

Methodical Contents of the CR Energy Balance Indicators

(Czech Statistical Office methodology)

The Czech Statistical Office publishes the energy balance in methodology that was used in past years, whereby the comparability of time series is guaranteed. Basic methodical difference between the CzSO methodology and the international methodology (IEA/OECD, Eurostat, UN) is in heat energy reporting. The CzSO reports all heat production including heat from plant (autoproducer undertakings) manufactories and fuel consumed for this heat production in the energy balance transformation sector while the international methodology presents only heat produced in public manufactories, heat produced in plant (autoproducer undertakings) manufactories determined for sale out of own undertaking and fuel consumed on this heat production. According to the international methodology it does not report the heat produced in plant manufactories for self-consumption inside of an undertaking in its energy balance, nevertheless the fuel consumed for this heat production is included in the final consumption.

The CzSO used for Energy Balance compiling results of its statistical surveys and partly results of Ministry of Industry and Trade (MIT) statistical surveys and data of the Energy Regulatory Office (ERO).

Basic CzSO statistical forms are:

EP 5-01	Annual form on Fuels and Energy Consumption and Fuels Stocks
EP 7-01	Annual form on Fuels Sources and Distribution
EP 8-01	Annual form on Energy Processes at Fuels Transformation
EP 9-01	Annual form on Fuels Consumption for Production of Selected Products
EP 10-01	Annual form on Electricity and Heat Production and Distribution
EPR 1-12	Monthly form on Crude Oil and Petroleum Products for Petroleum Products Producers
EPS 1-12	Monthly form on Crude Oil and Petroleum Products for Business and Stockkeeping Organizations

Collected and processed data from statistical forms are inputs into energy balance. Next text explains energy balance compiling and defines balance items. Statistical forms or subjects, which are sources of corresponding data are in braces.

Energy balance is composed of three basic parts:

- I. Primary energy sources
- II. Energy processes
- III. Final consumption of energy

I. Primary energy sources (EP 7-01, EP 10-01, EPR 1-12, EP 5-01, MIT, ERO)

Into this part of energy balance there are included:

- natural energy resources (EP 7-01, EP 10-01, EPR 1-12, MIT)
- imports and exports of fuels and energy (EP 7-01, EP 10-01, EPR 1-12, EPS 1-12, foreign trade statistics, MIT)
- changes in fuels and energy stock level (EP 7-01, EP 10-01, EPR 1-12)
- other sources (decreases) (EP 7-01, EPR 1-12, EPS 1-12)

Natural resources

- Fuels exploitation on a saleable output level (i.e. after primary treatment, e.g. coal after classification and washing)
- Electricity from water power resources measured on generator terminals (no, however, electricity generated in pumped-storage power plants that come under category „output from energy processes“),
- Heat energy produced in nuclear power plants (CHP plants, heating plants) both for electricity generation and for its distribution.

- Heat arising during exothermic chemical reactions that is further utilized (e.g. heat arising during sulphuric acid manufacturing)
- Into natural resources there we also include renewable energy sources, namely solar energy, geothermal energy, energy from heat pumps, biogas energy, wind energy etc.

Imports

Imports of all fuels and energy kinds, in form of intermediate/semi-finished products as well (e.g. different feedstocks from crude oil processing, namely straight run fuel oils and vacuum gas oils, raffinates, filtrates, hydrogenates and so on).

Electricity imports are indicated on the basis of measured data, not according to the data invoiced in the same way as in the international questionnaire on electricity.

Data on imports do not include transit fuel and energy supply.

Data on natural gas imports cover imports into storages rented on the other countries territory and serving to its consumption in the Czech Republic.

Exports

Exports of all kinds of fuels and energy (including intermediate products).

Data on exports do not include transit fuel and energy supply/delivery and losses connected with the transit.

Electricity exports are reported as well as imports on the basis of measured data.

Stock draw (+), stocks build (-) of suppliers

Stocks draw (stocks decrease) increases available resources and therefore it is marked (+), stock build (stocks increase) decreases these sources and therefore it is marked(-).

Into suppliers stocks there are included:

- fuel stocks held by mining (extraction) enterprises, production enterprises and sales activity organizations designed for sale, not for self-consumption
- gaseous fuels stocks in special underground gas storage facilities including so-called cushion gas

Stocks draw (+), stocks build (-) of consumers

Fuels stocks designed for consumption in the reporting unit are included into consumer stocks, not stocks designed for sale.

Other sources (+), other decreases (-)

Other registered and in other indicators not included increases or decreases of sources, e.g. draw or build of state material reserves, stocks draw or stocks build of liquid fuels intermediate products and so on.

Result from reclassification of produced liquid fuel, either in consequence of its specification change or because it was blended into another product, is incorporated here, too.²

A negative entry for one product must be compensated by a positive entry (or several entries) for another product or several products and vice versa.

The total net effect of this reclassification at the entry „total liquid fuels“ should be zero.

