



NATIONAL STATISTICAL INSTITUTE

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ENERGY BALANCE COMPILATION

Study tour on Energy statistics and Energy balances
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OVERVIEW

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- STRUCTURE OF BALANCES OF ENERGY PRODUCTS
- INDICATORS OF BALANCES OF ENERGY PRODUCTS
- SCHEMES OF OVERALL ENERGY BALANCE



INTRODUCTION

National Statistical Institute of Bulgaria (BNSI) as the leader in National Statistical System that produces and distributes accurate, objective and reliable information, based on national legislation and European Regulations and Directives. Energy statistics is one of the areas in which BNSI's experts prepare and disseminate information.

Overall energy balance (OEB) is the final annual result of efforts of energy statistics experts. It is compiled **according to principles and methodology of Eurostat**, using aggregated data from several statistical surveys in the field of energy statistics.

Overall energy balance is constructed under the format by integrating of data for the energy products.

OEB unit of measure is thousand tons of oil equivalents (toe).



INTRODUCTION

Energy Balance is compiled for each of the energy products according to PRODENERGY classification.

Energy balances are prepared in three units of measure:

- Specific units
- TJ
- Thousand tons of oil equivalent (toe)

Energy products balances in toe are base for compilation of the Overall Energy Balance.



DATA SOURCES FOR ENERGY BALANCES - SURVEYS

NSI conducts several annual surveys to collect data on energy balance sheets:

- Resources and Deliveries (RD)
- Fuels and energy Consumption (EC)
- Balance of energy-transformation processes (ETP):
 - Electricity and heat generation
 - Lignite briquettes production
 - Coke oven coke production
 - Blast furnace gas obtain
 - Petroleum products
 - Charcoal production

DATA SOURCES FOR ENERGY BALANCES - INDICATORS

➤ Resources and Deliveries

- Opening and closing stock levels
- Deliveries to service sector (all entities with economic activity over 53 on NACE Rev.2)
- Deliveries to households
- Imports and exports
- Marine bunkers
- International and Domestic Aviation

DATA SOURCES FOR ENERGY BALANCES – INDICATORS

➤ Fuels and Energy Consumption

- Opening and Closing stock levels
- Receipts and Total consumption for enterprise's activities
- ***Additional indicators*** are included for energy products, which can be consumed for non-energy use or as transport fuel:
 - **Natural gas** – data on Total consumption are to be reported, including amounts of gas consumed as
 - Non-energy use
 - Transport fuel.

DATA SOURCES FOR ENERGY BALANCES – INDICATORS

- **Diesel oil** - data on Total consumption are requested, but also including of which:

- for agriculture and construction engines.

According to the methodology of Energy balance, these quantities have to be reported as final energy consumption in the relevant sector.

- **Electricity** - data on Total consumption are requested, but also including of which:

- for transport.

- **LPG** - data on Total consumption are requested, but also including of which:

- for transport.



STRUCTURE OF ENERGY PRODUCTS BALANCES

The energy products balances consist of three sections:

- Primary energy
- Energy transformation
- Final consumption of energy

Each section of balances includes different indicators.

Sources are the aggregated data at national level from the above mentioned surveys.

INDICATORS OF BALANCES OF ENERGY PRODUCTS

Source of the data (surveys) are shown in the brackets after the indicators (see Annex 1 at the end of presentation).

➤ **Primary energy**

- Indigenous production (RD)
- Recovered products (RD)
- Imports (RD)
- Stocks change
 - ✓ Opening stock level (RD+EC)
 - ✓ Closing stock level (RD+EC)
- Exports (RD)
- Marine bunkering (RD)
- Gross inland consumption

INDICATORS OF BALANCES OF ENERGY PRODUCTS

➤ Transformation of energy (1)

▪ Input (ETP)

- Electricity and/or heat conventional plants (on fuels)
 - Main activity
 - ✓ Power plants
 - ✓ Combine power and heat plants (CHP)
 - ✓ Heat only plants
 - Autoproducers
 - ✓ Power plants
 - ✓ Combine power and heat plants (CHP)
 - ✓ Heat only plants
- Nuclear plants
- Lignite briquettes plants
- Coke oven
- Blast furnace
- Refinery
- Others (charcoal production)

