



METHODOLOGICAL EXPLANATION

Maja Kramžer, Teja Rutar, Tomaž Božič, Klemen Deželak

ANNUAL ENERGY STATISTICS

This methodological explanation relates to the data releases:

- Energy supply, Slovenia, annually, provisional data (First Release)
- Energy statistics, Slovenia, annually, final data (First Release)



October 2024



Content

1	PURPOSE.....	3
2	LEGAL FRAMEWORK.....	3
3	UNIT DESCRIBED BY THE PUBLISHED DATA.....	3
4	SELECTION OF OBSERVATION UNIT.....	4
5	SOURCES AND METHODS OF DATA COLLECTION.....	5
6	DEFINITIONS.....	7
7	EXPLANATIONS.....	10
8	PUBLISHING.....	12
9	REVISION OF THE DATA.....	13
10	OTHER METHODOLOGICAL MATERIALS.....	14

1 PURPOSE

The purpose of publishing the data is to show the structure of energy production and consumption in Slovenia, which includes domestic production, imports and exports, transformation and final energy consumption.

Key statistics published are:

- Amount of energy for supply by energy sources
- Amount of energy consumed in the process of transformation by energy sources
- Amount of final energy consumed by energy sources and consumption sectors
- Amount of electricity consumed, measured by advanced meters, in households and business entities by activity
- Amount of energy consumed in households by end use (space heating and cooling, water heating, cooking, other end uses)
- Amount of energy consumed in selected production activities by end use (heat and cold production, electrochemical processes, mechanical processes, space heating and cooling buildings and for water heating in office buildings, lighting and electrical appliances, non-specified use)

2 LEGAL FRAMEWORK

- [Annual Programme of Statistical Surveys \(LPSR\) \(only in Slovene\)](#)
- [National Statistics Act \(OJ RS, No. 45/95 and 9/01\)](#)
- [Regulation \(EC\) No 1099/2008](#) of the European Parliament and of the Council of 22 October 2008 on energy statistics (CELEX number 32008R1099)

3 UNIT DESCRIBED BY THE PUBLISHED DATA

Units described by the published data are:

- Energy produced, examined by energy source
- Imported and exported energy, examined by energy source and country
- Energy in the form of stocks, examined by energy source
- Transformation of energy, examined by energy source, which enters the transformation and the energy source that is the output from the transformation
- Energy consumed, examined by sector of consumption and energy source
- Electricity consumed, which is studied according to the data of the advanced meter and according to the consumer
- Energy consumed by households, examined by the end use
- Energy consumed in selected production activities by end use

4 SELECTION OF OBSERVATION UNIT

Observation units are business entities and dwellings occupied by private households.

The following surveys have full coverage:

- **E1-EE/L** – includes business entities the primary activity of which is electricity production and business entities which produce electricity and/or heat for their own use or sale in addition to their primary activity (200 units)
- **E3-TOP/L** – includes business entities which produce and/or distribute heat (62 units)
- **E4-EEP/L** – includes the electricity transmission business entities (1 unit)
- **E5-EED/L** – includes electricity distribution business entities (5 units)
- **E9-PL/L** – includes business entities which supply natural gas and liquefied petroleum gas (17 units)
- **E11-TG/L** – includes the business entity which extracts brown coal and lignite (1 unit)

E8-NPT/L includes selected business entities which trade with petroleum products (16 units). As a measure for cut-off the full quantity coverage of import/export of LPG, motor gasoline, kerosene jet fuel, biodiesel, diesel and fuel oils is applied.

E-PE/L is a sample survey (selection with threshold) which covers all active business entities with 20 or more employees that are according to NACE Rev. 2 registered in Agriculture, forestry and fishing (A), Mining and quarrying (B), Manufacturing (C), Electricity, gas, steam and air conditioning supply (D), Water supply, sewerage, waste management (E) and in Construction (F). Observation units that are additionally included employ less than 20 people, but consume larger quantities of specific energy products. Up to about 1,800 units are included in the sample. Reporting units with a certain activity according to the NACE Rev. 2 (A01, A02, D35) are obtained from other statistical surveys (KME-PMG, E1-EE/L, E5-EED/L). The statistical survey KME-PMG covers all agricultural holdings with agricultural production and business entities, which perform forestry activity. Both surveys have complete coverage of reporting units.

