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EU coordinated **ME**thods and procedures based on **R**eal **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: Greece

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 Greece

Greek industry sector has faced a lot of revamping with the vigorous shift towards industrialization. Manufacturing sector has, in fact, overtaken the agriculture sector in terms of contribution to the GDP. However the growth is unsettled by the increasing dependency on imports, that has been a reason of concern for Greece. The imports in 2009 were about 60 billion €, in contrast to the exports of only about 18 billion €. However, this is necessary for the prosperity of Greek industry, raw materials, machinery parts and fuel have to be imported.

In-house industries are rudimentary and have negligible production of iron and steel. Greece industries do not manufacture basic transport equipment, such as cars and trucks, due to shortage of skills, raw materials as well as infrastructural help. The only region that features industries is Athens, which is a hot spot due to easier capital availability as well as connectivity.

Greece has diversified industries; however, their contribution to the national economy is not quite significant. The various Greece industries are:

- Tourism
- Food and tobacco processing
- Textiles
- Chemicals
- Metal products
- Mining
- Petroleum

In terms of contribution towards the GDP, the following are the figures:

- Agriculture: 3.4%
- Industry: 20.8%
- Services: 75.8%

The most important sectors in Greece are:

- Chemical
- Glass
- Iron&Steel
- Ceramic&Cement
- Pulp&Paper
- Coke&Petroleum

- Machinery
- Other metals

2 Food and Beverage sector

The Greek Food and Beverage Industry, is the most important pillar of the Greek manufacturing, in terms of turn over, employment and value added. The food and drink industry is dynamic and competitive with strong investment and business activity in Greece, the Balkans and throughout Europe. The following tables show the main figures of the Greek Food and drink Industry.

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

NACE_R2	Number of enterprises	Turnover [million €]	Production value	Value added	Number of persons employed
Manufacturing of food products and beverages	14.434	11.660	10.241	2.619	80.174

In the following table the main figure per subsector of the Hellenic Food Industry are presented.

Sub - Sector	No of Employees	Turnover [billion €]	No of Companies	Production Values [billion €]	Gross Added Value [million €]
Feed	1,0603	0.7	144	0.51	78.6
Fruit & Vegetables	9,620	1.4	577	1.1	340.5
Mills Products	3,207	0.58	289	0.5	104.8
Dairy Products	8,819	1.98	866	1.6	340.5
Bakery	27,259	1.87	8,805	2.1	681.1
Drinks	8,017	1.5	722	1.4	366.7
Vegetable & Animal Fats & Oils	4,009	0.8	1,443	0.7	131
Meat	7,216	1.3	433	1.02	183.4
Fish	802	0.1	144	0.1	26.2
Other Products	8,819	1.3	1,010	1.1	340.5

The sector consists of a diverse range of companies from SMEs to large companies. The 95% of the total number of companies have less than 10 employees, as it is shown in the below Figure.

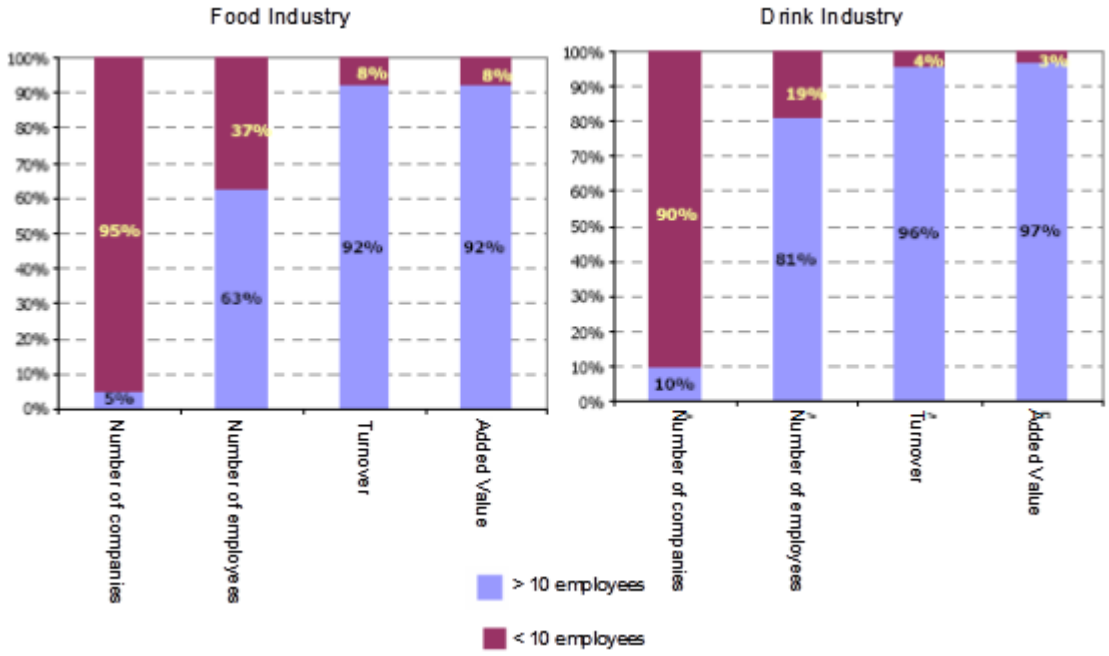

Figure 1: Companies distribution per number of employees.

The food and drink sector is composed of many sub-sectors, which apply their own production processes. The five main subsectors are bakery, "various food products" (which includes pastry, chocolate, confectionary, pasta and baby food), dairy, fruit & vegetables and meat & meat products.

