Czech Republic
Energy efficiency report

Objectives: 20.3 TWh of end-user energy savings in 2016, including 2.1 TWh in industry

<table>
<thead>
<tr>
<th>Overview</th>
<th>2011</th>
<th>2000-2011 (%/year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary intensity (EU=100)¹</td>
<td>155</td>
<td>--</td>
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<tr>
<td>CO₂ intensity (EU=100)</td>
<td>190</td>
<td>--</td>
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<tr>
<td>CO₂ emissions per capita (tCO₂/cap)</td>
<td>10.8</td>
<td>--</td>
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<tr>
<td><strong>Power generation</strong></td>
<td></td>
<td></td>
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<tr>
<td>Efficiency of thermal power plants (in %)</td>
<td>29</td>
<td>--</td>
</tr>
<tr>
<td>Rate of electricity T&amp;D losses (in %)</td>
<td>7.0</td>
<td>-</td>
</tr>
<tr>
<td>CO₂ emissions per kWh generated (gCO₂/kWh)</td>
<td>532</td>
<td>--</td>
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<tr>
<td><strong>Industry</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Energy intensity (EU=100)</td>
<td>120</td>
<td>-</td>
</tr>
<tr>
<td>Share of industrial CHP in industrial consumption (in %)</td>
<td>34</td>
<td>++</td>
</tr>
<tr>
<td>Unit consumption of steel (toe/t)</td>
<td>0.465</td>
<td>--</td>
</tr>
</tbody>
</table>

¹2010 and 2000-2010 for steel

++ Among the best performing countries  + Above the EU average 1  -- Below the EU average 1  --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: 20.3 TWh of energy savings in 2016

The first Czech National Energy Efficiency Action Plan (NEEAP) was adopted in 2007 and was revised in 2011. The second NEEAP strengthens the targets of the first plan and sets an energy savings target of 20.3 TWh by 2016, which corresponds to 9 percent savings compared with the average consumption over 2002-2006 (about 2.3 TWh/year of energy savings). About 28 percent of those savings should be achieved in the household sector, 18 percent in the transport sector, 11 percent in the industrial sector, 9 percent in services and 1 percent in the agricultural sector; the remaining 33 percent would be achieved through transversal measures.

The Energy Management Act took effect in 2000 and was amended in 2006 and 2010. It sets minimum requirements regarding energy demand in buildings and implements energy audits in buildings and energy labeling of electrical appliances. It also promotes the use of CHP and renewable energy sources (a national program is elaborated and updated every four years).

The Panel Program (2004) grants subsidies for the retrofitting of buildings. Between 2009 and 2012 the Czech Republic invested about €550m ($710m) in the Green Investment Scheme, which provides grants covering up to 50 percent of residential insulation costs. A new Green Investment Scheme was launched in January 2013 (2013-2020 period); 70 percent of the overall volume of funds is earmarked for the comprehensive refurbishment of private buildings, and the remaining 30 percent will be used for public service buildings. The program will be opened for applications in August 2013. It will offer financial support to the value of between 25 percent and 50 percent of insulation costs.

1.2. Energy consumption trends: high consumption per capita

Energy consumption per capita in the Czech Republic is 27 percent higher than the EU average, at 4.2 toe in 2011. After a decline between 1990 and 1999, total energy consumption grew regularly between 2000 and 2007 (1.2 percent/year), but fell again in 2008 and 2009 due to the economic crisis. Energy consumption then stabilized around 44 Mtoe in 2010 and 2011.

Fossil fuels cover nearly 80 percent of total energy consumption (2011): coal and lignite account for 44 percent, followed by oil with 19 percent and gas with 16 percent. Nuclear power supplies 17 percent of total energy needs.

![Figure 1: Energy consumption trends by sector](image)

The industrial sector (non-energy uses included) is no longer the largest energy consuming sector; its share has dropped dramatically, from 39 percent of energy consumption in 1990 to 28 percent in 2011. Besides industry consuming far less (~46 percent between 1990 and 2011), this decreasing share is also explained by the rising
consumption in the building and transport sectors, as well as in the power sector, which saw its share rise from 31 percent in 1990 to 36 percent in 2011.

Electricity consumption per capita is close to the EU average (about 5,500 kWh in 2011). Electricity consumption increased by 1.6 percent/year between 1993 and 2008 and fell during the crisis (stable in 2011). The share of electricity in final energy consumption increased regularly between 1990 and 2011, rising from 12 percent to 17 percent. The share of industry in electricity consumption is declining rapidly, falling from 60 percent in 1990 to 43 percent in 2011. In 1993 it was overtaken by the residential and services sector, which saw its electricity consumption grow very rapidly (by 2.7 percent/year, on average, between 1990 and 2011).

