# Climate Impacts of Japan's Public Finance

## Greenhouse Gas Emissions from JBIC's Fossil Fuel Finance and Alignment with the 1.5°C Goal


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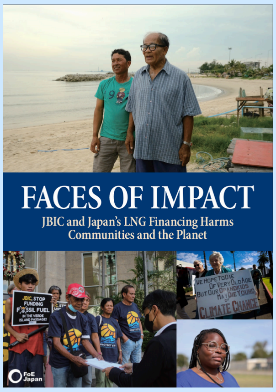


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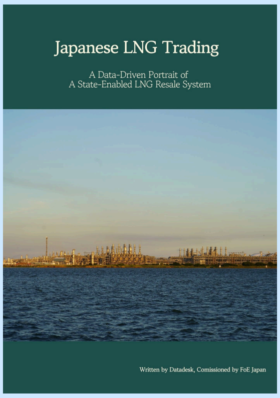


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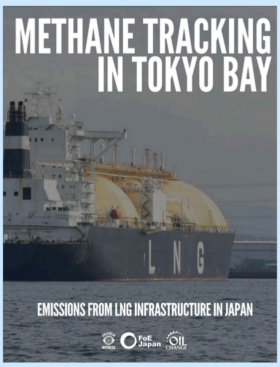


**Oil Field Witness, FoE Japan, Oil Change International. 2025. Methane Tracking in Tokyo Bay: Emissions from LNG Infrastructure in Japan.**

The report by Oilfield Witness, Friends of the Earth Japan and Oil Change International documents significant methane emissions from LNG infrastructure along Tokyo Bay and highlights the serious climate risks across the LNG supply chain.

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# Introduction

Investments drive greenhouse gas emissions by fuelling production. Large institutional investors, such as public banks and pension funds, play a pivotal role in this process. Their substantial financial commitments can determine the viability of capital-intensive projects. Given their concentrated influence, these investors wield disproportionate control over such projects and bear significant responsibility for the emissions they generate.

Public institutions, unlike private or publicly traded corporations that are accountable primarily to their investors, can potentially be held more accountable to the general public. However, both public and private investment institutions operate under a mandate to maximize returns, with decisions typically made by a small group of executives overseen by a board of governors. Public investment institutions may also be tasked with investing strategically to support the production of essential goods and services or to advance diplomatic and geopolitical objectives.

The Japan Bank for International Cooperation (JBIC) is a public financial institution that invests in foreign projects critical to Japan's strategic interests. Its mandate includes promoting international development while ensuring a stable supply of essential imported products. Energy carriers, such as natural gas and other fossil fuels, are among Japan's most crucial imports. With Japan relying on imports for nearly all (97%) of its oil and being the world's largest importer of liquefied natural gas (LNG), energy security is a key priority. As a result, JBIC plays a central role in securing oil and gas supplies abroad, making substantial investments in fossil fuel infrastructure, particularly LNG terminals and other gas projects.

From 1999 to 2024, JBIC loaned approximately $84 billion to over 100 fossil fuel projects in 38 countries.[1] These loans totaled over $205 billion when including cofinancing mobilized by JBIC's loans and related insurance backing.

Notably, JBIC is investing heavily in emerging LNG markets while Japanese companies secure long-term LNG purchase contracts. For instance, JBIC has loaned $850 million to Mitsubishi Corporation, which holds a 15% stake in *LNG Canada*—a liquefaction and export facility poised to become the first in Canada to export LNG to foreign markets.

Discussions about these projects often focus on carbon dioxide ($CO_2$) emissions from combustion, but a comprehensive lifecycle assessment—including upstream methane ($CH_4$) leakage—is essential for fully understanding their climate impact. Given methane's high global warming potential (GWP), especially over a shorter (e.g. a 20-year timescale), accounting for upstream emissions would significantly increase the estimated total greenhouse gas (GHG) impact of JBIC's financing. The purpose of this analysis is to quantify the total GHG emissions associated with JBIC-financed fossil fuel projects. The following report summarizes work commissioned by Friends of the Earth Japan (FoE Japan), where we conducted a thorough inventory of JBIC's fossil fuel infrastructure holdings and provided extensive analysis of its climate impacts.

# Literature Review

Before describing the novel work conducted, we should provide some important context on:

1) Methane leakage and its role in the outsized climate impact of gas (otherwise called "fossil", "methane", or typically, but euphemistically "natural" gas), and
2) Attributing emissions to fossil fuel infrastructure.

[1] Author's data. Currency is in current USD, unless otherwise specified.

## Fugitive Emissions

The climate impact of gas is often highly understated.[2] Be it through improper accounting of methane losses in inventories, or downplaying its warming potential by using long time horizons commonly used to aggregate greenhouse gases in national reporting — "natural" gas is often falsely touted as a "cleaner" alternative to coal. Mounting evidence shows that under many realistic circumstances that account for fugitive emissions underreporting and gas's impact over shorter time horizons, gas power can have a more severe warming effect than coal power, especially when sourced from LNG, which adds a high energy cost (usually resulting in combustion of gas creating additional carbon dioxide) and additional methane losses during processing and shipping (Howarth, 2024).

The main component of gas is methane, which is the second-largest contributing GHG to global heating after carbon dioxide. Methane has 82.5 and 29.8 times the global warming potential of carbon dioxide over 20 and 100 years, respectively (IPCC, 2021). Methane emissions are responsible for approximately 20% of present global heating.[3] Despite efforts to mitigate methane, atmospheric concentrations continue to increase at an alarming rate.[4]

While gas combustion produces less carbon dioxide than coal or oil, this downstream figure fails to capture the full climate impact of gas, particularly due to substantial uncombusted methane emissions—often termed "fugitive emissions." These occur across the entire oil and gas supply chain: upstream (e.g., exploration, extraction, abandoned wells), midstream (e.g., processing, storage, transmission, LNG transport), and downstream (e.g., local distribution, power plants, household use).

Methane is released both intentionally (e.g., venting unwanted gas) and unintentionally (e.g., leaks, flaring inefficiencies). Emissions also result from LNG handling (boil-off, regasification), marine transport ("methane slip"), and leaking infrastructure, even after well abandonment.

Recent studies in the U.S. and Canada show that significant methane losses come from irregular, high-volume events not captured by standard industry models—such as emissions during maintenance or equipment failure. These so-called "super-emitters" (e.g., pipeline ruptures) contribute 8–12% of global oil and gas methane emissions, or around 8 Mt $CH_4$ annually (Lauvaux et al., 2022).

The most comprehensive estimate of methane loss across the oil and gas supply chain is 2.3% of gross gas production from extraction to the city gate, as published in *Science* in 2018 (Alvarez et al., 2018). This estimate synthesizes over a decade of data from at least 10 bottom-up and top-down studies, covering six major U.S. oil and gas production regions and

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[2] For more detailed information on the understated climate impact of fossil gas please see the author's earlier work: "Burning Bridge: Debunking LNG as a Climate Solution" (2023). David Suzuki Foundation. Available at :https://davidsuzuki.org/wp-content/uploads/2023/05/Burning-Bridge-Debunking-LNG-as-a-Climate-Solution-Report.pdf

[3] In 2019, methane was responsible for 0.54 $W/m_2$ out of 2.84 $W/m_2$ total effective radiative forcing or 2.72 $W/m_2$ anthropogenic effective radiative forcing (Table AIII.3, Annex III, AR6 WGI), available at: https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_AnnexIII.pdf

[4] https://gml.noaa.gov/ccgg/trends_ch4/

433 sites, all validated through independent top-down methods. Unlike typical industry or government estimates—often based on controlled equipment testing—this study accounts for real-world operating conditions where most leaks occur. While this study focuses exclusively on US industry, it provides the most comprehensive hybridized validated survey to date, though methane loss rates may vary considerably across plays and by extraction technique.

Alvarez et al. (2018) found methane losses to be 60% higher than U.S. EPA estimates. This finding has since been confirmed by Rutherford et al. (2021), who also affirmed that the production phase is the largest source of leakage—1.5 to 2 times higher than EPA's greenhouse gas inventory reports. The body of research shows that relying solely on controlled-condition estimates leads to significant underreporting of actual emissions. These findings have been corroborated by global level studies, which suggest that methane leakage from fossil sources are significantly higher than reported from bottom-up inventories. Methane emissions studies using isotopic analysis have shown that fossil fuel-related methane is globally underestimated by 20–60% (Hmiel et al., 2020; Schwietzke et al., 2016), with over half of the recent global increase linked to North American shale gas production (Howarth, 2019).

## Emissions Attribution

There are some key ways to attribute GHG emissions to infrastructure like fossil fuel producing or consuming projects assessed in this work.

### Attributional versus Consequential Approach

The key accounting distinction we employ here is that developed and discussed at length by Brander (e.g. Brander, 2022). Brander distinguishes between attributional and consequential approaches to GHG accounting.

Attributional approaches are well-suited for assigning "carbon budgets" to specific entities because, in principle, their results can be aggregated to match total global emissions—for instance, the sum of all national inventories should closely reflect global emissions, and all sub-national Scope 1 emissions should approximate a nation's total direct emissions, without overlaps or gaps. These methods typically establish clear criteria for defining which sources and sinks to include and how to assign "ownership" or "responsibility" for emissions.

For example, national inventories use a territorial boundary rule that includes all emissions and removals within a country's borders. This rule is straightforward to apply with high certainty, making attributional accounting appropriate for regulatory enforcement or binding targets. However, the attributional method is limited in scope, prioritizing clear boundaries and conservation of emissions over global ramifications of infrastructure across supply chains.

Consequential approaches do not assign responsibility to entities in the same way, as their focus is on the outcomes of specific decisions rather than on attributing emissions within a defined boundary. This method applies well to big infrastructure decisions, like funding decisions made by large firms such as JBIC. This method allocates indirect emissions related to a project, regardless of where the project is built and where related emissions across the global supply chain occur.

This method may violate global conservation of emissions, since one project's indirect emissions (included in Scope 3 or lifecycle emissions) may be counted as the direct emissions from another project funded by another entity. Take for example a gas power plant. Its indirect emissions come from gas extraction. Say JBIC funds a power plant and we include the emissions from the gas upstream of the project, and these gas fields are financed by another investor. If one were to perform the complementary consequential account of emissions of the gas field, it would include emissions from combustion of the gas in JBIC's power plant, hence double counting emissions. For this reason, consequential emissions accounting is only suited for determining project emissions in a scenario where an investment decision results in a project being constructed when it otherwise would not have been. The method likewise should only be used to assess an individual actor's emissions impact in isolation, as we have attempted here. See methods for further discussion of this approach.

## Attribution to Investments: Allocation Approach

In previous work, emissions have been allocated to investors proportionally to their ownership share (Kenner, 2021). Some have also proposed a minimum ownership threshold, e.g. 10%, below which an investor is argued to not have significant influence over corporate management, and emissions from investments where less than this threshold is owned would be ignored (Dabi et al., 2022). However, in the case of investing in fossil fuel infrastructure, there is no credible argument as to alternative corporate governance options, and investing in a major infrastructure project, like a LNG terminal, comes with the informed decision to support fossil fuel production or consumption.

The simplest and most defensible way of allocating emissions from fossil fuel projects to investors is therefore to allot annual or lifetime emissions of a project proportionally to an ownership share. To do this, we will need the amount a party has invested in the project and the total investments in the project. Or in the case of institutional financing of a project through loans, which is how JBIC supports infrastructure development, we need to know JBIC's contribution to a project out of the project's total financing requirements.

We assume simply that JBIC invests in projects that for most part wouldn't go ahead without them. This does not mean that projects of a similar nature or even a specific project wouldn't have found alternative funding, and would have proceeded eventually, but that it was because of JBIC's loans and those facilitated by their loan and insurance backing (additional tranches referred to as "co-financing") that these projects were made possible, and so it is appropriate to attribute the emissions to this particular financial entity, and to employ a consequential approach to assigning Scope 3 emissions to the institution.

# Methods

Here we explain the steps involved in estimating the emissions related to financing by a given entity. This project focuses on the holdings of a public investment bank in Japan, the Japan Bank for International Cooperation (JBIC) — a major public financier of fossil fuel infrastructure, particularly LNG terminals and fossil gas projects.

The steps of the workflow were as follows:

1) Compile project-level database for projects funded by JBIC
2) Find missing data for project CapEx, capacity, etc.
3) Find best available emissions factors for each project
4) Gap-fill missing project tenor lengths
5) Create an emissions time series for each project that which counts emissions from projects with active loans
6) Aggregate emissions across the supply chain

## Compiling Updated and Thorough Project Database

In order to ascertain the amount of emissions related to JBIC's holdings, we must first compile an inventory of fossil fuel projects with loans from JBIC. We select a window of loans from the years 1999 to 2024. The cut-off date goes far enough back to ensure that currently-funded projects are included, and necessarily is truncated as to allow analysis to be done. However, after completing this analysis, we checked to confirm whether JBIC continues to fund new or refinance existing fossil fuel projects and confirmed that the bank continues to fund projects after our sample's end date.

To compile a set of projects, we used existing repositories of fossil fuel finance, including the Public Finance for Energy Database compiled by Oil Change International (https://energyfinance.org/), Friends of the Earth Japan (*in-house data shared with author*), project and transaction data collected from IJGlobal's energy finance database (https://hub.ijglobal.com/) and cross referenced these with JBIC press releases (https://www.jbic.go.jp/en/information/press/index.html) and other publicly available data online (see Supplementary Data for sources). We used the Wayback Machine (https://web.archive.org/) to access press release pages no longer hosted on JBIC's website, since their archive does not extend far back enough to verify details of loans made before April 2015, as of writing this report. Repositories were combined using fuzzy name matching techniques (using python) and verified individually by the author.

We recorded all project details relevant to the assessment of GHG emissions over time related to these loans. We imported JBIC loan amounts and cofinancing amounts, when available, from existing datasets and search press releases for any missing details. IJGlobal contained much of the loan and equity data by transaction and project, however, cofinancing amounts were not present. We added to those recorded in the Oil Change International database, and added missing values by looking up values in JBIC press releases.

We also recorded all loan starts, tenor lengths and/or loan end dates, when available (missing tenor durations are estimated, see below). We also recorded each project's location (country and region) and appended income levels for each country. After compiling a list of projects, cross checking and validating them, and removing duplicates, we populated other required information by searching publicly available information online. These additional details include project cost data (project capital expenditure or company value) and characteristics needed to find precise emissions factors estimates (e.g. fuel origin and type from related fields or closest matches). Fuzzy matching techniques and human verification were also used to match names of projects across other databases (e.g. emissions factors for power plants). More details on data sources, handling and synthesis are explained below in their relevant sections.

## Total Project Value

For projects, we use capital expenditure (CapEx) as the best measure of total project value. CapEx tends to be a good measure of total project value (where cost = loans + equity), and is more publicly available for projects than disaggregated loan and equity data. Many financial institutions like prominent Japanese banks (e.g. Mizuho Financial Group) employ carbon accounting based on the framework by the Partnership for Carbon Accounting Financials (PCAF, https://carbonaccountingfinancials.com/). Carbon accounting here refers to all relevant GHG emissions of "material" (i.e. significantly large) value, which for major fossil fuel producing and consuming projects includes carbon dioxide ($CO_2$) from combustion and methane ($CH_4$) from extraction. Carbon accounting by financial institutions distinguishes between Scope 1 emissions (defined as direct emissions, here used interchangeably) and Scope 3 emissions (full lifecycle emissions that include all direct and indirect emissions across the supply chain).[5]

For loans to companies or projects without clear delineations, we use the market capitalization of the company or related share of the market capitalization to the project. Here we first attempt to use available data from IJGlobal, which often includes CapEx estimates. For projects outside of the IJGlobal database and missing values within the database, we source them from publicly available information (e.g. investor reports), or estimate them based on CapEx requirements for similar projects (see below).

Market share or "exposure" is typically estimated by banks like the Mizuho Financial Group to determine the emissions share related to a given investment or loan amount. We followed the accepted approach of weighting emissions proportionally to share of financing or ownership stake, but for individual projects felt it more appropriate to use CapEx rather than market capitalization, since we were analysing the cost of an individual project rather than a stake in a company. We only used share of ownership as a proportion of market capitalization for loans that go to companies broadly and no associated CapEx could be reliably estimated for a given loan. We attempted to use CapEx as much as possible by estimating the amount of relevant spending over the same period.

[5] Note that we are not concerned with Scope 2 emissions as such, which generally include Scope 1 (onsite or "direct" emissions and emissions off-site from power generation used by a project. This scope is not relevant for our project sample of upstream (extraction, processing, etc.) and downstream (combustion) fossil fuel infrastructure.

For unlisted companies (not public e.g. state-owned enterprises), like the Abu Dhabi National Oil Company (ADNOC), we approximated CapEx by looking at the amount of planned spending over the same time period as the loan. For example, for a loan in 2017 to ADNOC as a whole for oil production, we found that ADNOC planned $109 billion (USD) from 2017–2022, half of which was earmarked for upstream investment, meaning that they would spend ~$11 billion per year. The approximate loan tenor was determined to be ~21 years (see explanation of tenor durations below). Therefore we estimated the comparable CapEx to be the average spending over the same time, i.e. ~$231 billion. Here JBIC contributed $2.1 billion ($3.0 billion with co-financing) and therefore its contribution to CapEx spending is 0.9% (1.3% with co-financing). We then used this to determine its share of related emissions in proportion to its financial contribution.