INDICATORS OF BALANCES OF ENERGY PRODUCTS

➤ Transformation of energy (2)

▪ Output (ETP)

- Electricity and/or heat conventional plants (on fuels)
 - Main activity
 - ✓ Power plants
 - ✓ Combine power and heat plants (CHP)
 - ✓ Heat only plants
 - Autoproducers
 - ✓ Power plants
 - ✓ Combine power and heat plants (CHP)
 - ✓ Heat only plants
- Nuclear plants
- Lignite briquettes plants
- Coke oven
- Blast furnace
- Refinery
- Others (charcoal production)

INDICATORS OF BALANCES OF ENERGY PRODUCTS

➤ Transformation of energy (3)

▪ Own use of energy sector

- Electricity generation (ETP), transmission (RD) and distribution (RD)
- Pumped storage hydroelectric plants (EC)
- Production and distribution of gaseous fuels (RD)
- Production and distribution of heat (RD)
- Extraction of coal/lignite (EC)
- Lignite briquettes plants (ETP)
- Coke oven (ETP)
- Blast furnace (ETP)
- Extraction of oil and natural gas (EC)
- Oil and gas pipelines (EC)
- Refinery (ETP)
- Others (charcoal production) (ETP)



INDICATORS OF BALANCES OF ENERGY PRODUCTS

- Transformation of energy (4)
 - **Exchanges and transfers, returns**
 - Interproduct transfers (RD)
 - Products transferred (from final product with sign “-” (RD) in feedstock with sign “+” (ETP))
 - Returns from petrochemical industry (from final product with sign “-” in feedstock with sign “+”) (ETP)



INDICATORS OF BALANCES OF ENERGY PRODUCTS

➤ Final consumption of energy

▪ *Non-energy use (EC)*

- Chemical industry
- Other industries

▪ *Final energy consumption*

- **Industry total** (Σ all industries, excluding energy sectors)

✓ **of which:** On economic activities by 2 digits of NACE rev.2, excluding:

- transport fuels: motor gasoline (EC), transport diesel (EC), natural gas (RD) and LPG (EC)
- Energy products, consumed for non-energy use (EC): White spirit, Petroleum bitumen, Paraffin Waxes, Petroleum tar



INDICATORS OF BALANCES OF ENERGY PRODUCTS

- **Transport**
 - ✓ Railway (EC)
 - ✓ Road (EC, RD)
 - ✓ Aviation (EC, RD)
 - ✓ Domestic navigation (RD)
- **Others**
 - ✓ Households (RD, excl. transport fuels: motor gasoline, transport diesel, natural gas and LPG)
 - ✓ Agriculture and forestry (EC)
 - ✓ Fishing (EC)
 - ✓ Others (RD, excl. transport fuels: motor gasoline, transport diesel, natural gas and LPG)



FORMATS OF OVERALL ENERGY BALANCE

We prepare three formats of energy balance:

- Extended
- Summary
- Overall Energy Balance sheet



FORMATS OF OVERALL ENERGY BALANCE

- **Extended format** comprises economic activities by 2 digits level (in industry) of NACE Rev.2 – actually these are the energy products balances.
- **Summary format** contains 13 economic activity's aggregates and aggregated group of energy products - as they have to be reported in Joint Annual Questionnaires.
- **Overall energy balance** contains 13 economic activity's aggregates (according to Joint Annual Questionnaires) and 11 products aggregated.

Extended and summary formats are made in specific units of measure, TJ and 1000 toe. Overall energy balance is shown in 1000 toe.



FORMATS OF OVERALL ENERGY BALANCE

- **Extended format (1) in specific units of measure** - it is a basic table.
 - A specific software program was developed by NSI programmers for compiling the balances of energy products.
 - Data sources are the aggregated at national level data by economic activities from the above mentioned surveys.

FORMATS OF OVERALL ENERGY BALANCE

Extended format (2) in TJ

Data from the ***extended format*** of energy products balances ***in specific units of measure are converted with energy products calorific values.***

Extended format (3) in 1000 toe

Data from the ***extended format*** of energy products balances ***in TJ are multiplied by a constant conversion factor 0.02388*** (as 1 TJ = 0.02388 Thousand toe).

