TASA-EFX NATIONAL MODELS DATA DESCRIPTION AND READ ME

Version 1.5

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INTRODUCTION

TASA-EFX (TASA - Emissions Factor Exchange) is a comprehensive, multi-regional, and multi-tier emissions factor dataset derived from environmentally-extended economic input-output models constructed at the national level and extended globally. Methods employed follow well-developed approaches of high-resolution EEIO models published to date, most notably USEEIO, KREEIO, and MXEEIO, in collaboration with the US Environmental Protection Agency (EPA), the National Research Foundation of Korea, and by members of the TASA Analytics team (Y. Yang et al., 2017, 2022; Zhang & Yang, 2024). The data presented are developed from public data consisting of two parts, economic input-output data developed by national governments roughly every 5-7 years and GHG satellite data compiled by the TASA research team from a variety of sources e.g. GHG satellite data, national GHG inventors, and published literature. Estimates of multi-tier Scope 1, Scope 2, and Scope 3 emissions are derived through a structural path analysis (SPA) of each industry sector's EEIO cradle-to-gate life-cycle emissions using power series expansion (Huang et al., 2009; Suh & Heijungs, 2007; Y. Yang et al., 2022) with modifications to align direct and indirect emissions relationships with the GHG accounting principles. For further methodological discussion, please explore additional resources available at tasaanalytics.com and peer-reviewed academic publications of our research team (Pelton et al., 2016; X. Yang et al., 2025; Y. Yang et al., 2017; Yin et al., 2025; Zhang & Yang, 2024).

USER GUIDE

Data products are offered across several levels of supply chain resolution to meet the various needs of users and applications. Descriptions of product contents and variables are available in Table 1 and 2, respectively. Additionally, products reference geographies using ISO 3166-1 alpha-3 codes (XXX), with results provided in local (###) and US currencies and across the EEIO reference year (YYYY), a benchmarked 2020 baseline year, and the most current years available (e.g., 2021, 2022, 2023 and 2024). Country specific details (e.g. local currency or EEIO reference year) are detailed in Table 3.

LIFE CYCLE INVENTORY ANALYSIS

TASA utilizes proprietary EEIO national models, currently 12 national models, representing approximately 70% of global production. These data have been prepared with carbon accountants in mind for ease of use and accuracy and use the same methodologies as the widely used USEEIO model – developed by TASA co-founder Yi Yang under contract by the U.S. Environmental Protection Agency. Descriptions of methods developed and applied to the USEEIO have been well documented (Ingwersen et al., 2022; Y. Yang et al., 2017). Similarly, the extension of these approaches developed by TASA’s team of researchers have also been peer-reviewed and published in high-quality academic journals (X. Yang et al., 2025; Y. Yang et al., 2022; Zhang & Yang, 2024).

An EEIO model consists of two components. The first is a national input-output table, usually compiled by government agencies as part of a country’s national accounts, that records annual transactions among industries and the flows of industrial output to households, government, investment, imports, and exports. The second component is the environmental satellite table, which contains quantitative information on industries' annual emissions, pollution, resource use, and waste. Information in the satellite table often comes from various sources and needs to go through various degrees of processing and mapping so as to be consistent with the sectoral definitions in the input-output table. In our study, we focus only on GHG emissions. Descriptive information for each model is provided in Tables 1-3.

Structural path analysis (SPA) is conducted, using power series expansion, to estimate the supply-chain's round-by-round input and output relationships of producing a given value of output. This analysis enables the identification and modification of mutually exclusive pathways and provides an estimate of the upstream production-consumption network structure ultimately contributing to the emissions of goods and services at final use. Paths are further organized to reflect the GHG protocol nomenclature of scope 1, scope 2 and scope 3 emissions of specific supply. This approach addresses three critical challenges in supply chain carbon management, by: (1) providing improved commodity granularity, (2) creating visibility into supply chain input pathways for attribution across actors, and (3) allowing for unique multi-regionality through path-exchange, as opposed to relying on average country-level trade flows.