E-RES is a sample survey which covers all active business entities with 2 or more employees that are according to NACE Rev. 2 registered in Wholesale and retail trade, repair of motor vehicles and motorcycles (G), Transportation and storage (H), Accommodation and food service activities (I), Information and communication (J), Financial and insurance activities (K), Real estate activities (L), Professional, scientific and technical activities (M), Administrative and support service activities (N), Public administration and defence, compulsory social security (excluding 84.22 – Defence activities) (O), education (P), Human health and social work activities (Q), Arts, entertainment and recreation (R) and Other service activities (S). and Activities of extraterritorial organisations and

bodies (U). Up to about 5,000 units are included in the sample.

In the statistical survey on **renewable energy sources** administrative sources have full coverage.

APEGG is a sample survey in which dwellings occupied by private households are chosen. Stratified sampling is used in the survey. The sample is stratified by the type of buildings (according to actual use), years of construction and types of settlements. Also the type of heating, the presence of farm and statistical regions are taken into account implicitly. Allocation of selection units is disproportional. The sample size is around 7,000 units.

5 SOURCES AND METHODS OF DATA COLLECTION

Data are collected annually with the following surveys:

- **E1-EE/L** – Electricity and heat production with technical information on energy devices. With the report the data on production (by energy source), consumption and sale of electricity and heat, on fuel consumption as well as on types, number and power of engines that drive generators are collected. The data are obtained by questionnaires sent by mail (Annual questionnaire on the electricity and heat production) and from the administrative source managed by Borzen.
- **E3-TOP/L** – Heat supply. With the report the data on production of heat by energy source, on purchase of heat, on fuel consumption in heat only plants, on distribution of heat as well as on heat pipelines are collected. The data are obtained from the administrative source managed by Energy Agency.
- **E4-EEP/L** – Electricity transmission. With the report the data on purchase, transmission, import, export of electricity and on losses in transmission grid are collected. The data are obtained by questionnaires sent by mail (Annual questionnaire on the electricity transmission).
- **E5-EED/L** – Electricity distribution. With the report the data on electricity and fuel consumption are collected. The data on electricity distribution are obtained from the administrative source (EPOS) managed by is the Ministry of the Environment, Climate and Energy – the Energy Directorate.
- **E8-NPT/L** – Petroleum products trade sale to trade companies, energy sector, manufacturing and mining sector, construction sector, road and rail transport, households and other sectors are collected. The data are obtained by questionnaires sent by mail (Annual questionnaire on the petroleum products trade).
- **E9-PL/L** – Gas supply. With the report the data on import, export, purchase, own use and losses and structure of sale of natural gas and liquefied petroleum gas are collected. The data are obtained by questionnaires sent by mail (Annual questionnaire on the gas supply).
- **E11-TG/L** – Coal extraction. With the report the data on production, sale and export of brown coal and lignite are collected. The data are obtained by questionnaires sent by mail (Annual questionnaire on the coal extraction).

- **E-PE/L** – Consumption of energy, fuels and selected oil derivatives. The report includes fuel consumption also for production of electricity and heat for sale. The data in this survey are obtained by online questionnaire (Consumption of energy, fuels and selected oil derivatives). Data for reporting units with a certain activity according to the NACE Rev. 2 (A01, A02, and D35) are obtained from other statistical surveys (KME-PMG, E1-EE/L and E5-EED/L). The KME-PMG survey provides data on energy consumption in agriculture and forestry, by type of energy source. Data from these statistical surveys are obtained with the paper questionnaire. Aggregated data on the consumption of certain energy sources for activities A01 and A02 (NACE Rev.2) are obtained from ARSO. Data on electricity consumption for activities A, C33, D, E and F (NACE Rev.2) are obtained from the Operator of the combined transmission and distribution power network (ELES).
- **E-RES** – Energy consumption in the services sector. With the report the data on energy consumption in the services sector by type of energy source and data on the use of alternative technologies are collected. The data in this survey are obtained by online questionnaire (Energy consumption in the services sector).
- **APEGG** – Energy consumption in households. The data in this survey are obtained by modelling. The Jožef Stefan Institute (IJS) also participates in the survey, namely by preparing a model of energy consumption in households by which data on energy consumption by end use and type of energy source, the consumption of electricity, types of space and water heating systems and energy sources for them are calculated. Input data for the model are the result of the survey Household energy consumption (which is carried out by SURS every 4 years), data on energy supply, which are collected by the above mentioned surveys in the field of energy, and data from various administrative sources (Eco Fund, Geological Survey of Slovenia) obtained by the The Jožef Stefan Institute - Energy Efficiency.
- **Renewable energy** – With the report the data on renewable energy sources (wood biomass, biogas, wind energy, solar energy, geothermal energy, etc.) are collected. The data in this survey are obtained by the above mentioned questionnaires sent by mail, by combined (web and field) survey combined with modelling (APEGG) and from the administrative sources (EPOS, Geological Survey of Slovenia, Borzen).
- **E3-TOP/L** – Heat supply. Data are obtained from administrative source, which administrator is Energy Agency. The Energy Agency, acting under public authorisation, carry out the administrative and other tasks specified in the Energy Act, EU regulations, which determine the competences of the national energy regulators, or in general act of the agency adopted on the basis of the energy legislation.
- **APEGG** is a sample survey in which dwellings occupied by private households are chosen. SURS does not obtain data for APEGG from the administrative sources. The Jožef Stefan Institute - Energy Efficiency Centre, itself obtains data from administrative sources and these are the input data for the model of energy use in households.

