Objectives:
- 10.9 Mtoe of end-user energy savings or about 10% in 2016
- Mandatory energy savings of 6 Mtoe for energy distributors over the 2008-2012 period

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<th>Overview</th>
<th>2011</th>
<th>2000-2011 (%/year)</th>
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<tr>
<td>Primary intensity (EU=100)¹</td>
<td>87</td>
<td>+ -0.5%</td>
</tr>
<tr>
<td>CO₂ intensity (EU=100)</td>
<td>95</td>
<td>+ -1.0%</td>
</tr>
<tr>
<td>CO₂ emissions per capita (in tCO₂/cap)</td>
<td>6.3</td>
<td>+ -1.4%</td>
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<table>
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<tr>
<th>Power generation</th>
<th>2011</th>
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<tr>
<td>Efficiency of thermal power plants (in %)</td>
<td>40</td>
<td>+ -0.4%</td>
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<tr>
<td>Rate of electricity T&amp;D losses (in %)</td>
<td>6.2</td>
<td>+ -0.3%</td>
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<tr>
<td>CO₂ emissions per kWh generated (in gCO₂/kWh)</td>
<td>374</td>
<td>- -2.4%</td>
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<table>
<thead>
<tr>
<th>Industry</th>
<th>2011</th>
<th>2000-2011 (%/year)</th>
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<tr>
<td>Energy intensity (EU=100)</td>
<td>96</td>
<td>+ -1.0%</td>
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<tr>
<td>Share of industrial CHP in industrial consumption (in %)*</td>
<td>17</td>
<td>- 3.2%</td>
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<tr>
<td>Unit consumption of steel (in toe/t)</td>
<td>0.236</td>
<td>+ -1.2%</td>
</tr>
</tbody>
</table>

*%/year for CHP is for the period 2003-2011

++ Among the best performing countries  + Above the EU average¹  - Below the EU average¹  --Among the worst performing countries

Latest update: March 2013

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

1.1. Policies: 10% energy savings target for 2016

Italy has adopted a National Energy Efficiency Action Plan 2008-2016 (NEEAP), which sets an energy savings target of about 10 percent in 2016, ie, 126.3 TWh (10.9 Mtoe) in buildings, transport and small industries. The industrial sector must achieve 8 percent of that target. A new NEEAP was presented in 2011, updating the energy efficiency measures to be adopted to achieve the 2016 target.

The Law Decree of July 2004 imposes energy saving obligations on energy distributors, and those savings have to be achieved among end users. The obligations are expressed in primary energy and yearly targets were fixed until 2012 (4.3 Mtoe in 2010, 5.3 Mtoe in 2011 and 6 Mtoe in 2012). Energy saving obligation targets should be strengthened under the framework of the National Energy Strategy to be adopted in 2013.

Each energy distributor has an energy saving quota proportional to its market share. The savings entitle distributors to certificates issued by the Gestore Mercato Elettrico (GME), which can be traded through bilateral contracts or in a dedicated marketplace. Distributors may purchase certificates if the savings achieved through their projects lie below their yearly target. There are sanctions for failing to meet the required volume of certificates. Over the period 2005-2008, 3.7 Mtoe were saved, compared with the target of 3.3 Mtoe; 77 percent of the energy saving projects were aimed at the reduction of electricity consumption, 19 percent at natural gas and the remaining 4 percent at other fuels. In 2012, the average price of the certificates on the GME market was 102 euros/MWh (US$128/MWh).

1.2. Energy consumption trends: one of the lowest per capita rates in the EU

Italy has one of the lowest levels of energy consumption per capita among countries of comparable industrial development (2.7 toe compared with the EU average of 3.3 toe).

Total energy consumption has been decreasing since 2005 (-1.6 percent/year, on average), in line with demand in the industrial sector. In 2009, total consumption decreased by 6.3 percent due to the economic crisis and lower demand from the power sector (-14 percent) and the industrial sector (-16 percent). The share of industry has been decreasing steadily since 1990: in 2011, industry (including non-energy uses) accounted for less than a quarter of total energy consumption, compared with 31 percent in 1990.