FORMATS OF OVERALL ENERGY BALANCE

➤ Summary format

- **Aggregated groups of economic activities in Industry sector:**
 - Iron And Steel
 - Non-Ferrous Metals Industries
 - Chemical Including Petrochemical Industry
 - Non-Metallic Mineral Products
 - Mining (excluding energy producing industries) And Quarrying
 - Food, Beverages and Tobacco
 - Textiles and Leather
 - Wood And Wood Products (other than pulp and paper)
 - Paper, Pulp and Printing
 - Machinery
 - Transport Equipment
 - Construction
 - Not Elsewhere Specified – Industry



FORMATS OF OVERALL ENERGY BALANCE

Summary format (2)

- **Aggregated groups of energy products.**
 - Brown coal and lignite
 - Feed-stocks for refinery
 - Gas/Diesel oil – transport diesel and heating other gasoil
 - Fuel Oil – low and high sulphur content

FURTHER IMPROVEMENTS PLANNED

- Harmonization of Bulgarian energy statistics methodology in accordance with the amendments in the European legislation on energy statistics - Regulations and Directives:
 - Update of the energy products observed in the nomenclature of PRODENERGY
 - Improvement of the methodology for collecting renewable energy data for heat pumps, biofuels (biodiesel, biogasoline, biokerosene).
 - Exploration of the possibilities to use energy data from administrative sources on renewable energy sources - solar thermal energy and heat pumps for heating and cooling.



INDICATORS OF ENERGY BALANCES AND SOURCES OF DATA FOR THEM

ANNEX 1

INDICATORS OF ENERGY BALANCES	SOURCES OF DATA	INDICATORS OF ENERGY BALANCES
Primary energy Indigenous production (suppliers) Recovered products (suppliers) Imports (suppliers) Stocks change Opening stock level (suppliers + consumers) Closing stock level (suppliers + consumers) Exports (suppliers) Marine bunkering (suppliers)	Resources and deliveries (suppliers)	Transformation of energy <i>Own use</i> Electricity generation, transmission and distribution (suppliers) Pumped storage hydroelectric plants (Final consumers) Production and distribution of gaseous fuels (suppliers) Production and distribution of heat (suppliers) Extraction of coal/lignite (Final consumers) Lignite briquettes plants Coke oven Blast furnace Extraction of oil and natural gas (Final consumers) Oil and gas pipelines (Final consumers) Refinery Others (charcoal production)
GROSS INLAND CONSUMPTION Transformation of energy <i>Input (units for transformation of energy)</i> Electricity and/or heat conventional plants (on fuels) Main activity Power plants Combine power and heat plants (CHP) Heat only plants Autoproducers Power plants Combine power and heat plants (CHP) Heat only plants Nuclear plants Lignite briquettes plants Coke oven Blast furnace Refinery Others (charcoal production)		Balances of energy transforming processes (units for transformation of energy)
Transformation of energy <i>Output (units for transformation of energy)</i> Electricity and/or heat conventional plants (on fuels) Main activity Power plants Combine power and heat plants (CHP) Heat only plants Autoproducers Power plants Combine power and heat plants (CHP) Heat only plants Nuclear plants Lignite briquettes plants Coke oven Blast furnace Refinery Others (charcoal production)	Fuel and energy consumption (consumers)	Final energy consumption Industry total (Σ all industries, excluding energy sectors) of which: On economic activities by 2 digits of NACE rev.2 (Final consumers), excluding: - transport fuels (Final consumers): motor gasoline, transport diesel, natural gas and LPG - Energy products, consumed for non-energy use (Final consumers): White spirit, Petroleum bitumen, Paraffin Waxes, Petroleum tar - Transformed in another fuels and own use of energy sector Transport Railway (Final consumers) Road (Final consumers) Aviation (suppliers + Final consumers) Inland navigation (suppliers) Others Households (suppliers, excl. transport fuels: motor gasoline, transport diesel, natural gas and LPG) Agriculture and forestry (Final consumers) Fishing (Final consumers) Others (suppliers, excl. transport fuels: motor gasoline, transport diesel, natural gas and LPG)



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THANK YOU FOR YOUR ATTENTION !

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