

The logo consists of a blue square containing the text 'TASA' in white and 'EFX' in yellow below it.

TASA
EFX

The background of the entire page is a blurred, high-speed photograph of a train moving through a tunnel, creating a sense of rapid motion and depth.

TASA-EFX
RAPID IO-LCA (rLCA)
DATA DESCRIPTION
AND READ ME

Version 1.3

tasaanalytics.com
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INTRODUCTION

TASA's rLCA (Rapid IO-LCA) products provide cradle-to-gate, economy-wide GHG life cycle assessments for nearly 35,000 product and service production systems across 148 global production environments, accounting for nearly all of global production. Leveraging cutting-edge environmentally extended input-output (EEIO) modelling methods developed by leading international research groups and TASA scientists, our rLCAs models provide sector-level GHG emissions factors and emissions supply chain structures consistent with GHG Protocol and LCA global standards. Data are provided at three levels; by (1) total requirements - monetary economic activity and total direct emissions (Mg CO₂e/\$MM), (2) aggregated supply chain tier inputs distributed across the top-10 tiers of supply, by direct (scope 1) and direct purchased electricity and heat (scope 2) emissions, and (3) supply chain pathway emissions through the first three tiers to illuminate embodied emissions (scopes 1-3) for direct suppliers (tier 1), direct suppliers' direct suppliers (tier 2) and suppliers', suppliers' suppliers (tier 3). Coverage metrics of each sector assessment is noted in the *Model Description* tab of the individual economic sector's data product.

USER GUIDE

This "Read Me" document acts as a brief methodological overview and a detailed description of rLCA contents. Goal and Scope as applicable to all rLCA products can be found in Table 1. For additional descriptions of product contents, variables, and country specific details refer to Tables 2, 3, and 4, respectively. Products reference geographies using ISO 3166-1 alpha-3 codes (XXX), with results provided in US dollars (USD). Models are available across the country specific EEIO reference year (YYYY), a benchmarked 2020 baseline year, and the most current model years available (e.g., 2022 and 2023), however, only the most recent year model is posted on the TASA-EFX store.

TABLE 1. GOAL AND SCOPE

VARIABLE	DESCRIPTION
Goal	The goal of these data is to inform practitioners and decision-makers of GHG emissions intensity across the supply chains of sector-level production in the designated geography. These data are often used in preliminary scoping studies, scope 3 purchased goods and services disclosures, intervention simulation, and hybrid-LCA studies.
Product Description	The products and services under study are represented by country level economic sectors. The economic sectors vary between countries and are cross referenced with the North American Industry Classification System (NAICS).
Functional Unit	The functional unit is million dollars of economic sector output
System Boundary	The system boundary is from cradle-to-gate for the life cycle inventory and impact assessment and includes all required inputs of the supply chain from raw material acquisition and preprocessing, product manufacturing, and upstream purchased transportation/distribution.
Temporal Relevancy	Sector-level data are produced through national EEIO models based on the most recently available economic input-output data, energy balance data, national emissions inventories and emissions satellite data. EEIO reference year ranges from 2013-2019, emissions sources range from 2018-2023, and adjusted model years include 2020, 2022, and 2023.
Impact Assessment	No grouping or further quantitative cross-category weighting have been applied to the results; therefore, interpretation is limited to the category of Global Warming Potential (GWP) without reference to other impact categories. Results are presented as Mg CO ₂ e.
Country/Region Environment	The region evaluated is each of the 147 country-level national models, plus one rest-of-world region.
Data & Data Quality Requirements	The quality of the data used is as precise, complete, consistent, and representative as possible with regards to the goal and scope, given the boundaries of the study. The economic, energy, and emissions data collected were evaluated for quality and completeness before inclusion into the models. Data from each model country, e.g. economic I/O data and PPI from the model country's government were preferred over global or proxy data whenever possible.

LIFE CYCLE INVENTORY ANALYSIS

Life Cycle Assessment (LCA) is an environmental accounting tool that is often leveraged to track progress towards diverse environmental goals. An integral part of an LCA is the production of a life cycle inventory, which lists the inputs and outputs associated with the product system under study. 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; 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 1-4.

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.

CRADLE-TO-GATE LIFE CYCLE IMPACT ASSESSMENT

Global Warming Potential (GWP), measured in carbon dioxide equivalents (CO₂eq), is the impact category considered in TASA-EFX datasets. The calculation of GWP is dependent on country-specific emissions inventories, ensuring methodological consistency and regional relevance. This metric is

categorized as a mid-point impact assessment approach. For comprehensive details on the data sources utilized for each model country's emissions, refer to Table 4.

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 MODEL 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, 2022, and 2023. Refer to Table 3 for country specific economic and emissions data sources.

EXTENDED MODELS Extended country models are provided for geographies where primary input-output 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 primary models (70% of global production) to represent 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, 135 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’s rLCA datasets provide deep insights into the emissions structure of individual sector-level supply chains and their differences between production regions. These data make it easy to gain an immediate and comprehensive understanding of aggregated emissions contributions by tier, by supply pathway, and in total. Each rLCA model provides more than 250,000 emissions exchanges (emissions factors) across the multi-tier supply chain structure of the final-use, supply chain production system – identifying where emissions reside for targeted management. For experienced practitioners, these data also facilitate comprehensive hybridization with company-provided and process-based LCA models (i.e., hybrid-LCA).