Estimation of the multi-tier structure of supply chain emissions is derived through a structural path analysis of a commodity's total embodied emissions as calculated by the EEIO approach, with a slight modification to align direct and indirect emissions relationships with the corporate GHG accounting structure, e.g., scope 1–3 emissions. In other words, the total emissions of a sector supply chain are the sum of its direct emissions, or scope 1 emissions, and the emissions embodied in its suppliers. The overall formula represents all inputs (energy, materials, and service) and thus includes electricity (and heat), which can be singled out and separated into direct emissions from combustion—which are identified as scope 2 emissions—and upstream emissions from transport and production of fuels—which are part of scope 3 emissions according to the GHG protocol.

DATA COMPILATION

TASA reviews and reconciles hundreds of data sources to produce its global emissions factor data. This includes high-resolution national input-output tables, regional input-output tables (e.g., OECD and EU), GHG inventories (e.g. EPA, ONS, UNFCCC, etc.), global economic data (e.g., UN Comtrade, country- and sector-level producer price data), as well as national, sub-regional and academic reports. Data compilation is carried out such that the best available data, and most robust assumptions, are used - reducing aggregation error and continuously improving data quality over time.

A "hierarchical" approach is taken in adopting and developing country-level environmentally extended input-output (EEIO) models across data availability and quality levels. First, countries from where refined input-output (IO) tables are well represented are constructed. These models are constantly evolving, however, TASA currently manages 12 country models at this level, representing approximately 70% of global gross domestic product. Second, TASA crosswalks and harmonizes differences across country reporting and classification systems, and accounts for technological differences and similarities across regions. TASA then expands the EEIO models of more aggregated countries' IO data by disaggregating sectors (e.g., electronics, automotive, steel, etc.) using well-established matrix augmentation and IO-based hybrid protocols (Joshi, 1999; Suh & Huppes, 2005). Third, where national IO tables don't exist, are highly aggregated, or poorly represented, we apply regional and technology, economy-wide, proxy structures, with modifications to key economic sector inputs (e.g., electricity and heavy primary industries where possible). These country data are clearly identified as “extended” models, for transparency.

MODEL TYPE

PRIMARY MODELS There are currently 12 primary data national models, representing approximately 70% of global production, that provide the backbone of TASA-EFX. Each Primary Model is developed using primary governmental input-output sources specific to each model country. This includes economic and greenhouse gas/emissions inventories that account for the unique technological and developmental qualities of each country. The primary data models offer emissions factors for each of the country’s EEIO Reference Year as well as inflation adjusted model years of 2020, 2021, 2022, 2023, and 2024. Refer to Table 3 for country specific economic and emissions data sources.

EXTENDED MODELS Extended country models are provided for geographies where primary input-out infrastructure and emissions reporting is lacking, or non-existent. Extended country models are extended representations of similar technological and socioeconomic environments determined through the assessment and application of data collected from many sources. Practitioners have often relied on single-country models (e.g., USEEIO), highly aggregated and average-trade multi-regional models (e.g. Exiobase), or global datasets relying heavily on the economic relationships of a single economy (e.g., CEDA) to estimate emissions footprints. However, these approaches can prove inaccurate, particularly when seeking deep insights into global, multi-tier supply chains. TASA-EFX leverages the diversity of twelve countries’ primary EEIO data to represent the economic relationships of extended country production environments and characterizes the emissions intensity of these flows by adjusting key inputs (e.g., energy and material inputs) to reflect the unique circumstances of that geography. In total, 139 country models, and one “rest of world” model, are constructed in this way.

RESULTS

The emission factors from TASA’s data sets are available in units of MgCO2e/$million. Emissions factors are also expressed in the local currency for all countries covered.

Sector definitions follow the industry and commodity classification of the US Bureau of Economic Analysis (BEA) and are mapped to the North American Industry Classification System (NAICS). This classification is “crosswalked” with other national classification systems employed by other country governments in developing their IO models. A crosswalk tool is provided with all downloads to easily identify corresponding sectors and commodities, globally.

