

EU-MERCI

EU coordinated **ME**thods and procedures based on **Re**al **C**ases for the effective implementation of policies and measures supporting energy efficiency in the **I**ndustry

HORIZON 2020 Project Nr. 693845

Analysis of the industrial sectors in different Countries: Poland

WP4: Picture of efficiency projects implemented by the
Industry sector-by-sector and process-by-process

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1 General overview of industry in Poland

In terms of numbers of enterprises, manufacturing industry in Poland is dominated by small enterprises employing less than 50 employees (they are 74% of all manufacturing companies in Poland). The medium-sized enterprises stand for 20% of Polish manufacturing companies. Large enterprises are the smallest group (6%). They are however responsible for the majority of sold production (64%)

In all the Voivodeships (Polish regions) small companies dominate in numbers, but the production quantity is however dominated by large companies. The manufacturing industry is quite uniformly distributed in the whole country, with the focus in Masovian, Silesian and Wielkopolskie Voivodeship (each approximately 12% of total number of companies). The total production of the industry however is the largest in Masovian Voivodeship.

Manufacturing industry in Poland consumes mainly natural gas (26% of total energy consumption in 2015), electricity (19%) and hard coal (11%). The most energy-consuming manufacturing industry branches are: manufacture of coke and refined petroleum products (NACE C19), manufacture of chemicals and chemical products (NACE C20) and manufacture of other non-metallic mineral products (NACE C23). Industry is the third biggest energy consumer in Poland (after households and transport).

2 Food & Beverage sector

The food and beverage sector is characterised by NACE Codes C10 (Manufacture of food products), C11 (Manufacture of beverages) and in many official statistics, C12 (Manufacture of tobacco products).

2.1 Sectoral Organisation

Polish food and beverage sector is represented by several associations. The associations gather the producers and other stakeholders of food industry. The main associations are:

- Polish Federation of Food Industry (PFPŻ)
- The Polish Association of Juice Producers (KUPS)
- Association of Polish Dairy Processors (ZPPM)
- The Polish Association of the Chocolate and Confectionery Polbisco
- National Association Of Dairy Cooperatives (KZSM)
- Polish Meat Association (Polskie Mięso)
- Union of Producers and Employers of Meat Industry (UPEMI)

2.2 Economic Indicators

In 2015 in Poland there were 15,475 economic entities in food sector and 553 in beverage sector. There were 5,588 entities hiring over 9 employees which is about 36% of entities in food sector and 177 which is about 32% of entities in beverage sector.

The total output of food sector was 45.9 billion € and 5.1 billion € for beverage sector which altogether was about 19% of whole industry manufacture output. Including tobacco sector the output of the whole food, beverage and tobacco sector makes up 20% of the whole industry manufacture output.

Table 1: Key economic parameters for Polish Food and Beverage sector.

Description	NACE (group)	Number of enterprises	No. of persons employed [thousands]	Production value [billion €]	Value added [billion €]	Sold production value [billion €]
Manufacture of food products	C10	1,386	283.6	45.9	10.3	35.5
Processing and preserving of meat and production of meat products	C10.1	401	96.3	N/A	N/A	11.6

Processing and preserving of fish. crustaceans and molluscs	C10.2	68	15.3	N/A	N/A	1.9
Processing and preserving of fruit and vegetables	C10.3	150	25.9	N/A	N/A	3.1
Manufacture of vegetable and animal oils and fats	C10.4	10	2.3	N/A	N/A	0.8
Manufacture of dairy products	C10.5	138	34.4	N/A	N/A	5.8
Manufacture of grain mill products. starches and starch products	C10.6	45	6.7	N/A	N/A	1.0
Manufacture of bakery and farinaceous products	C10.7	379	50.5	N/A	N/A	2.6
Manufacture of other food products	C10.8	152	43.2	N/A	N/A	5.7
Manufacture of prepared animal feeds	C10.9	43	9.0	N/A	N/A	2.9
Manufacture of beverages	C11	72	21.3	5.1	1.5	4.2
Distilling. rectifying and blending of spirits	C11.01	14	4.0	N/A	N/A	0.7
Manufacture of wine from grape	C11.02	N/A	N/A	N/A	N/A	N/A
Manufacture of cider and other fruit wines	C11.03	3	0.8	N/A	N/A	0.1
Manufacture of other non-distilled fermented beverages	C11.04	N/A	N/A	N/A	N/A	N/A
Manufacture of beer	C11.05	17	7.5	N/A	N/A	1.7
Manufacture of malt	C11.06	N/A	N/A	N/A	N/A	N/A

D4.2 - Picture of efficiency projects implemented by the Industry sector-by-sector and process-by-process

Manufacture of soft drinks; production of mineral waters and other bottled waters	C11.07	35	8.6	N/A	N/A	1.6
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2.3 Energy Consumption

Total direct energy consumption in 2015 in manufacture of food products (NACE C10) is estimated for 75 PJ and for the beverage sector (NACE C11) 8,5 PJ. In 2015 the consumption of energy for tobacco sector (NACE C12) is estimated for 1,3 PJ. The whole food, beverage and tobacco manufacturing sector consumed approximately 84,8 PJ of energy.