For power plants lacking financial data on contributions or total CapEx, we first attempted to find a similar plant in the same country with data then scale by cost per unit installed capacity (i.e. $/MW) to approximate missing CapEx data. If no similar plant in a country was available, we checked if there are similar plants with data at the regional scale and take their mean cost per unit capacity, or globally, if no regional data was available.

# GHG Emissions

Here we estimated GHG emissions from all fossil fuel extracting, processing and combusting infrastructure as precisely and accurately as possible. We estimate emissions for projects that mine coal, extract oil and gas, produce LNG, and combust these three fuels. We omitted emissions from refinery and transportation projects, because we felt there is significant overlap with the lifecycle emissions estimated for upstream (here oil gas and coal extraction and LNG production) and downstream (here power generation) infrastructure projects. For example, refining and end-use emissions in transportation of oil and gas is included in the downstream or "indirect" emissions component of the calculated lifecycle emissions of oil and gas. We focused exclusively on the two most significant sources of GHG emissions for fossil fuel projects—carbon dioxide ($CO_2$) and methane ($CH_4$). We describe the particular methods and data used to quantify these GHG emissions in the following sections.

## Upstream Emissions: Matching Oil and Gas Fields and Coal Mines

Here we used the Oil Climate Index Plus (OCI+) database (https://ociplus.rmi.org/) which aims to cover [~⅔] of oil and gas fields and provide a representative sample with all kinds and extremes of production. If the field was contained in the OCI+ sample we simply used the base case. If it was not present, and we found adjacent fields of the same type, we used these as a proxy. If no such fields were available, we searched for similar fields based on characteristics including age or maturity, location or distance offshore, geology, operator, etc. If there still were no suitable matches, we then used weighted average for region or world, e.g. for conventional offshore in Australia, where we used the global average for conventional offshore dry gas. All averages were weighted by production measured in embodied energy.

For coal mining emissions, we used emissions factors from Climate TRACE (https://climatetrace.org/), which is very comprehensive (aiming to be a totally comprehensive repository of greenhouse gas emitting infrastructure). The database uses a fixed emissions factor for carbon dioxide (0.0175 t of $CO_2$ per t of coal), and direct methane measurements by mine (in t $CH_4$ per t coal). We used the mine-specific methane emissions for estimating mining emissions. For coal plants' upstream emissions, we attempted to find reasonable matches of methane emissions rates by type of coal used closest to the coal plant. We calculated upstream emissions factors by adding the $CO_2$ and $CH_4$ emissions per t coal together using IPCC Sixth Assessment Report (AR6) values for GWP 100 and 20 for $CH_4$ of 30 and 82.5, respectively.

We assumed fixed capacity at the present rate (taking mean of last five years when volatile), except where capacity factors are known (only for power plants, see below).

## Midstream Emissions: LNG Terminals

Here we matched LNG terminals to their most likely source of gas from the OCI+ database. For example, Yemen LNG is sourced from gas produced in Yemen. Yemen produces dry sweet natural gas for export as LNG, particularly from the Marib-Jawf basin. OCI+ does not contain emissions for this particular field, however it is very similar to Block 61 (Khazzan/Ghazeer) in Oman, for which OCI+ has lifecycle emissions estimates, and hence we used the emissions factors from this field.

For the purpose of aggregating emissions across the supply chain, we then considered LNG terminals to be upstream and all upstream and midstream emissions associated with an LNG terminal to be "direct emissions," while downstream emissions from end-use are considered "indirect emissions" (see aggregation methods below). We also assume that capacity is fixed at present or near-future projected rates. This may overestimate LNG production somewhat, as terminals are not always used to capacity.

## Downstream Emissions: Power Plants

Here we again used data from Climate TRACE. We looked up each project and found its direct emissions (in this context, these downstream emissions are direct emissions). The data accounts for capacity factor (i.e. excludes downtime) so reported emissions are lower than if plants used at full capacity (many are not used close to capacity, e.g. peaking power like the Zerger Lebap open gas turbine plant in Turkmenistan). One can also calculate emissions as the product of the mean emissions factor (in $tCO_2$ per MWh) taken from the monthly data, the capacity of the plant (in MW), the capacity factor (proportion of time the plant operates) and the hours in a year. This provides a similar estimate to the reported emissions in Climate TRACE but can be slightly less precise than the reported values, however it allows us to estimate emissions into the future assuming stable operating conditions. Note that for inexact name matches or multiple possible entries with ambiguous labelling, we use MW boilerplate ratings to match the power plants from the database to our projects.

## Upstream Emissions: Power Plants

Here we used upstream emissions from OCI+ for gas and coal mining emissions from Climate TRACE for coal plants. We decided to use this approach, as it allowed us to be specific about the origin of fuel, and use independently updated and verified LCA analysis. This step required estimating the fuel input by plant capacity. To do this we needed the plant type so we can ascertain the plant thermal conversion efficiency. Knowing the efficiency and the energy content of the fuel then allowed us to estimate the fuel requirements per unit energy and then the fuel requirements over the average annual runtime of the power plant, which we calculated using data from Climate TRACE using the last five available years of plant data.

To calculate the upstream (here, indirect) emissions from power plants, we calculated the fuel use by equating energy used by plants embodied in the fuel to the output of the plants, as follows:

$$E = \eta F = \alpha C t \rightarrow F = \frac{\alpha C t}{\eta}$$

Where $E$ is energy, $\eta$ is plant efficiency, $F$ is energy embodied in the fuel, $\alpha$ is capacity factor (proportion of time the plant runs at full capacity), $C$ is plant capacity in terms of power (boilerplate MW), and $t$ is annual runtime. We then converted $\alpha C t$ from MWh to units of energy that can be used to compare between fuel types (e.g. Joules, $J$), if needed, and then converted fuel units from energy to tonnes ($t$) for coal and cubic metres ($m^3$) for gas.

## Emissions Calculations: Allocation of Emissions by Finance Share

Emissions factors were used as described above. Recall that capacity is presumed fixed at the present rate, except where capacity factors are known (only for power plants). For total project emissions, we ensure that projects with multiple loans (transactions) are not double counted, and the total emissions for each project is reported. For JBIC's share and co-financing share of project emissions, we take the proportion of total asset value, which is determined by using CapEx when available or total transaction value for unfinished projects for those without reported CapEx. These are left disaggregated at first, so that each loan can be determined to be active or repaid. Total emissions related to active loans are then reported by omitting those where loans are suspected to be repaid. Note that for projects where co-financed amounts are not publicly disclosed, we use the JBIC-only share of financing. Many transactions either do not have co-financing or co-financed amounts are not known, and therefore these co-financed emissions are underestimated.

## Tenor Lengths and Determining Whether a Loan is Active

We sourced tenor lengths from databases (e.g. IJGlobal) or bank reporting from e.g. press releases or shareholder reports. To fill the gaps in the data, we used a multiple linear regression to estimate a relationship between tenor length and possible determinants, e.g. project type, country, region, and income level of each country. We tried combinations of these and found that only using countries as the independent variable provides the best fit however because there are 43 countries and 184 transactions, using countries risks overfitting, and we would also expect project type to play an important role in determining the type of loan, so we instead opted for a fit that uses project type and income-level (which performed better than regions as an independent variable).

## Timeseries via Superposition of Projects

We created a timeseries for each project by setting its emissions to a constant value equal to the product of its capacity and emissions factor for all years a project is funded, and zero otherwise, creating a step function that turns on when a loan is active and off when it is not. Then we created a timeseries for each project type (and other categorical and lifecycle aggregations) by superposing each step function over the domain of all projects, i.e. by summing each individual timeseries together (Figure 1).

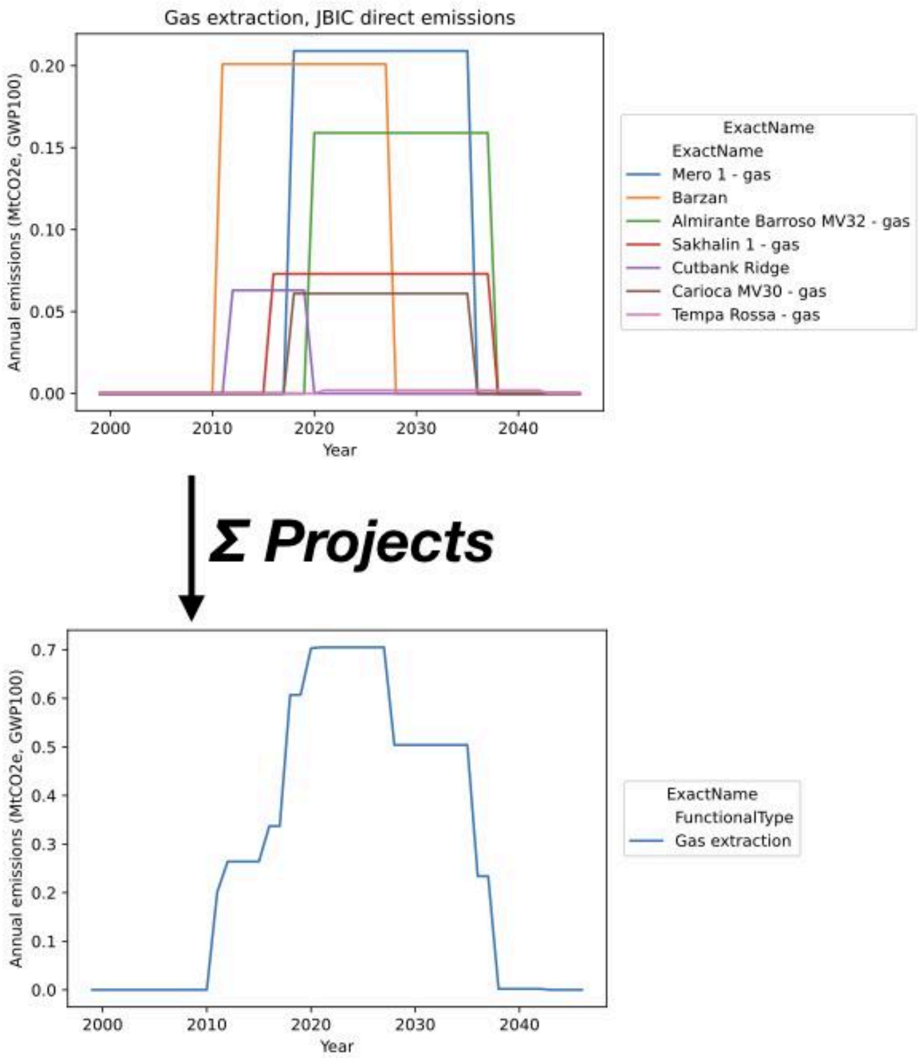



**Figure 1. Superposition of individual projects (top) to create timeseries of project type or other aggregated category or lifecycle emissions across supply chain.** Here we used gas extraction projects as an illustrative example but this has been done for all project types and categories. The emissions shown here are of JBIC's share of project emissions without cofinancing, in GWP100.

# Emissions Aggregation Using the Consequential Approach

To estimate the climate impact of JBIC's fossil fuel financing, we applied the consequential approach of emissions attribution. This approach seeks to capture the real-world emissions resulting from JBIC's financial involvement, not just the direct emissions from projects it has funded. It asks the central question: *Would these emissions occur in the absence of JBIC's financing?*

Accordingly, we include both:

- Direct emissions (Scope 1) from the financed projects themselves, and
- Indirect emissions (Scope 3) from other projects along the same supply chain.

The rationale is as follows—all direct emissions occur from a project, as well as any indirect emissions occurring that would not have occurred otherwise and are not already included in JBIC’s portfolio, since this would result in counting the same emissions as being directly emitted from one project and indirectly emitted by another. We acknowledge that this approach does not conserve emissions globally since the indirect emissions from a project financed by JBIC would be counted as the direct emissions from a project financed by another entity.[6]

To avoid double counting, we exclude overlapping emissions within the portfolio by fuel type, under the assumption that fossil fuels—particularly oil, LNG, and much of the coal—are traded globally or regionally within integrated markets where JBIC-funded infrastructure operates. This assumption holds especially well in contexts where extraction, transport, and combustion infrastructure are tightly coupled, such as LNG terminals supplying international markets or coal mines feeding nearby power plants.

The approach assumes globally integrated energy markets and follows these key steps:

1. Summing direct emissions from upstream (extraction) and downstream (combustion) projects.
2. Calculating the difference between upstream and downstream indirect emissions (or volumes), using the absolute value to represent emissions occurring elsewhere in the market system due to JBIC-related flows.
3. Adding the direct emissions (step 1) and the absolute value of the difference in indirect emissions (step 2) to yield the consequentialist aggregated total.

## Gas Emissions Processing

For gas-related infrastructure, specific methodological steps were implemented to integrate upstream and downstream emissions while avoiding double-counting:

[6] For example, if JBIC finances a gas plant, but not the gas extracted, the gas extraction would be financed by another entity, to which it would be allocated the gas extraction’s direct emissions. If you were to perform this method for all firms and take the sum of their emissions portfolios, it would exceed the direct emissions of all projects. However, this approach is still deemed appropriate and commonly employed to illustrate the climate impact of an isolated investor’s financing decisions.

**Upstream Integration:** The analysis filtered for gas extraction and LNG terminal projects, implementing an overlap adjustment methodology to prevent emissions double-counting. Direct emissions were aggregated by country, year, and functional type. For each country-year combination, LNG terminal emissions were compared with gas extraction emissions. When gas extraction exceeded LNG terminal emissions, only gas extraction values were retained (i.e. the amount of gas used in the LNG produced was already fully contained in that country's gas extraction). When LNG emissions were higher, the difference (LNG minus gas extraction) was added to the gas extraction total, treating this as additional production capacity.

This emissions-based aggregation approach assumes that LNG terminals and gas extraction facilities within the same country have roughly similar emissions factors. While this may not perfectly reflect reality, it provides a direct method for combining emissions without requiring volume-based calculations and subsequent emissions factor applications.

**Downstream Integration using Consequentialist Calculation:** The adjusted upstream gas extraction emissions were then combined with gas-fired power generation emissions to create a comprehensive dataset covering the full gas value chain from extraction through electricity generation. Total direct emissions were calculated by summing across both functional types (gas extraction and gas-fired generation) for each year. The absolute difference in indirect emissions between the two functional types was computed to capture the differential impact of choosing one pathway over another. Final consequentialist emissions combined total direct emissions plus the absolute difference in indirect emissions between functional types.

## Other Fuel Types

**Coal:** Coal emissions were aggregated using the same consequentialist methodology as gas, combining upstream (coal extraction/mining) and downstream (coal-fired power generation) emissions. However, unlike gas, no initial overlap adjustment was required since there were no overlapping functional types comparable to the LNG terminal and gas extraction overlap. Direct emissions were summed across both coal extraction and coal-fired generation for each year, and the absolute difference in indirect emissions between the two functional types was calculated and added to yield the final consequentialist total. Although coal types were not differentiated, this simplification is not expected to drastically alter the outcome. Regional trade dynamics for coal were not delineated, but this may be revisited in future refinements.

**Oil**: Oil sector estimates were based solely on lifecycle emissions from extraction, given the absence of downstream oil infrastructure in JBIC's portfolio.

The consequential approach reflects JBIC's real-world role in bringing fossil projects to life—especially in co-financed megaprojects—by assuming that co-financed tranches are typically interdependent. Projects involving only minor equity stakes in large firms (e.g. ADNOC) might deserve separate treatment, but were retained in the total for now.

All calculations were performed separately for different emission categories and global warming potential timeframes (GWP100 and GWP20), providing a comprehensive assessment of climate impact across different temporal perspectives and emission scopes.

# Results

## Portfolio Scope and Selection

We compiled and analyzed a dataset of 160 fossil fuel infrastructure loan transactions made by JBIC between 1999 and 2024. From this broader set, we selected only those loans associated with upstream infrastructure, including extraction and processing, and downstream infrastructure, defined as end-use combustion projects (e.g. gas-fired power plants).

We excluded midstream infrastructure (e.g. refineries, tankers, pipelines) from the sample. While such infrastructure contributes to emissions, it typically exists to serve upstream and downstream ends, and our aim was to quantify the consequential emissions burden attributable to JBIC's financing.[7] This choice reflects a system-level attribution approach: emissions are counted where they would not otherwise exist in the absence of both extraction and combustion capacity. This allowed us to combine emissions from projects at disparate ends of the supply chain and enabled estimates of total portfolio emissions.