6 DEFINITIONS

Net power is power with which a power plant can operate for a longer time.

Energy balance is an accounting framework of data on all energy products entering, exiting and used in the territory of a country. The energy balance presents all statistically significant energy sources of a country and their production, transformation and consumption by various sectors (industry, transport, etc.). The energy balance shows all forms of energy and all energy flows in a common measurement unit. It is prepared in the form of a table, where energy products are shown in the columns, and energy flows (production - transformation - consumption sectors) in the rows. The first step in creating an energy balance is to create balances for each individual energy product in its natural measurement units - either in physical units (e.g., tons and cubic meters) or in energy units (e.g., GWh for electricity and TJ for heat). In the second step, the balances of individual energy products, which have different measurement units, are converted into a common balance with a single energy unit. The conversion to a single energy unit is carried out by multiplying all data by the appropriate conversion factor (with the calorific value for energy products in physical units and by the factor for the conversion of measurement units for energy products measured in energy units). Any energy unit can be used to prepare the energy balance. SURS uses units of terajoules (TJ) and thousand tons of oil equivalent (1000 toe) in energy balances.

Energy intensity is the ratio of energy quantity (total primary energy supply or total final consumption) and gross domestic product at constant prices. Energy intensity decreases with energy efficiency improvements.

Energy dependency is the ratio of net imports (import – export) and total primary energy supply. It measures the extent to which the country relies on imports to meet its energy needs.

Energy use is total consumption of electricity and fuels for drive, internal transport, heating of workplaces and offices, consumption of warm water and steam for drive and technological processes.

Energy efficiency is the ratio of total final consumption and total primary energy supply.

GCV (gross calorific value) measures the total amount of heat produced by fuel combustion.

Ambient heat includes aerothermal, hydrothermal or geothermal energy captured by heat pumps from the environment; energy used to drive heat pumps (electricity, etc.) is not included.

Final consumption - energy sector includes fuel and energy that is consumed by the energy industry to support the extraction and production of fuels and transformation activities. It excludes own use of plants. The energy sector covers section Electricity, gas, steam and air conditioning supply (D) and

subsections Mining and quarrying (B): Mining of coal and lignite (B05), Extraction of crude petroleum and natural gas (B06), Mining of uranium and thorium ores (07.21), Extraction of peat (8.92), Support activities for petroleum and natural gas mining (09.1) and Manufacturing (C): Manufacture of coke and refined petroleum products (C19) of the Standard Classification of Activities.

Final consumption – agriculture and forestry includes fuel and energy consumption in agriculture and forestry or in areas according to the NACE Rev. 2 Crop and animal production, hunting and related service activities (A01) and Forestry and logging (A02).

Final consumption – production and construction include fuel and energy consumption in selected production activities NACE Rev. 2 registered in Mining and quarrying (B), excluding the subsections that are included in the Energy sector, Manufacture (C), excluding the subsection Manufacture of coke and refined petroleum products (C19) and Construction (F).