3 Pulp & Paper sector

The pulp and paper sector is defined by NACE Code C17 (Manufacture of paper and paper products), which consists of subsectors C17.1 (Manufacture of pulp, paper and paperboard) and C17.2 (Manufacture of articles of paper and paperboard).

3.1 Sectoral Organisation

The pulp and paper sector in Poland is represented by “The Association of Polish Papermakers” (SPP - Stowarzyszenie Papierników Polskich).

3.2 Economic Indicators

In 2015 in Poland there were 2,741 enterprises in the pulp and paper sector, only 700 of which employed more than 9 employees, which is about 26% of all enterprises.

The value of export products reached about 2.97 billion € and the import value was about 2.3 billion €.

Table 2: Key economic parameters for Polish Pulp and Paper sector.

Description	NACE (group)	Number of enterprises	No. of persons employed [thousands]	Production value [billion €]	Value added [billion €]	Sold production value [billion €]
Manufacture of paper and paper products	C17	237	41.8	8.8	2.4	7.3
Manufacture of pulp, paper and paperboard	C17.1	27	6.7	N/A	N/A	2.7
Manufacture of pulp	C17.11	N/A	N/A	N/A	N/A	N/A
Manufacture of paper and paperboard	C17.12	N/A	N/A	N/A	N/A	N/A
Manufacture of articles of paper and paperboard	C17.2	210	35.1	N/A	N/A	4.6

3.3 Energy Consumption

In 2015 the direct energy consumption in pulp and paper manufacturing sector was 64.4 PJ. The pulp and paper sector consumed 4,053 GWh of electrical energy.

4 Petroleum refineries sector

The sector of coke and petroleum products is defined by NACE code C19 (Manufacture of coke and refined petroleum products). There are two subsectors, NACE code C19.1 (Manufacture of coke oven products) and NACE code C19.2 (Manufacture of refined petroleum products).

4.1 Sectoral Organisation

The petroleum sector in Poland is represented by Polska Organizacja Przemysłu i Handlu Naftowego (POPIHN). The coke sector is represented only by few manufacturers thus there is no general organization gathering the manufacturers.

4.2 Economic Indicators

In 2015 in Poland there were 170 enterprises in coke and refined petroleum products sector. The value of export products reached about 3.4 billion € and the import value was about 9.38 billion € (GUS, 2016c).

Table 3: Key economic parameters for Polish Petroleum refineries sector.

Description	NACE (group)	Number of enterprises	No. of persons employed [thousands]	Production value [billion €]	Value added [billion €]	Sold production value [billion €]
Manufacture of coke and refined petroleum products	C19	19	12.2	15.2	2.4	14.3
Manufacture of coke oven products	C19.1	6	3.8	N/A	N/A	0.9
Manufacture of briquette and similar solid fuels from coal and peat, refined petroleum products	C19.2	13	8.4	N/A	N/A	13.4

4.3 Energy Consumption

In 2015 the direct energy consumption in coke and refined petroleum products manufacturing sector was 237 PJ. The coke and refined petroleum products sector consumed 3,408 GWh of electrical energy.

5 Chemical sector

The chemical sector is defined by NACE Code C20 (Manufacture of chemicals and chemical products).

5.1 Sectoral Organisation

The chemical sector in Poland proves great potential for improvement as the production of the sector plays less significant role than in many European countries. The main association in Polish chemical sector is Polish Chamber of Chemical Industry (PIPC). PIPC is a member of The European Chemical Industry Council.

5.2 Economic Indicators

In 2015 in Poland there were 2,311 economic entities in chemical sector. There were 672 entities hiring over 9 employees which is about 29% of entities in chemical sector.

The total output of chemical sector was 14.7 billion € which was about 5% of whole industry manufacture. The value of exported chemicals and chemical product in 2015 was about 5.5 billion €. The value of imported chemicals is estimated for 3.78 billion €.

Table 4: Key economic parameters for Polish Chemical sector.