TASA National datasets offer a breakdown of global emissions data by country and industry sectors. Country-level emissions factors are organized to include all final use emissions factors for all available sectors within each country model, providing Scope 1, 2, and 3 breakdowns to allow for targeted exchange of the TASA factor with primary data. In addition, TASA’s country-level emissions factor data also provides aggregated emissions contributions by tier and hotspot input contributions for the top 20 tier-1 inputs (direct requirements, by Scope 1, 2, and 3) to facilitate company efforts toward supplier engagement across multiple tiers.

PRICE INDEX ADJUSTMENTS

Given the time and resources required to develop national accounts information, Governments generally don't update economic input-output models annually. Following well-established practices, TASA adjusts emission factors from the IO reference year to the most recent available year using production price indices from each country modelled, when available, and from the U.S. Bureau of Economic Analysis (BEA) and U.S. Federal Reserve Economic Data (FRED), when necessary. By doing so, users can easily apply TASA's model year emissions factors to the economic year of their particular need.

PURCHASER PRICE CONVERSION

TASA provides emissions factors at producer prices, the amount received by the producer for the production of a good or service. These emissions factors are the most comparable to process-based life cycle assessments for products, but users may also wish to convert TASA emissions factors to ones more reflective of a consumer purchaser's price (or spend). Some emissions factor databases apply coarse and generic assumptions to calculate a "purchaser price," a price after adjustments for wholesale/retail trade margins and some transportation and logistics costs. Given the tremendous variation across purchasing agreements in the marketplace, TASA has chosen not to provide emissions factors at an a priori calculated purchaser price. Like other life cycle assessment methodological guidance, we recommend a partitioning approach and the development of additional analytical modules to account for transportation and retail/wholesale functions appropriately, when purchase prices include retail or wholesale margins. TASA's emissions factors are appropriate for manufacturer-direct purchases, without alteration.

REVIEW AND ASSURANCE

TASA is committed to rigorous peer-review of its methods. Dr. Yi Yang lead the publication of the original academic manuscript describing the USEEIO model (Y. Yang et al., 2017). Subsequently, Smith's former Ph.D. student and postdoctoral advisee, Dr. Mo Li, co-authored its most recent published revision (Ingwersen et al., 2022). TASA's methods and a number of its EEIO models have been widely published in the academic and technical literature, to both highlight the consistency across models and the differences between regional production environments. TASA's South Korea model (Y. Yang et al., 2022) and Mexico model (Zhang & Yang, 2024) methodologies have been made available following peer review, and a comparison of US, China, Korea and Mexico is in press (X. Yang et al., 2025).

LIMITATIONS AND ASSUMPTIONS

Data are based on high-resolution EEIO models, which strike a balance between specificity and system completeness (Huppes et al., 2006) and provide a useful guide and scoping assessment for firm-level analyses. They are especially well-suited to analyses across a broad range of sectors operating within the context of the entire economy. Use phase and end-of-life processing are outside the scope of these data. In addition, the national EEIO models used to create TASA's rLCA models do not directly account for trade between countries and assume that all inputs have the same environmental impacts as domestic production, a typical assumption of national EEIO models (Y. Yang & Suh, 2011). While existing Multi-regional IO models rely on assumptions to map trade across sectors (Miller & Blair, 2009), in doing so are often highly aggregated and of less relevance to corporate decision-making. TASA is available to assist clients in the development of multi-regional rLCA models that address these shortcomings by building multi-regionality in the foreground database (e.g., using data on firms and their primary suppliers distributed in different countries). For example, if a firm's supply chain involves substantial trade across countries, or in ways different from globally average trade flows, then the contributions of its multi-tier suppliers will likely deviate from those estimated using a particular national EEIO or MRIO model. However, accounting for unique, company-specific global sourcing among traceable inputs (e.g., T1-T3), better estimate a firm's unique supply chain footprint and emissions profile. For more information, please see TASA's hybrid-path analytical tools and services.

