

Reference Metadata in ESMS 2.0 structure

Material flow accounts

E_ZS.TM_A_EN_2024_1

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1	Contact
1.1	Contact organisation
State Statistical Office	
1.2	Contact organisation unit
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1.3	Contact name
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1.8	Contact fax number
00389 2 3111 336	
2	Metadata update
2.1	Metadata last certified
15/09/2024	
2.2	Metadata last posted
15/09/2024	
2.3	Metadata last update
15/09/2024	

3	Statistical presentation
3.1	Data description
<p>Economy-wide material flow accounts (EW-MFA) provide an aggregate overview, in thousand tonnes per year, of the material flows into and out of an economy. EW-MFA cover solid, gaseous, and liquid materials, except for bulk flows of water and air.</p> <p>The accounts comprise the following reporting tables:</p> <ul style="list-style-type: none"> • Table A 'Domestic extraction (DE)': records material flows from the environment into the economy in a detailed breakdown by type of material • Table B 'Imports' - total imports • Table D 'Exports' – total exports • Table G 'Balancing items' <p>Key indicators:</p> <p>Domestic extracted resources (DE) indicates the total amount of materials used by resident units from the environment for further processing in the economy.</p> <p>Direct material input (DMI): indicates the direct input of material into the economy. DMI includes all materials which are of economic value and which are available for use in production and consumption activities.</p> <p>Domestic material consumption (DMC): DMC is calculated as direct material input minus physical exports.</p> <p>Physical trade balance (PTB) - equals physical imports minus physical exports.</p>	
3.2	Classification system
<p>EW-MFA record physical flows of materials in a breakdown by type of flow and in a breakdown by type of material.</p> <p>The EW-MFA classification of materials is hierarchical with main material flow categories (1-digit level); i.e. MF.1 to MF.8. Each main category is further broken down, maximal down to 4-digit-level (see also the EW-MFA data structure in Annexes):</p> <p>1-digit: material category; 2-digit: material class; 3-digit: material group; 4-digit: material sub-group.</p> <p>The first four material categories MF.1 to MF.4 were initially designed for characterising domestic extraction of materials. The material categories MF.1 to MF.4 are also applied to physical imports and exports. The material categories MF.5 and MF.6 apply to physical imports and physical exports. Material category MF.7 applies exclusively to domestic processed output; while MF.8 solely applies to balancing items.</p> <p>The classification of MF.1 'biomass', MF.2 'metal ores', MF.3 'non-metallic mineral', and MF.4 'fossil energy materials/carriers' is based pragmatically on the statistical data sources employed</p>	

to compile domestic extraction for these type of materials, e.g. agriculture, forestry, fishery, and energy statistics. A notable particularity of EW-MFA is the attribution of type of material to physical imports and physical exports. Physical imports and exports are flows of products for which one commonly employs product classifications such as e.g. the Classification of Products by Activity (CPA) or Combined Nomenclature (CN). In EW-MFA traded products are presented by type of material and not by product classification. For this, each CN code is assigned to one and only one MF class. For raw products (e.g. output from mining) this assignment to one and only one MF class is straightforward. However, the further processed the goods are the more they are composed of more than one material. The material-wise assignment of semi-manufactured and finished goods is ambiguous.

Domestic processed outputs are hierarchically classified. Five categories are distinguished at 2-digit level:

- MF.7.1 Emissions to air;
- MF.7.2 Waste disposal to the environment;
- MF.7.3 Emissions to water;
- MF.7.4 Dissipative use of products;
- MF.7.5 Dissipative losses.

The final category (MF.8) is for the balancing items on the input and output side. Balancing items are a particularity of EW-MFA. They are only introduced for balancing purposes, i.e. needed to establish a material balance for the entire national economy, and are not to be included in the indicators derived from the accounts. Balancing items include two categories: items to be added to material inputs such as oxygen for combustion processes and respiration, and nitrogen; items to be added to material outputs such as water vapour from combustion and gases from respiration. On the input side balancing items constitute natural inputs; on the output side balancing items constitute residuals.

3.3 Sector coverage

The data refer to national economies as defined in the system of national accounts.

