

## **METHODOLOGY FOR OVERALL ENERGY BALANCE AND BALANCES OF RENEWABLES**

The overall energy balance is drawn up in accordance with the updated Eurostat methodology set out in Annex A and B of Regulation (EC) No 1099/2008 of the European Parliament and of the Council on energy sector statistics.

The overall energy balance (OEB) is presented as a 2-dimensional table with rows (containing indicators) and columns (defining energy products).

The OEB matrix presents the country's energy products with three sets of indicators:

- for energy supplied
- for transformed energy - input/output
- for final consumption of energy.

The data in the overall energy balance are presented in net calorific value in a single unit of measurement - thousands tonnes of oil equivalent (toe).

The conversion of each energy carrier from a specific measure (tonne, cubic metre, kilowatt) into a single energy measure shall be carried out with coefficients reflecting their net calorific content (the amount of heat that may be used). It is a difference between the gross amount of heat released by fuel combustion and the amount of heat required to evaporate the water contained in the fuel. The relationship between the units of measurement is - 1 GWh = 3,6 TJ = 0,08598 toe.

Energy products are presented in aggregated groups:

- Coal and solid fossil fuels

Hard coal - an aggregated product of anthracite, other bituminous and coking coal.

Anthracite is high-quality coal with less than 10% volatile matter and high carbon content (about 90% fixed carbon). Their gross calorific value is over 24000 kilojoules/kg on an ash-free but moist basis.

Other bituminous coal is high rank coal with higher volatile matter than anthracite (more than 10 %) and lower carbon content (less than 90 % fixed carbon). Its gross calorific value is greater than 24 000 kJ/kg on an ash-free but moist basis.

Coking coal is bituminous coal with a quality that allows the production of a coke (coke oven coke) suitable to support a blast furnace charge. Its gross calorific value is greater than 24 000 kJ/kg on an ash-free but moist basis.

Brown coal - an aggregated product of sub-bituminous coal and lignite.

Sub-bituminous coal are non-agglomerated coal with a gross calorific value between 20 000 kJ/kg and 24 000 kJ/kg containing more than 31 % volatile matter on a dry mineral matter free basis.

Lignite are non-agglomerating coal with a gross calorific value less than 20 000 kJ/kg and greater than 31 % volatile matter on a dry mineral matter free basis.

Coke - this group includes metallurgical coke, foundry coke and coke.

Tar - residual product obtained by carbonization of coking coal.

Coal briquettes – an energy product produced from coal by high-pressure briquetting with or without addition of a binding agent. This category includes dried lignite and dust.

- Gas produced - gas covered by plants for plant gas, coke gas, blast furnace gas and other exhaust gases.
- Peat and peat products – these are fuels of vegetable origin and are not used in the country.
- Bituminous shale and bituminous sands – contain a kerogen that is fuel but not used in the country.
- Oil and petroleum products – as raw materials are crude oil and petroleum distillates, including the pyrolysed petrol and fuel oil fractions returned by the petrochemical industry. Petroleum products are all finished products in oil refineries and mixing plants. It also includes products used as fuel in oil refineries for the production of petroleum products.
- Natural gas – gas located in underground fields, consisting mainly of methane.
- Renewable and biofuels – includes energy from renewable sources such as HPP (without pumping HPP), Wind PP, Photovoltaic PP, solid biomass (incl. waste), biogases, liquid biofuels. Solar thermal energy, geothermal energy and ambient heat captured by heat pumps are also included.
- Non-renewable waste – non-organic waste from economic activities and from the household sector.

- Nuclear energy – represents the primary thermal equivalent of electricity and heat produced by nuclear power plants, shown as the amount of heat generated by the nuclear reaction process.

- Electricity – includes electricity generated from all energy sources, including electricity generated outside the electricity transmission network and consumed for own needs.

- Heat – steam or hot water intended for final use (no steam used to produce electricity). Enterprises (plants) with a primary activity of heat generation or combined generation of electricity and heat shall take account of gross heat generation (including heat for their own needs of the plant) and autoproducer plants (enterprises with a main activity other than electricity and heat generation) shall report only the part of the heat generated by them which has been sold. The heat energy produced by the plant for the purpose of the enterprise's main production shall not be included. The fuels used for it shall be reported as final consumption of the economic activity concerned.

### **Energy balance indicators**

- Primary energy production represents any kind of extraction of energy products from natural sources in the territory of the country. Includes coal production (accounting for purified production), crude oil, natural gas, nuclear energy, renewable energy (water, wind, solar, geothermal and heat from the environment), biomass, biogas, liquid biofuels and non-renewable fuels.

- Recovered & recycled products - refers to slurry and shale from coal recovered from mines. Lubricating oils are used for petroleum products that are processed.

- Imports (incl. arrivals) and exports (incl. dispatches) - include the quantities passed through the political boundaries of the country, whether customs clearance has taken place or not. Transit is not reported (excluding electricity). Only energy products produced in the country are reported as exports in the energy balance.