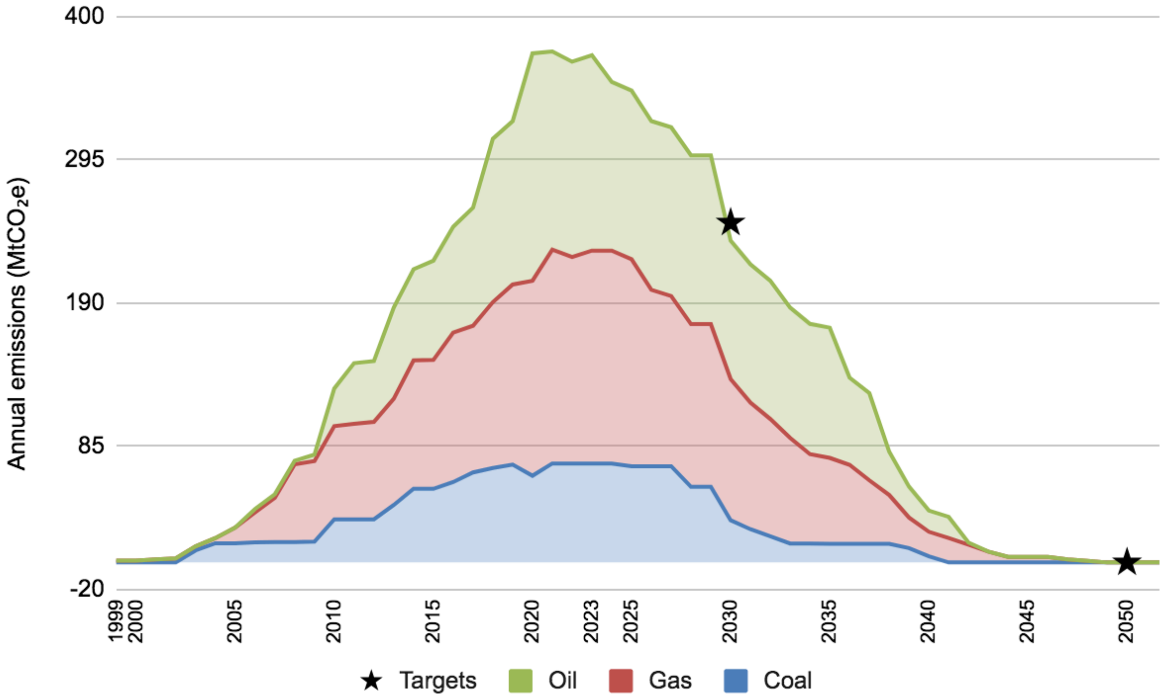
In this framework, LNG terminals were grouped with upstream assets before aggregating emissions across the supply chain, as they are typically built to facilitate gas extraction that would otherwise not occur. Projects producing both oil and gas were split into separate extraction categories to allow for aggregation by fuel type across the supply chain. This filtering left a final sample of 124 loan transactions across 104 distinct projects.

Figure 2 shows the geographical distribution of projects funded by JBIC, depicting the whole sample from 1999 to 2024, using total (i.e. unweighted by financial contribution) by project (with duplicates removed).

[7] Note that pipelines are sometimes built to facilitate expansion of oil or gas supply, and in their expanse, supply would be constrained. This is not the case in our dataset, where there are only two pipelines, one built to feed a gas power plant, which was included in the sample, and so its emissions were captured; and the other services coastal Brazil, from which we capture a sizable amount of gas production already. Hence adding these does not capture unrepresented emissions and further complicates aggregated emissions across the supply chain.


**Figure 2. Map of fossil fuel projects funded by JBIC.** Each circle represents national annual emissions by project type (total emissions, not share) and uses GWP100 to combine $CO_2$ and $CH_4$. The circle area is logarithmically scaled. Sample contains all projects funded from 1999 to 2024.

Figure 3 depicts emissions trends for the portfolio aggregated across supply chains by fuel type. Aggregated emissions mobilized by JBIC with cofinancing peak in 2021 and 2020 at 374 and 439 $MtCO_2e$ per year for GWP100 and GWP20, respectively (Table 1). Figure 4 contextualizes this aggregation between lower and upper boundaries of direct and lifecycle emissions.



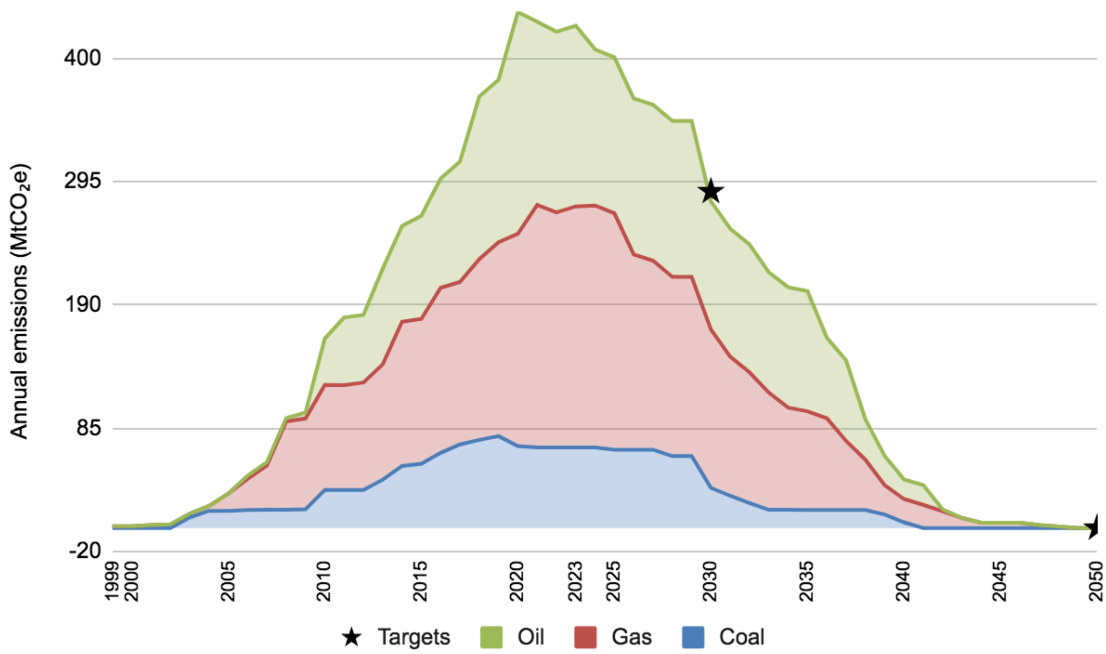




**Figure 3. Aggregated supply chain emissions using a consequentialist approach for share of emissions attributable to JBIC with cofinancing (top: GWP100, bottom: GWP20) .** Emissions trends are stacked such that top of oil (green line) indicates the total annual portfolio emissions. Targets are proportional to global emissions under the IEA NZE pathway, requiring 33% below 2023 levels by 2030 and zero by 2050.

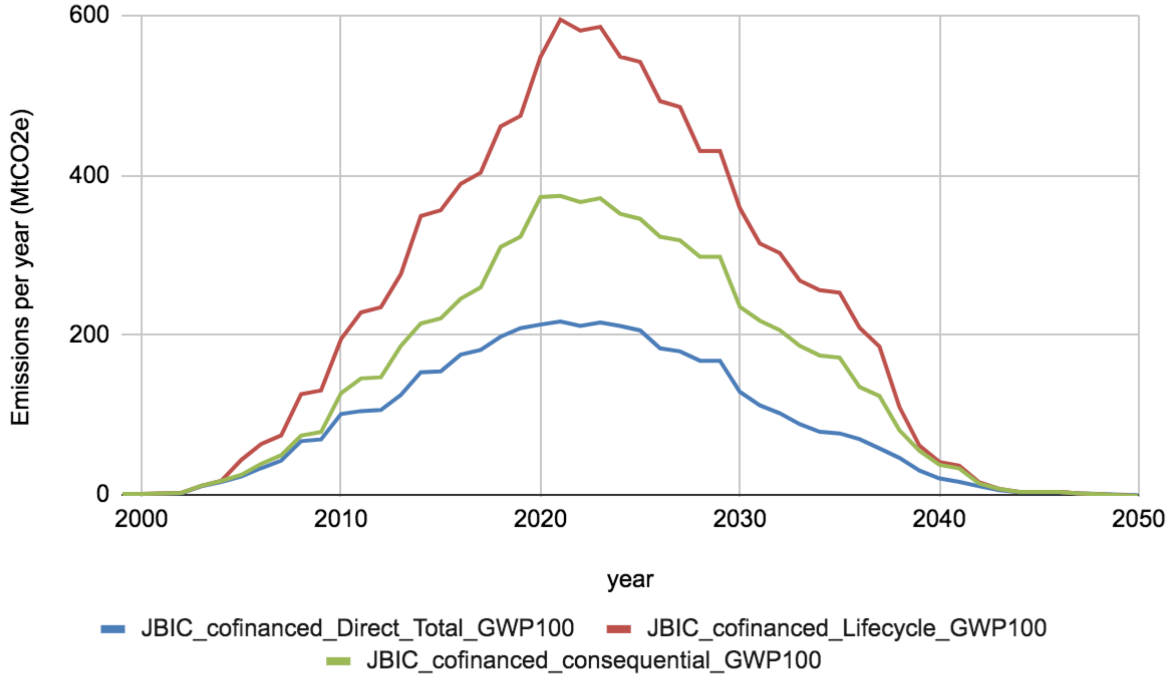



**Figure 4. Comparison of total direct (blue), consequentialist (green), and lifecycle (red) emissions.** Note that lifecycle emissions partially double count emissions, which is remedied by the consequentialist approach.

Figure 5 shows emissions over time from projects funded by JBIC by project type. Note that we do not differentiate between gas power for electricity or water desalinization in this classification scheme. Also notice that the full project emissions patterns differ substantially from shares, especially for oil extraction. This is because JBIC invests broadly in large oil producers like Abu Dhabi National Oil Company (ADNOC), and owns a relatively minor share in oil producing firms, which contrasts starkly from the much larger shares owned of individual projects that constitute the majority of JBIC's holdings.

Finally, Table 1 summarizes the key statistics for the total emissions timeseries.

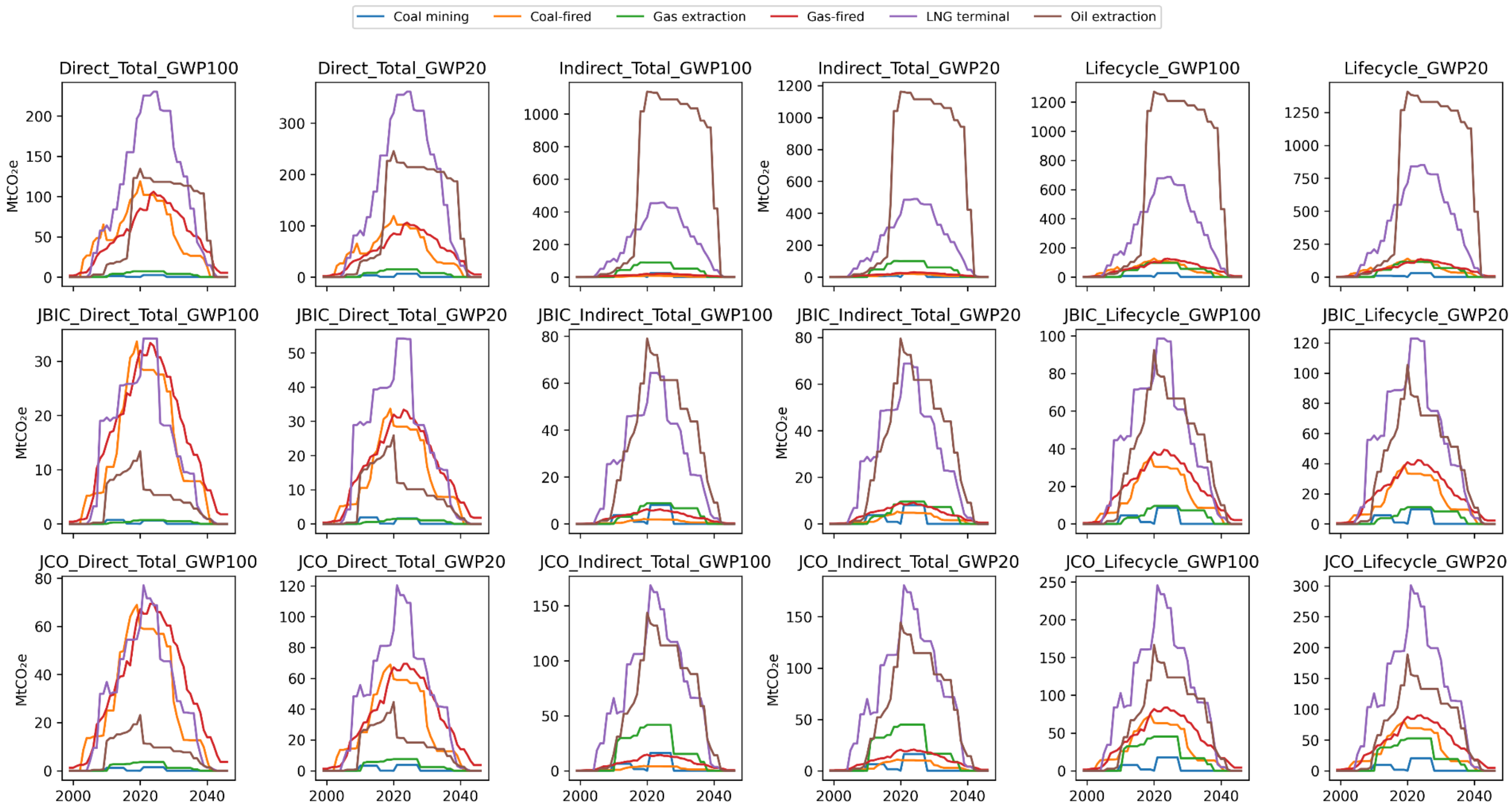



**Figure 5. Emissions by project type.** The first row contains total project emissions (unweighted). The second row contains emissions proportional to JBIC funding. The third row contains emissions proportional to JBIC funding with cofinancing.

**Table 1. Summary of total emissions for each allocation, for total project emissions (a), JBIC funded portion (b) and JBIC with confinanced portion (c), consequential emissions (d), and annual consequential emissions (e).**

| a | Total project emissions | | | | | |
|---|---|---|---|---|---|---|
| | Direct GWP100 | Direct GWP20 | Indirect GWP100 | Indirect GWP20 | Lifecycle GWP100 | Lifecycle GWP20 |
| Peak (max) emissions (MtCO2e) | 566 | 806 | 1725 | 1812 | 2285 | 2616 |
| Peak year | 2024 | 2024 | 2021 | 2021 | 2023 | 2023 |
| Cumulative 1999-2050 (GtCO2e) | 12.2 | 17.3 | 36.9 | 38.8 | 49.1 | 56.0 |
| Cumulative 2025-2050 (GtCO2e) | 5.9 | 8.7 | 22.0 | 23.0 | 27.9 | 31.7 |

| b | JBIC project emissions | | | | | |
|---|---|---|---|---|---|---|
| | Direct GWP100 | Direct GWP20 | Indirect GWP100 | Indirect GWP20 | Lifecycle GWP100 | Lifecycle GWP20 |
| Peak (max) emissions ($MtCO_2e$) | 104 | 131 | 162 | 173 | 265 | 303 |
| Peak year | 2023 | 2023 | 2021 | 2021 | 2023 | 2023 |
| Cumulative 1999-2050 ($GtCO_2e$) | 2.2 | 2.8 | 3.0 | 3.3 | 5.3 | 6.1 |
| Cumulative 2025-2050 ($GtCO_2e$) | 0.8 | 1.0 | 1.3 | 1.4 | 2.2 | 2.5 |

| c | JBIC with cofinancing project emissions | | | | | |
|---|---|---|---|---|---|---|
| | Direct GWP100 | Direct GWP20 | Indirect GWP100 | Indirect GWP20 | Lifecycle GWP100 | Lifecycle GWP20 |
| Peak (max) emissions ($MtCO_2e$) | 217 | 277 | 378 | 406 | 595 | 683 |
| Peak year | 2021 | 2021 | 2021 | 2021 | 2021 | 2021 |
| Cumulative 1999-2050 ($GtCO_2e$) | 4.6 | 5.8 | 6.9 | 7.5 | 11.5 | 13.3 |
| Cumulative 2025-2050 ($GtCO_2e$) | 1.8 | 2.2 | 3.1 | 3.3 | 4.8 | 5.5 |

| d | Consequential emissions | | | | | |
|---|---|---|---|---|---|---|
| | Total GWP100 | Total GWP20 | JBIC GWP100 | JBIC GWP20 | JBIC w/cofin GWP100 | JBIC w/cofin GWP20 |
| Peak (max) emissions ($MtCO_2e$) | 1722 | 1983 | 189 | 223 | 374 | 439 |
| Peak year | 2023 | 2020 | 2020 | 2020 | 2021 | 2020 |
| Cumulative 1999-2050 ($GtCO_2e$) | 37.8 | 43.6 | 3.8 | 4.5 | 7.6 | 8.9 |
| Cumulative 2025-2050 ($GtCO_2e$) | 22.5 | 25.8 | 1.6 | 1.8 | 3.3 | 3.8 |

| e | Annual Consequential emissions | | | | | |
|---|---|---|---|---|---|---|
| year | Total GWP 100 | Total GWP20 | JBIC GWP100 | JBIC GWP20 | JBIC w/cofin GWP100 | JBIC w/cofin GWP20 |
| 1999 | 2.1 | 2.3 | 0.5 | 0.5 | 1.4 | 1.6 |
| 2000 | 2.1 | 2.3 | 0.5 | 0.5 | 1.4 | 1.6 |
| 2001 | 3.3 | 3.7 | 0.6 | 0.7 | 2.3 | 2.5 |
| 2002 | 6.3 | 6.9 | 1.0 | 1.1 | 2.9 | 3.2 |
| 2003 | 28.6 | 30.0 | 3.9 | 4.1 | 11.8 | 12.3 |
| 2004 | 35.0 | 36.7 | 6.7 | 7.1 | 17.9 | 18.9 |
| 2005 | 45.8 | 50.8 | 9.6 | 10.6 | 25.5 | 29.4 |
| 2006 | 115.8 | 128.9 | 16.7 | 18.5 | 39.2 | 44.7 |
| 2007 | 132.2 | 147.2 | 22.8 | 25.1 | 49.9 | 56.2 |
| 2008 | 165.81 | 197.1 | 40.6 | 52.0 | 74.5 | 93.6 |
| 2009 | 191.3 | 223.9 | 43.1 | 54.7 | 79.0 | 98.4 |
| 2010 | 207.1 | 250.3 | 68.6 | 87.9 | 127.5 | 161.5 |
| 2011 | 232.6 | 275.1 | 80.5 | 100.5 | 146.1 | 179.4 |
| 2012 | 261.7 | 314.4 | 81.5 | 101.9 | 147.5 | 181.6 |
| 2013 | 302.7 | 358.2 | 99.7 | 120.8 | 186.8 | 221.0 |
| 2014 | 351.6 | 429.3 | 113.0 | 137.1 | 214.9 | 257.3 |
| 2015 | 384.7 | 469.5 | 120.2 | 144.3 | 221.1 | 266.1 |
| 2016 | 459.9 | 572.9 | 129.6 | 157.5 | 245.9 | 297.7 |
| 2017 | 837.8 | 978.2 | 139.5 | 167.8 | 259.9 | 312.3 |
| 2018 | 1481.8 | 1706.9 | 161.8 | 192.4 | 310.5 | 367.5 |
| 2019 | 1540.2 | 1798.6 | 168.3 | 199.9 | 323.4 | 381.9 |
| 2020 | 1708.1 | 1982.8 | 188.9 | 223.0 | 373.0 | 439.5 |
| 2021 | 1706.1 | 1962.4 | 186.2 | 213.4 | 374.4 | 431.4 |
| 2022 | 1700.6 | 1956.5 | 185.0 | 212.1 | 366.9 | 422.7 |
| 2023 | 1722.5 | 1979.9 | 187.5 | 214.9 | 371.6 | 427.9 |
| 2024 | 1690.6 | 1949.9 | 175.6 | 202.3 | 352.1 | 407.7 |

