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# ENERGY SECTOR – TRANSFORMATION PROCESSES

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## TRANSFORMATION PROCESSES

Data reported under Transformation sector are the quantities of input energy products, output of secondary energy products and own uses of the processes in :

- Main activity producer/ Autoproducer plants (electricity only, CHP, heat only)
- Patent fuel and briquetting plants
- Coke-oven plants
- Blast-furnace plants
- Petroleum Refineries
- Others (Charcoal Production Plants, Gas Works Plants, Coal Liquefaction Plants)

## Electricity and Heat Production

**Scope (coverage)** – All enterprises generating electricity and heat for sale

Producers are classified according to the purpose of production:

- **Main activity producers:** enterprises (both privately or publicly owned) which generate electricity and/or heat for sale to third parties, as their main activity. The enterprises are classified with economic activity - classes '35.11' or '35.30' by the NACE rev.2.
- **Autoproducers:** enterprises (both privately or publicly owned) which generate electricity and/or heat wholly or partly for their own use as an activity that supports their primary activity. The enterprises are classified with economic activity classes - different from '35.11' or '35.30' by the NACE rev.2.

## Electricity and Heat Production

These two types of plants are surveyed by type of units: for electricity (only) plants, for CHP and for heat (only) plants separately for indicators as follows:

**Input** - all energy products (quantities and their respective energy content in TJ) used for gross electricity generation and heat for sale. Data for gross electricity and heat production from combustible fuels are collected with 4 tables – coal and coal products, oil and petroleum products, natural gas (GCV), RES and wastes

			MAIN ACTIVITY PRODUCER PLANTS			AUTOPRODUCER PLANTS		
			ELECTRICITY (ONLY)	CHP	HEAT (ONLY)	ELECTRICITY (ONLY)	CHP	HEAT (ONLY)
Code of PRODENERGY	Name of fuels	UNITS	1	2	3	4	5	6
	Fuel input							
	Fuel input	TJ (NCV)						
	Electricity production	GWh						
	Heat production	TJ						
<b>TOTAL</b>	Electricity production	GWh						
	Heat production	TJ						

# Electricity and Heat Production

## **Output** - Gross and Net Electricity/Heat production in MWh

- Gross electricity production: the sum of the electrical energy production by all the generating sets concerned (including pumped storage) measured at the output terminals of the main generators.
- Gross heat production: is the total heat produced by the installation. It includes: heat used by the installation's auxiliaries which use a hot fluid (space heating, liquid fuel heating etc.); losses in the installation/network heat exchanges; heat from chemical processes used as a primary energy form.
- Net electricity production: the gross electricity production less the electrical energy absorbed by the generating auxiliaries and the losses in the main generator transformers.
- Net heat production: the heat supplied to the distribution system as determined from measurements of the outgoing and return flows.

## **Own Use** by Plant – difference between gross and net production of electricity/heat in MWh.

## **Structural data** on Gross and Net Electrical capacity in Mwe. Net maximum electrical capacity is:

- divided according to the technology of the generating plant - steam turbines, internal combustion engines, gas turbines, combined cycle system (two heat engines in a sequence to drive generators);
- separated into “single” fuel and “multiple” fuel firing.

## Patent fuel and briquetting plants

**Scope (coverage)** - All enterprises producing patent fuel and coal briquettes

### Indicators:

- **Input** – quantities of fine particles or residual dust from hard coal or lignite/brown coal in specific unit of measure (tons) and Net calorific value (kcal/kg)
- **Output** – patent fuel or lignite/brown coal briquettes and dry lignite in specific unit of measure (tons) and Net calorific value (kcal/kg)
- **Own use** – electricity, heat, etc.

# Coke oven coke production

**Scope (coverage)** - All enterprises producing coke oven coke.

## Indicators:

- **Input** – coking coal in specific unit of measure (tons) and Net calorific value (kcal/kg)
- **Output** – coke oven coke and tar in specific unit of measure (tons) and Net calorific value (GJ/t), also coke oven gas in Gross calorific value (TJ)
- **Own use** – electricity, heat, coke oven gas, natural gas, etc.