Final consumption - Service activities includes fuel and energy consumption in commercial and public service activities i.e. in activities according to NACE Rev. 2 registered in Wholesale and retail trade, repair of motor vehicles and motorcycles (G), Transportation and storage (H), Accommodation and food service activities (I), Information and communication (J), Financial and insurance activities (K), Real estate activities (L), Professional, scientific and technical activities (M), Administrative and support service activities (N), Public administration and defence, compulsory social security (excluding 84.22 – Defence activities) (O), education (P), Human health and social work activities (Q), Arts, entertainment and recreation (R) and Other service activities (S).

Types of water heating:

- **Local heating** – water is heated with electric heaters, gas heaters, etc.
- **Central heating** – water is heated in the space heating system (floor central or central heating).
- **District heating** – water is heated outside of the building – in a heat plant or boiler room for several buildings.

Types of space heating of dwellings:

- **Local heating** is the heating type where the heat source is located in the room which is heated. It is usually intended for a single room, which can be heated independently from other areas. Rooms are heated with different fireplaces (open, closed; thermo fireplaces and place tile stoves with a warm-water exchanger are not included here), stoves (ceramic, cast iron, steel)... We also use electric heaters; these can be radiant (usually in the bathroom), convection (with or without fan) or storage
- **Central heating** – the heat is produced in a furnace - central heating device for the whole dwelling or building. Dwelling is heated by radiators or radiant heating (floor, wall heating).
- **District heating** – the heat is produced outside of the building – in a heat plant or boiler room for several buildings.

NCV (net calorific value) measures the amount of heat we can use. The other part is used for evaporation of fuel moisture.

Non-energy use means that energy sources are used as feedstock in various sectors; that is, they are not used as fuel, nor are they converted into other energy sources.

Renewable energy sources (RES) renewable energy sources include biomass, biofuels, biogas, wind and renewable industrial and renewable municipal waste.

Total primary energy supply is the quantity of energy consumed within the borders of a country. It is calculated: indigenous production + imports – exports ± stock changes – international marine bunkers.

RES heating and cooling represents a share of renewable energy for heating and cooling; it is a quotient between gross final renewable energy consumption for heating and cooling and gross final energy consumption for heating and cooling.

RES electricity represents a share of renewable electricity; it is a quotient between gross final electricity consumption from renewable sources and gross final electricity consumption.

RES transport represents a share of renewable energy for transport; it is a quotient between gross final consumption of energy from renewable sources for transport and gross final energy consumption for transport.

RES overall share represents a share of renewable energy in gross final energy consumption.

RES ... of which from cooperation mechanism: in order to meet the required target share of RES from Directive 2009/28/EC, the mechanism of statistical transfer of renewable energy from another EU Member State can be used. The mechanism of statistical transfer can be implemented by buying the missing or selling the excess share of RES.

Electricity consumption for pumping is the amount of electricity used to pump water in pumped hydropower plants.

Gross electricity production is the sum of the electrical energy production by all the generating sets concerned measured at the output terminals of the main generators.

Net electricity production is equal to the gross electricity production less the electrical energy absorbed by the generating auxiliaries and the losses in the main generator transformers.

Main activity producers are supply undertakings which generate electricity, electricity and heat or heat only as their primary activity. They may be privately or publicly owned.

Autoproducers are undertakings which generate electricity and/or heat wholly or partly for their own use as an activity which supports their primary activity. They may be privately or publicly owned.

Sm³ - standard cubic meter is gas volume at standard conditions (at temperature 15°C and pressure 1,01325 bar).

Solar energy (solar thermal) is energy obtained with the help of solar energy collectors (solar collectors), which convert solar energy into heat for heating sanitary water and/or for space heating.

Stock change reflects the difference between opening stock level at the beginning of the period and closing level at the end of period.

Statistical difference is a category which includes the sum of unexplained statistical differences for individual fuels. It also includes the statistical differences that arise because of the variety of conversion factors.

Tonne of oil equivalent (TOE) expresses the amount of heat equivalent to the heat of combustion of one tonne of oil. TOE is an accounting unit which is used for expressing energy use in energy balances. 1000 toe = 41,868 TJ

Heat only plants are plants which are designed to produce heat only.

Heat pumps are devices that use heat from their surroundings and convert it into useful heat for space heating and/or water heating.