3.4 Statistical concepts and definitions

Conceptually economy-wide material flow accounts (EW-MFA) belong to the international system of environmental economic accounting ([SEEA-Central Framework](#)). Furthermore, EW-MFA is one of several physical modules of Eurostat's programme on European environmental economic accounts. It is covered by [Regulation \(EU\) No. 691/2011](#) on European environmental economic accounts.

EW-MFA are closely related to concepts and definitions of national accounts. Most notably they follow the residence principle, i.e. they record material flows related to resident unit's activities, regardless where those occur geographically.

Definitions:

Domestic extraction used (DEU) is the input from the natural environment to be used in the economy. This is the annual amount of raw material (except for water and air) extracted from the natural environment.

Import - As opposed to domestically extracted materials, goods traded with abroad: basic commodities, semi-manufactured goods and finished goods.

Export - As opposed to domestically extracted materials, goods traded with the abroad are the commodities and products in various stages of processing: basic commodities (unmilled cereals, ore concentrate and the like), semi-manufactured goods (worked wood or steel ingots) and finished goods (technical equipment, furniture and the like).

Direct Material raw materials/ Input (DMI) measures the direct input of materials for use in economy, that is all materials that have economic value and are used in production and consumption activities. DMI equals DEU plus imports. DMI includes materials that are either accumulated in infrastructure, buildings, and durable goods according to their lifetime, or exported. Recycled materials are not included in DMI.

Domestic Material Consumption measures (DMC) - measures the annual amount of raw materials extracted and used in national economy, plus all physical imports minus all physical exports.

Physical trade balance (PTB) - equals physical imports minus physical exports.

Biomass refers to the biodegradable components of products, agricultural waste and residue (including plant and animal matter), by products and waste produced in the forestry and wood industries, as well as biodegradable parts of municipal and industrial waste energy usage of which is allowed.

Minerals are natural homogeneous bodies of permanent chemical composition and determined physical characteristics that occur in specific geometric forms (crystals) or undetermined physical characteristics.

Ore is a mineral aggregate from which it is technically viable and economically justifiable to produce metals and/or other minerals usable in industry.

Non-metallic mineral raw material are raw materials which do not produce new raw materials as a result of melting, and are usually integrated in sedimentary rocks (quartz raw materials, clay, salt, dolomite, phosphorite, graphite, bauxite and cement raw materials).

Fossil energy (fuel) is produced naturally beneath Earth's surface during a long period of time from biological remains. Fossil fuels are renewable energy sources. There are three main forms of fossil fuels: coal, oil and natural gas.

Waste is every substance or object that was, is going to be or has to be discarded by its owner. Every discarded object and substance gathering, transport and processing of which are necessary for the protection of the public interest is considered waste.

3.5 Statistical unit

Not applicable.

3.6 Statistical population

Not applicable.

3.7 Reference area

NTES 1 and 2 (Republic of North Macedonia)

3.8 Time coverage

Since 2010 onwards.

3.9 Base period

Not applicable.

4 Unit of measure

Thousand tonnes.

5 Reference period

Calendar year

6 Institutional mandate

6.1 Legal acts and other agreements

NATIONAL LEGISLATION

Law on State Statistics ("Official Gazette of the Republic of Macedonia" No. 54/1997, 21/2007, 51/2011, 104/2013, 42/2014, 192/2015, 27/16, 83/18, 220/18, 31/20)
(<https://www.stat.mk/en/about-us/legal-acts/law-on-state-statistics/>)

Programme of Statistical Surveys 2023-2027 ("Official Gazette of the Republic of North Macedonia" No. 29/23 and 57/25) (<https://www.stat.mk/en/about-us/legal-acts/program-for-statistical-surveys/>)

EUROPEAN LEGISLATION

Regulation (EU)691/2011 on European Environmental Economic Accounts and Regulation (EU) 538/2014 on European Environmental Economic Accounts amending Regulation (EU) No.

691/2011.

6.2 Data sharing

Data on are exchanged with the Ministry of Environment and Spatial Planning based on a document - Memorandum of Cooperation.

Data are transmitted to Eurostat (via eDamis). Eurostat collects data on material flow accounts through an annual questionnaire on material flow accounts.

Data is shared through eDamis to Eurostat according to the Regulation (EU) No 691/2011 on European environmental economic accounts <https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2011:192:0001:0016:EN:PDF2>; UNECE (Joint questionnaire), UNSD-UNEP (Questionnaire on environmental statistics).