| | | | | | | |
|---|---|---|---|---|---|---|
| **2025** | 1678.0 | 1937.8 | 172.3 | 198.7 | 345.8 | 401.0 |
| **2026** | 1656.0 | 1902.7 | 156.6 | 174.2 | 323.4 | 365.9 |
| **2027** | 1650.0 | 1895.9 | 154.3 | 171.4 | 318.9 | 360.7 |
| **2028** | 1610.0 | 1868.2 | 143.5 | 164.9 | 298.3 | 346.8 |
| **2029** | 1609.6 | 1868.2 | 143.5 | 164.9 | 298.3 | 346.8 |
| **2030** | 1497.0 | 1739.2 | 115.5 | 134.3 | 235.7 | 278.1 |
| **2031** | 1468.2 | 1699.1 | 107.3 | 124.0 | 218.4 | 255.0 |
| **2032** | 1452.4 | 1680.9 | 100.1 | 115.9 | 206.5 | 241.6 |
| **2033** | 1393.1 | 1607.6 | 87.5 | 100.8 | 186.8 | 217.9 |
| **2034** | 1374.7 | 1588.0 | 83.8 | 96.8 | 174.8 | 205.2 |
| **2035** | 1329.7 | 1511.9 | 82.9 | 95.6 | 172.1 | 202.0 |
| **2036** | 1240.5 | 1415.1 | 66.1 | 77.4 | 135.4 | 162.2 |
| **2037** | 1200.9 | 1348.5 | 60.3 | 67.7 | 124.0 | 142.9 |
| **2038** | 1141.8 | 1277.9 | 44.3 | 49.7 | 81.1 | 92.8 |
| **2039** | 1116.5 | 1244.4 | 32.6 | 36.1 | 55.5 | 61.4 |
| **2040** | 530.3 | 572.4 | 21.5 | 23.4 | 38.0 | 41.5 |
| **2041** | 516.3 | 557.0 | 18.0 | 19.7 | 33.4 | 36.5 |
| **2042** | 30.9 | 35.2 | 6.2 | 6.8 | 14.6 | 16.0 |
| **2043** | 10.6 | 11.6 | 2.6 | 2.8 | 7.9 | 8.7 |
| **2044** | 6.0 | 6.7 | 2.0 | 2.2 | 4.1 | 4.6 |
| **2045** | 6.0 | 6.7 | 2.0 | 2.2 | 4.1 | 4.6 |
| **2046** | 6.0 | 6.7 | 2.0 | 2.2 | 4.1 | 4.6 |
| **2047*** | 3.7 | 4.2 | 1.7 | 1.9 | 2.2 | 2.5 |
| **2048*** | 2.3 | 2.7 | 1.6 | 1.8 | 1.1 | 1.3 |
| **2049*** | 1.0 | 1.2 | 1.4 | 1.6 | 0 | 0.1 |
| **2050*** | 0 | 0 | 1.2 | 1.4 | 0 | 0 |

*Extrapolated linearly based on the last four years.

# 1.5°C Alignment

Here we use an institutional 1.5°C scenario to determine whether JBIC's emissions align with the Paris Agreement's goal of limiting global heating well below 2ºC. Most scientists and global leaders agree a more precise target should aspirationally be limiting temperature rise to 1.5°C by the end of the century.[8] As one reference point, we consider the International Energy Agency's (IEA) Net Zero Emissions by 2050 (NZE) pathway,[9] using its global reduction targets of 33% below 2023 levels by 2030 and zero emissions by 2050 as a guide or goalpost for an institution's expected mitigation. Although some banks use the IEA NZE pathway as a standard for 1.5 °C alignment, it should be noted, however, that legacy pathways like the NZE are quite lenient, given that they necessarily rely on substantial negative emissions and a temporary overshoot of 1.5°C to allow for an economically-optimal transition to a carbon-neutral energy system (Brecha et al., 2022). Furthermore, global temperatures have already reached 1.5°C above preindustrial levels,[10] while global emissions trajectories have not tapered off to align with declining emissions in 1.5°C-compliant pathways. This means that successive mitigation efforts continue to be delayed and will need to be accordingly more aggressive to meet a 1.5°C target. In this regard, we see the more stringent IPCC pathway as the better standard of assessing 1.5°C goal alignment. The IPCC target is the GHG emission reduction of 43% compared to 2019 levels by 2030 (IPCC, 2023).

When applying the above approach to JBIC's portfolio and comparing it to a 1.5°C-aligned emissions trajectory, we find that under each of the three attribution methods described above—the results are not aligned with the reduction rate required by the IPCC. Relative to 2019 levels, the projected 2030 reduction rates are −3% for the total emissions of JBIC-supported projects, −27% for JBIC's financed emissions including co-financing, and −31% for JBIC's financed emissions based on JBIC's lending share only; none meets the 43% reduction target (see Table 2). These figures assume that JBIC ceases all lending and investment to fossil gas projects from 2025 onward. If JBIC continues fossil-fuel financing, the divergence from the IPCC's reduction target will widen further.

Regarding the IEA and Science Based Targets initiative (SBTi) pathways, if JBIC ceased all new fossil fuel lending immediately, the emissions from its financed share of active projects would decline fast enough to align with the global NZE pathway, as well as the 4.2% annual decline required under the SBTi framework (Table 2). This trajectory, however, assumes no additional financing and does not account for ongoing emissions from projects after loans are repaid. If the current pace of fossil gas financing continues, JBIC's emissions will likely exceed what is allowable under both 1.5°C-aligned pathways.

Note that IEA and SBTi frameworks do not necessarily align with global measures needed to limit warming to 1.5°C, which are based on likely insufficient measures to limit warming to 1.5°C by 2100. Also note that scaling emissions down from global targets is not necessarily appropriate when not all sectors must decarbonize at the same scale and speed. Fossil fuel supply and use are the most prominent sources of GHG emissions and likewise should be

[8] https://unfccc.int/process-and-meetings/the-paris-agreement

[9] https://www.iea.org/reports/global-energy-and-climate-model/net-zero-emissions-by-2050-scenario-nze

[10] https://climate.copernicus.eu/global-climate-highlights-2024

phased out more rapidly than other sectors. However, we have chosen to include 1.5°C-alignment approaches commonly used by the financial sector as well, even though we feel them to be insufficient, since they allow for consistent reporting to those familiar with these approaches.

Further, this method does not account for equity considerations that would imply wealthier or more capable actors to decarbonize faster. We also call attention to how setting targets from peak or near-peak emissions levels, as this approach does with JBIC's emissions, emphasizes the speed of decarbonization once new loans have stopped. Using other base years may result in misalignment with 1.5°C trajectories, even with the IEA and SBTi's 1.5°C-alignment approaches.

**Table 2. Results of 1.5°C-alignment (IPCC).** Comparing the emissions reduction rates under each attribution method (consequential) with the IPCC's reduction targets.

| **Emission Attribution (consequentialist) emissions** | **Estimated 2019 ($MtCO_2e$)** | **Predicted 2030 ($MtCO_2e$)** | **Percent change** | **IPCC aligned? (-43%)** |
|---|---|---|---|---|
| **Total (GWP100)** | 1,540 | 1,497 | **−3%** | ✗ |
| **JBIC with cofinanced (GWP100)** | 323 | 236 | **−27%** | ✗ |
| **JBIC (GWP100)** | 168 | 115 | **−31%** | ✗ |

Rounded to the nearest whole number. Since the IPCC adopts GWP100 (p. 4), our assessment of consistency with IPCC figures also uses GWP100 exclusively.

**Table 3. Results of 1.5°C-alignment (IEA and SBTi).** Comparing emissions from projects using aggregated (consequentialist) emissions across the supply chain, based on decline from peak emissions. SBTi requires a 4.2% annual reduction to be "1.5°C compliant."

| Aggregated (consequentialist) emissions | Slope ($MtCO_2e$ /year) | Percent change (%/year) | SBTi 1.5°C-aligned? | Predicted 2030 | Actual 2030 | Targeted 2030 | IEA NZE 1.5° -aligned? | 1.5°-aligned? (within 5%) |
|---|---|---|---|---|---|---|---|---|
| **Total (GWP100)** | -84 | -4.9 | ✔ | 1457 | 1497 | 1154 | ✘ | ✘ |
| **Total (GWP20)** | -84 | -4.3 | ✔ | 1572 | 1739 | 1327 | ✘ | ✘ |
| **JBIC (GWP100)** | -9 | -4.5 | ✔ | 119 | 115 | 126 | ✔ | ✔ |
| **JBIC (GWP20)** | -10 | -4.4 | ✔ | 137 | 134 | 144 | ✔ | ✔ |
| **JBIC with cofinanced (GWP100)** | -18 | -4.7 | ✔ | 244 | 236 | 249 | ✔ | ✔ |
| **JBIC with cofinanced (GWP20)** | -20 | -4.5 | ✔ | 279 | 278 | 287 | ✔ | ✔ |

# Emissions Scale and Systemic Impact

## Direct Emissions from JBIC-financed Fossil Fuel Projects

The magnitude of JBIC's emissions footprint is substantial by any standard. Annual direct emissions from JBIC-financed fossil fuel projects reached a peak of approximately 100 $MtCO_2e$ (GWP100) to 130 $MtCO_2e$ (GWP20) in 2023, a figure comparable to the annual emissions of smaller wealthy industrialized countries or medium-sized poorer countries. When co-financing is included, this figure roughly doubles, underscoring JBIC's catalytic role in enabling large-scale fossil infrastructure. While JBIC cannot be held directly responsible for emissions funded by other entities, the total direct emissions from projects held in its portfolio provides an important larger context, with projects directly emitting 560 $MtCO_2e$ (GWP100) to 800 $MtCO_2e$ (GWP20) at their peak in 2024.

## LNG Megaprojects

The emissions from LNG-related projects are particularly significant. Lifecycle emissions are projected to have peaked at 246 $MtCO_2e$/year (GWP100) and 300 $MtCO_2e$/year (GWP20) in 2021. Cumulative emissions from 2025–2050 are estimated to be 1.7 $GtCO_2e$ (GWP100) to 2.1 $GtCO_2e$ (GWP20). These emissions arise from the full LNG chain, including upstream extraction, midstream processing and shipping, and downstream combustion. While lifecycle estimates may slightly overlap with other categories, they provide a realistic view of the scale of JBIC's financing influence when examining LNG projects in isolation.

### Emissions Peak Timing

Emissions generally peak around 2020–2024 if there is no new finance to fossil fuel projects, reflecting the clustering of JBIC's active fossil fuel loans during that period. Without policy change, each new project pushes the peak later, extending the climate impact window of JBIC's portfolio.

## Limitations and Opportunities for Refinement

While this aggregation represents the most complete and policy-relevant estimate to date of JBIC's portfolio emissions, several limitations remain. The limited fungibility or mobility of some fossil fuels like coal complicates attribution based on trade routes. For LNG, contracted vs. spot market distinctions were not fully modeled. Coal trade regions were treated globally due to lack of clear boundaries. The treatment of co-financing assumes substantial project-level interdependency; smaller minority stakes might merit future methodological filtering. Further development could refine these limitations, particularly if aligned with academic publication or dedicated research funding. At this stage, the results provide a defensible and impactful estimate of the climate implications of Japan's public development financing deployed by JBIC. We also note that we used base case scenarios for methane losses across the supply chain, however, these could be supplemented with emerging research that hybridizes top-down with bottom-up methane emissions estimates.

# Discussion and Conclusions

Touted as "Japan's policy-based financial institution," JBIC is a government-owned entity that provides financial support for Japanese companies' overseas business development and is mandated with securing a stable and reliable supply of fossil fuel imports (predominantly oil and gas in the form of LNG, with some metallurgical coal for steel production) thereby supposedly contributing to Japan's energy security. JBIC tends to overinvest in upstream extraction in oil and gas fields, and coal mines; thereby increasing global supply more than Japanese demand, lowering prices and incentivising additional consumption (e.g. Erickson & Lazarus, 2014). JBIC also invests heavily in midstream (e.g. LNG terminals, refineries, pipelines, tankers) and downstream energy projects around the world including many gas- and coal-fired power plants. These financial decisions make JBIC a critical player in promoting the production and use of fossil fuels, and contributes strongly to locking in carbon intensive energy systems around the world (Erickson et al., 2015; Erickson & Lazarus, 2015; Seto et al., 2016).

Despite JBIC's public claims of climate responsibility, our analysis reveals that its ongoing fossil fuel financing is fundamentally incompatible with the goals of the Paris Agreement. If JBIC were to immediately cease funding new fossil fuel projects and refinancing existing ones, its emissions profile would align more closely with a 1.5°C-consistent pathway. However, this narrow compatibility obscures two critical issues: first, that such global pathways are themselves increasingly viewed as insufficient in light of accelerating climate impacts and equity concerns; and second, that JBIC continues to approve new fossil fuel projects, thereby extending its financed emissions well into the future and violating the spirit—and likely the letter—of international climate commitments.

The scale of JBIC's climate impact is stark. Using a consequential aggregation approach, the infrastructure it has financed since 1999 is associated with an estimated peak annual emissions of up to 1.7 $GtCO_2e$ (GWP100)—roughly equivalent to the combined annual emissions of Japan and Canada. Even JBIC's attributable share of emissions peaked at 189 $MtCO_2e$ (GWP100) in 2020, comparable to the entire national emissions of Ethiopia or Qatar that same year.[11] Over the full 1999–2050 time horizon, JBIC's share (not including co-finance) of cumulative emissions exceeds 3.8 $GtCO_2e$, and this rises to 7.6 $GtCO_2e$ when including cofinancing—over five times the emissions of the entire EU Emissions Trading System.[12] Looking ahead, from 2025 to 2050, JBIC's share of emissions (including co-finance) could still total 3.3 $GtCO_2e$, underscoring the long-lasting climate impact of projects already approved or under construction.

Relying on the date of loan activation or repayment to define climate responsibility is both analytically and ethically flawed, even though this report follows this mainstream methodology. Infrastructure enabled by JBIC often continues to operate for decades after the loan is repaid. If JBIC's financing was instrumental in project completion and operationalization, then the associated emissions—regardless of timing—should be attributed to JBIC's decision to fund. Failing to recognize this extended responsibility significantly understates the climate implications of its portfolio.

While applying global phaseout dates to a single financial institution may oversimplify the nuances of responsibility, the principle is clear: continued fossil fuel financing today undermines the possibility of a livable climate future. JBIC has the power to end its complicity—but as long as it continues funding fossil infrastructure, it remains a central driver of global emissions and climate breakdown.