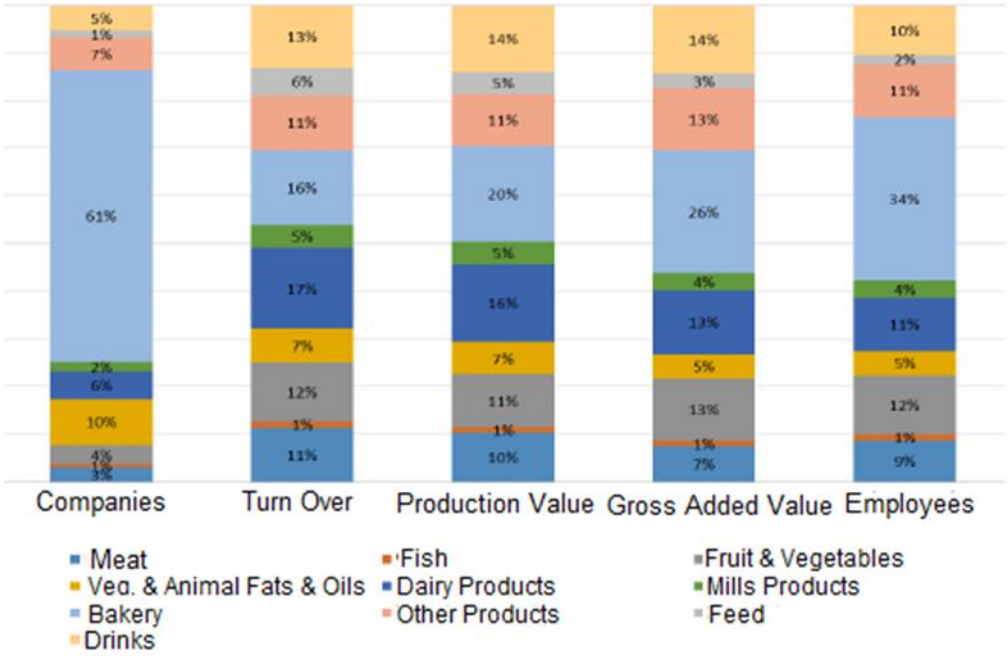

Figure 2: Economic indicators for Food & Beverage industry in Greece.

In the table below the total energy consumption of food industry in Greece is presented:

Table 2: Food and Beverage sector energy consumption in Greece.

Natural Gas	Butane/Propane	Heavy Fuel	Heating oil /Petroleum Product	Wood/Special Fuels	Total Fuel Consumption	Electricity Consumption
77,000	14,600	52,400	9,000	220,900	153,000	230,000

The split among different fuels is reported in the table below:

Table 3: Food and Beverage sector fuels consumption in Greece.

Food & Tabasco – Final Energy Consumption [ktoe]		
Oil	LPG	65
	Gas/Diesel Oil (w/o bio)	15
	Fuel Oil	71
	Total	***151***
Gas	Natural GAs	65
	Total	***65***
Total Renewables	Solid Biomass	145
	Biogas (all)	2
	Biodiesel	1
	Total	***148***
Electricity		***159***
Total all products		***523***

3 Pulp & Paper sector

The pulp and paper sector is defined by NACE code 17.1 (Manufacture of pulp, paper and paperboard), which consists of the subsectors 17.11 (Manufacture of pulp) and 17.12 (Manufacture of paper and paperboard). The sector of NACE code 17.2 is related, as it refers to the Manufacture of articles of paper and paperboard.

3.1 Economic indicators

There are about 641 companies active in the Greek pulp and paper industry (NACE C17), decreased to 607 in 2015. These companies employed about 6,938 persons in 2014.

Table 4: Key economic parameters for Greek Pulp and Paper sector.

Description	NACE (group)	Number of enterprises (2014)	No. of persons employed (2014)	Turnover or gross premiums written (2014)	Production value (2014)
Manufacture of paper and paper products	17	641	6,938	1,210.8	1,155
Manufacture of paper and paperboard	17.1	90	785	170.9	162.6
Manufacture of articles of paper and paperboard	17.2	551	6,153	1,039.9	992.3

3.2 Energy consumption

The energy use of the entire pulp and paper industry (NACE codes 17.1 and 17.2 combined) in 2014 was 98.6 ktoe. Most of this energy was provided from electricity (47.1 ktoe), natural gas (28.6 ktoe) and oil (20.6 ktoe). About 2.3 ktoe was provided from renewable energy.

4 Petroleum refineries sector

The sector of coke and petrol products is defined by NACE code 19 (Manufacture of coke and refined petroleum products). There are two subsectors, NACE C19.1 (Manufacture of coke oven products) and NACE C19.2 (Manufacture of refined petroleum products).

4.1 Economic indicators

There are 42 companies active in the coke and petrol products industry in Greece and they have about than 4,000 employees.

Table 5: Key economic parameters for Greek Petroleum refineries sector.

Description	NACE (group)	Number of enterprises (2015)	No. of persons employed (2014)	Turnover or gross premiums written (2015)	Production value (2015)
Manufacture of coke and refined petroleum products	19	42	3,914	17,677.4	17,505.4
Manufacture of coke oven products	19.1	10	32	3.2	4.3
Manufacture of refined petroleum products	19.2	32	3,882	17,674.2	17,501.1

4.2 Energy consumption

Total energy final consumption by the Greek chemical industry (NACE codes 19-21) in 2014 was 161.8 ktoe, of which 56.7 ktoe was electrical, 66.6 ktoe oil consumption and about 38.4 ktoe of natural gas.

