many assets were calculated using assumptions and proxies. The results should therefore be read as indicating orders of magnitude and portfolio composition; they should not be cited as estimates of individual assets' emissions.

Second, some factors may cause underestimation. Overseas project finance and shipping finance—the categories covered by this study—represent 33.0% of KDB's and KEXIM's outstanding fossil fuel finance according to the Fossil Fuel Finance White Paper. Outstanding amounts from transactions executed before 2020 and the shares provided by other co-financiers are excluded.

Third, some factors may cause overestimation. Utilization of midstream assets is held constant based on design throughput. In addition, the committed emissions and transported-fuel metrics retain supply-chain overlaps where the same fuel is counted as upstream or downstream emissions of multiple assets.

Fourth, vessel estimates are subject to variation. All 288 vessel transactions were assessed using standard vessel assumptions (Table A1-3). Differences in propulsion systems, vessel age and hull design are not reflected. Vessel-related results should therefore be interpreted as an indication of the order of magnitude for the fleet as a whole, rather than for individual vessels.

Fifth, the Scope 3 total is not a net emissions total. Structural double counting remains where the same fuel is recorded as downstream emissions of production assets and upstream emissions of refining or power generation assets. A previous study of Japan's JBIC offset this overlap by adding only the absolute difference between upstream and downstream indirect emissions. In this portfolio, however, upstream assets are located in two countries and downstream assets in 13, with only one country in common. There is therefore no physical basis for applying that approximation. Scope 3 results in this report are better suited to understanding composition and trends than to comparing absolute quantities. Adding Scope 3 emissions across institutions or directly comparing them with national inventories is not a valid interpretation.[53]

53 FoE Japan (2025).

Appendix 2. Detailed results

1. Results by institution

Table A2-1. Financial portfolio emissions and emissions intensity by institution (2024)

Instrument	Institution	Scope 1 & 2 ($MtCO_2e$)	Scope 3 ($MtCO_2e$)	Exposure (KRW billion)	Scope 1 & 2 intensity (tCO_2e/KRW billion)	Scope 3 intensity (tCO_2e/KRW billion)
Financed emissions	KDB	2.549	2.538	5,801.8	439.3	437.4
	KEXIM	1.785	3.135	6,131.3	291.2	511.3
Guarantee-associated emissions	KDB	0.128	1.074	4,132.0	30.9	260.0
	KEXIM	0.000	2.345	12,557.7	0.0	186.8
	K-SURE	0.110	0.265	1,373.3	79.8	193.2
Insurance-associated emissions	K-SURE	0.004	0.056	6,684.2	0.7	8.4

Note: These are annual attributed emissions for 2024. The three metrics are not additive. Exposure is shown in KRW billion, rounded to one decimal place.

Table A2-2. Committed emissions and emissions embodied in transported fuels by institution

Institution	Scope 1 & 2 ($MtCO_2e$)	Scope 3 ($MtCO_2e$)	Emissions embodied in transported fuels ($MtCO_2e$)	Assets
KEXIM	1,570.4	8,494.6	Vessels 10,628.3	198
KDB	1,291.7	1,925.0	Vessels 4,877.5; terminals 8,137.3; pipelines 2,074.4	96
K-SURE	353.6	1,758.4	Vessels 1,018.2	26
Sum across institutions (including overlaps)	3,215.7	12,178.0	-	320
Overall total	2,934.6	10,952.6	-	313

Note: These are lifetime totals and have a different time basis from the annual attributed emissions in Table A2-1; the two are not presented together. A facility supported by multiple institutions is counted under each institution, so the sum across institutions exceeds the overall total. Emissions embodied in transported fuels are shown separately by asset type, without a total, because aggregation across types would double count emissions (see Table A2-7).

2. Annual results

Table A2–3. Annual financial portfolio emissions by instrument ($MtCO_2e$/year)

Year	Financed Scope 1 & 2	Guarantee-associated Scope 1 & 2	Insurance-associated Scope 1 & 2	Financed Scope 3	Guarantee-associated Scope 3	Insurance-associated Scope 3
2020	1.87	0.13	0.00	0.88	0.52	0.00
2021	1.53	0.13	0.00	1.92	1.26	0.00
2022	2.94	0.29	0.00	5.36	2.89	0.00
2023	3.20	1.04	<0.01	5.54	3.30	0.06
2024	4.33	0.24	<0.01	5.67	3.68	0.06
2025	2.96	0.46	0.01	5.93	2.42	0.07
2026	3.02	0.60	0.01	8.47	1.63	0.07
2027	2.65	0.54	0.01	7.37	0.29	0.08
2028	2.44	0.48	0.02	6.48	0.26	0.08
2029	2.23	0.43	0.02	5.42	0.23	0.09
2030	1.86	0.37	0.02	4.55	0.19	0.09

Note: From 2025 onwards, the figures reflect repayment as commitments approved through 2024 approach maturity; no new commitments are included. The three metrics are not additive.