[11] https://edgar.jrc.ec.europa.eu/report_2023. For reference: Ethiopia is a developing country of over 130 million, and Qatar a wealthy country of 2.9 million.
[12] https://icapcarbonaction.com/en/ets/eu-emissions-trading-system-eu-ets

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# Appendix 1. Annual emissions by functional project type and attribution

**Table A1. Annual emissions by functional project type and attribution, GWP20, 1999–2046 ($MtCO_2e/yr$)**

| Functional Type | year | Direct | Indirect | Lifecycle | JBIC w/cofin Direct | JBIC w/cofin Indirect | JBIC w/cofin Lifecycle |
|---|---|---|---|---|---|---|---|
| Coal mining | 1999 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2000 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2001 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2002 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2003 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2004 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2005 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2006 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2007 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2008 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2009 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2010 | 3.2 | 6.3 | 9.5 | 3.2 | 6.3 | 9.5 |
| | 2011 | 3.2 | 6.3 | 9.5 | 3.2 | 6.3 | 9.5 |
| | 2012 | 3.2 | 6.3 | 9.5 | 3.2 | 6.3 | 9.5 |
| | 2013 | 3.2 | 6.3 | 9.5 | 3.2 | 6.3 | 9.5 |
| | 2014 | 3.2 | 6.3 | 9.5 | 3.2 | 6.3 | 9.5 |
| | 2015 | 3.2 | 6.3 | 9.5 | 3.2 | 6.3 | 9.5 |
| | 2016 | 0.4 | 7.6 | 8 | 0.1 | 1.5 | 1.6 |
| | 2017 | 0.4 | 7.6 | 8 | 0.1 | 1.5 | 1.6 |
| | 2018 | 0.4 | 7.6 | 8 | 0.1 | 1.5 | 1.6 |
| | 2019 | 0.4 | 7.6 | 8 | 0.1 | 1.5 | 1.6 |
| | 2020 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2021 | 6.5 | 23.5 | 30 | 3.8 | 16.2 | 20 |
| | 2022 | 6.5 | 23.5 | 30 | 3.8 | 16.2 | 20 |
| | 2023 | 6.5 | 23.5 | 30 | 3.8 | 16.2 | 20 |
| | 2024 | 6.5 | 23.5 | 30 | 3.8 | 16.2 | 20 |
| | 2025 | 6.5 | 23.5 | 30 | 3.8 | 16.2 | 20 |
| | 2026 | 6.5 | 23.5 | 30 | 3.8 | 16.2 | 20 |
| | 2027 | 6.5 | 23.5 | 30 | 3.8 | 16.2 | 20 |
| | 2028 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2029 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2030 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2031 | 0 | 0 | 0 | 0 | 0 | 0 |

| Functional Type | year | Direct | Indirect | Lifecycle | JBIC w/cofin Direct | JBIC w/cofin Indirect | JBIC w/cofin Lifecycle |
|---|---|---|---|---|---|---|---|
| | 2032 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2033 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2034 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2035 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2036 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2037 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2038 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2039 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2040 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2041 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2042 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2043 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2044 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2045 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2046 | 0 | 0 | 0 | 0 | 0 | 0 |
| Coal-fired | 1999 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2000 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2001 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2002 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2003 | 21.8 | 1.1 | 22.9 | 8.6 | 0.4 | 9 |
| | 2004 | 26.7 | 1.8 | 28.5 | 13.5 | 1.1 | 14.7 |
| | 2005 | 26.7 | 1.8 | 28.5 | 13.5 | 1.1 | 14.7 |
| | 2006 | 43.6 | 3.1 | 46.7 | 14.2 | 1.2 | 15.4 |
| | 2007 | 48.4 | 5 | 53.4 | 14.3 | 1.3 | 15.6 |
| | 2008 | 48.4 | 5 | 53.4 | 14.3 | 1.3 | 15.6 |
| | 2009 | 65.3 | 6.4 | 71.6 | 14.7 | 1.3 | 15.9 |
| | 2010 | 45.9 | 4.7 | 50.6 | 25 | 1.9 | 26.9 |
| | 2011 | 45.9 | 4.7 | 50.6 | 25 | 1.9 | 26.9 |
| | 2012 | 45.9 | 4.7 | 50.6 | 25 | 1.9 | 26.9 |
| | 2013 | 50.5 | 7.2 | 57.7 | 36.5 | 4.8 | 41.3 |
| | 2014 | 66.4 | 9.7 | 76 | 49.2 | 6.7 | 56 |
| | 2015 | 70.6 | 12.7 | 83.3 | 49.7 | 8.2 | 57.9 |
| | 2016 | 79.9 | 13.1 | 93.1 | 57 | 8.5 | 65.5 |
| | 2017 | 95.5 | 14.8 | 110.3 | 63.9 | 8.9 | 72.8 |
| | 2018 | 99.3 | 16 | 115.3 | 66.7 | 9.9 | 76.6 |
| | 2019 | 104.7 | 18.6 | 123.3 | 68.9 | 10.9 | 79.7 |
| | 2020 | 119 | 21.2 | 140.2 | 59.5 | 10.3 | 69.8 |
| | 2021 | 102.1 | 19.9 | 122 | 58.9 | 10.2 | 69.1 |
| | 2022 | 102.1 | 19.9 | 122 | 58.9 | 10.2 | 69.1 |
| | 2023 | 102.1 | 19.9 | 122 | 58.9 | 10.2 | 69.1 |
| | 2024 | 102.1 | 19.9 | 122 | 58.9 | 10.2 | 69.1 |

| Functional Type | year | Direct | Indirect | Lifecycle | JBIC w/cofin Direct | JBIC w/cofin Indirect | JBIC w/cofin Lifecycle |
|---|---|---|---|---|---|---|---|
| | 2025 | 94.6 | 17.8 | 112.4 | 56.8 | 10.1 | 66.9 |
| | 2026 | 94.6 | 17.8 | 112.4 | 56.8 | 10.1 | 66.9 |
| | 2027 | 94.6 | 17.8 | 112.4 | 56.8 | 10.1 | 66.9 |
| | 2028 | 77.7 | 16.5 | 94.2 | 51.6 | 9.7 | 61.3 |
| | 2029 | 77.7 | 16.5 | 94.2 | 51.6 | 9.7 | 61.3 |
| | 2030 | 52.4 | 11.9 | 64.3 | 28.8 | 5.5 | 34.2 |
| | 2031 | 44.4 | 11.5 | 55.9 | 22.4 | 5.1 | 27.5 |
| | 2032 | 35.6 | 8.3 | 43.9 | 17.7 | 3.5 | 21.2 |
| | 2033 | 28.8 | 7.3 | 36 | 12.8 | 2.8 | 15.5 |
| | d | 28.8 | 7.3 | 36 | 12.8 | 2.8 | 15.5 |
| | 2035 | 26.3 | 6.3 | 32.7 | 12.6 | 2.7 | 15.4 |
| | 2036 | 26.3 | 6.3 | 32.7 | 12.6 | 2.7 | 15.4 |
| | 2037 | 26.3 | 6.3 | 32.7 | 12.6 | 2.7 | 15.4 |
| | 2038 | 26.3 | 6.3 | 32.7 | 12.6 | 2.7 | 15.4 |
| | 2039 | 22.6 | 5 | 27.7 | 9.8 | 1.7 | 11.6 |
| | 2040 | 13.1 | 2.3 | 15.4 | 4.3 | 0.6 | 4.9 |
| | 2041 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2042 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2043 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2044 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2045 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2046 | 0 | 0 | 0 | 0 | 0 | 0 |
| Gas extraction | 1999 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2000 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2001 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2002 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2003 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2004 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2005 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2006 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2007 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2008 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2009 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2010 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2011 | 7.3 | 40.4 | 47.7 | 5.1 | 28.4 | 33.6 |
| | 2012 | 8.2 | 47.2 | 55.4 | 5.6 | 32.2 | 37.8 |
| | 2013 | 8.2 | 47.2 | 55.4 | 5.6 | 32.2 | 37.8 |
| | 2014 | 8.2 | 47.2 | 55.4 | 5.6 | 32.2 | 37.8 |
| | 2015 | 8.2 | 47.2 | 55.4 | 5.6 | 32.2 | 37.8 |
| | 2016 | 12.4 | 83 | 95.4 | 5.9 | 34.9 | 40.8 |

| Functional Type | year | Direct | Indirect | Lifecycle | JBIC w/cofin Direct | JBIC w/cofin Indirect | JBIC w/cofin Lifecycle |
|---|---|---|---|---|---|---|---|
| | 2017 | 12.4 | 83 | 95.4 | 5.9 | 34.9 | 40.8 |
| | 2018 | 15.1 | 100.9 | 116 | 7.1 | 42.6 | 49.7 |
| | 2019 | 15.1 | 100.9 | 116 | 7.1 | 42.6 | 49.7 |
| | 2020 | 15 | 100.1 | 115.1 | 7.5 | 44.9 | 52.4 |
| | 2021 | 15.1 | 100.4 | 115.4 | 7.5 | 44.9 | 52.4 |
| | 2022 | 15.1 | 100.4 | 115.4 | 7.5 | 44.9 | 52.4 |
| | 2023 | 15.1 | 100.4 | 115.4 | 7.5 | 44.9 | 52.4 |
| | 2024 | 15.1 | 100.4 | 115.4 | 7.5 | 44.9 | 52.4 |
| | 2025 | 15.1 | 100.4 | 115.4 | 7.5 | 44.9 | 52.4 |
| | 2026 | 15.1 | 100.4 | 115.4 | 7.5 | 44.9 | 52.4 |
| | 2027 | 15.1 | 100.4 | 115.4 | 7.5 | 44.9 | 52.4 |
| | 2028 | 7.8 | 60 | 67.8 | 2.4 | 16.5 | 18.9 |
| | 2029 | 7.8 | 60 | 67.8 | 2.4 | 16.5 | 18.9 |
| | 2030 | 7.8 | 60 | 67.8 | 2.4 | 16.5 | 18.9 |
| | 2031 | 7.8 | 60 | 67.8 | 2.4 | 16.5 | 18.9 |
| | 2032 | 7.8 | 60 | 67.8 | 2.4 | 16.5 | 18.9 |
| | 2033 | 7.8 | 60 | 67.8 | 2.4 | 16.5 | 18.9 |
| | 2034 | 7.8 | 60 | 67.8 | 2.4 | 16.5 | 18.9 |
| | 2035 | 7.8 | 60 | 67.8 | 2.4 | 16.5 | 18.9 |
| | 2036 | 5.1 | 42.1 | 47.2 | 1.2 | 8.7 | 9.9 |
| | 2037 | 5.1 | 42.1 | 47.2 | 1.2 | 8.7 | 9.9 |
| | 2038 | 0 | 0.3 | 0.3 | 0 | 0 | 0.1 |
| | 2039 | 0 | 0.3 | 0.3 | 0 | 0 | 0.1 |
| | 2040 | 0 | 0.3 | 0.3 | 0 | 0 | 0.1 |
| | 2041 | 0 | 0.3 | 0.3 | 0 | 0 | 0.1 |
| | 2042 | 0 | 0.3 | 0.3 | 0 | 0 | 0.1 |
| | 2043 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2044 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2045 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2046 | 0 | 0 | 0 | 0 | 0 | 0 |
| Gas-fired | 1999 | 1.8 | 0.5 | 2.3 | 1.2 | 0.4 | 1.6 |
| | 2000 | 1.8 | 0.5 | 2.3 | 1.2 | 0.4 | 1.6 |
| | 2001 | 2.8 | 0.9 | 3.7 | 1.9 | 0.6 | 2.5 |
| | 2002 | 5.3 | 1.6 | 6.9 | 2.5 | 0.7 | 3.2 |
| | 2003 | 5.3 | 1.6 | 6.9 | 2.5 | 0.7 | 3.2 |
| | 2004 | 6.1 | 2.1 | 8.2 | 3.1 | 1.1 | 4.2 |
| | 2005 | 11.4 | 3.7 | 15.1 | 6 | 2.2 | 8.1 |
| | 2006 | 16.4 | 5.7 | 22.1 | 9.9 | 3.7 | 13.6 |
| | 2007 | 25.9 | 7.7 | 33.6 | 19.1 | 5.6 | 24.7 |
| | 2008 | 31 | 8.8 | 39.8 | 20.9 | 6 | 26.9 |
| | 2009 | 33.1 | 9.4 | 42.5 | 22.6 | 6.5 | 29.1 |
| | 2010 | 35.4 | 10.6 | 46 | 26.1 | 7.8 | 33.9 |

| Functional Type | year | Direct | Indirect | Lifecycle | JBIC w/cofin Direct | JBIC w/cofin Indirect | JBIC w/cofin Lifecycle |
|---|---|---|---|---|---|---|---|
| | 2011 | 41.4 | 13 | 54.3 | 31.1 | 9.9 | 41 |
| | 2012 | 43 | 13.9 | 56.9 | 31.6 | 10.1 | 41.7 |
| | 2013 | 49.5 | 14.9 | 64.4 | 37.4 | 11.2 | 48.5 |
| | 2014 | 51.5 | 15.8 | 67.3 | 39.1 | 12 | 51.1 |
| | 2015 | 51.9 | 16 | 67.9 | 39.4 | 12.1 | 51.5 |
| | 2016 | 59.7 | 17.9 | 77.6 | 45.5 | 13.6 | 59.1 |
| | 2017 | 56.2 | 16.9 | 73.1 | 43.7 | 13.1 | 56.8 |
| | 2018 | 69.8 | 21.7 | 91.5 | 54.5 | 16.8 | 71.3 |
| | 2019 | 79.7 | 24.8 | 104.5 | 62.6 | 19.4 | 82 |
| | 2020 | 85.1 | 26 | 111.1 | 67.1 | 20.4 | 87.5 |
| | 2021 | 83.1 | 24.2 | 107.3 | 65.2 | 19 | 84.2 |
| | 2022 | 83.1 | 24.2 | 107.3 | 65.2 | 19 | 84.2 |
| | 2023 | 102.5 | 28.2 | 130.7 | 69.3 | 20 | 89.4 |
| | 2024 | 106 | 30.2 | 136.3 | 69.4 | 20.6 | 90 |
| | 2025 | 101.2 | 28.3 | 129.6 | 65.9 | 19.3 | 85.2 |
| | 2026 | 101.2 | 28.3 | 129.6 | 65.9 | 19.3 | 85.2 |
| | 2027 | 97.9 | 27.2 | 125.1 | 62.9 | 18.3 | 81.2 |
| | 2028 | 91.8 | 25.5 | 117.2 | 60.3 | 17.6 | 77.9 |
| | 2029 | 91.8 | 25.5 | 117.2 | 60.3 | 17.6 | 77.9 |
| | 2030 | 83.4 | 23.4 | 106.8 | 53.6 | 16 | 69.5 |
| | 2031 | 81.3 | 22.7 | 104 | 51.9 | 15.4 | 67.3 |
| | 2032 | 76.7 | 21.1 | 97.8 | 46.6 | 13.6 | 60.2 |
| | 2033 | 72.7 | 20.3 | 93 | 43.1 | 12.9 | 56.1 |
| | 2034 | 57.7 | 15.6 | 73.3 | 33.6 | 9.7 | 43.3 |
| | 2035 | 56.1 | 14.7 | 70.8 | 32 | 8.8 | 40.8 |
| | 2036 | 50.9 | 14 | 64.9 | 27.8 | 8.3 | 36.1 |
| | 2037 | 50.9 | 14 | 64.9 | 27.8 | 8.3 | 36.1 |
| | 2038 | 46.5 | 12.7 | 59.1 | 24.1 | 7.1 | 31.2 |
| | 2039 | 35.2 | 9 | 44.2 | 16.9 | 5.1 | 21.9 |
| | 2040 | 31.2 | 7.6 | 38.8 | 13.9 | 4 | 17.9 |
| | 2041 | 31.2 | 7.6 | 38.8 | 13.9 | 4 | 17.9 |
| | 2042 | 13.4 | 4 | 17.4 | 10.4 | 3.2 | 13.6 |
| | 2043 | 8.6 | 3 | 11.6 | 6.3 | 2.3 | 8.7 |
| | 2044 | 5.3 | 1.4 | 6.7 | 3.6 | 0.9 | 4.6 |
| | 2045 | 5.3 | 1.4 | 6.7 | 3.6 | 0.9 | 4.6 |
| | 2046 | 5.3 | 1.4 | 6.7 | 3.6 | 0.9 | 4.6 |
| LNG terminal | 1999 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2000 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2001 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2002 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2003 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2004 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2005 | 7.2 | 21.5 | 28.8 | 6.6 | 19.7 | 26.3 |

| Functional Type | year | Direct | Indirect | Lifecycle | JBIC w/cofin Direct | JBIC w/cofin Indirect | JBIC w/cofin Lifecycle |
|---|---|---|---|---|---|---|---|
| | 2006 | 37.4 | 53.3 | 90.7 | 13 | 26.4 | 39.5 |
| | 2007 | 37.4 | 53.3 | 90.7 | 13 | 26.4 | 39.5 |
| | 2008 | 81.1 | 100.6 | 181.6 | 48.3 | 54.9 | 103.2 |
| | 2009 | 81.1 | 100.6 | 181.6 | 48.3 | 54.9 | 103.2 |
| | 2010 | 90.6 | 120 | 210.6 | 55.6 | 69.9 | 125.5 |
| | 2011 | 81.1 | 100.6 | 181.6 | 48.3 | 54.9 | 103.2 |
| | 2012 | 116.9 | 157.9 | 274.8 | 49.2 | 56.8 | 106 |
| | 2013 | 116.9 | 157.9 | 274.8 | 49.2 | 56.8 | 106 |
| | 2014 | 166.6 | 261.5 | 428.1 | 71.3 | 102.7 | 174 |
| | 2015 | 166.6 | 261.5 | 428.1 | 71.3 | 102.7 | 174 |
| | 2016 | 236.8 | 311.1 | 547.9 | 81 | 112.7 | 193.7 |
| | 2017 | 236.8 | 311.1 | 547.9 | 81 | 112.7 | 193.7 |
| | 2018 | 236.8 | 311.1 | 547.9 | 81 | 112.7 | 193.7 |
| | 2019 | 307.5 | 357.8 | 665.4 | 81.5 | 113 | 194.5 |
| | 2020 | 320.3 | 392.5 | 712.8 | 91.3 | 139.9 | 231.2 |
| | 2021 | 355.5 | 484.6 | 840.1 | 120.3 | 180.6 | 300.9 |
| | 2022 | 355.5 | 484.6 | 840.1 | 113.9 | 173.8 | 287.7 |
| | 2023 | 355.5 | 484.6 | 840.1 | 113.9 | 173.8 | 287.7 |
| | 2024 | 361.5 | 489.3 | 850.8 | 109 | 157.5 | 266.4 |
| | 2025 | 361.5 | 489.3 | 850.8 | 109 | 157.5 | 266.4 |
| | 2026 | 326.5 | 461.2 | 787.7 | 73.9 | 129.4 | 203.4 |
| | 2027 | 324.1 | 455.5 | 779.5 | 72.6 | 126.3 | 198.9 |
| | 2028 | 324.1 | 455.5 | 779.5 | 72.6 | 126.3 | 198.9 |
| | 2029 | 324.1 | 455.5 | 779.5 | 72.6 | 126.3 | 198.9 |
| | 2030 | 267.8 | 387.3 | 655.2 | 63.3 | 116.4 | 179.7 |
| | 2031 | 239.1 | 327.5 | 566.6 | 49.1 | 87.4 | 136.4 |
| | 2032 | 239.1 | 327.5 | 566.6 | 49.1 | 87.4 | 136.4 |
| | 2033 | 210.8 | 268.5 | 479.3 | 41.7 | 72 | 113.7 |
| | 2034 | 210.8 | 268.5 | 479.3 | 41.7 | 72 | 113.7 |
| | 2035 | 140.6 | 218.9 | 359.5 | 41.2 | 71.7 | 112.9 |
| | 2036 | 140.6 | 218.9 | 359.5 | 41.2 | 71.7 | 112.9 |
| | 2037 | 69.9 | 172.2 | 242 | 21.6 | 58.7 | 80.2 |
| | 2038 | 57.1 | 137.5 | 194.6 | 11.7 | 31.8 | 43.5 |
| | 2039 | 43.5 | 96.3 | 139.9 | 3 | 6.9 | 9.9 |
| | 2040 | 21.9 | 45.4 | 67.3 | 1.9 | 3.8 | 5.7 |
| | 2041 | 21.9 | 45.4 | 67.3 | 1.9 | 3.8 | 5.7 |
| | 2042 | 7.4 | 15 | 22.4 | 0.8 | 1.5 | 2.3 |
| | 2043 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2044 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2045 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2046 | 0 | 0 | 0 | 0 | 0 | 0 |
| Oil extraction | 1999 | 0 | 0 | 0 | 0 | 0 | 0 |