PRODUCT LEVELS

OPEN ACCESS SILVER PRODUCT

The Open Access Silver Model provides total emissions factors in terms of the country of interest's currency (###) and USD that are further broken down into a sector's scope 1, 2, and 3 emissions (in GHG_scope_### and GHG_scope_USD tab) along with reference tabs for Producer Price Index (PPI), Exchange Rates, and a NAICS to EEIO sector Crosswalk information. The emissions factors (in GHG_### tab) are cradle-to-gate life-cycle emissions per million economic units (e.g. USD, MXN, CNY, etc.). The scope 1, 2, and 3 results aligned with common GHG accounting practices and indicate the mitigation potentials at different degrees of supplier engagement. The PPI tab details inflationary and deflationary purchase price indices to the EEIO Reference year (YYYY) by industry sector. The Exchange Rates tab lists exchange rates between U.S. Dollars and the country of interest's currency (###) for respective EEIO Reference years (YYYY) and Model years 2020, 2021, 2022, 2023, and 2024. The Crosswalk tab assists users in identifying the appropriate emissions factor by relating NAICS (North American Industry Classification System) codes to EEIO sectors.

GOLD PRODUCT

The Gold Model includes all data from the Open Access Silver Product, plus the scope 3 emissions further broken out into the tier 1 total scope 1, 2, and scope 3 emissions in the country of interest's currency (GHG_tiered_### tab) and USD (GHG_tiered_USD tab). The aggregated tier 1 total scope 3 emissions are also further broken out into aggregated tier 2 total scope 1, 2, and 3 emissions (Y. Yang et al., 2022; Zhang & Yang, 2024). These data represent a sector's emissions footprint from directly purchased supply (tier 1) and the direct purchased supply of tier 1 supply (i.e., tier 2). These data are particularly useful for sizing emissions contributions from electricity purchases (scope 2), and direct emissions (scope 1), embedded across the supply chain.

PLATINUM PRODUCT

The Platinum Model includes all data from the Gold Product with the addition of the Hotspots tabs in the country of interest's currency (Hotspots_### tab) and USD. (Hotspots_USD tab) The Hotspots tabs show the emissions profiles of the top 20 tier 1 inputs of a sector, by scope 1-3. The Hotspot rankings are useful in identifying the emissions contributions from key directly supplied inputs and provide supply chain visibility to inform supplier engagement efforts.

TABLE 1. EFX NATIONAL MODEL CONTENTS

TAB NAME	DESCRIPTION	NOTES
GHG_###	Industry sector emissions factors in country specific currency (Mg CO_2e/###$1M)	Values are provided for the EEIO reference year (YYYY) and Model years.
GHG_USD	Industry sector emissions factors in USD (Mg CO_2e/$1M)	Values are provided for the EEIO reference year (YYYY) and Model years. Annual currency exchange rates are shown in the Exchange Rates tab.
GHG_tiered_### (GHG_scope_### in Open Access Silver Model)	Industry sector emissions factors in country specific currency (Mg CO2e/###$1M), disaggregated by estimated economy-wide emissions scope and supply chain tier.	Values are provided for the EEIO reference year (YYYY) and Model years. Total emissions intensity is reported by industry sector emissions scope (e.g., scope 1, scope 2 and scope 3). Scope 3 is further disaggregated into emissions scopes at tier-1 (total direct inputs to industry sector) and tier-2 (total direct inputs to tier-1 inputs) only in the Gold and Platinum Products.
GHG_tiered_USD (GHG_scope_USD in Open Access Silver Model)	Industry sector emissions factors in USD (Mg CO2e/$1M), disaggregated by estimated economy-wide emissions scope and supply chain tier.	
Hotspots_###	Industry sector emissions factors in country specific currency (Mg CO2e/###$1M), by estimated economy-wide emissions scope and supply chain tier for the top 20 most GHG emissions-intensive tier-1 inputs (and remaining "other") inputs required to produce ###$1M for each sector of the economy.	Values are provided for the EEIO reference year (YYYY) and Model years. Top 20 required inputs are those that contribute the most to a given sector's scope 3 emissions (e.g., Hotspots tab cells G3 through G23 sum up to E3).
Hotspots_USD	Industry sector emissions factors in USD (Mg CO2e/$1M), by estimated economy-wide emissions scope and supply chain tier for the top 20 most GHG emissions-intensive tier-1 inputs (and remaining "other") inputs required to produce $1M for each sector of the economy.	
Exchange Rates	Exchange rates between U.S. Dollars and country specific currency (###) for respective EEIO Reference year (YYYY) and Model years 2020, 2021, 2022, 2023, adn 2024. See Table 3 for country of interest's model specifics. US IRS Exchange Rates (*Yearly Average Currency Exchange Rates | Internal Revenue Service*, n.d.): https://www.irs.gov/individuals/international-	