Table A2–4. Committed emissions by approval year ($MtCO_2e$)

Approval year	Scope 1 & 2	Scope 3
2020	912.4	9,091.4
2021	430.2	314.3
2022	544.7	557.5
2023	588.8	865.8
2024	458.4	123.5

Note: These are expected emissions over each asset's full lifetime associated with the approval of finance; no attribution factor is applied. Year-to-year variation depends on whether large transactions were approved in a given year.

3. Committed emissions by instrument and project type

Table A2–5. Committed emissions by financial instrument

Instrument	Scope 1 & 2 ($MtCO_2e$)	Scope 3 ($MtCO_2e$)	Facilities
Loans (PF)	2,080.5	9,105	111
Guarantees	731.3	1,000.5	198
Insurance	293.9	1,758.4	8
Overall total	2,934.6	10,952.6	313

Note: Emissions embodied in transported fuels are omitted because aggregation across asset types would double count emissions; values by type are provided in Table A2–7. A facility supported by multiple instruments is counted under each instrument, so the sum across instruments exceeds the overall total.

Table A2–6. Committed emissions by project type

Project type	Scope 1 & 2 ($MtCO_2e$)	Scope 3 ($MtCO_2e$)	Assets
Production (upstream)	111.6	1,148.2	3
Processing	218.8	1,584.3	7
Refining	640.6	8,109.3	4
Pipelines	4.9	-	1
Vessels	947.9	-	284
Terminals	596	-	9
Power generation	414.7	110.8	5

Note: Scope 3 emissions of transport assets—vessels, terminals and pipelines—are excluded from the calculation. A dash indicates that emissions were not calculated, rather than zero emissions.

Table A2–7. Emissions embodied in transported fuels by asset type and institution ($MtCO_2e$)

Asset type	KDB	KEXIM	K-SURE
Vessels	4,877.5	10,628.3	1,018.2
Pipelines	2,074.4	-	-
Terminals	8,137.3	-	-

Note: Values are not additive across asset types because the same fuel may pass through a terminal and then be loaded onto a vessel.

4. Committed emissions by country

Table A2–8. Committed emissions in the top 14 countries ($MtCO_2e$)

Country	Scope 1 & 2	Scope 3
United States	589.2	42.8
Kuwait	365.5	4,626.4
Saudi Arabia	273.0	151.1
Greece	226.0	-
Indonesia	193.0	838.9
Qatar	147.9	52.7
Oman	136.7	1,730.2
Norway	125.0	-
Australia	90.4	770.3
Viet Nam	82.5	22.0
Bahrain	79.0	1,000.5
Mozambique	78.2	889.7
Japan	62.5	-
France	55.9	-

Note: Facilities are assigned to their host country and vessels to the shipowner's country. Countries shown with a dash for Scope 3 emissions, such as Greece, Norway, Japan and France, have portfolios dominated by vessels.

5. Largest emitting facilities

Table A2–9. Top seven facilities by committed emissions (Scope 1 and 2)

Facility	Host country	Asset type	Scope 1 & 2 ($MtCO_2e$)
Al-Zour refinery	Kuwait	Refining	366
Jazan IGCC	Saudi Arabia	Power generation	209
Rio Grande LNG	United States	Terminals	152
Duqm refinery	Oman	Refining	137
Plaquemines LNG	United States	Terminals	112
Port Arthur LNG	United States	Terminals	108
Jawa 1 combined-cycle power plant	Indonesia	Power generation	97

Note: These are the seven facilities with the highest committed emissions. Individual asset values are estimates based on standard assumptions and are not suitable for citation in isolation.

6. Scenario analysis: emissions above the NZE-aligned pathway and required reductions

Table A2–10. Emissions above the NZE–aligned pathway and required reductions by scenario

Metric	Scenario	Year	Study trajectory ($MtCO_2e$/year)	NZE-aligned pathway ($MtCO_2e$/year)	Excess ($MtCO_2e$/year)	Required reduction (%)
Financed emissions	Immediate Cessation (from 2027)	2030	3.20	2.03	1.17	36.6
		2035	1.23	0.93	0.30	24.1
		2040	0.33	0.43	-0.10	Below pathway
		2050	0.00	0.11	-0.11	Below pathway
	Delayed Transition (cessation from 2031)	2030	6.12	2.03	4.09	66.8
		2035	3.41	0.93	2.47	72.6
		2040	1.13	0.43	0.70	62.1
		2050	0.00	0.11	-0.11	Below pathway
	BAU	2030	6.12	2.03	4.09	66.8
		2035	6.98	0.93	6.05	86.6
		2040	7.22	0.43	6.79	94.1
		2050	7.19	0.11	7.08	98.4
Committed emissions	Immediate Cessation (from 2027)	2030	123.89	12.85	111.04	89.6
		2035	132.03	5.91	126.13	95.5
		2040	132.03	2.71	129.32	97.9
		2050	124.16	0.71	123.45	99.4
	Delayed Transition (cessation from 2031)	2030	138.18	12.85	125.33	90.7
		2035	207.39	5.91	201.48	97.2
		2040	207.48	2.71	204.76	98.7
		2050	199.61	0.71	198.90	99.6
	BAU	2030	138.18	12.85	125.33	90.7
		2035	232.49	5.91	226.58	97.5
		2040	326.80	2.71	324.08	99.2
		2050	507.54	0.71	506.83	99.9