Electricity consumption per capita is also far below the European average (5,200 kWh in 2011 compared with 5,700 kWh for the EU). Electricity consumption grew strongly between 1990 and 2006 (2.4 percent/year, on average). However, that growth rate slowed down in 2007 and 2008. There was a 6 percent drop in 2009, linked to the economic crisis and to a fall in power consumption in the industrial sector (-15 percent). Industry's share in electricity consumption has been decreasing since 2000, from 53 percent to 45 percent in 2011.
1.3. Energy efficiency trends: low energy intensity and slow improvement in energy efficiency

Total energy consumption per unit of GDP (primary energy intensity), measured at purchasing power parity, is 13 percent lower than the EU average.

Total energy intensity has decreased much more slowly than in the EU as a whole, at 0.5 percent/year compared with 1.6 percent/year for the EU between 2000 and 2011. The industrial sector contributed the most to that decrease.

2. Power generation: large diffusion of gas combined cycles

The efficiency of the power sector has been increasing since 2004 and reached 47 percent in 2011. That improvement is due to the recent and rapid spread of renewables (wind and solar), which accounted for 7 percent of total power generation in 2011 (less than 1 percent in 2004), as well as efficiency improvements in
thermal generation (+1 percentage point), linked to the diffusion of gas combined cycles that now account for 55 percent of the total thermal capacity.

**Figure 4: Efficiency of power generation and thermal power plants**

**Figure 5: Thermal electricity capacity, by technology**

The Italian grid shows a low rate of transmission and distribution losses (T&D), at around 6 percent of the distributed volumes, ie, just below the EU average. Those losses have been reduced by 9 percent since 1990.

**Figure 6: Electric T&D losses**

### 3. Industry

#### 3.1. Policies: promotion of high-efficiency cogeneration

The CIP6 program has ensured the development of CHP installations across Italy since the 1990s. The support scheme provides for the payment of premium prices for the production of energy from “assimilated” sources (corresponding to CHP or waste-to-energy power plants). High-efficiency, biomass cogeneration installations are also supported through the green certificate scheme.

Legislative Decree No. 20/2007 called for an increasing use of high-efficiency cogeneration in industry and created incentives to support the diffusion of this technology. Incentives were defined for high-efficiency motors and inverters, mechanical vapor compression and, more broadly, for high-efficiency cogeneration.
3.2. Energy consumption trends: an even sharper decrease in consumption due to the crisis

Until 2003 industrial energy consumption increased at the steady rate of 1.3 percent/year, i.e., at the same rate as the country’s total energy consumption. It has been decreasing since then, with a sharp drop in 2009 (-18 percent) due to the global economic slowdown. In 2011, industrial energy consumption stood 10 percent below its 1990 level.

The share of electricity in industrial energy consumption has increased regularly since 1990 and reached 36 percent of the total in 2011 (compared with 28 percent in 1990). That rise is partly due to an increased penetration of electric steel making. The use of coal and of oil in industry has decreased steadily over time, accounting for just 8 percent and 12 percent, respectively, of industrial energy consumption in 2011. Natural gas represented up to 43 percent of the total in the early 2000s, but by 2011 had fallen to 34 percent.

The share of energy-intensive industries (steel, chemical, paper and non-metallic minerals) in overall industrial energy consumption has decreased slightly since 1990, but still represents about 60 percent of industrial energy consumption.

Source: Enerdata
3.3. Energy intensity trends: low energy intensity reduction

Over the period 2000-2010, the reduction in consumption per unit of industrial value added (energy intensity) was low (1.1 percent/year). The largest energy efficiency improvement took place in the chemical industry with a 3.5 percent/year reduction in the energy consumed per unit of value added. Meanwhile, the energy required per ton produced decreased by 1.2 percent/year for steel and by 0.8 percent/year for paper.

![Figure 10: Trends in the energy intensity of industrial branches](image)

Combined heat and power generation was rather stable until 2008, at around 12 percent of industry's electricity consumption, and then increased to 17 percent, ie, just below the EU average (18 percent).

![Figure 11: Share of industrial CHP in industrial consumption](image)

The energy intensity of the manufacturing industry (ie excluding construction and mining) decreased by 1 percent/year over the period 2000-2010. Around 60 percent of that reduction can be linked to energy efficiency improvements in the different branches. The rest of the variation (40 percent) is explained by changes in the structure of industrial value added, in particular the increase in the share of machinery equipment, ie the branch with the lowest energy intensity.
Figure 12: Trends in the energy intensity of manufacturing and structural effect

Source: Enerdata, Odyssee