5 Chemical sector

The chemical sector is defined by NACE Code 20 (Manufacture of chemicals and chemical products).

5.1 Economic indicators

In 2014, there were about 670 companies in the Greek chemical industry sector. About 11,000 persons are employed in the chemical sector, of whom 41% about 4,400, in the Manufacture of soap and detergents, cleaning and polishing preparations (NACE Code 20.41) and 22%, about 2,400, in the Manufacture of paints, varnishes and similar coatings, printing ink and mastics (NACE Code 20.3).

Table 6: ey economic parameters for Greek Chemical sector.

Description	NACE (group)	Number of enterprises (2014)	No. of persons employed (2014)	Turnover or gross premiums written (2014)	Production value [(2014)
Manufacture of chemicals and chemical products	20	666	10,918	2,172.3	1,979.6
Manufacture of basic chemicals, fertilisers and nitrogen compounds, plastics and synthetic rubber in primary forms	20.1	171	2,412	777.3	745.7
Manufacture of industrial gases	20.11	11	353	67.5	58.8
Manufacture of dyes and pigments	20.12	N/A	N/A	N/A	N/A
Manufacture of other inorganic basic chemicals	20.13	13	80	11.1	11.3
Manufacture of other organic basic chemicals	20.14	37	300	60.5	59.2
Manufacture of fertilisers and nitrogen compounds	20.15	40	846	309.4	290.3
Manufacture of plastics in primary forms	20.16	62	665	277.1	274.2
Manufacture of synthetic rubber in	20.17	N/A	N/A	N/A	N/A

primary forms					
Manufacture of pesticides and other agrochemical products	20.2	21	526	164.7	115.9
Manufacture of paints, varnishes and similar coatings, printing ink and mastics	20.3	133	2,346	353.2	338.7
Manufacture of soap and detergents, cleaning and polishing preparations	20.41	234	4,391	651	595.9
Manufacture of perfumes and toilet preparations	20.42	70	2,681	379.8	332.6
Manufacture of other chemical products	20.5	102	1,205	221.2	167.6
Manufacture of explosives	20.51	13	100	24.7	21.7
Manufacture of glues	20.52	18	450	58.3	50
Manufacture of essential oils	20.53	12	137	26.7	25.9
Manufacture of other chemical products n.e.c.	20.59	61	550	114.5	84.2
Manufacture of man-made fibres	20.6	3	7	1.8	1.7

5.2 Energy consumption

Total energy final consumption by the Greek chemical industry (including Petrochemical and Pharmaceutical, NACE C19-21) in 2014 was 161.8 ktoe, of which 56.7 ktoe was electrical, 66.6 ktoe oil consumption and about 38.4 ktoe of natural gas.

6 Non-metallic minerals sector

6.1 Glass

The glass manufacturing sector is defined by NACE Code 23.1 (Manufacture of glass and glass products) and includes the manufacturing of flat glass, hollow glass, glass fibres and other glass products and shaping and processing of flat glass and other glass products, including technical glassware.

6.1.1 Economic indicators

Until 2014, there were about 300 companies in the Greek glass industry sector. The subsectors performances are reported in the table below.

Table 7: Key economic parameters for Greek Glass sector.

Description	NACE (group)	Number of enterprises (2014)	No. of persons employed (2014)	Turnover or gross premiums written (2014)	Production value (2014)
Manufacture of glass and glass products	23.1	278	1,067	107.5	96.7
Manufacture of flat glass	23.11	19	30	2.3	2.3
Shaping and processing of flat glass	23.12	175	480	35.7	30.7
Manufacture of hollow glass	23.13	36	446	64.2	55.9
Manufacture of glass fibres	23.14	N/A	N/A	N/A	N/A
Manufacture and processing of other glass, including technical glassware	23.19	48	111	5.3	7.7

6.1.2 Energy consumption

Glass manufacturing is included intto the Manufacture of other non-metallic mineral products (Non-metallic Minerals, e.g. Glass, pottery & building mat. Industry) which energy consumption for 2014 was 760.3 ktoe.

6.2 Ceramic & Cement

The ceramic and cement sector is represented by most of the subgroups of NACE code 23 (Manufacture of other non-metallic mineral products), except for subgroup 23.1 of the glass industry. In this section, there is a focus on the subsectors 23.2 (Manufacture of refractory products), 23.3 (Manufacture of clay building material), 23.4 (Manufacture of other porcelain and ceramic products), 23.5 (Manufacture of cement, lime and plaster), 23.6 (Manufacture of articles of concrete, cement and plaster), 23.7 (Cutting, shaping and finishing of stone) and 23.9 (Manufacture of abrasive products and non-metallic mineral products n.e.c.).

6.2.1 Economic indicators

There are about 2,881 companies active in the Greek ceramics and cement industry. Together, these companies employ approximately 12,656 persons.

Table 8: Key economic parameters for Greek Ceramic and Cement sector.

Description	NACE (group)	Number of enterprises (2014)	No. of persons employed (2014)	Turnover or gross premiums written (2014)	Production value (2014)
Ceramic and cement sector	23.2-23.9	2,881	12,656	1,708	1,626.1
Manufacture of refractory products	23.2	27	214	21.9	16.9
Manufacture of clay building material	23.3	85	524	47.7	44.8
Manufacture of other porcelain and ceramic products	23.4	357	595	21.6	46.4
Manufacture of cement,lime and plaster	23.5	177	2,120	548.9	523
Manufacture of articles of concrete, cement and plaster	23.6	1,111	5,130	660.9	601.5
Cutting, shaping and finishing of stone	23.7	1.006	3,327	279.3	302.8
Manufacture of abrasive products and	23.9	118	746	127.7	90.7

non-metallic mineral products n.e.c.					