Description	NACE (group)	Number of enterprises	No. of persons employed [thousands]	Production value [billion €]	Value added [billion €]	Sold production value [billion €]
Manufacture of chemicals and chemical products	C20	253	63.7	14.7	4.0	12.0
Manufacture of basic chemicals, fertilisers and nitrogen compounds, plastics and synthetic rubber in primary forms	C20.1	83	25.1	N/A	N/A	7.0
Manufacture of pesticides and other agrochemical products	C20.2	5	0.8	N/A	N/A	0.10

Manufacture of paints, varnishes and similar coatings, printing ink and mastics	C20.3	37	6.7	N/A	N/A	1.0
Manufacture of soap and detergents, cleaning and polishing preparations, perfumes and toilet preparations	C20.4	87	22.2	N/A	N/A	2.6
Manufacture of other chemical products	C20.5	36	7.9	N/A	N/A	1.3
Manufacture of man-made fibres	C20.6	5	1	N/A	N/A	0.1

5.3 Energy Consumption

Total direct consumption of energy in 2015 in manufacture of chemicals and chemical products (NACE C20) is estimated for 188 PJ which accounts for about 20% of the whole manufacturing industry. Chemical sector is the second greatest consumer of energy in polish industry. Chemical sector is also second greatest consumer of electricity among industrial manufacturing sectors in Poland.

6 Non-metallic minerals sector

6.1 Glass

The glass sector is defined by NACE Code C23.1 (manufacture of glass and glass products) within the manufacture of other non-metallic mineral products sector (C23). This includes the manufacturing of flat glass, hollow glass, glass fibres and other glass products. The other sections within the non-metallic mineral products sector are listed in section 5 (ceramic & cement).

6.1.1 Sectoral Organisation

The glass industry in Poland is represented by Polish Glass Manufacturers Federation (Związek Pracodawców “Polskie Szkło”). It gathers members of all main sectors in glass industry such as: flat glass, flat glass processing, packaging glass, domestic glass, special glass and other enterprises connected to glass sector.

6.1.2 Economic Indicators

The main glass products manufactured in Poland are glass packages most of which are glass bottles and jars. The package sector produces about 1,250 thousand tonnes of products a year. There are about 100 companies working in glass industry in Poland. Polish glassworks manufacture about 2,700-3,000 thousand tonnes of glass per year.

Table 5: Key economic parameters for Polish Glass sector.

Description	NACE (group)	Number of enterprises	No. of persons employed [thousands]	Production value [billion €]	Value added [billion €]	Sold production value [billion €]
Manufacture of other non-metallic mineral products	C23	365	88.6	12.0	4.2	8.7
Manufacture of glass and glass products	C23.1	100	31.7	N/A	N/A	2.6
Manufacture of flat glass	C23.11	N/A	N/A	N/A	N/A	0.3
Shaping and processing of flat glass	C23.12	N/A	N/A	N/A	N/A	1.31

Manufacture of hollow glass	C23.13	N/A	N/A	N/A	N/A	0.61
Manufacture of glass fibres	C23.14	N/A	N/A	N/A	N/A	0.11
Manufacture and processing of other glass, including technical glassware	C23.19	N/A	N/A	N/A	N/A	0.11

6.1.3 Energy Consumption

In 2015 the direct energy consumption in whole non-metallic mineral manufacturing sector 114,6 PJ. The whole non-metallic sector consumed 4,682 GWh of electrical energy.

6.2 Ceramic & Cement

The ceramic and cement sector is represented by most of the subgroups of NACE code C23 (Manufacture of other non-metallic mineral products), except for subgroup C23.1 of the glass industry. In this section, there is a focus on the subsectors C23.2 (Manufacture of refractory products), C23.3 (Manufacture of clay building material), C23.4 (Manufacture of other porcelain and ceramic products), C23.5 (Manufacture of cement, lime and plaster) specifically subsector C23.51. There are also other subsectors included in NACE code C23 (Manufacture of other non-metallic mineral products).

6.2.1 Sectoral Organisation

The manufacture of cement sector in Poland is represented by Polish Cement Association (SPC - Stowarzyszenie Producentów Cementu). The ceramic sector is represented by The Polish Ceramic Society (PTCer - Polskie Towarzystwo Ceramiczne). There are also many organizations related to specific branches of ceramic and cement sector.

6.2.2 Economic Indicators

In cement manufacturing sector there are 13 production plants.



Figure 1: Cement manufacturing plants in Poland.

In 2015 in the manufacture of non-metallic mineral products sector in Poland there were 9,493 enterprises that employed about 133.1 thousand employees. Under 16% of enterprises have over 9 employees.

Table 6: Key economic parameters for Polish Ceramic and Cement sector.