As for natural gas, such reclassification can also occur in case that a definite quantity from the non-associated gas system is transferred into the associated gas system.³

Concerning solid fuels, fuels reclassification can also occur, especially between categories of steam coal and coking coal.

At the solid fuels entry there is also valid, that the total net effect of this reclassification should be zero.

Total primary energy sources

Arithmetical sum of above-mentioned indicators, i.e. natural resources (+)imports, (-)exports, (+/-) stocks level change, (+/-) other sources.

II. Energy processes (EP 8-01, EP 10-01, EPR 1-12, EP 9-01)

Energy processes are productive activities whose result is enhancement of utility value of the energy materials that pass through them.

We consider, under energy processes in the energy balance, only those processes in which it is balanced on the one hand charge/input into processes and on the other hand production and losses in charge. In addition to this energy processes balance there are further observed fuels and energy which were expended on energy process operation (**working consumption**).

As energy processes in the energy balance there are (or were) mentioned the following activities:

- Sub-bituminous coal (brown coal) briquetting
- High-temperature carbonization in coking plants
- Gasification under pressure of coal
- Blast-furnace gas production in blast furnaces
- Gasification in industrial generating stations
- Liquid fuels production from crude oil and tars
- Production of heat
- Electricity production

Secondary energy sources (EP 10-01)

It is the quantity of energy that was, after its use in definite energy or technological process, newly utilized in form of fuels or heat, either in the identical process or for other energy purposes.

Input, consumption at fuels upgrading (EP 8-01)

Input, consumption for heat production (EP 10-01)

Input, consumption for electricity production (EP 10-01)

Fuels and energy that are processed in energy processes in order to change their utility qualities, e.g. lignite/sub-bituminous coal for patent fuels and energogas production, coking coal fit for coke and coke-oven gas production, crude oil for liquid fuels production, fuels for heat and electricity production in steam power plants and electricity used for repumping in pumped-storage power plants, heat produced in nuclear power plants and used for electric energy and heat production for distribution.

In case non-energy materials occur in a charge, they are expressed by quantity of energy needed to their obtaining (e.g. hydrogen incoming into hydrogenation is reported by synthesis gas quantity spent on its obtaining in a plant).

Operating consumption

Operating/working consumption of energy processes (consumption serving directly to maintenance and ensuring the relevant energy process operation).

Fuel and energy consumption at their extraction and processing (EP 9-01)

- at fuels extraction (including mining transport)
- at primary fuels treatment (classification, washing and so on)

Losses (during fuels and energy distribution and losses of fuels by their depreciation and destruction)

Difference between fuels and energy input into long-distance transport systems (oil and gas pipelines, public electricity and heat distribution systems) and output from them. Losses in intra-plant distribution systems, that are parts of consumption, are not included here.

Reasoned losses caused by depreciation and destruction are included into this entry, too.

III. Final consumption

It is the fuels and energy consumption ascertained before their input into consumers/appliances in which they are utilized for final utility effect, not for other energy production (with the exception of secondary energy sources).

Final consumption is divided in the energy balance according to sectors:

- *consumption in agriculture and forestry (EP 5-01)*
- *consumption in industry (EP 5-01)*
- *consumption in construction (EP 5-01)*
- *consumption in transport (EP 5-01)*
- *consumption of other branches (EP 5-01)*
- *consumption in household (EP 7-01, MPO)*

Total final consumption

Total primary energy sources (+) secondary energy sources (-) total charge/input into energy processes (+) production from energy processes (-) operating consumption (-) losses (+/-) balance differences.

Energy balance in International Methodology

In comparison with previous publications, this publication contains, in addition, energy balance tables in international methodology. For this purpose there was used freely accessible MS Excel file from the IEA website. As input data there was used data from annual joint IEA/OECD, Eurostat and UN questionnaires:

Coal Annual Questionnaire 2009 and Historical Revisions

Oil Annual Questionnaire 2009 and Historical Revisions

Natural Gas Questionnaire 2009 and Historical Revisions

Electricity and Heat Annual Questionnaire 2009 and Historical Revisions

Renewables Annual Questionnaire 2009 and Historical Revisions

For questionnaires compiling, there is used data from CzSO, MIT and ERO statistical forms concerning individual sorts of fuels, electricity and heat. The data is converted into the IEA methodology. Data on Coal, Oil and Oil products are shown in thousand tons, data on gases in TJ, Natural gas in gross calorific value, Coal gases in net calorific value. To convert physical units into energy units there are used average calorific values (Conversion Factors) for mining/extraction, production, imports, exports, coke production, blast furnace process, main/public producers of electricity and heat, industrial branches and other sectors. These values are inserted into spreadsheet directly and that is why close attention have to be paid to them because quality of energy balance, which is expressed in energy balance difference, depends on their accuracy.

As a basic energy balance unit the IEA uses ktoe, i.e. thousand tons of oil equivalent (1 ktoe = 41 868 GJ). Unlike the CzSO balance, the balance in international methodology is divided differently. It includes Coal gases and Coal tar into Coal, Natural gas and Gas Work Gas includes into Gas, Renewables are classified in more detail.