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.

TABLE 2. rLCA PRODUCT CONTENTS

TAB NAME	DESCRIPTION
Model Description	Data on region, model year, EEIO reference year, currency, and coverage estimates.
Sector Emissions Factors	Industry sector total emissions factors in USD (Mg CO ₂ e/\$1M). Values are provided for the Model Year and include Scope 1, 2, and 3 totals.
10 Tiers_all_sectors	Industry sector emissions factors in USD (Mg CO ₂ e/\$1M). By default, values are provided for the most current National Model Year (e.g., 2023) but can be developed for other model years upon request.
Tier_1 Pathway Analysis	Industry sector emissions factors in USD (Mg CO ₂ e/\$1M), by estimated economy-wide emissions scope and supply chain tier for Model Year. Includes top 40 most GHG emissions-intensive tier-1 inputs (and remaining "other") required to produce \$1M for each sector of the economy.
Tier_2 Pathway Analysis	Industry sector emissions factors in USD (Mg CO ₂ e/\$1M), by estimated economy-wide emissions scope and supply chain tier in Model Year. Includes top 40 most GHG emissions-intensive tier-2 inputs (and remaining "other") required to produce \$1M for each sector of the economy.
Tier_3 Pathway Analysis	Industry sector emissions factors in USD (Mg CO ₂ e/\$1M), by estimated economy-wide emissions scope and supply chain tier. Includes top 20 most GHG emissions-intensive tier-3 inputs (and remaining "other") required to produce \$1M for each sector of the economy.
Total Requirements	Total and direct economic requirements in the EEIO reference year along with total emissions intensities (Mg CO ₂ e/\$1M) for each economic sector in the Model Year.

TABLE 3. VARIABLE GLOSSARY

The model year is indicated in each rLCA product title and corresponding Model Description tab.

VARIABLE	DESCRIPTION
Sectors	Country industry sector names developed from National Environmentally-Extended Input-Output (EEIO) models
Total Emissions Intensity	Sector total emissions factor (cradle-to-gate) of industry sector production in Mg CO2e per million USD (1 Mg = 1 metric tonne) for Model Year
Year	Emissions factors are provided for Model Year, refer to Model Description tab
USD	US Dollar (\$) - Emissions factors presented in million US dollars (\$1M)
Tx	Tier number, ie. T1 represents direct suppliers to primary sector, T2 represents suppliers to the T1 direct suppliers, and so forth.
S1	Scope 1: emissions factor estimates associated direct emissions of industry sector production
S2	Scope 2: emissions factor estimates associated with direct purchased electricity and heat of industry sector production.
S3	Scope 3: emissions factor estimates associated with upstream required inputs of industry sector production.
Tx_def	Sector name for the supplier of T(x-1)
Tx_ttl	Total emissions factor for T(x>0) will be equivalent to sum(T(x-1)_S3)
Tx_S1	Contribution of industry sector T(x-1)_S3 emissions attributed to scope 1 emissions of tier x inputs. i.e. $T2_S1 + T2_S2 + T2_S3 = T1_S3$.
Tx_S2	Contribution of industry sector T(x-1)_S3 emissions attributed to scope 1 emissions of tier x inputs. i.e. $T2_S1 + T2_S2 + T2_S3 = T1_S3$.
Tx_S3	Contribution of industry sector T(x-1)_S3 emissions attributed to scope 3 emissions of tier x inputs (eg. Tiers x+1:n). i.e. $T2_S1 + T2_S2 + T2_S3 = T1_S3$.
Direct Requirement	Direct-purchased economic activity (\$M) required, by input sector at tier 1 supply, for the production of final demand output of the focal sector.
Total Requirement	Total economic activity (\$M) required, by input sector, for the production of final demand output of the focal sector.
Total Emissions	Emissions embodied in the total economic activity (\$M) required, by input sector, for the production of final demand output of the focal sector.

TABLE 4. 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 - CNEIO	
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.
PPI	PPI data for China emissions factor calculations are derived from the following sources: CNY PPI Reference (Y. Yang & Suh, 2011).
GERMANY - DEEIO	
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 - INEIO	
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-0
JAPAN - JPEIO	
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 (Y. 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 - MXEIO	
Country Code (XXX)	MEX
Currency (###)	(MXN) Mexican Peso (MX\$) - Emissions factors presented in million pesos (MX\$1M)
EEIO Reference Year (YYYY)	2013
Economic Data Sources	Input Output data were provided by the National Institute of Statistics, Geography and Informatics of Mexico, differentiating 262 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 Thailand (THA) economic input-output data 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 THA'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 EPA.
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)	2017
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)	2022
Economic/Emissions Data Sources	The emissions factors provided for the United States of America (USA) have been developed by the Environmental Protection Agency (EPA), with a reference year of 2022 (Ingwersen et al. 2022; Yang et al., 2017)
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

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