Description	NACE (group)	Number of enterprises	No. of persons employed [thousands]	Production value [billion €]	Value added [billion €]	Sold production value [billion €]
Manufacture of other non-metallic mineral products	C23	365	88.6	12.0	4.2	8.7
Ceramic and cement sector	C23.2-C23.9	265	56.9	N/A	N/A	6.1
Manufacture of refractory products	C23.2	7	2.3	N/A	N/A	0.3

Manufacture of clay building material	C23.3	30	8.3	N/A	N/A	0.7
Manufacture of other porcelain and ceramic products	C23.4	20	10.3	N/A	N/A	0.7
Manufacture of cement, lime and plaster	C23.5	13	5.6	N/A	N/A	1.3
Manufacture of articles of concrete, cement and plaster	C23.6	162	24.1	N/A	N/A	2.3
Cutting, shaping and finishing of stone	C23.7	4	0.3	N/A	N/A	0.0
Manufacture of abrasive products and non-metallic mineral products n.e.c.	C23.9	29	6	N/A	N/A	0.8

6.3 Energy Consumption

In 2015 the direct energy consumption in whole non-metallic mineral manufacturing sector was 114.6 PJ. The whole non-metallic sector consumed 4,682 GWh of electrical energy.

7 Iron & Steel sector

The iron and steel sector is represented by the NACE codes C24.1 (Manufacture of basic iron and steel and of ferro-alloys n.e.c.), C24.2 (Manufacture of tubes, pipes, hollow profiles and related fittings, of steel) and C24.3 (Manufacture of other products of first processing of steel), as well as C24.51 (Casting of iron) and C24.52 (Casting of steel). The iron and steel sector is a part of manufacture of basic metals sector represented by NACE code C24.

7.1 Sectoral Organisation

The iron and steel sector is represented by Polish Steel Association (Hutnicza Izba Przemysłowo-Handlowa HIPH), which gathers steel manufacturers, steel processing plants and other cooperative entities including research centers and design offices.

7.2 Economic Indicators

In 2015 the entire basic metals sector employed 63.6 thousand of people. There were 1,357 enterprises 31% of which employed over 9 persons.

In 2015 export value of manufacturing of basic metals sector reached about 4.9 billion €. The import value in this sector reached about 2.54 billion €. The iron and steel sector generates about half of the sold production value of the entire basic metals sector.

Table 7: Key economic parameters for Polish Iron and Steel sector.

Description	NACE (group)	Number of enterprises	No. of persons employed [thousands]	Production value [billion €]	Value added [billion €]	Sold production value [billion €]
Entire basic metals sector	C24	N/A	55	10.7	2.2	10.1
Manufacture of basic iron and steel and of ferro-alloys n.e.c.	C24.1	15	20.1	N/A	N/A	5.2
Manufacture of tubes, pipes, hollow profiles and related fittings, of steel	C24.2	20	4.6	N/A	N/A	0.6
Manufacture of other products of	C24.3	28	4.9	N/A	N/A	0.7

first processing of steel						
Manufacture of basic precious and other non-ferrous metals	C24.4	34	10.7	N/A	N/A	2.3
Casting of metals	C24.5	82	14.7	N/A	N/A	1.2

7.3 Energy Consumption

The whole manufacture of basic metals sector consumed 99.9 PJ of energy. The sector consumed 8,436 GWh of electricity.

In 2015 the total emission of CO₂ in polish ironworks reached 7 million tonnes which was about 18% less than in 2014. The average amount of CO₂ emitted per metric tonne of crude steel also reduced and reached 0.77 tonnes.

8 Other Metals sector

The other metals sector refers to the manufacture of basic metals and is defined by NACE Code C24 excluding iron and steel. The sector thus includes the Manufacture of basic precious and other non-ferrous metals (C24.4) that includes for example copper, lead, zinc, tin and aluminium production, as well as the casting of light metals (C24.53) and casting of other non-ferrous metals (C24.54).

8.1 Sectoral Organisation

The non-ferrous metal sector is represented by the Economic Chamber of Non-Ferrous Metals and Recycling (IGMNiR - Izba Gospodarcza Metali Nieżelaznych i Recyklingu). IGMNiR gathers 69 company members. The focus of IGMNiR is placed also on recycling of metals including ferrous metals. The main metals included in this sector are: copper, aluminium, lead, zinc and silver.

8.2 Economic Indicators

In 2015 the entire basic metals sector employed about 55 thousands of people. In 2015 export value of manufacturing of basic metals sector reached about 4.9 billion €. The import value in this sector reached about 2.54 billion €.

Table 8: Key economic parameters for Polish Other metals sector.