6.2.2 Energy consumption

Ceramic and cement belong to the Manufacture of other non-metallic mineral products (Non-metallic Minerals e.g. Glass, pottery & building mat. Industry) which energy consumption for 2014 was 760.3 ktoe.

7 Iron & Steel sector

The iron and steel sector is represented by the NACE codes 24.1 (Manufacture of basic iron and steel and of ferro-alloys n.e.c.), 24.2 (Manufacture of tubes, pipes, hollow profiles and related fittings, of steel) and 24.3 (Manufacture of other products of first processing of steel), as well as 24.51 (Casting of iron) and 24.52 (Casting of steel).

7.1 Economic indicators

In 2015, the total investment in the iron and steel industry increased by 174.2% compared with 2014. In 2014, an increase of 18.7% had been recorded in the corresponding investments compared with 2013.

Table 9: Key economic parameters for Greek Iron and Steel sector.

Description	NACE (group)	Number of enterprises (2014)	No. of persons employed (2014)	Turnover or gross premiums written (2014)	Production value (2014)
Manufacture of basic iron and steel and of ferro-alloys n.e.c.	24.1	92	2,513	545.8	595.3
Manufacture of tubes, pipes, hollow profiles and related fittings, of steel	24.2	116	1,538	347.8	309.6
Manufacture of other products of first processing of steel	24.3	341	2,548	275	274.2
Cold drawing of bars	24.31	88	633	72.1	65.5
Cold rolling of narrow strip	24.32	13	98	5.9	9.3
Cold forming or folding	24.33	204	1,522	154.1	170
Cold drawing of wire	24.34	36	295	42.9	29.4
Precious metals production	24.41	39	291	36.3	37.2

Aluminium production	24.42	64	4,378	1,976.1	1,966.3
Lead, zinc and tin production	24.43	15	136	11	15.6
Copper production	24.44	65	1,012	543.5	474.2
Other non-ferrous metal production	24.45	17	120	44.9	12.6
Casting of metals	24.5	281	2,527	428.3	482.9
Casting of iron	24.51	155	1,521	333	373.1
Casting of steel	24.52	33	234	27.3	24.5

7.2 Energy consumption

Energy consumption for Iron & steel industry, in 2014, was 135 ktoe. The consumption of electricity in the iron and steel industry decreased by 10.6% in 2015 compared with 2014. In 2014, an increase of 2.6% had been recorded in the corresponding consumption of electricity compared with 2013.

8 Other metals sector

The other metals sector refers to the manufacture of basic metals (NACE Code 24), excluding iron and steel. The sector thus includes the Manufacture of basic precious and other non-ferrous metals (NACE code 24.4) that includes for example copper, lead, zinc, tin and aluminium production, as well as the casting of light metals (NACE code 24.53) and casting of other non-ferrous metals (NACE code 24.54).

8.1 Economic indicators

There are 1,033 companies active in the other metals sector, of which 289 in Casting of metals (NACE C24.5).

Table 10: Key economic parameters for Greek Other metals sector.

Description	NACE (group)	Number of enterprises (2015)	No, of persons employed (2014)	Turnover or gross premiums written (2015)	Production value (2015)
Manufacture of basic precious and other non-ferrous metals	C24.4	194	5,937	2,653.5	2,598.7
Precious metals production	C24.41	N/A	291	N/A	N/A
Aluminium production	C24.42	N/A	4,378	N/A	N/A
Lead, zinc and tin production	C24.43	N/A	136	N/A	N/A
Copper production	C24.44	N/A	1,012	N/A	N/A
Other non-ferrous metal production	C24.45	N/A	120	N/A	N/A
Processing of nuclear fuel	C24.46	N/A	N/A	N/A	N/A
Casting of metals	C24.5	289	2,527	440.8	488.0
Casting of light metals	C24.53	N/A	402	N/A	N/A
Casting of other non-ferrous metals	C24.54	N/A	370	N/A	N/A

8.2 Energy consumption

The total energy use by the other metal products, was in 2014 828.2 ktoe. About 50% of the energy to the sector is provided from electricity (405 ktoe), 255 ktoe from natural gas and about 160 ktoe from lignite.

9 Machinery sector

The sector of machinery and equipment is a varied sector consisting of the Manufacture of fabricated metal products, except machinery and equipment (NACE code 25), Manufacture of computer, electronic and optical products (NACE code 26), Manufacture of electrical equipment (NACE code 27) and Manufacture of machinery and equipment not elsewhere classified (NACE code 28). There are dozens of subsectors under these four main categories.

9.1 Economic indicators

There are about 10,373 companies active in the entire sector of machinery and equipment, of which most (about 7,550) are in the subsector of the manufacture of fabricated metal products (NACE code 25).

These companies together employ more than 41,800 persons. Subsectors that employ large numbers of people include the manufacture of structural metal products (NACE C25.1; 11,529 persons), the treatment and coating of metals (NACE C25.12; 6,857 persons) and the Manufacture of electrical equipment (NACE C27 5,737 persons), as the Manufacture of machinery and equipment n.e.c . NACE C28 with 11,800 persons).

Table 11: Key economic parameters for Greek Machinery sector.