Source: KoSIF and SFOC, based on IEA (2023)

Appendix 3. Frequently asked questions

Q1. Why not add the five metrics together? Wouldn't a single total be easier to understand?

The metrics cannot be added together. Loans, guarantees and insurance contribute to emissions through different channels, and PCAF requires metrics with different characteristics to be reported separately. Committed emissions cover the entire project without an attribution factor and therefore have a different accounting basis from attributed emissions. Emissions embodied in transported fuels also overlap with emissions already recorded for other assets handling the same fuel, so adding them would result in double counting. This report therefore presents the five metrics side by side to show different perspectives on the same portfolio.

Q2. Why use outstanding amounts rather than commitment amounts?

Financed emissions measure the share attributable to a financial institution at the assessment date. Even if an institution committed KRW 1 trillion 10 years ago, the emissions currently attributed to it will be much lower if most of that amount has been repaid. This approach has a limitation: once the loan is fully repaid, its emissions disappear from the institution's accounts, although the facility financed by that loan continues to emit greenhouse gases. This is why the report also calculates committed emissions.

Q3. If the analysis covers only part of the financing activity, what is missing?

The study collected and analyzed asset-level data for newly approved transactions from 2020 to 2024. It excludes outstanding amounts from finance provided before 2020, transactions for which asset-level information could not be identified, and other institutions' shares in co-financed transactions. According to the Fossil Fuel Finance White Paper, overseas project finance and shipping finance—the categories examined here—account for 33.0% of KDB's and KEXIM's outstanding fossil fuel finance. Actual emissions could therefore be higher than the estimates in this report. However, assumptions such as fixed utilization rates and supply-chain overlaps can increase the estimates, so the results require careful interpretation.

Q4. Why are insurance-associated emissions so low?

Premiums were not disclosed, so annual premiums were assumed to equal 1% of the contract amount, and the attribution factor was calculated by dividing this premium by total project cost. This assumption explains why insurance exposure of KRW 6.7 trillion is associated with only 4,400 tCO_2e per year. Disclosure of actual premiums could change the order of magnitude of this metric.

Q5. Are committed emissions certain to occur?

No. Committed emissions represent the emissions potential embedded in the current capital stock, not an inevitable outcome. Actual emissions can change with early retirement, changes in utilization or retrofits. This is also why the scenario chapter identifies continued scope for policy intervention. However, climate research widely documents the tendency of capital-intensive facilities to operate for their full lifetimes because of sunk costs and institutional inertia.

Q6. Can the emissions estimates for individual projects or facilities be cited?

This is not recommended. Total project costs, capacities and maturities are widely missing, and emissions for many assets were estimated using standard assumptions. In particular, all 288 vessel transactions were assessed using standard vessel assumptions. The results should be interpreted as indicating the order of magnitude and composition of the overall portfolio. Uncertainty is too high for them to be cited as individual asset emissions estimates.

Q7. Do these metrics imply that the facilities would not have been built without Korean public finance?

No. This study did not test that counterfactual. Committed emissions and emissions embodied in transported fuels indicate the scale of emissions associated with projects in which Korean public financial institutions participated; they do not establish causal responsibility. Determining whether a particular financing transaction was essential to a project proceeding would require a separate analysis of the project's financing structure and alternative funding sources.

Q8. Don't emissions embodied in transported fuels involve double counting?

Yes, if they are added to other metrics. Gas transported by a vessel may already be counted as downstream (Scope 3) emissions of the gas field that produced it. Fuel passing through a terminal may then be loaded onto a vessel, so aggregation across transport infrastructure types also counts the same fuel more than once. This metric is therefore reported separately and is not added to any other value. The approach is analogous to consumption-based accounting, which presents overseas emissions embodied in imports alongside territorial emissions. The metric nevertheless serves a policy purpose: financial institutions' emissions accounts do not capture the production and combustion emissions of the fossil fuels carried by the transport infrastructure they support, and making that scale visible is informative.

Off the Books:
Financed Emissions from
South Korea's Public Finance for Overseas Fossil Fuel Projects

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