

Greece

Energy efficiency report



Objective: 16.5 TWh of end-use energy savings for 2016

Overview	2010		2000-2010 (%/year)	
Primary intensity (EU=100) ¹	75	++	-2.5%	++
CO ₂ intensity (EU=100)	107	-	-3.3%	++
CO ₂ emissions per capita (in tCO ₂ /cap)	7	+	-1.2%	+
Power generation	2010		2000-2010 (%/year)	
Efficiency of thermal power plants (in %)	39	+	0.9%	+
Rate of electricity T&D losses (in %)	5	+	-4.7%	++
CO ₂ emissions per kWh generated (in gCO ₂ /kWh)	650	--	-2.2%	+
Industry	2010		2000-2010 (%/year)	
Energy intensity (EU=100)	81	++	-3.7%	+
Share of industrial CHP in industrial consumption (in %)	13	-	6.0%	+
Unit consumption of steel (in toe/t)	0.10	++	-5.7%	++

++ Among best countries + Better than the EU average¹ - Below the EU average¹ --Among countries with the lowest performances

Latest update: March 2012

¹ The European Union, as the best performing region, is used as the benchmark.

1. Overview

1.1. Policies: 16.5 TWh energy savings target for 2016 (NEEAP)

Greece has adopted a 16.5 TWh (1.4 Mtoe) energy savings target for 2016 in its National Energy Efficiency Action Plan (NEEAP), as requested by the Energy Service Directive of the European Commission. No additional targets were set in the second NEEAP, published in September 2011.

Greece launched a program for Energy Efficiency and the Promotion of Renewable Energies with the aim of encouraging energy savings in industry and buildings, and of improving energy efficiency in the transport sector.

Established within the framework of the 2nd Community Support Framework, the Operational Program for Energy (OPE) provided capital cost grants for the promotion of renewable energy and energy conservation. In completing OPE, the Greek Government expected to save 4.3 percent and 2.2 percent in the industrial and service sectors, respectively.

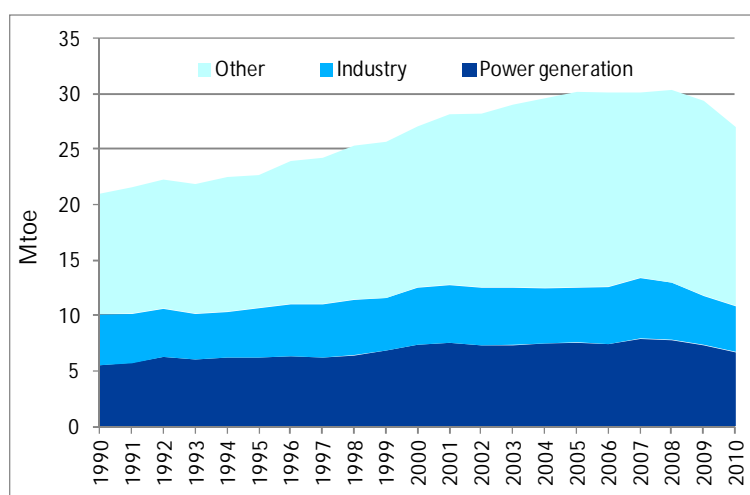
1.2. Energy consumption trends: big drop caused by economic recession

Total energy consumption per capita stands at 2.4 toe/cap, ie 30 percent below the EU average. Total energy consumption has been increasing since 2008 (2 percent/year on average). In 2009, it decreased by 3 percent, and in 2010 at an even faster pace (-8 percent) due to the deep economic crisis that struck the country.

Oil plays an important role in meeting the country's energy demand, accounting for 52 percent of total energy consumption in 2010, but its share is decreasing slightly (57 percent in 1990); the share of gas has grown rapidly (currently 13 percent of energy needs compared with 1 percent in 1990). Lignite covers 28 percent of the country's needs, while the contribution of biomass is low (4 percent).

The share of industry in energy consumption is decreasing. In 2010, industry (including non-energy uses) accounted for 15 percent of total energy consumption, compared with 21 percent in 1990. The share of the power sector in energy consumption has been relatively stable since 1990, at around 25 percent.