Types of heat pumps are divided according to the source they use:

- round-water heat pumps use heat from the earth;
- air-water heat pumps cool outside air (in some cases indoor air, e.g. large cellar for wine, food, etc.), and heat radiator and sanitary water
- water-water heat pumps use heat from underground and surface water;
- air-air heat pumps use the heat from the ambient air; they heat the air inside the living space and they can't be used to heat sanitary water;

Transformation includes fuel consumption for electricity and heat production.

Carbon intensity is the ratio between total amount of CO₂ emissions and total primary energy supply in the country.

7 EXPLANATIONS

7.1 CLASSIFICATIONS

Results of the E-PE/L, E-RES surveys and data on electricity consumption in production and service activities, measured by advanced meters are published by the Standard Classification of Activities 2008, which is published on SURS's website at the following link:

<http://www.stat.si/statweb/en/Methods/Classifications>

in the form of SKD engine or as a complete classification under the heading "Economic Classification".

7.2 DATA PROCESSING

DATA EDITING

Data in APEGG were statistically edited with the combination of systematic corrections and imputation procedures. The following imputation methods were used: logical imputations (imputed value is derived from the values of other variables) and hot-deck imputations (nearest neighbour method, in which a value of a similar unit – donor, is imputed).

Data in E-PE/L were statistically edited with the validity and consistency check. A combined approach of correction is performed, i.e. automatic and manual data editing. We also use data imputation procedures, namely methods of logical and historical imputations.

Data in E-RES were statistically edited with the validity and consistency check. Manual data editing was performed. We also used data imputation procedures, namely methods of logical imputations.

Data in surveys were statistically edited with the validity and consistency check. Manual editing is implemented.

For more, see the general methodological explanations [Statistical data editing](#).

WEIGHTING

With weighting adjustment we want to achieve representativeness of the sample, so that the weighted data give us as good population estimates as possible.

Weighting is used in APEGG, E-PE/L and E-RES.

In APEGG the process of weighting is determined according to the sampling plan, unit non-response and according to the available auxiliary population variables used for calibration (statistical regions, types of settlements and the data from the Real Estate Register – the number of occupied dwellings, age and type of building, the main way domestic heating).

In E-PE/L and E-RES the process of weighting is determined according to unit non-response.

SEASONAL ADJUSTMENT

Seasonal adjustment is not applicable.

7.3 INDICES

Indices are not published.

7.4 PRECISION

In statistical surveys different kinds of errors can occur (e.g. sampling error, non-response error, measurement error) influencing the reliability and accuracy of the statistical results. Errors deriving from the random mechanisms determine the precision and consequently the reliability of the statistical estimates. The precision of the statistical estimate is estimated by calculating the standard error (SE). The Statistical Office of the Republic of Slovenia draws attention to less reliable estimates by flagging them with a special sign.

If the table contains estimated population totals of (continuous) variables, estimated averages of continuous variables or estimated ratios of population totals of (continuous) variables, publishing limitations are determined by the relative standard errors or the coefficients of variation (CV). In such cases it holds:

If the coefficient of variation (CV) is

- 10% or below ($CV \leq 10\%$), the estimate is reliable enough and is published without limitations;
- between 10% and up to 30% ($10\% < CV \leq 30\%$) the estimate is less reliable and is flagged for caution with letter M;
- over 30% ($CV > 30\%$), the estimate is too unreliable to be published and therefore suppressed for use by letter N.

For more, see the general methodological explanations [Precision of statistical estimates](#).

7.5 OTHER EXPLANATIONS

Electricity consumption measured by advanced meters does not include electricity generated from photovoltaic power plants, which the household or business entity did not send to the distribution system but used for itself.

Data from the APEGG survey are calculated by using a model of energy consumption in households (IJS-CEU). Due to the updating of the model with recent input data, the already published model calculated data may subsequently be modified.

Some totals do not add up due to rounding.

8 PUBLISHING

The data is published at the NUTS-1 level (Slovenia), except for data on electricity consumption in households and production and service activities, measured by advanced meters, where the data, in addition to the NUTS-1 level, is also published at the NUTS-2 level (cohesion regions) and NUTS-3 (municipalities).