Description	NACE (group)	Number of enterprises (2015)	No, of persons employed (2014)	Turnover or gross premiums written (2015)	Production value (2015)
Manufacture of fabricated metal products, except machinery and equipment	C25	7,550	21,763	2,999.9	2,792.2
Manufacture of structural metal products	C25.1	5,219	11,529	1,424.8	1,349.6
Manufacture of metal structures and parts of structures	C25.11	N/A	4,672	N/A	N/A
Manufacture of doors and windows of metal	C25.12	N/A	6,857	N/A	N/A
Manufacture of tanks, reservoirs and containers of metal	C25.2	130	512	74.9	50.3
Manufacture of central heating radiators and boilers	C25.21	N/A	191	N/A	N/A
Manufacture of other tanks, reservoirs and containers of metal	C25.29	N/A	321	N/A	N/A
Manufacture of steam generators, except central heating hot water boilers	C25.3	12	52	4.9	4.8
Manufacture of steam generators, except central heating hot water boilers	C25.30	N/A	52	N/A	N/A

Manufacture of weapons and ammunition	C25.4	23	825	37.1	65.3
Manufacture of weapons and ammunition	C25.40	N/A	825	N/A	N/A
Forging, pressing, stamping and roll-forming of metal; powder metallurgy	C25.5	210	320	38.4	38.4
Forging, pressing, stamping and roll-forming of metal; powder metallurgy	C25.50	N/A	320	N/A	N/A
Treatment and coating of metals; machining	C25.6	638	1,795	206.5	192.8
Treatment and coating of metals	C25.61	N/A	1,303	N/A	N/A
Machining	C25.62	N/A	492	N/A	N/A
Manufacture of cutlery, tools and general hardware	C25.7	273	2,059	247.5	248.2
Manufacture of cutlery	C25.71	N/A	1,268	N/A	N/A
Manufacture of locks and hinges	C25.72	N/A	459	N/A	N/A
Manufacture of tools	C25.73	N/A	332	N/A	N/A
Manufacture of other fabricated metal products	C25.9	1,045	4,671	965.8	842.7
Manufacture of steel drums and similar containers	C25.91	N/A	249	N/A	N/A
Manufacture of light metal packaging	C25.92	N/A	1,460	N/A	N/A
Manufacture of wire products, chain and springs	C25.93	N/A	768	N/A	N/A
Manufacture of fasteners and screw machine products	C25.94	N/A	84	N/A	N/A
Manufacture of other fabricated metal products n.e.c.	C25.99	N/A	2,110	N/A	N/A
Manufacture of computer, electronic and optical products	C26	236	2,580	464.0	433.7
Manufacture of electronic components and boards	C26.1	68	556	63.1	62.1
Manufacture of electronic components	C26.11	N/A	512	N/A	N/A
Manufacture of loaded electronic boards	C26.12	N/A	44	N/A	N/A
Manufacture of computers and peripheral equipment	C26.2	33	137	38.9	25.4
Manufacture of computers and peripheral equipment	C26.20	N/A	137	N/A	N/A
Manufacture of communication equipment	C26.3	40	419	58.3	56.3
Manufacture of communication equipment	C26.30	N/A	419	N/A	N/A
Manufacture of consumer electronics	C26.4	20	45	7.5	11.9
Manufacture of consumer electronics	C26.40	N/A	45	N/A	N/A
Manufacture of instruments and appliances for measuring, testing and navigation; watches and clocks	C26.5	53	1,227	234.5	223.4
Manufacture of instruments and appliances for measuring, testing and navigation	C26.51	N/A	1,219	N/A	N/A
Manufacture of watches and clocks	C26.52	N/A	8	N/A	N/A
Manufacture of irradiation, electromedical and	C26.6	6	92	15.9	13.9

electrotherapeutic equipment					
Manufacture of irradiation, electromedical and electrotherapeutic equipment	C26.60	N/A	92	N/A	N/A
Manufacture of optical instruments and photographic equipment	C26.7	13	101	41.9	38.6
Manufacture of optical instruments and photographic equipment	C26.70	N/A	101	N/A	N/A
Manufacture of magnetic and optical media	C26.8	3	3	3.8	2.1
Manufacture of magnetic and optical media	C26.80	N/A	3	N/A	N/A
Manufacture of electrical equipment	C27.	783	5,737	1,263.4	1,115.1
Manufacture of electric motors, generators, transformers and electricity distribution and control apparatus	C27.1	194	1,317	147.5	118.4
Manufacture of electric motors, generators and transformers	C27.11	N/A	376	N/A	N/A
Manufacture of electricity distribution and control apparatus	C27.12	N/A	941	N/A	N/A
Manufacture of batteries and accumulators	C27.2	13	557	124.8	107.4
Manufacture of batteries and accumulators	C27.20	N/A	557	N/A	N/A
Manufacture of wiring and wiring devices	C27.3	36	1,064	546.9	516.6
Manufacture of fibre optic cables	C27.31	N/A	N/A	N/A	N/A
Manufacture of other electronic and electric wires and cables	C27.32	N/A	1,012	N/A	N/A
Manufacture of wiring devices	C27.33	N/A	N/A	N/A	N/A
Manufacture of electric lighting equipment	C27.4	246	811	52.3	78.0
Manufacture of electric lighting equipment	C27.40	N/A	811	N/A	N/A
Manufacture of domestic appliances	C27.5	215	1,465	302.3	206.9
Manufacture of electric domestic appliances	C27.51	N/A	923	N/A	N/A
Manufacture of non-electric domestic appliances	C27.52	N/A	542	N/A	N/A
Manufacture of other electrical equipment	C27.9	79	523	89.5	87.9
Manufacture of other electrical equipment	C27.90	N/A	523	N/A	N/A
Manufacture of machinery and equipment n.e.c.	C28	1,718	11,800	980.5	1,807.4
Manufacture of general-purpose machinery	C28.1	148	886	73.2	135.7
Manufacture of engines and turbines, except aircraft, vehicle and cycle engines	C28.11	N/A	144	N/A	N/A
Manufacture of fluid power equipment	C28.12	N/A	74	N/A	N/A
Manufacture of other pumps and compressors	C28.13	N/A	344	N/A	N/A

