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| **Name of the data set:** FIGARO-E3: a high-resolution extended multi-regional input-output database consistent with official statistics |
| **Acronym of data set**: FIGARO-E3 |
| **Contact organization and mail address:** Joint Research Centre (JRC-Seville)  Edificio Expo, C. Inca Garcilaso, 3, 41092 Sevilla |
| **Contact person and e-mail address:** José Manuel Rueda-Cantuche, Josem.RCANTUCHE @ec.europa.eu |
| **Link (when downloaded from the internet)** |
| **Frequency of dissemination:** Irregular |
| **Data description:**  The FIGARO-E3 database have been compiled in the framework of the project FIGARO-E3, a joint effort by the Knowledge for Innovation, Finance and Growth Unit (JRC.B.7) of the European Commission Joint Research Centre and the Basque Centre for Climate Change (BC3). The objective of this project was to disaggregate the FIGARO inter-country supply, use and input-output tables, and create satellite accounts for energy, greenhouse gas emissions and labour by skill and gender using data from other sources such as EXIOBASE, EDGAR, Eurostat, OECD, etc.  The FIGARO-E3 database consists of the following components:   * Inter-country Supply (ic-supply) and Use (ic-use) tables * Inter-country Input-Output tables in model B (ic-io-B; industry technology assumption) and model D (ic-io-D; fixed product sales structure assumption) * Energy and GHG emission accounts * Employment accounts by gender and skill (based on information about education or occupation)   FIGARO-E3 covers 45 countries (including EU Member States) plus a “rest of the world” region. The industry/product resolution consist on 176 industries and 213 products.  Energy accounts cover six energy indicators: Primary energy supply (PES), Net energy use (NEU), Final Energy Use (FEU), Energy industry own use (EOU), energy losses (LOSS) and non-energy use (NENE). Three additional indicators are available upon request: Gross energy supply (GES), Gross energy use (GEU) and Emission relevant energy use (EREU). GHG emission accounts cover four substances: carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O) and fluorinated gases (F-gases). Employment accounts contain six indicators as a result of the combination of two gender types (male and female) and three skill levels (low, medium and high).  Data sources for the Inter-country Supply, Use and Input-Output tables are FIGARO (EU IC-SUIOTs) tables and EXIOBASE v3.8.2. tables.  Data sources for employment accounts are OECD TiVA indicators 2021 edition and EXIOBASE v3.8.2.  The data sources for energy and GHG emissions accounts are the 2017 version of the extended International Energy Agency (IEA) energy balances, emission factors from IPCC, emissions from non- combustion processes from the EDGAR database. GHG emission accounts have been reconciled with official emission accounts from Eurostat for European countries. This implies that the link between IEA energy data and GHG data is lost in the case of European countries. Energy accounts have not been reconciled with Eurostat data, given the differences between accounting principles. Therefore, the GHG figures of the European countries are consistent with Eurostat data. For the remaining countries, emissions from combustion processes are consistent with IEA energy data adapted to the accounting principles of the System of National Accounts, while the emissions from non-combustion processes are consistent with EDGAR figures.  The energy, GHG emissions and employment accounts provide information on energy flows, emissions and employment arranged in a way fully compatible with concepts, principles and classifications of FIGARO-e Supply, Use and Input-Output tables – thus enabling integrated analyses of environmental, energy, labour and economic issues. |
| **Classification system:** An ad-hoc industry/product classification system was created under the project FIGARO-E3 consisting in a disaggregation of the FIGARO classification of 64 industries and 64 products based on the EXIOBASE classification of 163 industries and 200 products.  Energy accounts distinguish:   1. Supply and Use: the elements of this dimension are Gross energy supply (GES): Supply of all energy products, primary or secondary, by domestic industries; Primary energy supply (PES): Supply of energy products extracted from the environment by domestic industries; Gross energy use (GEU): Use of all energy products, primary or secondary by domestic industries and final consumers such as households; Net energy use (NEU): Use of energy products by domestic end users, including the losses incurred during transformation, distribution, transmission and transport, but excluding exports; Final energy use (FEU): Use of energy products by non-energy end users; Energy industry own use (EOU): Final energy consumption by the energy industry; Energy losses (LOSS): Transformation, distribution, transmission and transport losses; Non-energy use (NENE): Energy use for non-energetic purposes; Emission-relevant energy use (EREU): Use of all energy products that lead to air emissions by domestic industries and final consumers such as households. FEU, EOU and LOSS are subcomponents of NEU. 2. Energy product: The flows are broadly grouped into natural energy inputs (flows from environment to economy) and energy products (flows within economy). PES includes 19 types of natural inputs. GES, GEU, NEU, FEU, EOU, LOSS, NENE and EREU include 63 energy products. The data is presented as the sum of all energy products or natural inputs. Upon request, the data at energy product and natural input level can be made available to users with an IEA license.   GHG emissions contain four types of air pollutants: CO2, CH4, N2O and F-gases.  Labour accounts distinguish employment by gender (male/female) and 3 skill levels (low/medium/high). |
| **Coverage – time / sector:** 2015 Total economy |
| **Statistical concepts and definitions:** Inter-country Supply and Use tables are matrices by industry and product describing production processes and the transactions in products between countries in great detail. These tables show:  a) the structure of the costs of production and the value added that is generated in the production process;  b) the flows of goods and services produced within the national economy and  c) the flows of goods and services with different trade partners and the rest of the world.  Inter-country Input-Output tables are product-by-product (model B) or industry-by-industry (model D) matrices describing the production processes and the transactions in products between industries in different countries in great detail. A symmetric input-output table rearranges both supply and use in a single table with identical classification of products (or industries respectively) employed for both rows and columns.  The energy extensions are related to the System of Environmental-Economic Accounting (SEEA) although they differ in the format from energy accounts. In this context, energy extensions are constructed to be used directly in input-output analysis, while energy accounts act as a standalone dataset that can also be adapted for input-output analysis.  The definitions of the energy indicators covered can be found in Usubiaga-Liaño et al. 2021. The document also provides information on the double accounting related to the use of some of the extensions.  The energy extensions record the energy flows associated with the activities of all resident units, regardless of where the energy use or supply actually occurs geographically.  Air emission extensions record the flows of GHGs emitted by resident units and flowing into the atmosphere. Air emissions accounts record emissions arising from the activities of all resident units, regardless of where these emissions actually occur geographically. Air emissions accounts have the same system boundaries as ESA and are also based on the residence principle.  Natural flows of GHGs are excluded e.g. volcanos, forest fires. Also excluded are air emissions arising from land use, land use changes and forestry as well as any indirect emissions.  Usubiaga-Liaño, A., Arto, I., & Acosta-Fernández, J. (2021). Double accounting in energy footprint and related assessments: How common is it and what are the consequences? Energy, 222, 119891 |
| **Reference area:** EU Member States plus Argentina, Australia, Brazil, Canada, Switzerland, China (except Hong Kong), United Kingdom, Indonesia, India, Japan, South Korea, Mexico, Norway, Russia, Saudi Arabia, Türkiye, United States, South Africa and Rest of the World |
| **Unit of measure:**  Data in the Inter-country Supply, Use and Input- Output tables are presented in million euro in current prices.  Data in the Energy accounts are presented in Terajoules (TJ).  Data in GHG emissions accounts are presented in two files. One is given in kt CO2e using the GWP100 factors from the 5th Assessment Report of the IPCC. In the second one, data is given in kt for CO2, CH4 and N2O, and in kt CO2e for F-gases. Data in Employment accounts are presented in thousand (k) persons. |
| **Reference period:** The reference period is the calendar year. |
| **Format:** Inter-country Supply, Use, and Input-Output tables, Energy and Emission accounts, and Labour accounts are provided as CSV files with UTF-8 encoding and a comma delimiter. Classifications are available in an XLSX file, and the code is in GAMS. |
| **Annexes** |
| **Assumptions and methods used to fill in the gaps:** The detailed methodology is described in:  Cazcarro, I., Usubiaga-Liaño, A., Román, M. V., Piñero, P., Dietzenbacher, E., Rueda-Cantuche, J. M., & Arto, I. (2024). FIGARO-E3: A high resolution extended multi-regional input-output database consistent with official statistics. Scientific Data. |