- SiStat Database: [Energy](#) – Energy production and consumption – Energy balance and energy indicators. Absolute data and shares are published
- SiStat Database: [Energy](#) – Energy production and consumption – Electricity. Absolute data by the item name are published
- SiStat Database: [Energy](#) – Energy production and consumption – Solid, liquid and gaseous fuels. Absolute data by the type of fuel and the item name are published
- SiStat Database: [Energy](#) – Energy production and consumption – Heat. Absolute data by the item name are published
- SiStat Database: [Energy](#) – Energy production and consumption – Renewables and wastes. Absolute data by the energy source and type of use are published
- SiStat Database: [Energy](#) – Energy production and consumption – Consumption of energents and stocks in industry. Absolute data by section and subsection of the Standard Classification of Activities and the energy source are published
- SiStat Database: [Energy](#) – Energy production and consumption – Consumption of energy products in service activities. Absolute data by section of the Standard Classification of Activities and the energy source are published
- SiStat Database: [Energy](#) – Energy production and consumption – Household energy consumption. Absolute data and shares are published.
- First Release (Energy, Energy production and consumption): »Energy supply, Slovenia, annually«
- First Release (Energy, Energy production and consumption): »Energy statistics, Slovenia, annually«
- EUROSTAT (Statistical Office of the European Union)
- International Energy Agency (IEA)

9 REVISION OF THE DATA

9.1 PUBLISHING OF PRELIMINARY AND FINAL DATA

Some basic data are published in the First Release in May of each year and revised and detailed data are published in October of each year. With this publication the data become final.

In line with the revision of energy statistics, which the Statistical Office started to implement in 2020, we extended the time series of data on household energy consumption until 2000, and at the same time we revised the previous time series from 2009 on. The extension of the time series mainly affected data on the use of renewable energy sources in households, which have been incomplete so far. These renewable energy sources are wood fuels (firewood, wood pellets, wood briquettes, wood chips, wood waste), solar energy (that is produced by solar collectors) and ambient heat (aerothermal, hydrothermal or geothermal energy captured by heat pumps from the environment).

In 2020 we also revised data on energy use in industry, where we recalculated data for 2018 and 2019 according to the methodology used before those years. By unifying the criteria for the selection of observation units, we thus achieved greater comparability of data in time series from 2018 on.

In 2020 we also expanded the balance of final electricity consumption and included data on final consumption in agriculture.

Data on renewable energy sources were in 2020 supplemented by the breakdown of industrial waste into renewable and non-renewable parts, and with this breakdown we supplemented the data for a longer time series from 2003 on.

Based on all the mentioned changes, we also revised the energy balance and energy indicators from 2000 onwards.

Publishing of provisional and final data is planned. Due to the needs of users for timely information, provisional data are published that meet the criteria of the quality of official statistical data but do not meet the quality that can be met with complete coverage. Data are revised when recent, more complete and better data can significantly contribute to the quality of data-based decision-making.

9.2 FACTORS INFLUENCING COMPARABILITY OVER TIME

There are no breaks in time series, so all points in time are comparable.

From the reference year 2022 on, the category "Final consumption - other consumers" no longer covers consumption in service activities. Since then it has been shown as a separate category.

10 OTHER METHODOLOGICAL MATERIALS

Methodological materials on SURS's website are available at <https://www.stat.si/statweb/en/Methods/QuestionnairesMethodologicalExplanationsQualityReports>.

Questionnaires (only in Slovene):

- Household energy consumption (APEGG),
- Electricity and heat production (E1-EE/L),
- Electricity transmission (E4-EEP/L),
- Electricity distribution (E5-EED/L),
- Petroleum products trade (E8-NPT/L),
- Gas supply (E9-PL/L),
- Coal extraction (E11-TG/L),
- Energy, fuels and selected oil derivatives (E-PE/L),
- Energy consumption in the services sector (E-RES)

Theme: Energy, Sub-theme: Energy production and consumption

Annual quality report for the surveys:

- Household energy consumption survey (APEGG),
- Annual and monthly survey on electricity and heat production (E1-EE/L, E1-EE/M),
- Annual survey on the heat supply (E3-TOP/L),
- Annual and monthly survey on the petroleum products trade (E8-NPT/L, E8-NPT/M),
- Annual survey on the gas trade (E9-PL/L),
- Annual statistical survey on consumption of energy, fuels and selected oil derivatives (E-PE/L).

Theme: Energy, sub-theme: Energy production and consumption