Due to differences in methodological definitions of indicators, reclassification of energy products (petroleum product due to a change in its qualities or mixing is reported as another) and various units of measurement data on imports and exports of individual product positions may differ with those of foreign trade statistics.

- Changes in stocks – reflects the difference between stocks at the beginning and at the end of the year in producers, large foreign trade companies and consumers. The increase in stocks is shown by a sign “-” and the reduction - with the sign “+”.

- Gross available energy – is calculated from primary energy production + recovered & recycled products + imports - exports + stock change. Shows the amount of energy required to meet energy demand in the country.

- International maritime bunker – quantities of fuels delivered to ships of all flags that are engaged in international navigation. The international navigation may take place at sea, on inland lakes and waterways, and in coastal waters (port of departure and port of arrival in different countries).

- Gross inland consumption – Gross Available Energy excluding the International maritime bunker.

- International aviation – quantities of fuels delivered to aircrafts for international flights. The domestic/international split is determined on the basis of departure and landing locations and not by the nationality of the airline.

- Total energy supply – represents the amount of energy required to meet domestic consumption in the country. For secondary products derived from a transformation process, the data may be a negative number.

- Transformation input - reflects the quantities of fuels and energy which are used to produce other energy products in the various energy transformation processes.

- Transformation output - the secondary energy products derived from the individual conversion processes are indicated.

- Energy sector – reflects final consumption of energy and fuels (not transformed in other energy products) for the implementation and maintenance of the main activity of companies producing energy products.

- Distribution losses – includes losses in gas and heat distribution, electricity transmission and distribution, and transport of other fuels.

- Available for final consumption - the quantities of energy products available for final use, resulting in no other energy products. This indicator is calculated as: Total energy supply – Transformation input + Transformation output - Energy Sector Consumption – Distribution losses.

The final consumption is divided for: non-energy and energy purposes.

- Final non-energy consumption shows the quantities of fuels used as raw material for the production of non-fuel products.

- Final energy consumption contains data for consumed energy products which are not transformed into others. The quantities of fuel consumed for the production of heat that is not sold by autoproducers are reported in the figures for the final consumption of fuels by relevant sector of economic activity.

The quantities of fuels/energy consumed are classified in three sectors according to the main economic activity of the enterprises using them:

- Industry - The industrial sector is divided into twelve sectoral groupings according to their structure of the Classification of Economic Activities (NACE rev.2). Fuels used for transport by industrial companies are not included here but are taken into account in the transport sector.

- ✓ Iron & steel - NACE rev.2, groups 24.1, 24.2, 24.3 and classes 24.51, 24.52.
- ✓ Chemical & petrochemical - NACE rev.2, divisions 20 and 21.
- ✓ Non-ferrous metals - NACE rev.2, group 24.4 and classes 24.53, 24.54.
- ✓ Non-metallic minerals - NACE rev.2, division 23.
- ✓ Transport Equipment - NACE rev.2, divisions 29 and 30.
- ✓ Machinery - NACE rev.2, divisions 25, 26, 27 and 28.
- ✓ Mining & quarrying - NACE rev.2, divisions 07 (excl.07.21), 08 (excl.08.92) and 09.9.
- ✓ Food, beverages & tobacco - NACE rev.2, divisions 10, 11 and 12.
- ✓ Paper, pulp & printing - NACE rev.2, divisions 17 and 18.
- ✓ Wood & wood products - NACE rev.2, division 16.
- ✓ Construction - NACE rev.2, divisions 41, 42 and 43.
- ✓ Textile & leather - NACE rev.2, divisions 13, 14 and 15.
- ✓ Not elsewhere specified (industry) - NACE rev.2, divisions 22, 31 and 32.

- Transport – energy and fuels used for all transport activity, regardless of the sector in which the activity occurs, are reported. Energy and fuels used by transport enterprises for non-transport activity are not included – they are reported in the Commercial & public services sector.

- ✓ Rail transport – the quantities of energy products used in rail traffic, including in the industrial rail infrastructure and in rail transport as part of the urban and suburban transport system (e.g. trains, tramways, metro).
- ✓ Road transport – includes energy products consumed by cars on the territory of the country, including fuel for households. This does not include fuel for: stationary construction machines; the operation of the agricultural technique of the field and of the logging machines. This indicator includes electricity for trolley buses and electric vehicles.
- ✓ Domestic aviation – indicates the fuels charged in the country for domestic flights to Bulgarian and foreign airlines.
- ✓ Domestic navigation – covers the fuels delivered to vessels of all flags when a departure port and a port of arrival are located in the territory of the country.
- ✓ Pipeline transport - quantities of energy products used as energy in the support and operation of pipelines transporting energy products. Includes the energy consumed by pumping stations and the maintenance of the pipeline. Excludes the energy consumed by natural or synthetic gas pipeline distribution.

- Other sectors – covers consumption in Commercial & public services sector (NACE rev.2, divisions 33; 36; 37; 38; 39; 45; 46; 47; 52;...; 99), Households, Agriculture & forestry (NACE rev.2, divisions 01 and 02), "Fishing" (NACE rev.2, division 03).