Description	NACE (group)	Number of enterprises	No. of persons employed [thousands]	Production value [billion €]	Value added [billion €]	Sold production value [billion €]
Entire basic metals sector	C24	179	55	10.7	2.2	10.1
Manufacture of basic precious and other non-ferrous metals	C24.4	34	10.7	N/A	N/A	2.3
Precious metals production	C24.41	N/A	N/A	N/A	N/A	N/A
Aluminium production	C24.42	N/A	N/A	N/A	N/A	1.6
Lead, zinc and tin production	C24.43	N/A	N/A	N/A	N/A	0.73
Copper production	C24.44	N/A	N/A	N/A	N/A	N/A

Other non-ferrous metal production	C24.45	N/A	N/A	N/A	N/A	0.03
Processing of nuclear fuel	C24.46	N/A	N/A	N/A	N/A	N/A
Casting of light metals	C24.53	N/A	N/A	N/A	N/A	0.13
Casting of other non-ferrous metals	C24.54	N/A	N/A	N/A	N/A	0.13

8.3 Energy Consumption

The whole manufacture of basic metals sector consumed 99.9 PJ of primary energy. The sector consumed 8,436 GWh of electricity

9 Machinery sector

The machinery and equipment sector is a varied sector consisting of the Manufacture of fabricated metal products, except machinery and equipment (NACE code C25), Manufacture of computer, electronic and optical products (NACE code C26), Manufacture of electrical equipment (NACE code C27) and Manufacture of machinery and equipment not elsewhere classified (NACE code C28). There are many more subsectors under these four main categories.

9.1 Sectoral Organisation

There is no general organization gathering manufacturers in metal products, machinery and equipment sector. Polish organizations in this sector focus on specific type of product e.g. CECED Polska is an association of employers in household appliance sector.

9.2 Economic Indicators

In 2015 in Poland there were 45,180 enterprises in entire metal products, machinery and equipment industry sector. About 77% of enterprises were in the manufacture of fabricated metal products sector. The value of export of entire metal products sector reached about 26.3 billion € and the import value was about 19.8 billion €.

Table 9: Key economic parameters for Polish Machinery sector.

Description	NACE (group)	Number of enterprises	No. of persons employed [thousands]	Production value [billion €]	Value added [billion €]	Sold production value [billion €]
Entire metal products, machinery and equipment industry	C25, C26, C27, C28	2,035	405.8	55.6	16.5	41.0
Manufacture of fabricated metal products, except machinery and equipment	C25	1,184	178.7	22.9	8.4	14.0
Manufacture of structural metal products	C25.1	393	60	N/A	N/A	4.7
Manufacture of tanks, reservoirs and containers of metal	C25.2	86	14.6	N/A	N/A	1.1
Manufacture of steam generators, except central	C25.3	11	5.6	N/A	N/A	0.7

heating hot water boilers						
Manufacture of weapons and ammunition	C25.4	9	4.7	N/A	N/A	0.2
Forging, pressing, stamping and roll-forming of metal; powder metallurgy	C25.5	39	5.6	N/A	N/A	0.5
Treatment and coating of metals; machining	C25.6	289	33.4	N/A	N/A	2.3
Manufacture of cutlery, tools and general hardware	C25.7	72	11.1	N/A	N/A	0.5
Manufacture of other fabricated metal products	C25.9	285	43.7	N/A	N/A	4.0
Manufacture of computer, electronic and optical products	C26	154	45.7	8.8	1.7	7.6
Manufacture of electronic components and boards	C26.1	48	15.4	N/A	N/A	1.9
Manufacture of computers and peripheral equipment	C26.2	16	2.9	N/A	N/A	0.3
Manufacture of communication equipment	C26.3	26	9.5	N/A	N/A	1.7
Manufacture of consumer electronics	C26.4	12	6.9	N/A	N/A	3.1
Manufacture of instruments and appliances for measuring, testing and navigation; watches and clocks	C26.5	46	10.6	N/A	N/A	0.6
Manufacture of irradiation, electromedical and electrotherapeutic equipment	C26.6	N/A	N/A	N/A	N/A	0.0
Manufacture of optical instruments and photographic equipment	C26.7	N/A	N/A	N/A	N/A	0.12
Manufacture of magnetic and optical media	C26.8	N/A	N/A	N/A	N/A	0.02
Manufacture of electrical equipment	C27	284	86.4	13.2	3.2	11.5

