Air emissions accounts by NACE Rev. 2 activity (env_ac_ainah_r2)

National Reference Metadata in Single Integrated Metadata Structure (SIMS)

Compiling agency: Statistical Office of the Slovak Republic Slovak Hydrometeorological Institute

Eurostat metadata

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1. Contact   Top

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2. Metadata update Top

2.1. Metadata last certified	30/09/2022
2.2. Metadata last posted	30/09/2022
2.3. Metadata last update	30/09/2022

3. Statistical presentation Top

3.1. Data description

Air emissions accounts (AEA) record flows of gaseous and particulate materials emitted into the atmosphere as a result of economic activity.

AEA are a subset of environmental-economic accounts. They offer a detailed breakdown for 64 emitting economic activities (NACE), plus households, as defined in the national accounts of EU countries. They are aligned with economic statistics and GDP. These features make them suitable for integrated environmental-economic analyses and modelling – for example, 'carbon footprints' and climate-change modelling scenarios.

National Statistical Institutes (NSI) submit AEA to Eurostat through a mandatory annual data collection. The data collection includes an electronic questionnaire and this quality report.

3.2. Classification system

The AEA dataset has the following dimensions:

1)   **Air pollutant**: Emissions to the air of the following gaseous and particulate substances are collected (greenhouse gases, air pollutants):

- Carbon dioxide without emissions from biomass (CO_2),
- Carbon dioxide from biomass (Biomass CO_2)*,
- Nitrous oxide (N_2O), Methane (CH_4),
- Perfluorocarbons (PFCs),
- Hydrofluorocarbons (HFCs),
- Sulphur hexafluoride (SF_6) including nitrogen trifluoride (NF_3),
- Nitrogen oxides (NOx),
- Non-methane volatile organic compounds, (NMVOC),
- Carbon monoxide (CO),
- Particulate matter < 10μm (PM_{10}),
- Particulate matter < 2,5μm ($PM_{2.5}$),
- Sulphur dioxide (SO_2),
- Ammonia (NH_3)

2)   **Geopolitical entity**: the EU Member States, EFTA Countries, Candidate Countries etc.

3)   **Economic activities**: include 64 production activities (classified by NACE rev.2 A*64), and households' consumption (3 sub-classes).

4)   **Time**: reference year for which air emissions are reported

5)   **Unit**: tonnes and thousand tonnes

3.3. Coverage - sector

The data refer to national economies as defined in the system of national accounts. Greenhouse gases and air pollutants emitted by resident units representing the national economy are covered.

3.4. Statistical concepts and definitions

Conceptually AEA belongs to the international system of environmental economic accounting (SEEA-Central Framework). Furthermore, AEA 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.

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

Further methodological guidelines are provided in various publications by Eurostat (see Eurostat website > Environment > Methodology, heading: 'Air emissions accounts').

3.5. Statistical unit

Data refer to emissions by resident economic units in the sense of SEEA CF 2012 and National Accounts (ESA), including households.

3.6. Statistical population

The national economy is as defined in SEEA CF 2012 and National Accounts (ESA), i.e. all economic activities undertaken by resident units.

3.7. Reference area

The reference area is the economic territory as defined in SEEA CF 2012 and National Accounts (ESA). A unit is said to be a resident unit of a country when it has a centre of economic interest in the economic territory of that country, that is when it engages for an extended period (1 year or more) in economic activities in that territory.

By following this residence principle, the Air Emission Accounts record emissions from resident units' activities, regardless of where they occur. This is the main conceptual difference between emission inventories for greenhouse gases (UNFCCC) and air pollutants (CLRTAP).

3.8. Coverage - Time

AEA data for Slovakia are available for the period 1995–2020.

3.9. Base period

Not applicable because AEA are not reported as indices.

4. Unit of measure   Top

The unit of measure is tonnes or thousand tonnes.
F-gases (HFC, PFC, SF_6 and NF_3) are reported in tonnes of CO_2 equivalents.

SO_X are reported in tonnes of SO_2 equivalents, and NO_X are reported in tonnes of NO_2 equivalents.

5. Reference Period   Top

The data refer to calendar years.

6. Institutional Mandate

6.1. Institutional Mandate - legal acts and other agreements

Air emissions accounts (AEA) are legally covered by [Regulation (EU) 691/2011](#) on European Environmental Economic Accounts.

6.2. Institutional Mandate - data sharing

Not applicable at the national level.