	taxpayers/yearly-average-currency-exchange-rates. World Bank Official Exchange Rates: https://data.worldbank.org/indicator/PA.NUS.FCRF	
PPI	Inflationary and deflationary purchase prices indexed to the **EEIO Reference year (YYYY)** by industry sector are provided for reference. (PPI, producer price index)	**Refer to Table 3 to find PPI resources used for each Primary Model.** Inflation adjustments are based on sector-level PPI data that are publicly available. These data are in some cases more aggregated than the resolution of the EEIO sectors and so may not precisely reflect a product or sector's price change over time. If users have more specific inflation data on a product or sector, we recommend applying your own data to adjust for inflation.
Crosswalk	Each country reports industry sector data slightly differently for economic input-output modeling. We provide a crosswalk table that maps country industry sectors used in TASA's EEIO to NAICS (North American Industry Classification System) for standardization (US Census Bureau, 2017).The crosswalk is based on expert interpretation of the sectors in each IO table (except in the case of USEEIO which maps directly to the NAICS codes) and is only a guide. Selecting the appropriate sector for a given product is ultimately at the discretion of the user.	

TABLE 2. VARIABLE GLOSSARY

The modeled year is indicated preceding all header variables within models.

VARIABLE	DESCRIPTION
Sectors	Country industry sector names used in EEIO model
Total Emissions Intensity	Overall (total) emissions factor (cradle-to-gate) of industry sector production in Mg CO2e per million ### and USD (1 Mg = 1 metric tonne)
Year	Emissions factors are provided for **YYYY** EEIO reference year (refer to Table 3) and 2020, 2021, 2022, 2023, and 2024 Model Years
USD	US Dollar ($) - Emissions factors presented in million US dollars ($1M)
Scope 1	Emissions factor estimates associated direct operational emissions of industry sector production
Scope 2	Emissions factor estimates associated with direct purchased electricity and heat of industry sector production
Scope 3	Emissions factor estimates associated with upstream required inputs of industry sector production
Tier 1 Scope 1	Contribution of industry sector Scope3 emissions attributed to scope 1 emissions of tier 1 inputs. Tier 1 Scope 1 + Tier 1 Scope 2 + Tier 1 Scope 3 = Scope 3.
Tier 1 Scope 2	Contribution of industry sector Scope3 emissions attributed to scope 2 emissions of tier 1 inputs. Tier 1 Scope 1 + Tier 1 Scope 2 + Tier 1 Scope 3 = Scope 3.
Tier 1 Scope 3	Contribution of industry sector Scope3 attributed to upstream scope 3 emissions of tier 1 (e.g., tiers 2-n). Tier 1 Scope 1 + Tier 1 Scope 2 + Tier 1 Scope 3 = Scope 3.
Tier 2 Scope 1	Contribution of industry sector Tier1_scope3 emissions attributed to scope 1 emissions of tier 2 inputs. Tier 2 Scope 1 + Tier 2 Scope 2 + Tier 2 Scope 3 = Tier 1 Scope 3.
Tier 2 Scope 2	Contribution of industry sector Tier1_scope3 emissions attributed to scope 2 emissions of tier 2 inputs. Tier 2 Scope 1 + Tier 2 Scope 2 + Tier 2 Scope 3 = Tier 1 Scope 3.
Tier 2 Scope 3	Contribution of industry sector Tier1_scope3 attributed to upstream scope 3 emissions of tier 2 (e.g., tiers 3-n). Tier 2 Scope 1 + Tier 2 Scope 2 + Tier 2 Scope 3 = Tier 1 Scope 3.
Tier 1 Input Sector	Top 20 hotspot input sector name
Tier 1 Total Emissions Intensity	Total contribution of industry sector Scope 3 emissions attributed to Tier 1 hotspot inputs
Tier 1 Scope 1	Contribution of industry sector Scope 3 emissions attributed to scope 1 emissions of Tier 1 hotspot inputs. Sum of Tier 1 Total Emissions Intensity (e.g. rows 3-23) = Scope 3
Tier 1 Scope 2	Contribution of industry sector Scope 3 emissions attributed to Scope 2 emissions of Tier 1 hotspot inputs. Sum of Tier 1 Total Emissions Intensity (e.g. rows 3-23) = Scope 3