Manufacture of electric motors, generators and transformers and electricity distribution and control apparatus	C27.1	114	28	N/A	N/A	2.4
Manufacture of batteries and accumulators	C27.2	13	3.2	N/A	N/A	0.7
Manufacture of wiring and wiring devices	C27.3	43	10.8	N/A	N/A	1.8
Manufacture of electric lighting equipment	C27.4	36	9.7	N/A	N/A	1.4
Manufacture of domestic appliances	C27.5	39	25.2	N/A	N/A	4.4
Manufacture of other electrical equipment	C27.9	39	9.5	N/A	N/A	0.8
Manufacture of machinery and equipment n.e.c.	C28	513	95	10.8	3.3	7.9
Manufacture of general-purpose machinery	C28.1	101	26.2	N/A	N/A	2.5
Manufacture of other general-purpose machinery	C28.2	144	22.3	N/A	N/A	1.9
Manufacture of agricultural and forestry machinery	C28.3	74	14.8	N/A	N/A	1.2
Manufacture of metal forming machinery and machine tools	C28.4	33	4.6	N/A	N/A	0.3
Manufacture of other special-purpose machinery	C28.9	161	27.1	N/A	N/A	1.9

9.3 Energy Consumption

In the table below the energy consumption for the different subsectors in Poland.

Table 10: Energy consumption for machinery sector in Poland

Subsector	Direct Energy Consumption	Electrical Energy Consumption
NACE C25-28	33.9 PJ	4,544 GWh
NACE C25	15.1 PJ	1,839 GWh

NACE C26	2.7 PJ	327 GWh
NACE C27	8.2 PJ	1,237 GWh
NCE C28	8 PJ	1,141 GWh

10 Energy statistics

10.1 Energy Consumption

The total direct consumption in Polish manufacturing industry (NACE code C) was 925,1 PJ in 2015. The main energy carriers used in industry sector were hard coal (108 PJ), natural gas (247.7 PJ) and electricity (177 PJ). The sectors with highest direct energy consumption were manufacture of coke and refined petroleum products (237 PJ), manufacture of chemicals and chemical products (188 PJ) and manufacture of other non-metallic mineral products (114.6)

In 2014 the industry sector energy consumption accounted for 23% of the whole energy consumption. Industry is the third biggest consumer after households (31%) and transport (26%). The energy intensity decreased by 3.59% between 2010 and 2014.

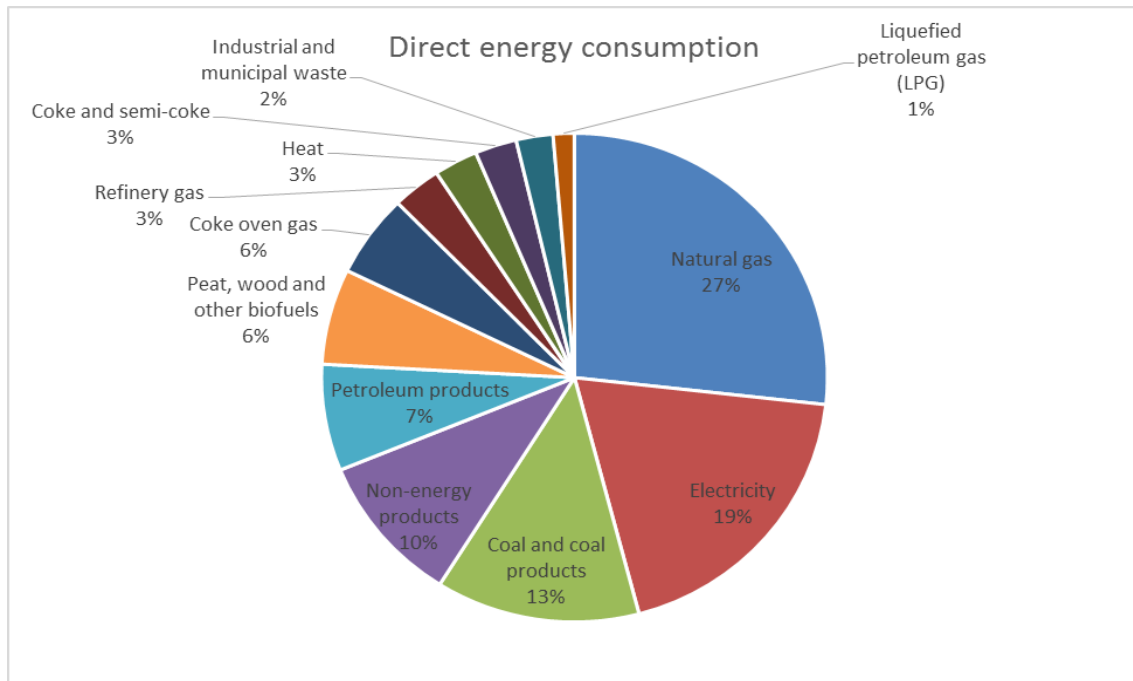


Figure 2: Direct energy consumption in manufacturing industry (NACE C) by energy carrier in Poland in 2015.