7. Confidentiality

7.1. Confidentiality - policy

In Slovakia, information on air pollution is not subjected to the protection of statistical confidentiality, since according to the [Act No. 137/2010 Coll. on Air Protection](#), air pollution sources operators are obliged to inform the public about air pollution caused by emissions emitted from their sources and on implementing measures to reduce this air pollution.

7.2. Confidentiality - data treatment

Compiled AEA Questionnaire for Slovakia doesn't contain confidential statistical data (no data are flagged "as confidential").

8. Release policy

8.1. Release calendar

Not applicable. AEA statistics are not included in the First release calendar.

8.2. Release calendar access

Not applicable.

8.3. Release policy - user access

The Policy on data dissemination is defined in accordance with the Act on State Statistics, the development strategy of the Statistical Office of the SR, the information dissemination strategy of Eurostat and the European Statistics Code of Practice.

Information on [principles of release and provision of statistical information](#) is available on the website of the Statistical Office of the SR.

9. Frequency of dissemination

Annually, after the validation period.

10. Accessibility and clarity

10.1. Dissemination format - News release

No news release.

10.2. Dissemination format - Publications

Data on air pollutants emissions broken down by economic activities are presented in the Statistical Yearbook of the SR (table T 26-14 and 26-15) and in the publication Selected indicators on Environment.

10.3. Dissemination format - online database

AEA data are published in public database of the Statistical Office of the SR - DATAcube: table "Air Emissions Accounts" [zp1002rs].

Data are updated annually after the validation period.

10.3.1. Data tables - consultations

Not applicable.

10.4. Dissemination format - microdata access

Not applicable.

10.5. Dissemination format - other

AEA data are published on the website of the Slovak Hydrometeorological Institute: https://oeab.shmu.sk/o-nas/dokumenty.html (under "Other documents" - "Air Emission Accounts", excel file for download).

10.5.1. Metadata - consultations

No applicable.

10.6. Documentation on methodology

Methodology on AEA compilation for Slovakia is described in the following documents:

- Final Report on the grant project: Methodology and Tools for Preparation of Environmental Accounts - Air Emissions in the Slovak Republic - Grant Agreement No. 50904.2010.004-2010.596 (delivered to Eurostat in September 2013),
- Final Report on Implementation of the Action: Quality Improvements of the Air Emission Accounts and Extension of Provided Time-series - Grant Agreement No. 05122.2016.001-2016.277 (delivered to Eurostat in September 2018). The report is published on the website of the Slovak Hydrometeorological Institute: https://www.shmu.sk/sk/?page=2339

10.6.1. Metadata completeness - rate

Not applicable.

10.7. Quality management - documentation

Metadata/Quality report for users of AEA statistics is published on the website of the Statistical Office of the SR - access: www.statistics.sk > Metadata > Quality Reports > Air Emissions Accounts.

11. Quality management

11.1. Quality assurance

Statistical Office of the SR has implemented the Quality Management System (QMS) which is on the international standard ISO 9001. The QMS is described in the Quality manual (only available in Slovak). The application of the quality manual in practice ensures that all activities that have an impact on the quality of statistical products are planned, managed, examined and assessed. The national QMS is based on the European Statistics Code of Practice. Also, the following documents are part of the QMS: Quality policy of the Statistical Office of the SR, Quality Declaration of the

[Statistical Office of the SR](#) and [Vision and strategic/quality objectives of the Statistical Office of the SR](#).

Slovak Hydrometeorological Institute which compiles the AEA is the holder of the quality management system certificate according to ISO 9001: 2015 (this certificate relates also to monitoring, evaluation, provision of data and information on air quality). Department of Emissions and Biofuels of the Slovak Hydrometeorological Institute: https://oeab.shmu.sk/ has implemented the process documentation of the National Statistical System (NSS). The implementation activities included the following: appointment of the Head Statistician, inventory of statistical products, the introduction of quality reporting, commitment to the European Statistics Code of Practice and documentation of the statistical process. This framework enables standardisation of the input data collection and dissemination of statistical products. NSS is coordinated by the Statistical Office of the SR.

11.2. Quality management - assessment

The quality of AEA statistics for Slovakia is satisfactory and is still continually improving (particularly through grant projects financed by Eurostat).

AEA questionnaire is compiled on the basis of information from reliable data sources - reporting for GHGs under the UNFCCC (using the National Inventory System of the SR) and reporting for air pollutants under the CLRTAP (using the National Emissions Information System - NEIS). Compiled AEA data are checked and validated at the national level (checks in the Slovak Hydrometeorological Institute, Statistical Office of the SR) and also by Eurostat.