| Functional Type | year | Direct | Indirect | Lifecycle | JBIC w/cofin Direct | JBIC w/cofin Indirect | JBIC w/cofin Lifecycle |
|---|---|---|---|---|---|---|---|
| | 2000 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2001 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2002 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2003 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2004 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2005 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2006 | 5.2 | 17.6 | 22.8 | 0.6 | 2.2 | 2.8 |
| | 2007 | 5.2 | 17.6 | 22.8 | 0.6 | 2.2 | 2.8 |
| | 2008 | 5.2 | 17.6 | 22.8 | 0.6 | 2.2 | 2.8 |
| | 2009 | 5.9 | 22.8 | 28.6 | 0.9 | 4.2 | 5.1 |
| | 2010 | 29.1 | 33.9 | 63 | 24.2 | 15.3 | 39.4 |
| | 2011 | 32.5 | 56.5 | 89 | 26.5 | 31.1 | 57.6 |
| | 2012 | 32.5 | 56.5 | 89 | 26.5 | 31.1 | 57.6 |
| | 2013 | 36.7 | 84.7 | 121.4 | 29.6 | 51.9 | 81.5 |
| | 2014 | 36.7 | 84.7 | 121.4 | 29.6 | 51.9 | 81.5 |
| | 2015 | 42.1 | 111.7 | 153.8 | 30.7 | 57.3 | 88 |
| | 2016 | 44.5 | 127.1 | 171.6 | 31.3 | 61.7 | 93 |
| | 2017 | 106.1 | 458.1 | 564.2 | 32.8 | 69.8 | 102.6 |
| | 2018 | 226.4 | 1040.4 | 1266.8 | 37.4 | 101 | 138.5 |
| | 2019 | 226.4 | 1040.4 | 1266.8 | 37.4 | 101 | 138.5 |
| | 2020 | 245.6 | 1162 | 1407.5 | 44.6 | 144.3 | 188.8 |
| | 2021 | 223.6 | 1159.9 | 1383.6 | 21.5 | 134.6 | 156.1 |
| | 2022 | 223 | 1154.7 | 1377.7 | 21.2 | 132.6 | 153.9 |
| | 2023 | 223 | 1154.7 | 1377.7 | 21.2 | 132.6 | 153.9 |
| | 2024 | 214.4 | 1114.5 | 1328.9 | 18.3 | 114.6 | 132.9 |
| | 2025 | 214.4 | 1114.5 | 1328.9 | 18.3 | 114.6 | 132.9 |
| | 2026 | 214.4 | 1114.5 | 1328.9 | 18.3 | 114.6 | 132.9 |
| | 2027 | 214.4 | 1114.5 | 1328.9 | 18.3 | 114.6 | 132.9 |
| | 2028 | 214.4 | 1114.5 | 1328.9 | 18.3 | 114.6 | 132.9 |
| | 2029 | 214.4 | 1114.5 | 1328.9 | 18.3 | 114.6 | 132.9 |
| | 2030 | 210.2 | 1086.3 | 1296.5 | 15.2 | 93.8 | 109 |
| | 2031 | 210.2 | 1086.3 | 1296.5 | 15.2 | 93.8 | 109 |
| | 2032 | 210.2 | 1086.3 | 1296.5 | 15.2 | 93.8 | 109 |
| | 2033 | 204.9 | 1059.3 | 1264.1 | 14.1 | 88.4 | 102.5 |
| | 2034 | 204.9 | 1059.3 | 1264.1 | 14.1 | 88.4 | 102.5 |
| | 2035 | 204.9 | 1059.3 | 1264.1 | 14.1 | 88.4 | 102.5 |
| | 2036 | 192.7 | 983.3 | 1176 | 9.5 | 59.1 | 68.7 |
| | 2037 | 192.7 | 983.3 | 1176 | 9.5 | 59.1 | 68.7 |
| | 2038 | 186.9 | 942 | 1129 | 5.6 | 29 | 34.5 |
| | 2039 | 186.9 | 942 | 1129 | 4 | 20.8 | 24.9 |

| Functional Type | year | Direct | Indirect | Lifecycle | JBIC w/cofin Direct | JBIC w/cofin Indirect | JBIC w/cofin Lifecycle |
|---|---|---|---|---|---|---|---|
| | 2040 | 74.6 | 421.7 | 496.2 | 2.6 | 14.1 | 16.7 |
| | 2041 | 74.6 | 421.7 | 496.2 | 2.6 | 14.1 | 16.7 |
| | 2042 | 1.3 | 9 | 10.4 | 0.2 | 1.4 | 1.6 |
| | 2043 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2044 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2045 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2046 | 0 | 0 | 0 | 0 | 0 | 0 |

*Figures are rounded to one decimal place.

**Table A2. Annual emissions by functional project type and attribution, GWP100, 1999–2046 ($MtCO_2e/yr$)**

| Functional Type | year | Direct | Indirect | Lifecycle | JBIC w/cofin Direct | JBIC w/cofin Indirect | JBIC w/cofin Lifecycle |
|---|---|---|---|---|---|---|---|
| Coal mining | 1999 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2000 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2001 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2002 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2003 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2004 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2005 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2006 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2007 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2008 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2009 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2010 | 1.2 | 6.3 | 7.5 | 1.2 | 6.3 | 7.5 |
| | 2011 | 1.2 | 6.3 | 7.5 | 1.2 | 6.3 | 7.5 |
| | 2012 | 1.2 | 6.3 | 7.5 | 1.2 | 6.3 | 7.5 |
| | 2013 | 1.2 | 6.3 | 7.5 | 1.2 | 6.3 | 7.5 |
| | 2014 | 1.2 | 6.3 | 7.5 | 1.2 | 6.3 | 7.5 |
| | 2015 | 1.2 | 6.3 | 7.5 | 1.2 | 6.3 | 7.5 |
| | 2016 | 0.2 | 7.6 | 7.8 | 0 | 1.5 | 1.6 |
| | 2017 | 0.2 | 7.6 | 7.8 | 0 | 1.5 | 1.6 |
| | 2018 | 0.2 | 7.6 | 7.8 | 0 | 1.5 | 1.6 |
| | 2019 | 0.2 | 7.6 | 7.8 | 0 | 1.5 | 1.6 |
| | 2020 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2021 | 2.5 | 23.5 | 26 | 1.5 | 16.2 | 17.7 |
| | 2022 | 2.5 | 23.5 | 26 | 1.5 | 16.2 | 17.7 |
| | 2023 | 2.5 | 23.5 | 26 | 1.5 | 16.2 | 17.7 |
| | 2024 | 2.5 | 23.5 | 26 | 1.5 | 16.2 | 17.7 |
| | 2025 | 2.5 | 23.5 | 26 | 1.5 | 16.2 | 17.7 |

| Functional Type | year | Direct | Indirect | Lifecycle | JBIC w/cofin Direct | JBIC w/cofin Indirect | JBIC w/cofin Lifecycle |
|---|---|---|---|---|---|---|---|
| | 2026 | 2.5 | 23.5 | 26 | 1.5 | 16.2 | 17.7 |
| | 2027 | 2.5 | 23.5 | 26 | 1.5 | 16.2 | 17.7 |
| | 2028 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2029 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2030 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2031 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2032 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2033 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2034 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2035 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2036 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2037 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2038 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2039 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2040 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2041 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2042 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2043 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2044 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2045 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2046 | 0 | 0 | 0 | 0 | 0 | 0 |
| Coal-fired | 1999 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2000 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2001 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2002 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2003 | 21.8 | 0.5 | 22.3 | 8.6 | 0.2 | 8.8 |
| | 2004 | 26.7 | 0.8 | 27.5 | 13.5 | 0.5 | 14 |
| | 2005 | 26.7 | 0.8 | 27.5 | 13.5 | 0.5 | 14 |
| | 2006 | 43.6 | 1.4 | 45 | 14.2 | 0.5 | 14.7 |
| | 2007 | 48.4 | 2.1 | 50.5 | 14.3 | 0.5 | 14.9 |
| | 2008 | 48.4 | 2.1 | 50.5 | 14.3 | 0.5 | 14.9 |
| | 2009 | 65.3 | 2.7 | 68 | 14.7 | 0.5 | 15.2 |
| | 2010 | 45.9 | 1.9 | 47.9 | 25 | 0.8 | 25.8 |
| | 2011 | 45.9 | 1.9 | 47.9 | 25 | 0.8 | 25.8 |
| | 2012 | 45.9 | 1.9 | 47.9 | 25 | 0.8 | 25.8 |
| | 2013 | 50.5 | 2.9 | 53.4 | 36.5 | 1.9 | 38.5 |
| | 2014 | 66.4 | 3.9 | 70.2 | 49.2 | 2.7 | 51.9 |
| | 2015 | 70.6 | 5 | 75.6 | 49.7 | 3.2 | 52.9 |
| | 2016 | 79.9 | 5.2 | 85.1 | 57 | 3.4 | 60.4 |
| | 2017 | 95.5 | 5.9 | 101.4 | 63.9 | 3.6 | 67.4 |
| | 2018 | 99.3 | 6.3 | 105.6 | 66.7 | 3.9 | 70.6 |

| Functional Type | year | Direct | Indirect | Lifecycle | JBIC w/cofin Direct | JBIC w/cofin Indirect | JBIC w/cofin Lifecycle |
|---|---|---|---|---|---|---|---|
| | 2019 | 104.7 | 7.3 | 112 | 68.9 | 4.3 | 73.2 |
| | 2020 | 119 | 8.3 | 127.3 | 59.5 | 4 | 63.6 |
| | 2021 | 102.1 | 7.7 | 109.9 | 58.9 | 4 | 62.9 |
| | 2022 | 102.1 | 7.7 | 109.9 | 58.9 | 4 | 62.9 |
| | 2023 | 102.1 | 7.7 | 109.9 | 58.9 | 4 | 62.9 |
| | 2024 | 102.1 | 7.7 | 109.9 | 58.9 | 4 | 62.9 |
| | 2025 | 94.6 | 7 | 101.6 | 56.8 | 3.9 | 60.8 |
| | 2026 | 94.6 | 7 | 101.6 | 56.8 | 3.9 | 60.8 |
| | 2027 | 94.6 | 7 | 101.6 | 56.8 | 3.9 | 60.8 |
| | 2028 | 77.7 | 6.4 | 84.1 | 51.6 | 3.8 | 55.4 |
| | 2029 | 77.7 | 6.4 | 84.1 | 51.6 | 3.8 | 55.4 |
| | 2030 | 52.4 | 4.6 | 57 | 28.8 | 2.1 | 30.9 |
| | 2031 | 44.4 | 4.4 | 48.8 | 22.4 | 2 | 24.4 |
| | 2032 | 35.6 | 3.2 | 38.8 | 17.7 | 1.4 | 19.1 |
| | 2033 | 28.8 | 2.8 | 31.5 | 12.8 | 1.1 | 13.8 |
| | d | 28.8 | 2.8 | 31.5 | 12.8 | 1.1 | 13.8 |
| | 2035 | 26.3 | 2.4 | 28.8 | 12.6 | 1 | 13.7 |
| | 2036 | 26.3 | 2.4 | 28.8 | 12.6 | 1 | 13.7 |
| | 2037 | 26.3 | 2.4 | 28.8 | 12.6 | 1 | 13.7 |
| | 2038 | 26.3 | 2.4 | 28.8 | 12.6 | 1 | 13.7 |
| | 2039 | 22.6 | 1.9 | 24.6 | 9.8 | 0.7 | 10.5 |
| | 2040 | 13.1 | 0.9 | 14 | 4.3 | 0.2 | 4.6 |
| | 2041 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2042 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2043 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2044 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2045 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2046 | 0 | 0 | 0 | 0 | 0 | 0 |
| Gas extraction | 1999 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2000 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2001 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2002 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2003 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2004 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2005 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2006 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2007 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2008 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2009 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2010 | 0 | 0 | 0 | 0 | 0 | 0 |

| Functional Type | year | Direct | Indirect | Lifecycle | JBIC w/cofin Direct | JBIC w/cofin Indirect | JBIC w/cofin Lifecycle |
|---|---|---|---|---|---|---|---|
| | 2011 | 3.4 | 37.5 | 41 | 2.4 | 26.4 | 28.8 |
| | 2012 | 3.9 | 43.6 | 47.5 | 2.7 | 29.8 | 32.4 |
| | 2013 | 3.9 | 43.6 | 47.5 | 2.7 | 29.8 | 32.4 |
| | 2014 | 3.9 | 43.6 | 47.5 | 2.7 | 29.8 | 32.4 |
| | 2015 | 3.9 | 43.6 | 47.5 | 2.7 | 29.8 | 32.4 |
| | 2016 | 5.9 | 72.8 | 78.6 | 2.8 | 31.9 | 34.8 |
| | 2017 | 5.9 | 72.8 | 78.6 | 2.8 | 31.9 | 34.8 |
| | 2018 | 7.2 | 89.7 | 96.9 | 3.4 | 39.3 | 42.7 |
| | 2019 | 7.2 | 89.7 | 96.9 | 3.4 | 39.3 | 42.7 |
| | 2020 | 7.1 | 89.3 | 96.4 | 3.6 | 41.6 | 45.2 |
| | 2021 | 7.2 | 89.5 | 96.7 | 3.6 | 41.6 | 45.2 |
| | 2022 | 7.2 | 89.5 | 96.7 | 3.6 | 41.6 | 45.2 |
| | 2023 | 7.2 | 89.5 | 96.7 | 3.6 | 41.6 | 45.2 |
| | 2024 | 7.2 | 89.5 | 96.7 | 3.6 | 41.6 | 45.2 |
| | 2025 | 7.2 | 89.5 | 96.7 | 3.6 | 41.6 | 45.2 |
| | 2026 | 7.2 | 89.5 | 96.7 | 3.6 | 41.6 | 45.2 |
| | 2027 | 7.2 | 89.5 | 96.7 | 3.6 | 41.6 | 45.2 |
| | 2028 | 3.7 | 52 | 55.7 | 1.2 | 15.2 | 16.4 |
| | 2029 | 3.7 | 52 | 55.7 | 1.2 | 15.2 | 16.4 |
| | 2030 | 3.7 | 52 | 55.7 | 1.2 | 15.2 | 16.4 |
| | 2031 | 3.7 | 52 | 55.7 | 1.2 | 15.2 | 16.4 |
| | 2032 | 3.7 | 52 | 55.7 | 1.2 | 15.2 | 16.4 |
| | 2033 | 3.7 | 52 | 55.7 | 1.2 | 15.2 | 16.4 |
| | 2034 | 3.7 | 52 | 55.7 | 1.2 | 15.2 | 16.4 |
| | 2035 | 3.7 | 52 | 55.7 | 1.2 | 15.2 | 16.4 |
| | 2036 | 2.4 | 35 | 37.4 | 0.6 | 7.9 | 8.5 |
| | 2037 | 2.4 | 35 | 37.4 | 0.6 | 7.9 | 8.5 |
| | 2038 | 0 | 0.2 | 0.2 | 0 | 0 | 0 |
| | 2039 | 0 | 0.2 | 0.2 | 0 | 0 | 0 |
| | 2040 | 0 | 0.2 | 0.2 | 0 | 0 | 0 |
| | 2041 | 0 | 0.2 | 0.2 | 0 | 0 | 0 |
| | 2042 | 0 | 0.2 | 0.2 | 0 | 0 | 0 |
| | 2043 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2044 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2045 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2046 | 0 | 0 | 0 | 0 | 0 | 0 |
| Gas-fired | 1999 | 1.8 | 0.3 | 2.1 | 1.2 | 0.2 | 1.4 |
| | 2000 | 1.8 | 0.3 | 2.1 | 1.2 | 0.2 | 1.4 |
| | 2001 | 2.8 | 0.5 | 3.3 | 1.9 | 0.4 | 2.3 |
| | 2002 | 5.3 | 1 | 6.3 | 2.5 | 0.5 | 2.9 |
| | 2003 | 5.3 | 1 | 6.3 | 2.5 | 0.5 | 2.9 |
| | 2004 | 6.1 | 1.4 | 7.5 | 3.1 | 0.8 | 3.8 |