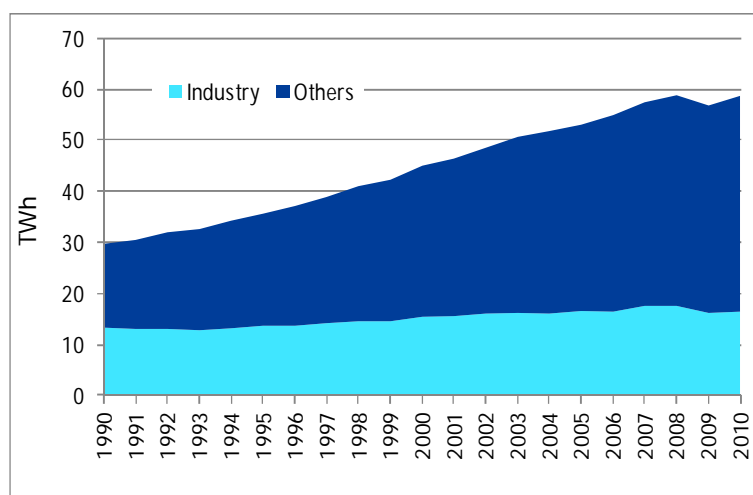
Figure 1: Energy consumption trends by sector



Source: Enerdata

Electricity consumption per capita is about 11 percent below the European average (5,200 kWh in 2010). Electricity represents 26 percent of energy consumption, with a steadily increasing market share. Electricity consumption grew strongly until 2008 (4 percent/year on average since 1990) but dropped by 3.5 percent in 2009 due to the economic crisis. Industry's share in electricity consumption has been decreasing since 1990, from 41 percent to 24 percent in 2010.

Figure 2: Electricity consumption trends by sector



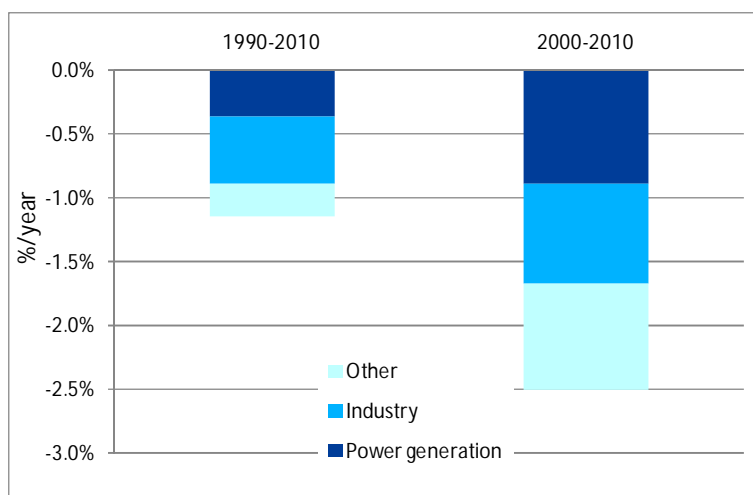
Source: Enerdata

1.3. Energy efficiency trends: slow improvements

Total energy consumption per unit of GDP (primary energy intensity), measured at purchasing power parity, is 25 percent lower than the EU average.

Total energy intensity has decreased more slowly than in the EU as a whole, at 1.1 percent/year compared with 1.6 percent/year for the EU between 1990 and 2010, although between 2000 and 2010 the decline was sharper than the EU average (2.5 percent/year compared with 1.3 percent/year). Industry contributed to about half of this drop, and the power sector to about 1/3.