7 Confidentiality

7.1 Confidentiality - policy

1. The protection of individual data is regulated by the Law on State Statistics (<https://www.stat.mk/en/about-us/legal-acts/law-on-state-statistics/>).
2. The basic principles and activities undertaken to ensure data confidentiality are described in the Policy on Statistical Confidentiality (<https://www.stat.mk/en/about-us/policies-and-strategies/policy-on-statistical-confidentiality/>).

7.2 Confidentiality - data treatment

Pursuant to Article 38 of the Law on State Statistics (<https://www.stat.mk/en/about-us/legal-acts/law-on-state-statistics/>) and the Policy on Statistical Confidentiality (<https://www.stat.mk/en/about-us/policies-and-strategies/policy-on-statistical-confidentiality/>), individual data are not published. However, if access is granted to microdata from the relevant survey, then the methods used to prevent data disclosure should be specified.

8 Release policy

8.1 Release calendar

The date of data publication is determined in the Advance Release Calendar, which is updated quarterly.

8.2 Release calendar access

<https://www.stat.mk/en/publishing-calendar/#/>

8.3 User access

All users have equal access to statistics at the same time: this means that the publication dates are announced in advance and no user has access to official statistics before they are published. Statistical

data are first published in the "News Releases" edition on the website of the State Statistical Office at 12:00.

9 Frequency of dissemination

Annual

10 Accessibility and clarity

10.1 News release

News Releases are published and they are available on the website of the SSO in the section: "News Releases" (<https://www.stat.mk/en/all-new-releases>)

News Release "Material Flow Accountss" is published annually is it is available on the website of the SSO in the section: "News Releases" (<https://www.stat.mk/en/stat/industry-energy-and-environment/environment/material-flow-accounts/>).

10.2 Publications

Data on Materail Flow Accounts are published in:

Publications:

Statistical Yearbook (https://www.stat.gov.mk/PrikaziPublikacija_1_en.aspx?rbr=845)

Environmental Statistics (https://www.stat.gov.mk/PrikaziPublikacija_1.aspx?rbr=847)

10.3 On-line database

MAKStat-database - Environment

http://makstat.stat.gov.mk/PXWeb/pxweb/mk/MakStat/MakStat_ZivotnaSredina/700_ZivSred_SMT_mk.px/?rxid=5fb9e032-a14e-4692-a6ae-5677cf87a7a4

10.4 Micro-data access

The use of microdata by external users is possible only for research purposes and is done in accordance with the Law on State Statistics (Article 41, Article 42 and Article 43). Access to anonymised microdata is defined by an internal procedure of the State Statistical Office "Access to anonymised microdata for scientific research purposes" (<https://www.stat.mk/en/about-us/procedures/rules-for-access-to-anonymised-microdata-for-research-purposes/>).

10.5 Other

At the request of users, data are also prepared in a form according to their needs.

10.6 Documentation on methodology

The Methodological explanation, national

<http://www.stat.gov.mk/MetodoloskiObjasSoop.aspx?id=130&rbrObl=28>

Methodology Eurostat

<https://ec.europa.eu/eurostat/en/web/products-manuals-and-guidelines/-/KS-34-00-536https://ec.europa.eu/eurostat/documents/3859598/9117556/KS-GQ-18-006-EN-N.pdf/b621b8ce-2792-47ff-9d10-067d2b8aac4b>

Regulation of European Parliament No. 691/2011.

<https://publications.europa.eu/en/publication-detail/-/publication/8f5dc5e0-e656-11e3-8cd4-01aa75ed71a1>

10.7 Quality documentation

The quality report is published on the SSO web-site
(https://www.stat.gov.mk/meta_n/ZSD2019.pdf) The last refers to 2023 година.

The quality report is transmitted to Eurostat via ESS Metadata handler
(<https://webgate.ec.europa.eu/estat/spe/metaconv/home.htm#>). The last refers to the reference year 2023 (preliminary).

11 Quality management

11.1 Quality assurance

The quality of the processes and products in the State Statistical Office is ensured by adhering to the European Statistics Code of Practice (<https://www.stat.mk/en/about-us/quality/code-of-practice/>) and the Quality Assurance Framework within the European Statistical System (ESS Quality Assurance Framework – <https://ec.europa.eu/eurostat/documents/64157/4392716/ESS-QAF-V2.0-final.pdf>). The quality criteria are also determined in the Law on State Statistics in Article 4b and Article 4c (<https://www.stat.mk/en/about-us/legal-acts/law-on-state-statistics/>).