Manufacture of other taps and valves	C28.14	N/A	159	N/A	N/A
Manufacture of bearings, gears, gearing and driving elements	C28.15	N/A	165	N/A	N/A
Manufacture of other general-purpose machinery	C28.2	529	4,826	419.9	638.2
Manufacture of ovens, furnaces and furnace burners	C28.21	N/A	244	N/A	N/A
Manufacture of lifting and handling equipment	C28.22	N/A	1,962	N/A	N/A
Manufacture of office machinery and equipment (except computers and peripheral equipment)	C28.23	N/A	35	N/A	N/A
Manufacture of power-driven hand tools	C28.24	N/A	16	N/A	N/A
Manufacture of non-domestic cooling and ventilation equipment	C28.25	N/A	1,720	N/A	N/A
Manufacture of other general-purpose machinery n.e.c.	C28.29	N/A	849	N/A	N/A
Manufacture of agricultural and forestry machinery	C28.3	352	1,619	117.4	297.8
Manufacture of agricultural and forestry machinery	C28.30	N/A	1,619	N/A	N/A
Manufacture of metal forming machinery and machine tools	C28.4	354	1,803	103.3	348.0
Manufacture of metal forming machinery	C28.41	N/A	1,491	N/A	N/A
Manufacture of other machine tools	C28.49	N/A	312	N/A	N/A
Manufacture of other special-purpose machinery	C28.9	335	2,667	266.7	387.8
Manufacture of machinery for metallurgy	C28.91	N/A	354	N/A	N/A
Manufacture of machinery for mining, quarrying and construction	C28.92	N/A	225	N/A	N/A
Manufacture of machinery for food, beverage and tobacco processing	C28.93	N/A	764	N/A	N/A
Manufacture of machinery for textile, apparel and leather production	C28.94	N/A	250	N/A	N/A
Manufacture of machinery for paper and paperboard production	C28.95	N/A	30	N/A	N/A
Manufacture of plastic and rubber machinery	C28.96	N/A	47	N/A	N/A
Manufacture of other special-purpose machinery n.e.c.	C28.99	N/A	997	N/A	N/A

9.2 Energy consumption

The total energy use by the metal products, machinery and equipment sector amounts to about 36.4 ktoe. Most of the energy for this sector is provided from electricity (17 ktoe) and oil (15.6 ktoe). The rest of energy consumption is divided between natural gas (2.9 ktoe) and RES (about 1 ktoe).

10 Energy statistics

10.1 Energy consumption

The total final energy consumption of the industry sector in Greece amounted in 2014 to about 3,088 ktoe. Divided among energy carriers, the main sources were oil (1,128 ktoe), electricity (1,106 ktoe) natural gas (464 ktoe), RES (163.4 ktoe) and coal (227 ktoe).

Divided among industrial sectors, the sectors with the highest energy consumption were non-ferrous metal (828 ktoe), non-metallic minerals (760 ktoe) and Food and Tobacco (523 ktoe). See the Figures below for a more detailed overview.