Figure 3: Energy intensity trends

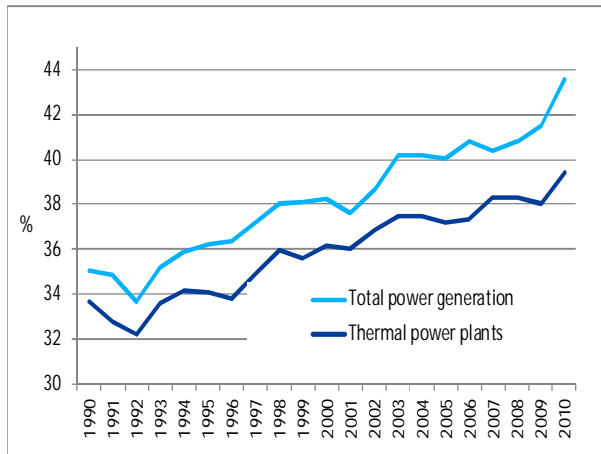


Source: Enerdata

2. Power generation

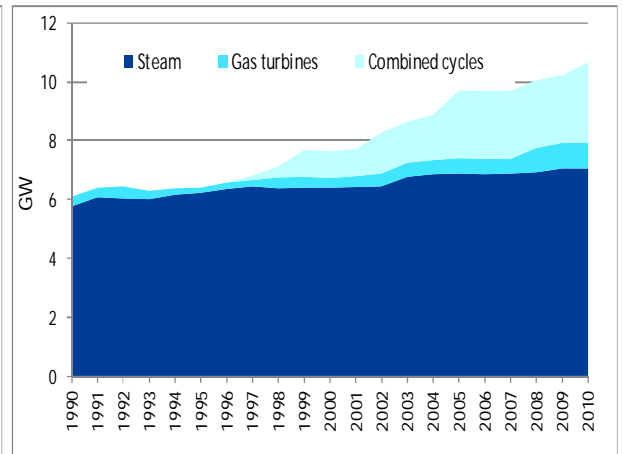
The average efficiency of the power sector has been increasing since 1990 and reached 44 percent in 2010. That improvement was achieved through the spread of gas combined cycle facilities (26 percent of thermal capacity in 2010) and the increasing use of renewable energies (wind power). There has been a noticeable improvement in the efficiency of thermal power plants (up to +6 percent between 1990 and 2010).

Figure 4: Efficiency of power generation and thermal power plants



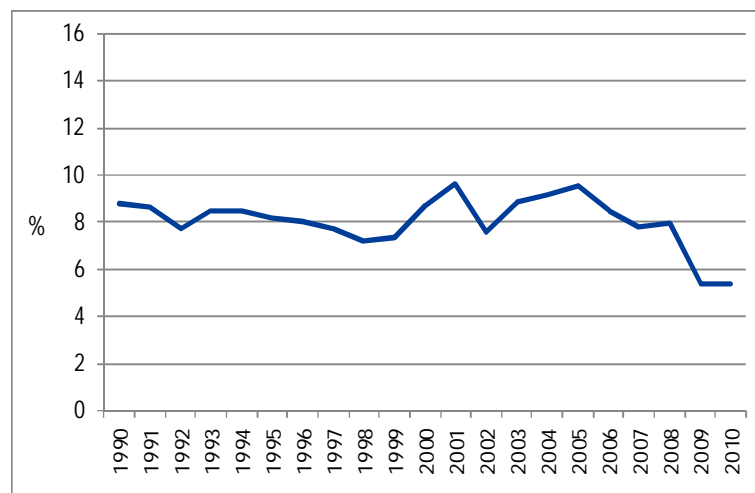
Source: Enerdata

Figure 5: Thermal electricity capacity, by technology



The Greek grid shows a low rate of transmission and distribution losses (T&D), at around 6 percent of the distributed volumes, ie just above the EU average. In the past, those losses varied between 7 percent and 10 percent.

Figure 6: Electric T&D losses



Source: Enerdata

3. Industry

3.1. Policies: incentives for the mandatory implementation of Energy Management Systems

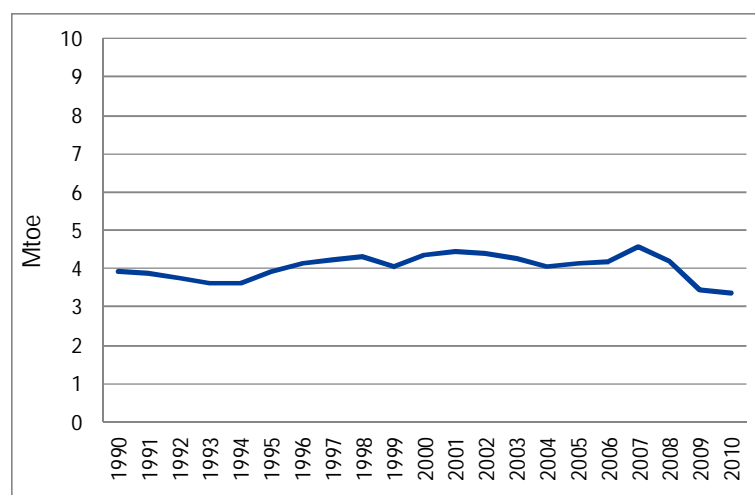
The measure entitled “Incentives for the mandatory implementation of Energy Management Systems” is aimed at the implementation of Energy Management Systems (EMS) in industry. The implementation of this measure is expected to lead to industrial energy savings of 1 percent. The Government will subsidize 1,000 industries with 10,000 euros (13,600 US dollars) per industry.