12. Relevance [Top](#)

12.1. Relevance - User Needs

AEA are important for monitoring the interaction between the economy and the environment, in particular in the context of global climate change. The relevance of the AEA is enhanced by using a conceptual framework consistent with the National Accounts, which allows putting AEA data in relation to economic indicators such as production, GDP, etc. AEA data are also used in modelling, including carbon footprint.

The main user of the AEA data for Slovakia is Eurostat. At the national level, the information from the AEA questionnaire is provided to the interested experts from the Ministry of Environment of the SR and to other relevant institutions.

12.2. Relevance - User Satisfaction

The customer's satisfaction survey specifically regarding AEA statistics is not carried out.

12.3. Completeness

Submitted AEA data for Slovakia are complete and meet the requirements of the relevant legislation - Regulation 691/2011 on European environmental economic accounts, (Annex I). All mandatory data are reported in the AEA questionnaire 2022.

12.3.1. Data completeness - rate

Not applicable; To ensure comparability, this will be calculated and provided by EUROSTAT in the European quality report using a standardised method.

13. Accuracy [Top](#)

13.1. Accuracy - overall

Overall, the accuracy of AEA data compiled on the basis of GHG and Air pollutants Inventories is considered to be good. Compiled AEA data are checked and validated at the national level (checks in the Slovak Hydrometeorological Institute, Statistical Office of the SR) and also by Eurostat.

Data calculated on the basis of less sufficient methodological approaches are described in attached Annex 1.

Annexes:
AEA-Annex1_SK - completed

13.2. Sampling error

Not applicable because data are not based on a sample survey.

13.2.1. Sampling error - indicators

Not applicable because data are not based on a sample survey.

13.3. Non-sampling error

Not applicable.

13.3.1. Coverage error

Not applicable.

13.3.1.1. Over-coverage - rate

Not applicable.

13.3.1.2. Common units - proportion

Not applicable.

13.3.2. Measurement error

Not applicable.

13.3.3. Non response error

Not applicable.

13.3.3.1. Unit non-response - rate

Not applicable.

13.3.3.2. Item non-response - rate

Not applicable.

13.3.4. Processing error

Not applicable.

13.3.5. Model assumption error

Not applicable.

14. Timeliness and punctuality

14.1. Timeliness

Final compiled AEA questionnaire is ready 21 months after the end of the reference year.

Preliminary data on air emissions are available 12 months after the end of the reference year, but in a different classification than it is required in AEA. The final data on GHGs and air pollutants emissions are available not earlier than 18 months after the end of the reference year.

14.1.1. Time lag - first result
Not applicable.
14.1.2. Time lag - final result
T+21 months.

14.2. Punctuality
The deadline for data transmission specified in Annex I, section 4(2) of the Regulation 691/2011 on European environmental economic accounts was met.
14.2.1. Punctuality - delivery and publication
Slovakia submitted the compiled AEA Questionnaire 2022 (the reference year 2020) to Eurostat on 27 September 2022.

15. Coherence and comparability   Top

15.1. Comparability - geographical
AEA are compiled according to harmonised guidelines provided by Eurostat and so AEA data are comparable across EU countries.
15.1.1. Asymmetry for mirror flow statistics - coefficient
Not applicable.

15.2. Comparability - over time
Breaks in time series are described in attached Annex 2. **Annexes:** AEA-Annex2_SK - completed
15.2.1. Length of comparable time series
Not applicable; To ensure comparability, this will be calculated and provided by EUROSTAT in the European quality report using a standardised method.

15.3. Coherence - cross domain
15.3.1. Coherence - sub annual and annual statistics
Not applicable, because AEA data are annual.
15.3.2. Coherence - National Accounts
The data are coherent with principles, definitions and concepts in National Accounts (ESA) and satellite System of Environmental-Economic Accounting (SEEA).

15.4. Coherence - internal
Internal coherence is ensured by the accounting framework.

16. Cost and Burden   Top

Staff engaged in AEA statistics: 3 experts from the Slovak Hydrometeorological Institute and 1 expert from the Statistical Office of the SR.

The burden on respondents: not applicable. No specific statistical survey for the purpose of obtaining data for AEA is conducted. AEA are compiled by using already existing data sources.

17. Data revision Top

17.1. Data revision - policy

There is no specific national revision policy for AEA.

17.2. Data revision - practice

The main reasons for revisions to AEA data are:

- revisions in national emissions inventories (annual revisions of whole time series),

- changes/improvements of methodologies.

In 2022 AEA reporting there was performed revision of allocation of emissions from road transport to NACE/HH for the time series 2013-2020.