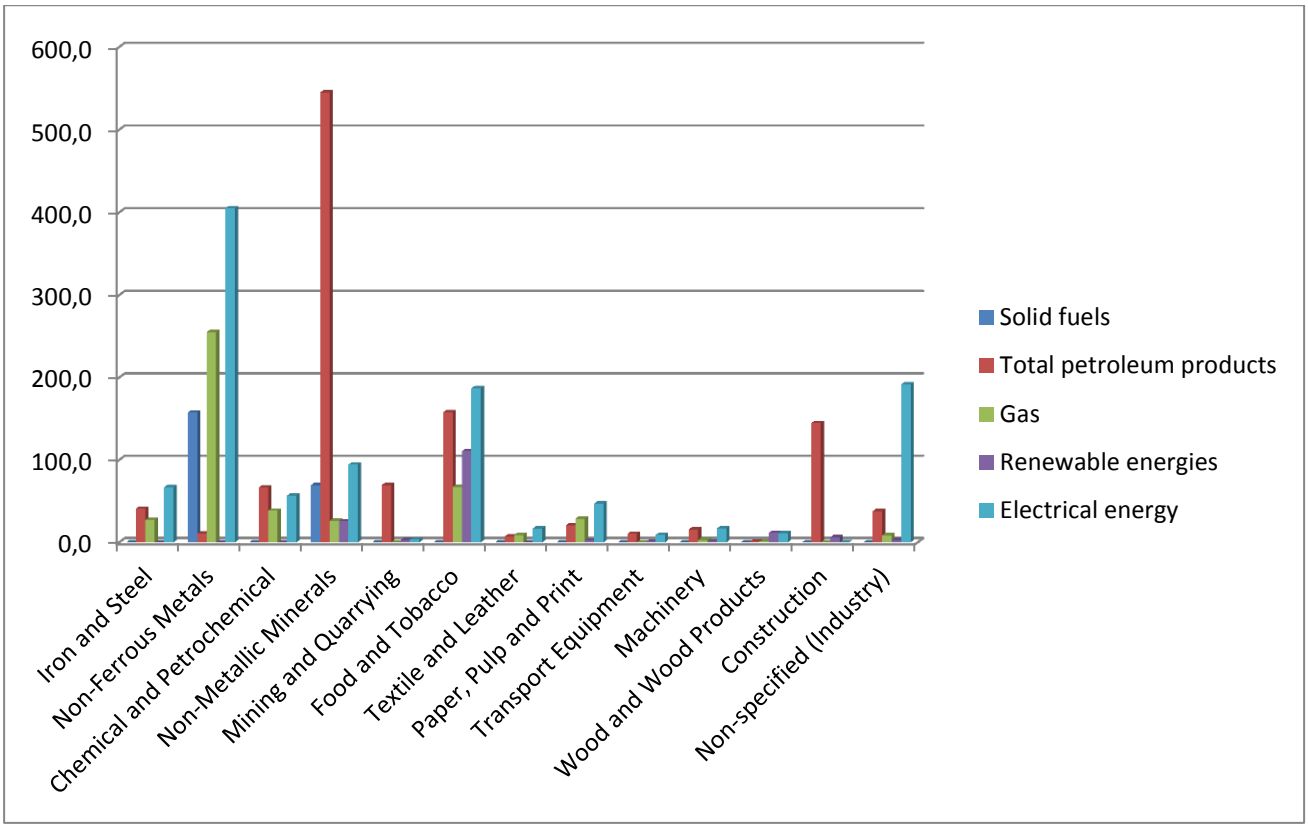

Figure 3: Energy consumption by fuel for each sector in Greece.

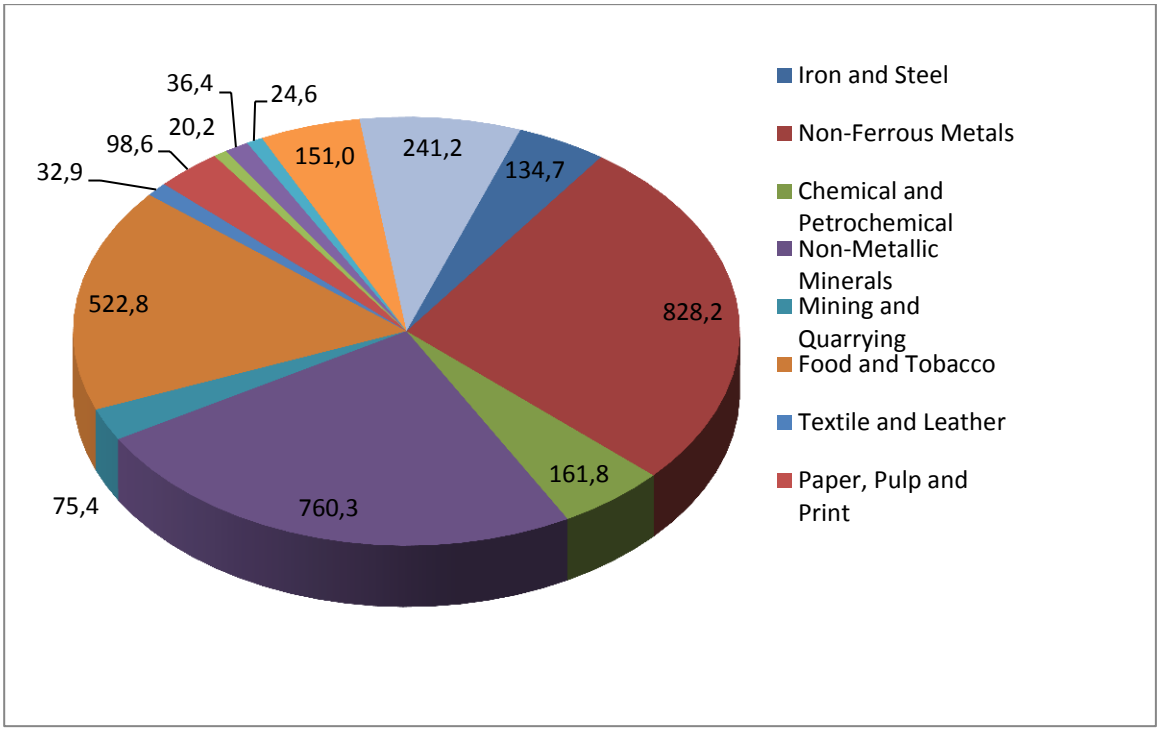

Figure 4: Share of fuel consumption in Greek industry.

10.2 Greenhouse Gas Emissions

In 2013, GHG emissions (without LULUCF) amounted to 105.11 Mt CO_{2eq} showing a decrease of 2.55% compared to base year emissions and a minor increase of 0.1% compared to 1990 levels. If emissions/removals from LULUCF were to be included then the decrease would be 0.81% (from 102.62 Mt CO_2 eq. in 1990 to 101.79 Mt CO_2 eq. in 2013).

Carbon dioxide emissions accounted for 78.9% of total GHG emissions in 2013 (without LULUCF) and decreased by approximately 0.46% from 1990. Methane emissions accounted for 11.1% of total GHG emissions in 2013 and decreased by 9.44% from 1990, while nitrous oxide emissions accounted for 4.4% of the total GHG emissions in 2013 and decreased by 37.01% from 1990. Finally, f-gases emissions (from production and consumption) that accounted for 5.6% of total GHG emissions in 2013 were increased by 37.9% from 1995 (base year for F-gases f or KP accounting).