The “Promotion of voluntary agreements in industry” measure aims to set up a Voluntary Agreement Program based on existing European Projects. The measure will be implemented in all industries that are not included in the Emission Trading Scheme (ETS). The core of the agreements is the Action Plan, which will include the goals, the approach to the selection of partners, the benefits and the incentives (except subsidies). Through the Action Plan industries commit to the implementation of specific measures aimed at reducing energy consumption. Industries wishing to become Partners will receive aid, advice and technical assistance from National Contact Points in formulating and carrying out the Action Plan.

3.2. Energy consumption trends: steady energy consumption until 2007

Industrial energy consumption remained relatively steady between 1990 and 2007 (around 4 Mtoe) but has decreased by 25 percent since then.

Figure 7: Trends in industrial energy consumption

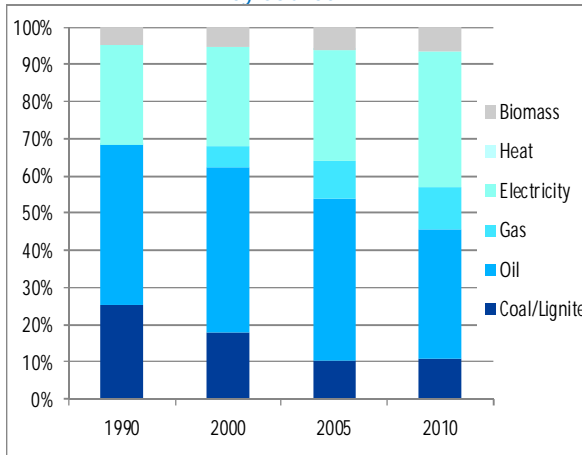


Source: Enerdata

Oil and electricity are the main sources of energy in industry (35 percent each in 2010). The use of coal and lignite has decreased significantly, from 25 percent in 1990 to 11 percent of total consumption in 2010. The market share of natural gas has grown substantially, reaching 12 percent of the total in 2009 (0 percent in 1990).

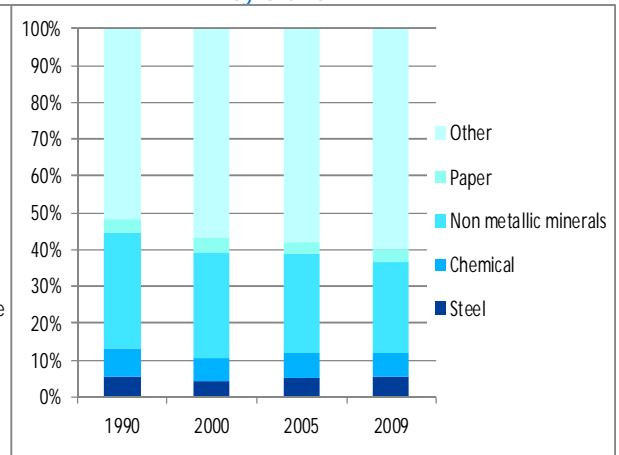
The share of energy-intensive industries in overall industrial energy consumption has fallen slightly since 1990. The non-metallic minerals industry is quite important, although its share decreased from 32 percent in 1990 to 22 percent in 2010. The share of the chemical and steel industries is lower (around 10 percent together); since 1990 they have lost less than 1 percentage point each in total industrial consumption. The share of the paper industry is marginal, representing just 2 percent of industrial consumption.

Figure 8: Energy consumption of industry, by source



Source: Enerdata

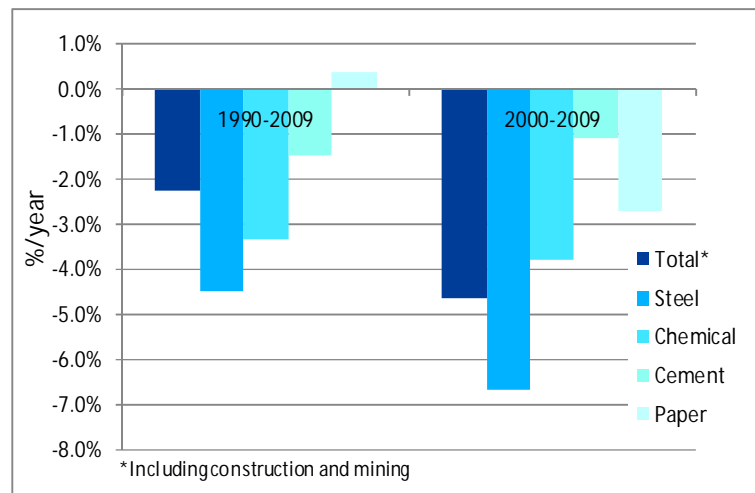
Figure 9: Energy consumption of industry, by branch