Tier 1 Scope 3	Contribution of industry sector Scope3 emissions attributed to scope 2 emissions of tier-1 hotspot inputs. Sum of Tier 1 Total Emissions Intensity (e.g. rows 3-23) = Scope 3
PPI_YYYY	Producer price index for 2020; YYYY reference year = 100 (Refer to Table 3 for country of interest's EEIO reference year)
PPI_2020	Producer price index for 2020; YYYY reference year = 100 (Refer to Table 3 for country of interest's EEIO reference year)
PPI_2021	Producer price index for 2021; YYYY reference year = 100 (Refer to Table 3 for country of interest's EEIO reference year)
PPI_2022	Producer price index for 2022; YYYY reference year = 100 (Refer to Table 3 for country of interest's EEIO reference year)
PPI_2023	Producer price index for 2023; YYYY reference year = 100 (Refer to Table 3 for country of interest's EEIO reference year)
PPI_2024	Producer price index for 2024; YYYY reference year = 100 (Refer to Table 3 for country of interest's EEIO reference year)
NAICS code	North American Industry Classification System six-digit code
NAICS definition	North American Industry Classification System six-digit sector definition
XXX EEIO Sector	XXX industry sector name used in EEIO model
Sector XXX Alt 1	XXX first alternative sector definition, when more granular than the NAICS classification
Sector XXX Alt 2	XXX second alternative sector definition, when more granular than the NAICS classification
Sector XXX Alt 3	XXX third alternative sector definition, when more granular than the NAICS classification

TABLE 3. PRIMARY DATA COUNTRY SPECIFICATIONS

Using the IRS's Yearly Average Currency Exchange Rates, each country specific currency (###) has been converted to USD for respective EEIO Reference years (YYYY) and Model years (2020, 2022, and 2023).

CHINA - CNEEIO	
Country Code (XXX)	CHN
Currency (###)	(CNY) Chinese Yuan (¥) - Emissions factors presented in million CNY (¥1M)
EEIO Reference Year (YYYY)	2017
Economic Data Sources	The economic input-output data of China (mainland) were provided by the National Bureau of Statistics of China, differentiating 149 industry sectors
Emissions Data Sources	Energy balance table of primary and secondary energy use by different sectors, provided by the National Bureau of Statistics of China (2019). Scientific publications on GHG emissions from non-energy sources including industrial processes and agricultural production* Matrix augmentation of electronic sectors **
PPI	PPI data for China emissions factor calculations are derived from the following sources: CNY PPI Reference http://www.stats.gov.cn/english/
GERMANY - DEEEIO	
Country Code (XXX)	DEU
Currency (###)	(EUR) European Euro (€) - Emissions factors presented in million euros (€1M)
EEIO Reference Year (YYYY)	2021