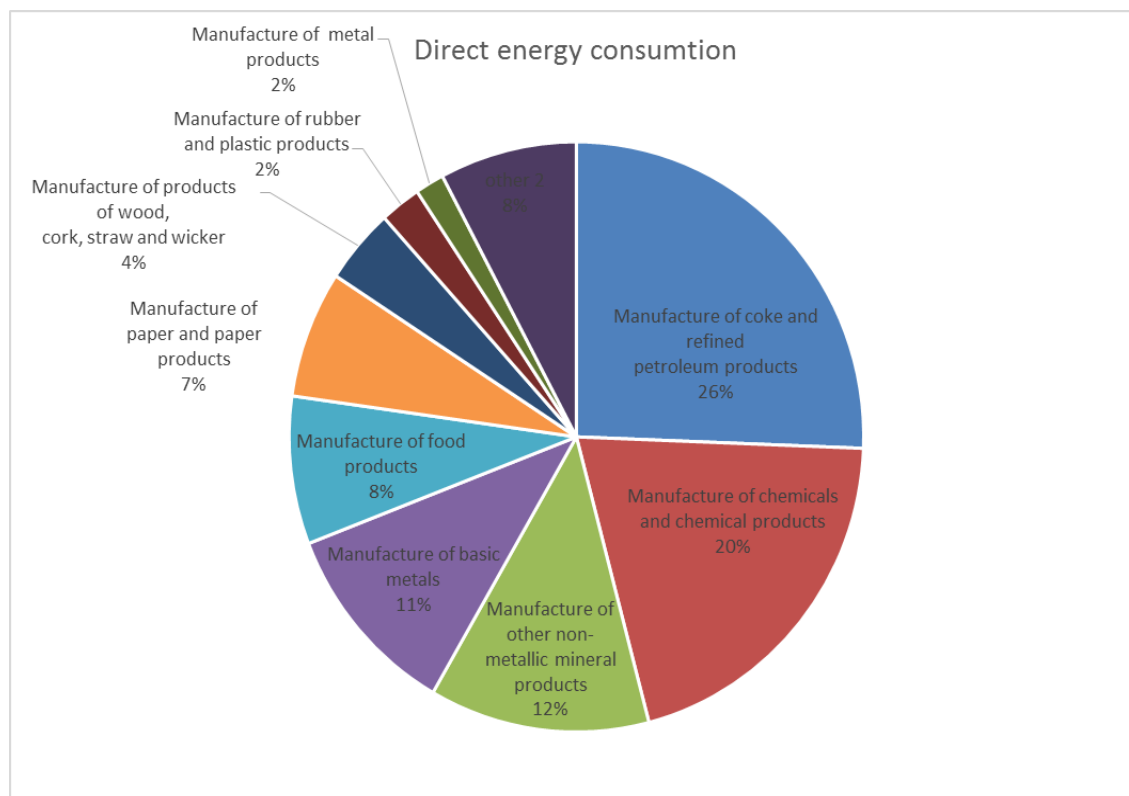


Figure 3: Direct energy consumption in manufacturing industry (NACE C) by sector in Poland in 2015.

Table 11: Total energy consumption by detailed industry sector breakdown in Poland in 2015.

Description	NACE (group)	Total direct energy consumption [PJ]	Percentage of industrial energy consumption	Key energy carriers
Entire industry sector	C	925.1	100.00%	Hard coal (108 PJ). Natural gas (247.7 PJ). Electricity (177 PJ)
Food	10	75	8.11%	Hard coal (21.5 PJ). Natural gas (22.3 PJ). Electricity (19.9 PJ)
Beverages	11	8.5	0.92%	Hard coal (1 PJ). Natural gas (3.2 PJ). Electricity (2.2 PJ)
Tobacco	12	1.3	0.14%	Natural gas (0.5 PJ). Electricity (0.6 PJ)
Textiles	13	3.6	0.39%	Natural gas (1.1 PJ). Electricity (1.4 PJ)
Clothing	14	1.1	0.12%	Natural gas (0.23 PJ). Electricity (0.4 PJ)
Leather and shoes	15	0.62	0.07%	Natural gas (0.2 PJ). Electricity (0.2 PJ)