3.3. Energy intensity trends: moderate energy intensity reduction

Over the period 1990-2009, the energy consumption per unit of value added (energy intensity) decreased by around 2 percent/year. The largest energy efficiency improvement took place in the steel industry with a 4.5 percent/year reduction in the energy consumption per ton of steel. Energy consumption per unit of value added in the chemical industry decreased by 3 percent/year over the period. Compared with the other industrial branches, the cement industry posted a moderate reduction in the energy required per ton produced (1.5 percent/year between 1990 and 2009).

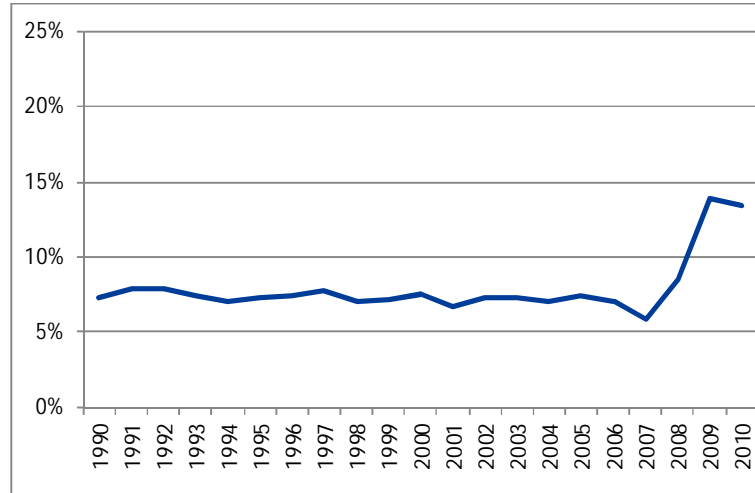
Figure 10: Trends in the energy intensity of industrial branches



Source: Enerdata, Odyssee

Combined heat and power generation was stable until 2007, at around 7 percent of industry's electricity consumption, and has increased strongly since then.

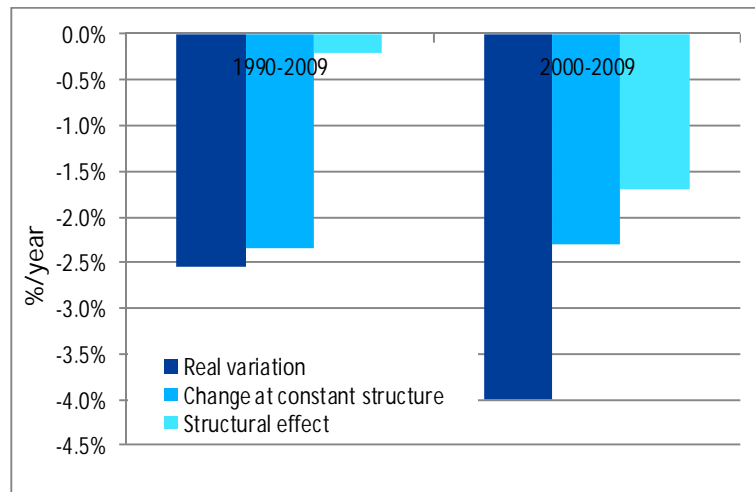
Figure 11: Share of CHP in industrial consumption



Source: Enerdata

The energy intensity of the manufacturing industry (ie excluding mining and construction) decreased by 4 percent/year over the period 2000-2009. When calculated at constant structure, the decrease is slower, at 2.3 percent/year: the difference (about 1.7 percent/year) is caused by changes in the industrial structure, mainly an increase in the share of machinery and transport equipment, ie the branch with the lowest energy intensity, in the industrial value added. That structural effect explains about 40 percent of the total variation. Over the period 1990-2009 the structural effect was negligible.

Figure 12: Trends in the energy intensity of manufacturing and structural effect



Source: Enerdata, Odyssee