| Functional Type | year | Direct | Indirect | Lifecycle | JBIC w/cofin Direct | JBIC w/cofin Indirect | JBIC w/cofin Lifecycle |
|---|---|---|---|---|---|---|---|
| | 2005 | 11.4 | 2.5 | 13.9 | 6 | 1.5 | 7.5 |
| | 2006 | 16.4 | 4 | 20.4 | 9.9 | 2.7 | 12.5 |
| | 2007 | 25.9 | 5.4 | 31.3 | 19.1 | 3.9 | 23.1 |
| | 2008 | 31 | 6 | 37.1 | 20.9 | 4.2 | 25.1 |
| | 2009 | 33.1 | 6.5 | 39.6 | 22.6 | 4.5 | 27.2 |
| | 2010 | 35.4 | 7.2 | 42.6 | 26.1 | 5.3 | 31.4 |
| | 2011 | 41.4 | 8.9 | 50.2 | 31.1 | 6.8 | 38 |
| | 2012 | 43 | 9.6 | 52.6 | 31.6 | 7 | 38.6 |
| | 2013 | 49.5 | 10.2 | 59.7 | 37.4 | 7.7 | 45.1 |
| | 2014 | 51.5 | 10.9 | 62.4 | 39.1 | 8.3 | 47.4 |
| | 2015 | 51.9 | 11 | 62.9 | 39.4 | 8.4 | 47.8 |
| | 2016 | 59.7 | 12.3 | 72 | 45.5 | 9.4 | 54.9 |
| | 2017 | 56.2 | 11.7 | 67.9 | 43.7 | 9.1 | 52.8 |
| | 2018 | 69.8 | 15.3 | 85.2 | 54.5 | 11.9 | 66.4 |
| | 2019 | 79.7 | 17.7 | 97.4 | 62.6 | 13.9 | 76.5 |
| | 2020 | 85.1 | 18.6 | 103.7 | 67.1 | 14.6 | 81.7 |
| | 2021 | 83.1 | 17.1 | 100.2 | 65.2 | 13.5 | 78.6 |
| | 2022 | 83.1 | 17.1 | 100.2 | 65.2 | 13.5 | 78.6 |
| | 2023 | 102.5 | 19.5 | 122 | 69.3 | 14 | 83.3 |
| | 2024 | 106 | 20.7 | 126.7 | 69.4 | 14.4 | 83.7 |
| | 2025 | 101.2 | 19.5 | 120.8 | 65.9 | 13.6 | 79.5 |
| | 2026 | 101.2 | 19.5 | 120.8 | 65.9 | 13.6 | 79.5 |
| | 2027 | 97.9 | 18.8 | 116.7 | 62.9 | 12.9 | 75.8 |
| | 2028 | 91.8 | 17.6 | 109.3 | 60.3 | 12.4 | 72.7 |
| | 2029 | 91.8 | 17.6 | 109.3 | 60.3 | 12.4 | 72.7 |
| | 2030 | 83.4 | 16.2 | 99.6 | 53.6 | 11.3 | 64.9 |
| | 2031 | 81.3 | 15.7 | 97 | 51.9 | 10.9 | 62.8 |
| | 2032 | 76.7 | 14.5 | 91.2 | 46.6 | 9.6 | 56.2 |
| | 2033 | 72.7 | 14 | 86.7 | 43.1 | 9.2 | 52.3 |
| | 2034 | 57.7 | 10.5 | 68.3 | 33.6 | 6.7 | 40.3 |
| | 2035 | 56.1 | 9.9 | 65.9 | 32 | 6 | 38 |
| | 2036 | 50.9 | 9.4 | 60.3 | 27.8 | 5.7 | 33.5 |
| | 2037 | 50.9 | 9.4 | 60.3 | 27.8 | 5.7 | 33.5 |
| | 2038 | 46.5 | 8.4 | 54.9 | 24.1 | 4.8 | 28.9 |
| | 2039 | 35.2 | 6.1 | 41.4 | 16.9 | 3.5 | 20.4 |
| | 2040 | 31.2 | 5 | 36.3 | 13.9 | 2.7 | 16.6 |
| | 2041 | 31.2 | 5 | 36.3 | 13.9 | 2.7 | 16.6 |
| | 2042 | 13.4 | 2.6 | 16 | 10.4 | 2.1 | 12.5 |
| | 2043 | 8.6 | 2 | 10.6 | 6.3 | 1.6 | 7.9 |
| | 2044 | 5.3 | 0.7 | 6 | 3.6 | 0.5 | 4.1 |
| | 2045 | 5.3 | 0.7 | 6 | 3.6 | 0.5 | 4.1 |
| | 2046 | 5.3 | 0.7 | 6 | 3.6 | 0.5 | 4.1 |
| LNG terminal | 1999 | 0 | 0 | 0 | 0 | 0 | 0 |

| Functional Type | year | Direct | Indirect | Lifecycle | JBIC w/cofin Direct | JBIC w/cofin Indirect | JBIC w/cofin Lifecycle |
|---|---|---|---|---|---|---|---|
| | 2000 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2001 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2002 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2003 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2004 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2005 | 4.4 | 20.3 | 24.7 | 4 | 18.6 | 22.6 |
| | 2006 | 29.9 | 49.8 | 79.7 | 9.4 | 24.8 | 34.3 |
| | 2007 | 29.9 | 49.8 | 79.7 | 9.4 | 24.8 | 34.3 |
| | 2008 | 57.7 | 94.7 | 152.4 | 32 | 52 | 84 |
| | 2009 | 57.7 | 94.7 | 152.4 | 32 | 52 | 84 |
| | 2010 | 64.1 | 113 | 177 | 36.9 | 66.1 | 102.9 |
| | 2011 | 57.7 | 94.7 | 152.4 | 32 | 52 | 84 |
| | 2012 | 84 | 147.7 | 231.7 | 32.5 | 53.7 | 86.3 |
| | 2013 | 84 | 147.7 | 231.7 | 32.5 | 53.7 | 86.3 |
| | 2014 | 115.3 | 245.8 | 361.1 | 46.4 | 96.8 | 143.1 |
| | 2015 | 115.3 | 245.8 | 361.1 | 46.4 | 96.8 | 143.1 |
| | 2016 | 155.1 | 291.7 | 446.8 | 54.4 | 106.1 | 160.5 |
| | 2017 | 155.1 | 291.7 | 446.8 | 54.4 | 106.1 | 160.5 |
| | 2018 | 155.1 | 291.7 | 446.8 | 54.4 | 106.1 | 160.5 |
| | 2019 | 196.7 | 334.9 | 531.7 | 54.7 | 106.4 | 161 |
| | 2020 | 203.8 | 367 | 570.9 | 60.2 | 131.2 | 191.4 |
| | 2021 | 225.5 | 452.2 | 677.7 | 77 | 168.6 | 245.6 |
| | 2022 | 225.5 | 452.2 | 677.7 | 71.6 | 162.3 | 233.9 |
| | 2023 | 225.5 | 452.2 | 677.7 | 71.6 | 162.3 | 233.9 |
| | 2024 | 230.3 | 456.3 | 686.6 | 68.7 | 146.8 | 215.5 |
| | 2025 | 230.3 | 456.3 | 686.6 | 68.7 | 146.8 | 215.5 |
| | 2026 | 208 | 429.6 | 637.5 | 46.4 | 120.1 | 166.5 |
| | 2027 | 206.4 | 424.1 | 630.5 | 45.5 | 117.1 | 162.6 |
| | 2028 | 206.4 | 424.1 | 630.5 | 45.5 | 117.1 | 162.6 |
| | 2029 | 206.4 | 424.1 | 630.5 | 45.5 | 117.1 | 162.6 |
| | 2030 | 160.9 | 361 | 521.9 | 37.6 | 107.9 | 145.6 |
| | 2031 | 142.9 | 305.7 | 448.6 | 28.9 | 81.1 | 110 |
| | 2032 | 142.9 | 305.7 | 448.6 | 28.9 | 81.1 | 110 |
| | 2033 | 124.9 | 248.9 | 373.8 | 24.2 | 66.4 | 90.5 |
| | 2034 | 124.9 | 248.9 | 373.8 | 24.2 | 66.4 | 90.5 |
| | 2035 | 85 | 203 | 288.1 | 23.9 | 66 | 89.9 |
| | 2036 | 85 | 203 | 288.1 | 23.9 | 66 | 89.9 |
| | 2037 | 43.4 | 159.8 | 203.2 | 12.4 | 54 | 66.4 |
| | 2038 | 36.3 | 127.7 | 164 | 6.8 | 29.2 | 36 |
| | 2039 | 28.8 | 90.6 | 119.4 | 2 | 6.4 | 8.4 |
| | 2040 | 14.7 | 42.5 | 57.2 | 1.3 | 3.5 | 4.8 |
| | 2041 | 14.7 | 42.5 | 57.2 | 1.3 | 3.5 | 4.8 |
| | 2042 | 5.2 | 13.8 | 19 | 0.5 | 1.4 | 1.9 |

| Functional Type | year | Direct | Indirect | Lifecycle | JBIC w/cofin Direct | JBIC w/cofin Indirect | JBIC w/cofin Lifecycle |
|---|---|---|---|---|---|---|---|
| | 2043 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2044 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2045 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2046 | 0 | 0 | 0 | 0 | 0 | 0 |
| Oil extraction | 1999 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2000 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2001 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2002 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2003 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2004 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2005 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2006 | 3 | 17.6 | 20.6 | 0.4 | 2.2 | 2.5 |
| | 2007 | 3 | 17.6 | 20.6 | 0.4 | 2.2 | 2.5 |
| | 2008 | 3 | 17.6 | 20.6 | 0.4 | 2.2 | 2.5 |
| | 2009 | 3.4 | 22.7 | 26.1 | 0.5 | 4.2 | 4.7 |
| | 2010 | 15.2 | 33.8 | 49 | 12.4 | 15.2 | 27.6 |
| | 2011 | 16.9 | 56.3 | 73.2 | 13.5 | 31 | 44.5 |
| | 2012 | 16.9 | 56.3 | 73.2 | 13.5 | 31 | 44.5 |
| | 2013 | 19 | 84.5 | 103.5 | 15.1 | 51.7 | 66.8 |
| | 2014 | 19 | 84.5 | 103.5 | 15.1 | 51.7 | 66.8 |
| | 2015 | 21.7 | 111.3 | 133 | 15.6 | 57.1 | 72.7 |
| | 2016 | 23.1 | 126.7 | 149.8 | 16 | 61.5 | 77.5 |
| | 2017 | 60.2 | 456.6 | 516.8 | 16.9 | 69.6 | 86.5 |
| | 2018 | 123 | 1015.9 | 1139 | 19.3 | 100.4 | 119.7 |
| | 2019 | 123 | 1015.9 | 1139 | 19.3 | 100.4 | 119.7 |
| | 2020 | 134.4 | 1137.1 | 1271.5 | 23.1 | 143.5 | 166.6 |
| | 2021 | 123.3 | 1135 | 1258.3 | 11.3 | 133.9 | 145.3 |
| | 2022 | 122.9 | 1129.9 | 1252.8 | 11.2 | 131.9 | 143.1 |
| | 2023 | 122.9 | 1129.9 | 1252.8 | 11.2 | 131.9 | 143.1 |
| | 2024 | 118.2 | 1089.8 | 1208 | 9.7 | 114 | 123.6 |
| | 2025 | 118.2 | 1089.8 | 1208 | 9.7 | 114 | 123.6 |
| | 2026 | 118.2 | 1089.8 | 1208 | 9.7 | 114 | 123.6 |
| | 2027 | 118.2 | 1089.8 | 1208 | 9.7 | 114 | 123.6 |
| | 2028 | 118.2 | 1089.8 | 1208 | 9.7 | 114 | 123.6 |
| | 2029 | 118.2 | 1089.8 | 1208 | 9.7 | 114 | 123.6 |
| | 2030 | 116.1 | 1061.6 | 1177.8 | 8.1 | 93.2 | 101.3 |
| | 2031 | 116.1 | 1061.6 | 1177.8 | 8.1 | 93.2 | 101.3 |
| | 2032 | 116.1 | 1061.6 | 1177.8 | 8.1 | 93.2 | 101.3 |
| | 2033 | 113.5 | 1034.8 | 1148.2 | 7.6 | 87.9 | 95.4 |
| | 2034 | 113.5 | 1034.8 | 1148.2 | 7.6 | 87.9 | 95.4 |
| | 2035 | 113.5 | 1034.8 | 1148.2 | 7.6 | 87.9 | 95.4 |

| Functional Type | year | Direct | Indirect | Lifecycle | JBIC w/cofin Direct | JBIC w/cofin Indirect | JBIC w/cofin Lifecycle |
|---|---|---|---|---|---|---|---|
| | 2036 | 107 | 959 | 1066 | 5.2 | 58.7 | 63.8 |
| | 2037 | 107 | 959 | 1066 | 5.2 | 58.7 | 63.8 |
| | 2038 | 103.9 | 917.9 | 1021.8 | 3.1 | 28.6 | 31.7 |
| | 2039 | 103.9 | 917.9 | 1021.8 | 2.2 | 20.5 | 22.7 |
| | 2040 | 45.1 | 420.3 | 465.4 | 1.4 | 14.1 | 15.5 |
| | 2041 | 45.1 | 420.3 | 465.4 | 1.4 | 14.1 | 15.5 |
| | 2042 | 0.7 | 9 | 9.7 | 0.1 | 1.4 | 1.5 |
| | 2043 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2044 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2045 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2046 | 0 | 0 | 0 | 0 | 0 | 0 |

*Figures are rounded to one decimal place.