# Blast-furnace plants

**Scope (coverage)** - All enterprises producing blast furnace gas

## Indicators:

- **Input** – total quantity of coke oven coke, charged in blast furnace in specific unit of measure (tons) and Net calorific value (kcal/kg)
- **Output** – quantity of blast furnace gas obtained in specific unit of measure (1000 m<sup>3</sup>) and its Gross calorific value (TJ)
- **Own use** – electricity



# Petroleum Refineries

**Scope (coverage)** - All enterprises producing petroleum products

## Indicators:

- **Input** – crude oil, NGL, refinery feedstocks, additives/oxygenates (of which biofuels), other hydrocarbons
- **Output** – production of all finished petroleum products: refinery gas, ethane, LPG, naphtha, motor gasoline as well as its part of biogasoline, aviation gasoline, gasoline type jet fuel, kerosene type jet fuel as well as its bio part, other kerosene, gas/diesel oil, low and high sulphur fuel oil, white spirit and SBP, lubricants, bitumen, paraffin waxes, petroleum coke and other products in specific unit of measure (tons) and Net calorific value (GJ/t). Gross Refinery Output excludes refinery losses, but includes Refinery fuel.
- **Own use** – energy products consumed in support of the operation of a refinery as electricity, some petroleum products, natural gas, etc.

# Petroleum Refineries

- **Backflows From Petrochemical Sector To Refineries** - they are finished or semi-finished products which are returned from petrochemical manufacturing to refineries for processing, blending or sale.

It is necessary to clarify the reporting of two indicators:

## **Interproduct transfers**

Quantities reclassified either because their specification has changed or because they are blended into another product.

A negative entry for one product is compensated by a positive entry (or several entries) for one or several products and vice versa; the total net effect should be zero.

## **Products transferred**

Imported petroleum products which are reclassified as feedstocks for further processing in the refinery, without delivery to final consumers.

## Charcoal Production Plants

**Scope (coverage)** - All enterprises producing charcoal through distillation of wood and production of charcoal in the forest (using traditional methods)

### Indicators:

- **Input fuels** – total quantity of wood in specific unit of measure (cub. m) and Net calorific value (GJ/cub. m)
- **Output** – quantity of charcoal in specific unit of measure (tons) and its Net calorific value (GJ/t)
- **Own use** – electricity when the production is through distillation of wood.

# Gas Works Plants

**Scope (coverage)** - All enterprises producing gas work gas

## Indicators:

- **Input fuels** – quantities of coal, coal products, coke oven gas and substitute natural gas used to produce gas in gas works and coal gasification plants in specific unit of measure and calorific value
- **Output** – gas from gas works and coal gasification plants in Gross calorific value
- **Own use** – energy products used as a fuel for heating and operation of equipment in specific unit of measure and calorific value

# Coal Liquefaction Plants

**Scope (coverage)** - All enterprises producing synthetic oil

## Indicators:

- **Input fuels** – quantities of coal, oil shale and tar sands used to produce synthetic oil in specific unit of measure and calorific value
- **Output** – shale oil and other oil products derived from liquefaction in specific unit of measure (tons) and Net calorific value (GJ/t)
- **Own use** – energy products used as a fuel for heating and operation of equipment in specific unit of measure and calorific value



## ENERGY SECTOR

Quantities of energy products consumed by the energy industry to support the extraction (mining, oil and gas production) or plant operations of transformation activities.

Excludes quantities of fuels transformed into another energy form (which should be reported under the transformation sector).

Includes the manufacture of chemical materials for atomic fission and fusion and the products of these processes.

# ENERGY SECTOR

<b>Energy sector</b>	<b>NACE Rev. 2</b>
Electric power generation, transmission and distribution	35.1
Used for pumped storage	part of 35.1
Manufacture of gas; distribution of gaseous fuels through mains	35.2
Steam and air conditioning supply	35.3
Extraction of coal	05
Extraction of peat	08.92
Briquetting plants	part of 19.20
Coke-ovens and blast-furnaces	19.10
Oil and gas extraction and Support activities	06 and 09.1
Oil and gas pipelines	49.50
Refineries	19.20
Mining of uranium and thorium ores	07.21



# ENERGY SECTOR

The commodity balance formats used by Eurostat and the IEA differ in structure.

The Eurostat energy balance includes 'transformation matrix' divided between inputs and outputs. Consumption of the energy branch includes NACE Divisions 05, 06, 08.92, 07.21, 09.1, 19 and 35, also includes energy products used in support of the operation of oil and gas pipelines NACE Class 49.50, but excludes pipeline losses – they are reported as distribution losses.





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**Thank you for your attention!**

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