An overview of total GHG emissions for the time period 1990–2013, along with the contribution of each sector to the total GHG emissions are presented below in Figure 5.

In 2013, GHG emissions from Industrial Processes and Product Use account for 11.30% of total emissions (excluding LULUCF) and have decreased by 14.96% compared to base year emissions and increased by 6.81% compared to the emissions of 1990, while the average annual rate of increase is estimated at 0.59% for the period 1990 – 2013. Emissions from this sector are characterized by intense fluctuations during the period 1990 – 2013 reaching a minimum value of 10.23 Mt CO2 eq in 2011 and a maximum value of 16.29 Mt CO_{2eq} in 1999. The low value for 2013 is directly related to the effects of

the economic recession whereas the maximum value is attributed to changes in industrial production and especially in HCFC-22 production. It should be noted that had it not been for the consumption of f-gases subcategory, the decrease of the recent years would have been much deeper. A second higher value of emissions can be observed for 2005, also being related to HCFC-22 production, since in the next year the respective plant ceased its operation. Significant changes can be observed in this sector compared to the last inventory which can be attributed to the changes in GWP values.

Emissions from Agriculture that accounted for 8.8% of total emissions in 2013 (without LULUCF), decreased by approximately 11.48% compared to 1990 levels. Emissions reduction is mainly due to the reduction of N_2O emissions from agricultural soils, because of the reduction in the use of synthetic nitrogen fertilizers. The decrease in the use of synthetic nitrogen fertilizers is attributed to the increase of organic farming, the high price of fertilizers and the impact of initiatives to promote energy efficiency practices in fertilizer use. The changes of other determining parameters of GHG emissions from the sector (e.g. animal population, crops production etc.) have a minor effect on GHG emissions trend.

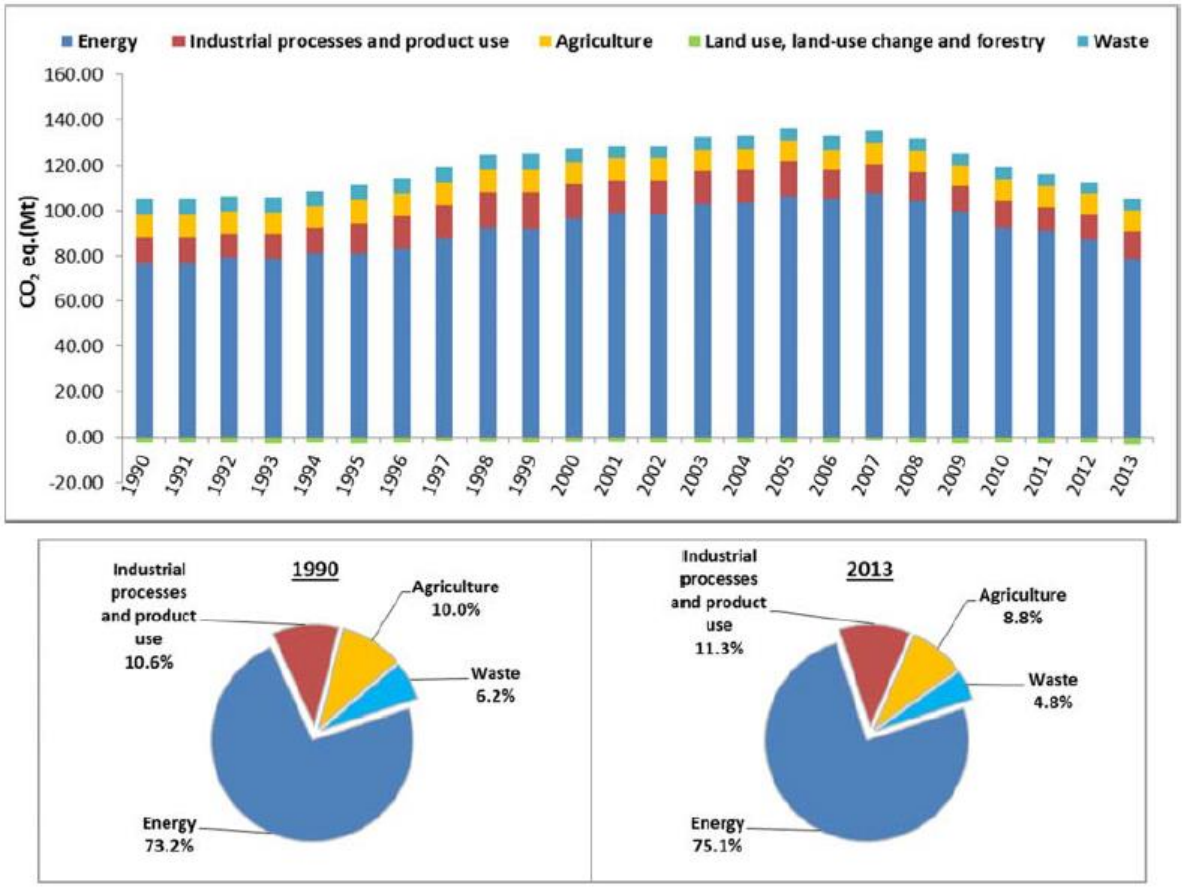

Figure 5: Trend of total GHG emissions for the period 1990-2013 and the share of each sector.