11.2 Quality assessment

The State Statistical Office carries out statistical activities in accordance with the Statistical Business Process Model, which is based on the international model - Generic Statistical Business Process Model (GSBPM). The application of this model and international standards in statistical production ensures a high level of accuracy and comparability of data.

12 Relevance

12.1 User needs

Data on material flow accounts are used by Ministry of Environment and Physical Planning as indicators - part of the Report on progress of the environment, environmental organizations and interested citizens. Data are used by department of Sustainable development in SSO for calculation of SDG indicator - Domestic material consumption and Resource productivity.

12.2	User satisfaction
Starting from 2009, the State Statistical Office conducts a User Satisfaction Survey every three years.	
12.3	Completeness
Time series from 2010-2022.	
13	Accuracy and reliability
13.1	Overall accuracy
The survey methodology and the data collection method ensure good coverage and accuracy of the data.	
13.2	Sampling error
Not applicable .	
13.3	Non-sampling error
Not applicable	
14	Timeliness and punctuality
14.1	Timeliness
T+180 days	
14.2	Punctuality
The data are published on the day announced in the Advance Release Calendar.	
15	Coherence and comparability
15.1	Comparability - geographical
<p>There is geographic comparability of the data disseminated at the national level.</p> <p>Due to the unity of principles, variables, definitions and classifications used there is a high degree of comparability with EU Member States with regard to the survey's results.</p>	

Geographical comparability is also enhanced due to the relevant Manual of Eurostat and the relevant checks conducted by Eurostat.

15.2 Comparability - over time

Data from 2010 onwards are calculated according to NKD Rev. 2 and the comparability of time series is ensured.

15.3 Coherence - cross domain

The data are coherent with national accounts and environmental-economic accounts. For calculation of material flow accounts data from other statistical surveys are used. From these data with additional processing appropriate indicators are calculated which are used for calculation of material flow accounts. Then calculated data are compared with the data from: agricultural statistics, energy, industry and foreign trade. Before the comparison, methodological differences are considered in order to check reliability, accuracy of collected data from this analytical survey with other surveys.

15.4 Coherence - internal

Internal coherence of data is ensured, data are compared with other surveys from the sector.

16 Cost and burden

Not applicable.

17 Data revision

17.1 Data revision - policy

Data revision is made in accordance with the Statistical Data Revision Policy of the SSO: (<https://www.stat.mk/en/about-us/policies-and-strategies/data-revision/>).

17.2 Data revision - practice

Not applicable.

18 Statistical processing

18.1 Source data

EW-MFA is a systematic and comprehensive conceptual framework which consists of accounting rules, definitions, and classifications. For populating the EW-MFA framework with

data various statistical sources have to be used. Those original sources have to be reformatted and amended in order to comply with the concepts of the EW-MFA accounting system.

For preparing the tables, data from administrative sources and statistical surveys were used. The main sources were data compiled by statistical surveys from production statistics (PRODCOM), agricultural crop statistics forestry and fishery statistics, energy, water collection, treatment and supply, external trade statistics (import and export). For the calculation of indicators per capita we used data on average population for individually year. For the calculation of indicators of resource productivity we used data on GDP (in chain-linked volumes to the respective reference year exchange rates and in PPS) from the Eurostat's Eurobase.

18.2	Frequency of data collection
Annual	
18.3	Data collection
EW-MFA data collection is regulated by <u>Regulation (EU) No. 691/2011</u> on European environmental economic accounts.	
Data collection is done using other statistical surveys in SSO.	
18.4	Data validation
Input data validation is done through the entire process of processing and during the calculation of indicators. Data validation is performed during the fulfilment of the Eurostat questionnaire, automatically based on data entered.	
18.5	Data compilation
Data are taken from other SSO surveys , after which data control is performed according to advanced defined logical propositions. Data are entered into Eurostat questionnaire which has own validation tables. By the end standardized output tables are prepared with the main results which are published.	
18.6	Adjustment
Not applicable.	
19	Comment
A.1	Annexes