17.2.1. Data revision - average size

Not applicable; To ensure comparability, this will be calculated and provided by EUROSTAT in the European quality report using a standardised method.

18. Statistical processing Top

18.1. Source data

AEA for Slovakia are compiled based on data from the national emissions inventories for air pollutants and GHGs (2022 submissions).

The main source of data for GHG emissions is the Annual GHG Emissions Inventory submission 2022 (delivered to the UNFCCC on 15th April 2022). GHG emissions balance is based on the annual statistical data provided by the Statistical Office of the SR, data from the EU Emission Trading System (EU ETS), data collected in the National Emissions Information System (NEIS) and information from various national and international organisations (e.g. EUROCONTROL), enterprises and other relevant subjects.

In the case of air pollutants, the main source of input emissions data is the National Emission Information System (the database NEIS) which covers medium and large stationary sources of air pollution. Operators of large and medium air pollution sources are obliged to report, on annual basis, specific data on the operation. Data obtained from operators are gathered in the NEIS database. The NEIS database covers emissions from energy and industry sectors, partly fugitive emissions and emissions from the waste sector. The emissions inventory for other sectors is annually compiled by applying calculations based on the activity and auxiliary data provided by the Statistical Office of the SR and by applying international methodologies (agriculture and waste sectors) or national methodologies (households sector).

Information on the main economic activity of companies from the Register of Organisations of the Statistical Office of the SR is used to allocate data on emissions to particular categories of economic activities (NACE Rev.2).

For road transport, source data for allocation of emissions to NACE/HH are obtained from the following new sources:

- IS EVO (Vehicle Database) managed by the Ministry of Interior of the SR - vehicle registration information system used for the collecting, recording and storage of information on registered vehicles in Slovakia. It contains information about car owners and also information on VIN number, vehicle registration number, type of fuel, engine capacity, gross vehicle weight, maximum combined weight, emission standards according to EU Directives, date of first registration and date of first registration in Slovakia.
- Technical Control Database operated by the Ministry of Transport of the SR - contains information on VIN number, vehicle registration number, date of technical control, category of vehicle and total millage. Information on total mileage and the date of control from this database is used for estimating the annual mileage of each individual vehicle. The VIN number and registration number are used for linking (cross-checking) the data from the IS EVO and Technical Control Database.
- Register of the Organisation of the Statistical Office of the SR.

These new data sources for allocating road transport emissions to NACE/HH are described in more detail in the report - "Deliverable 1.1: Methodology for allocation of road transport emissions" for the Grant project "Improving the allocation of road transport emissions in AEA module and coherence between AEA and PEFA modules", which was submitted to Eurostat in April 2022.

18.2. Frequency of data collection

National emissions inventories for air pollutants and GHGs which are used as a data source for the AEA are elaborated and reported on an annual basis.

AEA questionnaire is compiled annually.

18.3. Data collection

AEA are compiled by using data form already existing data sources listed in item 18.1 "Source data". No specific data collection for the purpose of obtaining data for AEA is carried out.

18.4. Data validation

Source data from the national emissions inventories are checked and validated by experts from the Slovak Hydrometeorological Institute. Slovak Hydrometeorological Institute is the holder of the quality management system certificate according to ISO 9001: 2015 (this certificate among other things relates also to monitoring, evaluation, provision of data and information on air quality). The NEIS database which is used for obtaining data on emissions of air pollutants allows complex data processing at particular District Environmental Offices and verification of the accuracy of emissions calculated from input data reported by operators of large and medium air pollution sources.

The built-in checking tool available in the questionnaire was applied for data checks. Implausible changes between consecutive years in time series detected by the built-in checking tool are explained in respective footnotes.

Compiled AEA Questionnaire for Slovakia is also checked and validated by the Statistical Office of the SR.

18.5. Data compilation

In the case of air pollutants emissions from air pollution sources, the inventory-first approach is applied. It means that compilation of this part of AEA is based on data from the reporting of Air Pollutants Emission Inventory under the Convention of UNECE on Long-Range Transboundary

Air Pollution (CLRTAP Convention) and under Directive (EU) 2016/2284 on the Reduction of National Emission of Certain Pollutants (NECD). Data on emissions from economic activities are allocated to NACE Rev.2 categories based on information on the main economic activity of operators of stationary air pollution sources.