Wood and wood products	16	38.3	4.14%	Solid biomass and animal products (8.8 PJ). Peat and wood (14.2 PJ). Electricity (7.5 PJ)
Pulp and paper	17	64.4	6.96%	Solid biomass and animal products (12.3 PJ). Peat and wood (14.8 PJ). Electricity (14.6 PJ)
Printing and publishing	18	2	0.22%	Natural gas (0.5 PJ). Electricity (1.2 PJ)
Refined petroleum	19	237	25.62%	Non-energy products (78.4 PJ). Coke oven gas (40.5 PJ). Natural gas (26 PJ)
Chemical industry	20	188	20.32%	Hard coal (39.6 PJ). Natural gas (102.7 PJ). Electricity (26 PJ)
Pharmaceuticals	21	3	0.32%	Natural gas (0.8 PJ). Electricity (1.1 PJ)
Rubber and plastics	22	21.4	2.31%	Natural gas (4.2 PJ). Electricity (11.9 PJ)
Building materials	23	114.6	12.39%	Hard coal (22.9 PJ). Natural gas (40.6 PJ). Electricity (16.9 PJ)
Basic metals	24	99.9	10.80%	Coke and semi-coke (17.8 PJ). Natural gas (23.8 PJ). Electricity (30.4 PJ)
Metal products	25	15.1	1.63%	Natural gas (4.9 PJ). Electricity (6.6 PJ)
Computers and electronics	26	2.7	0.29%	Hard coal (0.8 PJ). Natural gas (0.4 PJ). Electricity (1.2 PJ)
Electrical equipment	27	8.2	0.89%	Natural gas (1.9 PJ). Electricity (4.5 PJ)
Machinery	28	8	0.86%	Natural gas (1.4 PJ). Electricity (4.1 PJ)
Motor vehicles	29	13.3	1.44%	Natural gas (3.4 PJ). Electricity (7.9 PJ)
Other transport equipment	30	3.5	0.38%	Heat (0.8 PJ). Electricity (1.4 PJ)
Furniture	31	10.3	1.11%	Peat and wood (2.9 PJ) Solid biomass and animal products (1.9 PJ) Electricity (3.4 PJ)
Other manufacturing	32	2.7	0.29%	Non-energy products (1.6 PJ) Electricity (0.6 PJ)
Repair and installation	33	2.7	0.30%	Automotive diesel oil (0.6 PJ). Electricity (0.8 PJ)

10.2 Energy Prices

For industrial consumers whose consumption placed between 10–100 TJ, the natural gas prices in the first semester of 2016 in Poland were 0.027 €/kWh (excluding VAT but including taxes and levies that are not recoverable) and reached the level of 0.0333 €/kWh with all taxes included. This was below the EU-28 average which was 0.0315 €/kWh (excluding VAT but including taxes and levies that are not recoverable).

For industrial consumers whose consumption placed between 50–2000 MWh, the electricity prices in the first semester of 2016 in Poland were 0.0808 €/kWh (excluding VAT but including taxes and levies that are not recoverable) and reached the level of 0.0993 €/kWh with all taxes included. This was below the EU-28 average which was 0.1169 €/kWh (excluding VAT but including taxes and levies that are not recoverable).

Consumer prices of petroleum products at the end of 2015 were: for petrol (Euro-super 95), the price without taxes and duties was 0.42 €/l in Poland, lower than the EU-28 average which was 0.44 €/l, including taxes and duties, the price was 0.98 €/l, lower than the EU-28 which was 1.3 €/l; for automotive diesel the price without taxes and duties was 0.45 €/l in Poland, higher than the EU-28 average which was 0.44 €/l, including taxes and duties the price was 0.96 €/l, lower than the EU-28 average which was 1.13 €/l; for LPG motor fuel the price without taxes and duties was 0.28 €/l in Poland, higher than the EU-28 average which was 0.33 €/l, including taxes and duties the price was 0.47 €/l, lower than the EU-28 average which was 0.54 €/l.

10.3 Carbon Dioxide Conversion Factors

The carbon dioxide conversion factor for electrical energy for end users defined by KOBIZE equals 825,412 kg CO₂/MWh. The carbon dioxide conversion factors for different fuels are listed in the table below:

Table 12: Calorific values and Carbon Dioxide Conversion Factors for different types of fuel.

Fuel type	Carbon Dioxide Conversion Factor [kg/GJ]
Hard coal for coking plants	93.57
Hard coal for iron and steel sector	93.92
Hard coal for non-ferrous metals sector	94.70
Hard coal for food, beverage and tobacco sector	94.73
Hard coal for other industry sectors	94.73
High-methane natural gas	56.1

Nitrified natural gas	56.1
Coke and semi-coke	107

10.4 Conversion Factors to Primary Energy

The conversion factors based on the Regulation of the Minister of Economy defined as the invers of the non-renewable primary energy consumption factors are:

- 91% for fuel oils, natural gas, LPG, hard coal, lignite
- 500% for biomass
- 33% for electricity

These factors are to be revised during the legislation changes for new energy efficiency act.