# Appendix 2. List of JBIC Transactions and Total Emissions

**Table A3. List of JBIC Transactions and Total Emissions ($MtCO_2e/yr$)**

| Transaction | Stage | Functional Type | Country | Direct Emission (GWP100) | Direct Emission (GWP20) | Indirect Emission (GWP100) | Indirect Emission (GWP20) | Lifecycle Emission (GWP100) | Lifecycle Emission (GWP20) |
|---|---|---|---|---|---|---|---|---|---|
| Barossa/Caldita gas field | Midstream | LNG terminal | Australia | 0.9 | 1.9 | 10.6 | 11.3 | 11.5 | 13.3 |
| Gorgon Downstream Facility (LNG) | Midstream | LNG terminal | Australia | 20.1 | 26.1 | 33.6 | 36.3 | 53.7 | 62.4 |
| Gregory (Crinum) coking coal mine: Loan for Coking Coal Mine Project by Sojitz Corporation in Australia | Upstream | Coal mining | Australia | 0.9 | 2.2 | 13.3 | 13.3 | 14.2 | 15.6 |
| Scarborough Gas Field and FPU Unit: Scarborough Offshore | Midstream | LNG terminal | Australia | 5.2 | 7.4 | 13.8 | 15 | 19 | 22.4 |
| Waitsia gas field | Midstream | LNG terminal | Australia | 0.4 | 0.8 | 5 | 6.4 | 5.4 | 7.3 |
| Wheatstone LNG - Acquisition of 10% stake in Wheatstone LNG | Midstream | LNG terminal | Australia | 6.2 | 9.7 | 19.5 | 21 | 25.7 | 30.7 |
| Al Hidd IWPP | Downstream | Gas-fired | Bahrain | 2.5 | 2.5 | 0.5 | 0.7 | 3 | 3.2 |
| Bibiana III power station | Downstream | Gas-fired | Bangladesh | 1 | 1 | 0.1 | 0.2 | 1.1 | 1.2 |
| Meghnaghat Gas-Fired Power Plant Phase I (745MW) | Downstream | Gas-fired | Bangladesh | 2.3 | 2.3 | 0.3 | 0.5 | 2.6 | 2.8 |
| Almirante Barroso MV32 FPSO: Buzios oil field - gas | Upstream | Gas extraction | Brazil | 0.4 | 0.9 | 5.6 | 6 | 6.1 | 6.9 |
| Almirante Barroso MV32 FPSO: Buzios oil field - oil | Upstream | Oil extraction | Brazil | 1.7 | 3.3 | 25.7 | 25.8 | 27.4 | 29.1 |
| Sepia FPSO: FPSO Carioca MV30 - gas | Upstream | Gas extraction | Brazil | 0.4 | 0.9 | 5.6 | 6 | 6.1 | 6.9 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Sepia FPSO: FPSO Carioca MV30 - oil | Upstream | Oil extraction | Brazil | 2 | 4 | 30.9 | 31 | 32.9 | 35 |
| Cernambi Sul MV24 FPSO | Upstream | Oil extraction | Brazil | 2.1 | 4.2 | 28.2 | 28.3 | 30.3 | 32.5 |
| Cidade De Itaguai Mv26 FPSO (Cernambi Norte) | Upstream | Oil extraction | Brazil | 2.1 | 4.2 | 28.2 | 28.3 | 30.3 | 32.5 |
| FPSO Cidade de Santos MV20 | Upstream | Oil extraction | Brazil | 0.3 | 0.7 | 5.1 | 5.2 | 5.5 | 5.8 |
| Espadarte MV 14 FPSO | Upstream | Oil extraction | Brazil | 3 | 5.2 | 17.6 | 17.6 | 20.6 | 22.8 |
| Guara FPSO | Upstream | Oil extraction | Brazil | 1.7 | 3.4 | 22.5 | 22.6 | 24.2 | 26 |
| FPSO Marlim 1 MV33 | Upstream | Oil extraction | Brazil | 2.4 | 4.2 | 14 | 14.1 | 16.5 | 18.2 |
| Mero 1 FPSO - gas | Upstream | Gas extraction | Brazil | 0.9 | 1.8 | 11.3 | 11.9 | 12.2 | 13.7 |
| Mero 1 FPSO - oil | Upstream | Oil extraction | Brazil | 2 | 4 | 30.9 | 31 | 32.9 | 35 |
| Tartaruga FPSO | Upstream | Oil extraction | Brazil | 2.7 | 5.4 | 26.9 | 27 | 29.5 | 32.3 |
| Cutbank Ridge Montney Shale Gas | Upstream | Gas extraction | Canada | 0.5 | 1 | 6.1 | 6.8 | 6.6 | 7.8 |
| LNG Canada | Midstream | LNG terminal | Canada | 13.2 | 19.7 | 37.5 | 39.6 | 50.8 | 59.3 |
| Cochrane Coal-Fired Power Plant (550MW) | Downstream | Coal-fired | Chile | 2.1 | 2.1 | 0.2 | 0.4 | 2.2 | 2.5 |
| 663MW Auraiya Gas Power Station | Downstream | Gas-fired | India | 0.5 | 0.5 | 0.1 | 0.2 | 0.6 | 0.7 |
| Kudgi Super Thermal Power Plant (2400MW) | Downstream | Coal-fired | India | 11.9 | 11.9 | 0.8 | 2 | 12.7 | 13.9 |
| Malinau Coal Mines | Upstream | Coal mining | Indonesia | 0.2 | 0.4 | 7.6 | 7.6 | 7.8 | 8 |
| Central Java Coal-Fired Power Plant (2000MW) | Downstream | Coal-fired | Indonesia | 8.1 | 8.1 | 0.2 | 0.4 | 8.2 | 8.4 |
| Cirebon Coal-Fired Power Plant (660MW) | Downstream | Coal-fired | Indonesia | 2.7 | 2.7 | 0.1 | 0.1 | 2.8 | 2.9 |
| Cirebon 2 Coal-Fired Power Plant (1000MW) | Downstream | Coal-fired | Indonesia | 4.1 | 4.1 | 0.1 | 0.2 | 4.2 | 4.3 |
| Donggi Senoro LNG Liquefaction | Midstream | LNG terminal | Indonesia | 1.6 | 2.4 | 5.4 | 5.8 | 7 | 8.2 |
| Java 1 CCGT Power Plant (1760MW): Jawa-1 Gas-to-Power | Downstream | Gas-fired | Indonesia | 4 | 4 | 1.1 | 1.5 | 5.1 | 5.4 |
| Jawa-2 Gas-Fired Combined Cycle Power Plant | Downstream | Gas-fired | Indonesia | 2 | 2 | 0.5 | 0.7 | 2.5 | 2.7 |
| Kalselteng 2 Coal-Fired Power Plant | Downstream | Coal-fired | Indonesia | 0.8 | 0.8 | 0 | 0 | 0.8 | 0.9 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Lontar Thermal Power Plant | Downstream | Coal-fired | Indonesia | 1.3 | 1.3 | 0 | 0 | 1.3 | 1.3 |
| Muara Karang Gas-Fired Combined Cycle Power Plant | Downstream | Gas-fired | Indonesia | 0.6 | 0.6 | 0.2 | 0.2 | 0.8 | 0.8 |
| Paiton Power Plants (Units 3,7,8) (2045MW) | Downstream | Coal-fired | Indonesia | 8.4 | 8.4 | 0.3 | 0.7 | 8.7 | 9.1 |
| Tangguh LNG Facility | Midstream | LNG terminal | Indonesia | 25.5 | 30.1 | 29.5 | 31.8 | 55 | 62 |
| Tanjung Jati B Coal-Fired Power Plant (Units 1-4) (2640MW) | Downstream | Coal-fired | Indonesia | 10.9 | 10.9 | 0.3 | 0.5 | 11.2 | 11.4 |
| Tanjung Jati B Coal-Fired Power Plant (Units 5-6) (2000MW) | Downstream | Coal-fired | Indonesia | 8.3 | 8.3 | 0.2 | 0.4 | 8.4 | 8.7 |
| Tempa Rossa oil field development project - gas | Upstream | Gas extraction | Italy | 0 | 0 | 0.2 | 0.3 | 0.2 | 0.3 |
| Tempa Rossa oil field development project - oil | Upstream | Oil extraction | Italy | 0.7 | 1.3 | 9 | 9 | 9.7 | 10.4 |
| Chugoku Electric Loan 2023 | Downstream | Gas-fired | Japan | 14.1 | 14.1 | 1.7 | 2.6 | 15.9 | 16.8 |
| Amman East CCGT Power Plant (370MW) | Downstream | Gas-fired | Jordan | 1.1 | 1.1 | 0.1 | 0.2 | 1.2 | 1.3 |
| Az Zour North IWPP Phase I (1500MW) | Downstream | Gas-fired | Kuwait | 5.2 | 5.2 | 0.4 | 0.7 | 5.6 | 5.9 |
| Altamira II CCGT Power Plant (495MW) | Downstream | Gas-fired | Mexico | 1.2 | 1.2 | 0.2 | 0.4 | 1.5 | 1.6 |
| Carboelectrica del Pacifico Coal-fired Power Plant (651MW) | Downstream | Coal-fired | Mexico | 3.3 | 3.3 | 0.1 | 0.2 | 3.3 | 3.4 |
| Chicontepec Oil Field | Upstream | Oil extraction | Mexico | 11.9 | 23.3 | 11.1 | 11.1 | 22.9 | 34.3 |
| Rio Bravo II CCGT Power Plant (495MW) - Acquisition of Gas Natural Mexico CCGT Portfolio | Downstream | Gas-fired | Mexico | 1 | 1 | 0.3 | 0.4 | 1.2 | 1.4 |
| Rio Bravo III CCGT Power Plant (495MW) - Acquisition of Gas Natural Mexico CCGT Portfolio | Downstream | Gas-fired | Mexico | 1 | 1 | 0.3 | 0.4 | 1.2 | 1.4 |
| Rio Bravo IV CCGT Power Plant (500MW) - Acquisition of Gas Natural Mexico CCGT Portfolio | Downstream | Gas-fired | Mexico | 1 | 1 | 0.3 | 0.4 | 1.3 | 1.4 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Salamanca Gas-Fired Combined Cycle Power Plant Project | Downstream | Gas-fired | Mexico | 2.4 | 2.4 | 0.8 | 1.4 | 3.3 | 3.9 |
| Saltillo CCGT Power Plant (248MW) - Acquisition of Gas Natural Mexico CCGT Portfolio | Downstream | Gas-fired | Mexico | 0.6 | 0.6 | 0.2 | 0.3 | 0.7 | 0.8 |
| San Luis Gas-Fired Combined Cycle Power Plant Project | Downstream | Gas-fired | Mexico | 1.1 | 1.1 | 0.3 | 0.6 | 1.4 | 1.6 |
| Tuxpan II CCGT Power Plant (495MW) | Downstream | Gas-fired | Mexico | 1 | 1 | 0.2 | 0.3 | 1.2 | 1.3 |
| Jorf Lasfar IPP (2056MW) | Downstream | Coal-fired | Morocco | 13.4 | 13.4 | 1 | 2.6 | 14.4 | 16 |
| Safi Coal-fired Power Plant (1320MW) | Downstream | Coal-fired | Morocco | 6 | 6 | 0.4 | 0.9 | 6.4 | 7 |
| Mozambique LNG Project (Rovuma Offshore Area 1 Block) | Midstream | LNG terminal | Mozambique | 7.1 | 12.8 | 32.1 | 34.7 | 39.2 | 47.4 |
| Sur IPP (2000MW) | Downstream | Gas-fired | Oman | 2.1 | 2.1 | 0.5 | 0.8 | 2.6 | 2.9 |
| PNG LNG Phase I | Midstream | LNG terminal | Papua New Guinea | 6.4 | 9.5 | 18.3 | 19.4 | 24.7 | 28.9 |
| Ilijan Combined Cycle Power Plant (1200MW) | Downstream | Gas-fired | Philippines | 1.8 | 1.8 | 0.3 | 0.5 | 2.1 | 2.3 |
| Barzan Gas Project Phase I | Upstream | Gas extraction | Qatar | 3.4 | 7.3 | 37.5 | 40.4 | 41 | 47.7 |
| Facility D Desalination Plant (2400MW) | Downstream | Gas-fired | Qatar | 4.8 | 4.8 | 0.6 | 1 | 5.4 | 5.8 |
| 2000MW Mesaieed Independent Power Plant | Downstream | Gas-fired | Qatar | 3.9 | 3.9 | 0.5 | 0.8 | 4.4 | 4.8 |
| Qatargas 3 (LNG Train 6) | Midstream | LNG terminal | Qatar | 4.4 | 7.2 | 20.3 | 21.5 | 24.7 | 28.8 |
| Ras Laffan C IWPP (2730MW) | Downstream | Gas-fired | Qatar | 5.1 | 5.1 | 0.6 | 1 | 5.8 | 6.2 |
| Arctic LNG 2 | Midstream | LNG terminal | Russia | 41.6 | 70.7 | 43.2 | 46.7 | 84.8 | 117.4 |
| Sakhalin I Oil and Gas Field - gas | Upstream | Gas extraction | Russia | 2 | 4.1 | 29.2 | 35.8 | 31.1 | 40 |
| Sakhalin I Oil and Gas Field - oil | Upstream | Oil extraction | Russia | 1.1 | 2 | 11.9 | 12 | 13 | 13.9 |
| Sakhalin II LNG Facility | Midstream | LNG terminal | Russia | 22.4 | 35.1 | 26.7 | 28 | 49.1 | 63.1 |
| Yamal LNG | Midstream | LNG terminal | Russia | 39.9 | 70.2 | 45.9 | 49.6 | 85.7 | 119.8 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Loan to Trafigura Pte Ltd Contributing Toward Securing Stable LNG Supply for Japanese Utility Company | Midstream | LNG terminal | Singapore | 9.5 | 14.5 | 28.7 | 30.5 | 38.2 | 44.9 |
| 240MW Kinyerezi IPP | Downstream | Gas-fired | Tanzania | 0.4 | 0.4 | 0.1 | 0.2 | 0.5 | 0.6 |
| BLCP Map Ta Phut Coal-Fired Power Plant (1.434GW) | Downstream | Coal-fired | Thailand | 4.9 | 4.9 | 0.3 | 0.7 | 5.2 | 5.6 |
| Chonburi Gas-Fired Thermal Power Plant (2500MW) PPP | Downstream | Gas-fired | Thailand | 5.5 | 5.5 | 1.6 | 2 | 7.1 | 7.5 |
| Gulf Pluak Daeng CCGT Power Plant (2.65GW) | Downstream | Gas-fired | Thailand | 3.3 | 3.3 | 1.3 | 1.7 | 4.6 | 4.9 |
| Kaeng Khoi II CCGT (1468 MW) | Downstream | Gas-fired | Thailand | 1.8 | 1.8 | 0.8 | 1 | 2.6 | 2.8 |
| Khanom 4 CCGT Plant (930MW) | Downstream | Gas-fired | Thailand | 1.5 | 1.5 | 0.6 | 0.7 | 2.1 | 2.3 |
| Nong Saeng Gas-fired Power Plant (1600MW) | Downstream | Gas-fired | Thailand | 1.6 | 1.6 | 0.7 | 0.9 | 2.3 | 2.5 |
| 1400MW Ratchaburi CCGT Plant (RPCL) | Downstream | Gas-fired | Thailand | 2.5 | 2.5 | 1 | 1.3 | 3.5 | 3.8 |
| Sriracha GSRC CCGT Power Plant (2.65GW) | Downstream | Gas-fired | Thailand | 3.3 | 3.3 | 1.1 | 1.5 | 4.5 | 4.8 |
| U-Thai CCGT Power Plant | Downstream | Gas-fired | Thailand | 1.6 | 1.6 | 0.7 | 0.9 | 2.3 | 2.5 |
| Zerger Lebap Gas-Fired Power Plant (400MW) | Downstream | Gas-fired | Turkmenista n | 1.6 | 1.6 | 0.2 | 0.4 | 1.8 | 2 |
| ADNOC: Abu Dhabi National Oil Company (ADNOC) | Upstream | Oil extraction | United Arab Emirates | 58.8 | 112.3 | 497.6 | 520.4 | 556.4 | 632.7 |
| ADNOC Onshore: Abu Dhabi Onshore Oil Fields | Upstream | Oil extraction | United Arab Emirates | 37.1 | 61.6 | 329.9 | 331 | 367 | 392.6 |
| ADNOC Onshore: ADCO Oilfields | Upstream | Oil extraction | United Arab Emirates | 37.1 | 61.6 | 329.9 | 331 | 367 | 392.6 |
| Al Layyah Gas-Fired Power Plant Expansion (1026.3MW) | Downstream | Gas-fired | United Arab Emirates | 2.9 | 2.9 | 0.4 | 0.6 | 3.3 | 3.5 |
| Fujairah F2 IWPP | Downstream | Gas-fired | United Arab Emirates | 4.5 | 4.5 | 0.7 | 1 | 5.2 | 5.5 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Fujairah F3 Natural Gas-fired Combined Cycle Power Plant | Downstream | Gas-fired | United Arab Emirates | 5.4 | 5.4 | 0.8 | 1.2 | 6.3 | 6.6 |
| Hail Oil Field | Upstream | Oil extraction | United Arab Emirates | 0.3 | 0.5 | 3.5 | 3.5 | 3.8 | 4 |
| Hamriyah Gas-Fired Power Plant (1800MW) | Downstream | Gas-fired | United Arab Emirates | 3.7 | 3.7 | 0.7 | 0.9 | 4.4 | 4.6 |
| Lower Zakum Oil Field | Upstream | Oil extraction | United Arab Emirates | 6.6 | 10.3 | 74.3 | 74.6 | 80.9 | 84.8 |
| Satah Offshore Oil Field and Um-Dalkh Offshore Oil Field | Upstream | Oil extraction | United Arab Emirates | 0.7 | 1.4 | 7.1 | 7.1 | 7.8 | 8.5 |
| Shuweihat S2 IWPP (1.51GW) | Downstream | Gas-fired | United Arab Emirates | 2.1 | 2.1 | 0.5 | 0.6 | 2.6 | 2.7 |
| Shuweihat S3 IPP (1600MW) | Downstream | Gas-fired | United Arab Emirates | 2.2 | 2.2 | 0.5 | 0.7 | 2.7 | 2.9 |
| Taweelah B IWPP Plant (2000MW) | Downstream | Gas-fired | United Arab Emirates | 3.5 | 3.5 | 0.4 | 0.6 | 3.8 | 4.1 |
| Cameron LNG Phase I | Midstream | LNG terminal | United States | 11.7 | 19 | 35.8 | 38.9 | 47.6 | 57.9 |
| Freeport LNG Terminal - Freeport LNG Train 1 only | Midstream | LNG terminal | United States | 18 | 28.3 | 56.8 | 59 | 74.8 | 87.3 |
| Longview Coking Coal Mine | Upstream | Coal mining | United States | 1.6 | 4.3 | 10.1 | 10.1 | 11.8 | 14.5 |
| Syr Darya II Shirin CCGT Plant (1.6GW) | Downstream | Gas-fired | Uzbekistan | 5.3 | 5.3 | 0.7 | 1.4 | 6 | 6.7 |
| Binh Thuan Ultra-Supercritical Coal-Fired Power Generation Plant | Downstream | Coal-fired | Viet Nam | 2.4 | 2.4 | 0.4 | 1 | 2.8 | 3.4 |
| Duyen Hai 3 Coal Fired Power Plant (1860MW) | Downstream | Coal-fired | Vietnam | 7.5 | 7.5 | 1.2 | 3.2 | 8.6 | 10.7 |
| Haiphong Coal Fired Power Plant (1200MW) | Downstream | Coal-fired | Vietnam | 4.8 | 4.8 | 0.7 | 1.9 | 5.5 | 6.7 |
| Quang Ning Coal Mines | Upstream | Coal mining | Vietnam | 1.2 | 3.2 | 6.3 | 6.3 | 7.5 | 9.5 |
| Nghi Son 2 Coal-Fired Power Plant (1.2GW) | Downstream | Coal-fired | Vietnam | 3.7 | 3.7 | 0.5 | 1.3 | 4.2 | 5 |
| Phu My 3 Power Plant (717MW) | Downstream | Gas-fired | Vietnam | 0.8 | 0.8 | 0.4 | 0.5 | 1.2 | 1.3 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Van Phong 1 Coal-Fired Power Plant (1.32GW) | Downstream | Coal-fired | Vietnam | 5.4 | 5.4 | 0.9 | 2.5 | 6.4 | 7.9 |
| Vung Ang 2 Coal-Fired Power Plant (1.2GW) | Downstream | Coal-fired | Vietnam | 4.8 | 4.8 | 0.7 | 1.9 | 5.5 | 6.7 |
| Yemen LNG | Midstream | LNG terminal | Yemen | 5.4 | 8.6 | 18.2 | 19.2 | 23.6 | 27.8 |

*Figures are rounded to one decimal place

**Climate Impacts of Japan's Public Finance:**
**Greenhouse Gas Emissions from JBIC's Fossil Fuel Finance and Alignment with the 1.5°C Goal**

November 5, 2025

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