In the case of <u>GHGs emissions</u> from air pollution sources, the different approaches are applied depending on different sectors. For a compilation of data for the energy and industry sector, the energy-first approach is applied, taking into consideration specific national circumstances. Allocation of emissions arising from these sectors is based on information from energy statistics and from Physical energy flow accounts (PEFA). As regards GHGs emissions from the agriculture, transport and waste sector, the inventory-first approach is used. It means that emissions from GHGs inventories for these sectors are allocated to NACE Rev.2 categories on the basis of value-added of particular NACE Rev.2 economic activities and taking into consideration specific national circumstances.

The methodology for AEA compilation for Slovakia is described in detail in a technical report on the grant project " <u>Quality improvements of the air emission accounts and extension of provided time-series</u> " and also in previous quality reports.

18.5.1. Imputation - rate

Not applicable.

18.5.2. Method used to allocate emissions to economic activities

a) *Annual GHG Emissions Inventory* - CO_2, biomass CO_2, N_2O, CH_4, HFCs, PFCs, SF_6 and NF_3;

Allocation of the relevant emissions reported in the CRF categories to the NACE Rev.2 categories was based on the methodology described in the Technical Report on the grant project " <u>Quality improvements of the air emission accounts and extension of provided time-series</u> " - Grant Agreement No. 05122.2016.001-2016.277 – (hereinafter referred to as "Technical Report")*,* <u>ANNEX IV</u>, Chapter A.2-2.

The year 2020 was deeply impacted by the COVID-19 pandemic. Due to the lockdown of the Slovak economy, several industrial and energetic plants broke or stopped production during the year. On the other hand, other industrial productions were strengthened, such as pharmaceuticals, hygiene and food. Therefore allocation of emissions was shifted to these NACE Rev.2 categories instead of previously dominated categories (car manufacturing, services, etc.).

b) *Air pollutants emission inventory* - NO_x, CO, NMVOC, SO_x, NH_3, PMs:

Totals for air pollutants emissions (NO_x, SO_x, NH_3, CO and PMs) may differ from last year's AEA submission because of the annual recalculations, performed to ensure continual improvements in data quality (application of new methodologies, emission factors and revision of methods used in inventory).

Emissions not covered in the NEIS (NFR categories: fugitive emissions, agriculture, households, transport and waste treatment), but which enter into the emission inventory are balanced within the national inventory by international and national methodologies and are included in national totals for Slovakia. Emissions were appropriately distributed into NACE industries and HH, based on national circumstances and correspondence matrices described in the Technical Report, <u>ANNEX IV</u>, Chapter A.2-1.

An enhanced method for calculation of emissions from the residential heating sector (households) is described in detail in the Technical Report, <u>ANNEX III</u> – " Description of methodology for households' heating ".

For information regarding the method used for allocating road transport emissions to NACE/HH see the sub-concept 18.5.3. The method used to determine and distribute road transport emissions.
Note: Data on the NACE subsection L68A is not possible to identify in the NEIS database. Available are only data for the whole NACE category L (Real Estate Activities).

18.5.3. Method used to determine and distribute road transport emissions

For both a) GHG emissions and b) air pollutants emissions, the enhanced methodology for allocating road transport emissions to NACE/HH (using new data sources) has been developed in an ongoing grant project and applied in 2022 AEA reporting. For more details see the report - "Deliverable 1.1: Methodology for allocation of road transport emissions" for the Grant project "Improving the allocation of road transport emissions in AEA module and coherence between AEA and PEFA modules", which was submitted to Eurostat in April 2022.

18.5.4. Adjustments for residence principle

The following calculations were applied for residence principle adjustments:

Air transport:

a) H51 = 30% of UNFCCC_international_aviation + 30% of UNFCCC_domestic_aviation

b) BI_less_air = 30% of UNFCCC_international_aviation

c) BI_plus_air = 70% of UNFCCC_domestic_aviation.

Due to a lack of national data or statistics, emissions from international aviation were estimated on the basis of EUROCONTROL data.

Water transport:

a) H50 = 30% of UNFCCC_international_navigation + 30% of UNFCCC_domestic_navigation

b) BI_less_air = 30% of UNFCCC_international_navigation

c) BI_plus_air = 70% of UNFCCC_domestic_navigation.

Emissions of GHGs and air pollutants from international water transport (non-residents) were estimated on the basis of fuels sold to international companies in Slovak ports.

Land transport: Due to a lack of data in this area, expert judgement was applied – it is assumed that emissions produced by national residents abroad and emissions produced by non-residents on the territory of Slovakia are equal.

18.6. Adjustment

Not applicable.

18.6.1. Seasonal adjustment

Not applicable.

19. Comment

No comment.

Related metadata

Annexes