Economic Data Sources	Input-Output table is from the Federal Statistical Office of Germany, available at https://www.destatis.de/EN/Themes/Economy/National-Accounts-Domestic-Product/Tables/input-output
Emissions Data Sources	GHG emissions data are from the National Inventory Report for the German Greenhouse Gas Inventory (1990 – 2021), provided by German Environment Agency, available at https://unfccc.int/documents/627785
PPI	PPI data are from the Federal Statistical Office of Germany, available at https://www.destatis.de/EN/Themes/Economy/Prices/_node.html
INDIA - INEEIO	
Country Code (XXX)	IND
Currency (###)	(INR) Indian Rupee (₹) - Emissions factors presented in million rupees (₹1M)
EEIO Reference Year (YYYY)	2018
Economic Data Sources	The economic input-output data for India (IND) were provided by the Ministry of Statistics & Programme Implementation, Government of India, differentiating 66 industrial sectors
Emissions Data Sources	The GHG satellite data were estimated based on sectoral GHG emissions provided by the GHG platform-India (https://www.ghgplatform-india.org)
PPI	PPI data for IND emissions factor calculations are derived from the following government sources: Wholesale price index, https://eaindustry.nic.in/download_data_1112.asp & All India Consumer Price Index https://www.data.gov.in/catalog/all-indiaconsumer-price-index-ruralurban
JAPAN - JPEEIO	
Country Code (XXX)	JPN
Currency (###)	(JPY) Japanese Yen (¥) - Emissions factors presented in million Japanese yen (¥1M)
EEIO Reference Year (YYYY)	2015
Economic Data Sources	The economic input-output data for Japan (JPN) were provided by the Official Statistics of Japan, differentiating 385 industry sectors.
Emissions Data Sources	The GHG satellite data were estimated based on i) an energy balance table provided by the Agency for Natural Resources and Energy in Japan (2019) and ii) a GHG inventory provided by the National Institute for Environmental Studies in Japan (2020).
PPI	PPI data for JPN emissions factor calculations are derived from the following sources: Bank of Japan PPI Reference: https://www.stat-search.boj.or.jp/index_en.html
SOUTH KOREA - KREEIO	
Country Code (XXX)	KOR
Currency (###)	(KRW) South Korean Won (₩) - Emissions factors presented in million won (₩1M)
EEIO Reference Year (YYYY)	2017
Economic Data Sources	The economic input-output data of South Korea (KOR) were provided by the Economic Statistic System under the Bank of Korea, differentiating 372 industry sectors.
Emissions Data Sources	The GHG satellite data were estimated using i) South Korea's Energy balance table provided by the Korean Energy Statistical Information System (KESIS) under Korean Ministry of Trade, Industry and Energy and ii) the Greenhouse Gas Inventory provided by the Research Center under Korean Ministry of Environment (Yang et al., 2022).
PPI	PPI data for KR emissions factor calculations are derived from the following source: Korean Statistical Information Service https://kosis.kr/statHtml/statHtml.do?orgId=301&tblId=DT_404Y014&language=en&conn_path=I3
MEXICO - MXEEIO	
Country Code (XXX)	MEX
Currency (###)	(MXN) Mexican Peso (MX$) - Emissions factors presented in million pesos (MX$1M)
EEIO Reference Year (YYYY)	2018
Economic Data Sources	Input Output data were provided by the National Institute of Statistics, Geography and Informatics of Mexico, differentiating 834 industry sectors.

