Objective: 20% reduction in primary intensity by 2023

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<th>2000-2011 (%/year)</th>
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<td>Primary intensity (EU=100)</td>
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<td>CO₂ intensity (EU=100)</td>
<td>123</td>
<td>-</td>
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<td>CO₂ emissions per capita (in tCO₂/cap)</td>
<td>4</td>
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<td>Unit consumption of steel (in toe/t)</td>
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<td>+</td>
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*2010 and 2000-2010 for steel

++ 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: 20% reduction in primary energy intensity by 2023

The Energy Efficiency Law, adopted in 2007, sets the rules for energy management in industry and in large buildings, project support, energy efficiency consultancy companies, voluntary agreements, etc. It affects industry, power plants, transmission and distribution systems, buildings, services and transport. Enforced in 2009, the regulation on Increased Energy Efficiency in the Use of Energy Resources and Energy put in place authorizations and certifications for universities, engineering organizations and energy consultancy companies to support energy efficiency projects in industry through voluntary agreements. The Energy Strategy Plan sets a 20 percent primary energy intensity reduction target for 2023 compared with the 2008 level.

The General Directorate of Electric Power Resources, Survey and Development Administration (EIE) provides investment support for energy efficiency projects with a maximum payback period of five years. The investment support covers 20 percent of project costs up to a maximum of 500,000 Turkish lira (100 lira= US$55).

In March 2011, Turkey and the European Bank for Reconstruction and Development (EBRD) signed a Memorandum of Understanding (MoU) for the launch of a Sustainable Energy Action Plan (SEAP). The EBRD provides credit lines and low-interest loans for energy efficiency improvement projects through the TURSEFF program (TURkey Sustainable Energy Financing Facilities).

1.2. Energy consumption trends: steady growth in energy consumption

Energy consumption per capita is low and in 2011 amounted to 1.6 toe, ie, slightly below the world average (1.9 toe) and equal to half of the European Union (EU) average.

Total consumption has been increasing at the rapid rate of 4.9 percent/year, on average, since the 2001 crisis, with slight decreases in 2008 and 2009 due to the economic downturn, and a rapid growth since then.

Figure 1: Energy consumption trends by sector

The share of industry, including non-energy uses, in total energy consumption has remained relatively stable at around 30 percent, with a low point in 2008 as a consequence of the economic crisis. The share of the power sector increased rapidly during the decade of the 1990s and has been relatively stable since 2000, at around 18 percent.

Electricity consumption per capita is slightly below the world average (2,550 kWh, compared with a world average of 2,750 kWh). Since 2001, total electricity consumption has increased at the very rapid pace of 6.1 percent/year, despite a 3.1 percent drop in 2009 due to the global economic crisis. The share of electricity in
energy consumption surged between 1990 and 2011, from 9 percent to 19 percent. Although its market share is decreasing, industry still accounts for the largest share of electricity consumption (47 percent in 2011 compared with 62 percent in 1990).

1.3. Energy efficiency trends: industry contributes significantly to the energy intensity reduction

Total energy consumption per unit of GDP (primary energy intensity, measured at purchasing power parity) is equal to half of the world average.

Total energy intensity decreased by an average of 0.5 percent per year between 2000 and 2011, which is much slower than the EU average of 1.6 percent. Industry contributed to a significant part of this reduction, whereas the power sector is moving in the opposite direction.
2. Power generation

2.1. Policies: exemptions from efficiency law for renewable and CHP power plants

The 2007 Energy Efficiency Law exempted certain categories of power plants from the obligation to obtain licenses and establish companies. The exemption applies to renewable energy plants with an installed capacity of up to 500 kW; cogeneration plants with at least 80 percent overall efficiency; and micro-cogeneration plants with an installed capacity of up to 50 kW.

2.2. Efficiency of the power sector: increasing energy efficiency in thermal power plants

The efficiency of thermal power plants has increased significantly, from 34 percent in 1998 to 44 percent in 2005. That increase is linked to the growing share of gas combined cycles in thermal electricity production; in 2005 they represented close to 60 percent of the thermal capacity. Since 2006, there has been a slight decrease in efficiency caused by the growing share of coal and lignite in thermal power generation. This impacted the average efficiency of power generation which, in addition, fluctuates because of the share of hydropower.

![Figure 4: Efficiency of power generation and thermal power plants](source: Enerdata)

The rate of transmission and distribution losses (T&D) in the Turkish power grid stands at 15 percent of the volumes distributed. It decreased sharply after 2000, following a noticeable surge. The world average stands at 9 percent and the EU average at 6.5 percent.

![Figure 6: Electric T&D losses](source: Enerdata)
3. Industry

3.1. Policies: subsidies for energy efficiency projects

In 2009 the regulation on Increasing Energy Efficiency in the Use of Energy Resources and Energy, which set out the provisions of the 2007 Energy Efficiency Law, was adopted to support energy efficiency projects and voluntary agreements in industry.

The Turkish energy efficiency agency EIE can subsidize up to 20 percent of the project costs of industrial establishments investing in energy efficiency. In addition, if they are committed to reducing their energy intensity by an average of 10 percent over a three-year period under a voluntary agreement, the EIE will subsidize 20 percent of their energy costs during the first year.

In the framework of the Energy Efficiency Law, industrial establishments consuming more than 1,000 toe are obliged to report their energy consumption to the EIE and have an energy manager to monitor energy efficiency. In September 2012, Turkey counted more than 4,500 certified energy managers. In addition, larger companies that consume over 50,000 toe must establish energy management units.

The first objective of the Turkish Energy Efficiency Strategy 2012-2023 is to reduce energy intensity and energy losses in the industrial and services sectors. The strategy sets an energy intensity reduction target of at least 10 percent for all industry sub-sectors within 10 years.

3.2. Energy consumption trends: growing share of electricity and natural gas

Industrial energy consumption grew by an average of 4.2 percent/year between 1990 and 2007, ie, more rapidly than the country's overall energy consumption. Following a 22 percent drop in 2008 as a consequence of the global economic downturn, industrial energy consumption rebounded strongly in 2010 (20 percent), bringing it back to its 2007 level.

Coal and lignite and natural gas are the main energy sources in industry, with market shares of 31 percent each in 2011, although they show diverging trends: coal and lignite are down from 46 percent in 2000, while gas is up from just 8 percent in 2000. Similarly to coal, oil was scaled down from over 24 percent in 2000 to 5 percent at present.

Energy-intensive industries (steel, chemical, paper and non-metallic minerals) represented around 39 percent of the sector's overall energy consumption in 2010. Of those industries the steel industry is the largest consumer,
with around 23 percent of the total, ie, five percentage points over its market share of 2000. In 2010, the non-metallic minerals industry (cement, ceramics, etc.) accounted for 9 percent of industrial energy consumption, while the chemical industry had a market share of 6 percent.

**Figure 8: Energy consumption of industry, by source**

**Figure 2: Energy consumption of industry, by branch**

3.3. Energy intensity trends: large reduction in industrial energy intensity

Between 2000 and 2010 energy consumption per unit of industrial value added (energy intensity) decreased by 2.3 percent/year, thanks to a good performance by the steel sector which reduced its specific energy consumption per ton by 2.5 percent/year over the period. On the contrary, the consumption per unit of value added in the chemical industry increased by 1 percent/year.

**Figure 103: Trends in the energy intensity of industrial branches**

Source: Enerdata
Combined heat and power generation represents almost 6 percent of industrial electricity consumption and its share is decreasing.

Figure 41: Share of industrial CHP in industrial consumption

Source: Enerdata