Emissions Data Sources	GHG satellite data were estimated based on Mexico's National Inventory Report submitted to the UNFCCC.
PPI	PPI data for MX emissions factor calculations are derived from the following source: MX PPI Reference https://en.www.inegi.org.mx/programa/inpp/2019/ - Tabular_data
NETHERLANDS - NLEEIO	
Country Code (XXX)	NLD
Currency (###)	(EUR) Euros (€) - Emissions factors presented in million euros (€1M)
EEIO Reference Year (YYYY)	2018
Economic Data Sources	The economic input-output data for the Netherlands (NLD) were provided by Statistics Netherlands, differentiating 91 industry sectors
Emissions Data Sources	The GHG satellite data were estimated using NLD's GHG inventory provided by the National Institute for Public Health and the Environment in Netherlands.
PPI	PPI data for NL emissions factor calculations are derived from the following source: NL PPI Reference: https://opendata.cbs.nl/#/CBS/en/dataset/83760ENG/table
SINGAPORE - SGEEIO	
Country Code (XXX)	SGP
Currency (###)	(SGD) Singapore Dollar (S$) - Emissions factors presented in million SGD (S$1M)
EEIO Reference Year (YYYY)	2015
Economic Data Sources	The economic input-output data for Singapore (SGP) were provided by the Department of Statistics of Singapore, differentiating 105 industry sectors.
Emissions Data Sources	The GHG satellite data were estimated using SGP's GHG inventory extracted from the Fourth Biennial Update Report submitted to the UNFCCC prepared by Singapore's National Environmental Agency
PPI	PPI data for SG emissions factor calculations are derived from the following sources: SG PPI for manufactured goods reference https://www.singstat.gov.sg/find-data/search-by-theme/economy/prices-and-price-indices/latest-data, SG PPI and CPI services references https://www.singstat.gov.sg/find-data/search-by-theme/economy/prices-and-price-indices/latest-data & https://www.mas.gov.sg/statistics/mas-core-inflation-and-notes-to-selected-cpi-categories
THAILAND - THEEIO	
Country Code (XXX)	THA
Currency (###)	(THB) Thai baht (฿) - Emissions factors presented in million baht (฿1M)
EEIO Reference Year (YYYY)	2015
Economic Data Sources	The economic input-output data for Thailand (THA) were provided by the Office of the National Economic and Social Development Council of Statistics, Geography and Informatics of Thailand, differentiating 179 industry sectors
Emissions Data Sources	The GHG satellite data were estimated using Thailand's GHG inventory from its Third National Communication submitted to the UNFCCC
PPI	PPI data for THA emissions factor calculations are derived from the following sources: TH manufacturing products PPI from the Economic and Trade Indices Database (ETID): https://www.price.moc.go.th/
TAIWAN - TWEEIO	
Country Code (XXX)	TWN
Currency (###)	(TWD) Taiwan Dollar (NT$) - Emissions factors presented in million Taiwan Dollars (NT$1M)
EEIO Reference Year (YYYY)	2016
Economic Data Sources	The economic input-output data for Taiwan (TWN) were provided by the National Statistics of Taiwan, differentiating 164 industry sectors
Emissions Data Sources	The GHG satellite data were estimated using Taiwan's GHG inventory provided by its Environmental Protection Administration.
PPI	PPI data for TW emissions factor calculations are derived from the following sources: TW PPI Reference: https://nstatdb.dgbas.gov.tw/dgbasAll/webMain.aspx?sys=100&funid=dgmaine

UNITED KINGDOM - UKEEIO	
Country Code (XXX)	GBR
Currency (###)	(GBP) British pound sterling (£) - Emissions factors presented in million pounds (£1M)
EEIO Reference Year (YYYY)	2019
Economic Data Sources	The economic input-output data for the United Kingdom (GBR) were provided by the Office for National Statistics in the UK, differentiating 105 industry sectors.
Emissions Data Sources	The GHG satellite data were estimated based on GHG inventory from the National Atmospheric Emissions Inventory provided by UK's Office for National Statistics.
PPI	PPI data for UK emissions factor calculations are derived from the following sources: UK Service Sectors Reference https://www.ons.gov.uk/economy/grossdomesticproductgdp/datasets/uksecondestimateofgdpdatatables & UK All Other Industry Sectors Reference https://www.ons.gov.uk/economy/inflationandpriceindices/datasets/producerpriceindexstatisticalbulletindataset
UNITED STATES - USEEIO	
Country Code (XXX)	USA
Currency (###)	(USD) US Dollar ($) - Emissions factors presented in million US dollars ($1M)
EEIO Reference Year (YYYY)	2017
Economic/Emissions Data Sources	The GHG emissions factors provided for the United States of America (USA) have been developed by the Environmental Protection Agency (EPA), covering annual GHG emissions from 2017 to 2023 (Ingwersen et al. 2022; Yang et al., 2017). 2017, 2020, 2021 GHG data are from USEEIOv2.3, released in August 2024; 2022 GHG data are from USEEIOv2.5 released in April 2025; and 2023 GHG data are from USEEIOv2.6, released in October 2025.
PPI	PPI data for US emissions factor calculations are derived from the Chain-Type Price Indexes for Gross Output by Industry, available at https://www.bea.gov/itable/gdp-by-industry

Note: General PPI content/variable descriptions (applicable to all country models) can be found in Tables 1 & 2.

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