**Figure 2: Electricity consumption trends by sector**

![Electricity consumption trends by sector](image)

Source: Enerdata

**1.3. Energy efficiency trends: energy intensity remains high**

Total energy intensity (total energy consumption per unit of GDP), measured at purchasing power parity, is 55 percent higher than the EU average (2011). However, it is decreasing at a rapid pace, which has accelerated since 2000: 2.3 percent/year, on average, between 1990 and 2011, and 2.6 percent/year since 2000.

Between 2000 and 2011 the power sector contributed to more than half of the decrease in energy intensity (55 percent); this improvement was triggered by the replacement of low-efficiency steam turbines by CCGT units. The rest of the decrease is mainly attributable to the industrial sector (36 percent). Before 2000, industry played the dominant role in the intensity reduction.

**Figure 3: Energy intensity trends**

![Energy intensity trends](image)

Source: Enerdata
2. Power generation

2.1. Policies: minimum energy efficiency requirements in power and heat generation

The second Czech National Energy Efficiency Action Plan (2011) does not expect large efficiency gains in the power sector over the next 10-15 years. It aims to improve the energy efficiency of the transmission and distribution of electricity and heat, with energy savings estimated at 50 GWh/year (i.e. a total of 444 GWh between 2009 and 2016). The NEEAP also includes measures implemented under the Operational Programs (OPE) launched in 2007, which target the construction of new facilities and the renovation of existing facilities to increase the use of CHP generation.

2.2. Efficiency of the power sector: slow improvement

The efficiency of the power sector is rather low (32 percent in 2011) and improving slowly, due to the large share of nuclear and coal and lignite-fired generation, which account for nearly 90 percent of power generation. The efficiency rate of thermal power plants is low (29 percent compared with the EU average of 37 percent), which is explained by the high share of coal and lignite and the low penetration of gas combined cycles, which account for just 7 percent of the thermal capacity.

![Figure 4: Efficiency of power generation and thermal power plants](image1.png)

![Figure 5: Thermal electricity capacity, by technology](image2.png)

The rate of network losses has regularly decreased since 1993 (-2.1 percentage points), reaching 7 percent in 2011. It remains slightly above the EU average of 6.5 percent.

![Figure 6: Electric T&D losses](image3.png)
3. Industry

3.1. Policies: 2.1 TWh of energy savings in 2016

The second Czech National Energy Efficiency Action Plan (2011) sets an energy savings target for the industrial sector of 2.3 TWh in 2016. Measures taken under the Operational Program Enterprise and Innovation (OPEI) are expected to save up to 1.25 TWh in 2016. Investment support is available to industrial companies that carry out projects for energy savings in buildings and energy-efficient industrial processes (including CHP), and financial support is provided for R&D programs in the area of energy savings. By 2016, 0.85 TWh should have been saved through voluntary energy savings agreements.

The Energy Economy Act, implemented in 2000, required that new boilers in the industrial sector exceeding a certain specified size had to produce heat and electricity (CHP) with a minimum level of efficiency. The promotion of power generation from CHP and renewable energy sources was reaffirmed in 2004, when the Energy Act was amended.

The Operational Program Industry and Enterprise (OPIE), launched in 2004 by the Czech Ministry of Industry and Trade, made energy audits compulsory for companies consuming more than 35 terajoules (TJ)/year (or about 9.73 GWh/year); those audits were partially subsidized (up to 30 percent of the costs). Industrial companies could apply for soft loans for energy savings investments (up to 40 percent). Subsidies were also granted to small and medium enterprises (SMEs) to modernize their energy management systems, improve their energy efficiency and implement CHP generation. In 2008 the OPIE was replaced by the Operational Program Enterprise and Innovation (OPEI), which offers to finance 1/3 of energy savings investments, and which is expected to save 1.2 TWh in 2016.

3.2. Energy consumption trends: declining industrial consumption

The energy consumption of the Czech industrial sector has been decreasing on a regular basis, decreasing by 50% between 1990 and 2009; the decline was rapid between 1990 and 1999 (6.6 percent/year) and then slowed down (1.5 percent/year until 2009). In 2010 and 2011, industrial consumption grew noticeably, exceeding its 2007 level.

![Figure 7: Trends in industrial energy consumption](image)

The energy consumption of the industrial sector is increasingly oriented toward gas, which saw its market share reach 26 percent in 2010, up from 15 percent in 1990, and electricity (23 percent in 2011 compared with 13 percent in 1990). The consumption of oil and coal has fallen dramatically since 1990; consequently, their shares in the energy mix have fallen from 49 percent to 33 percent in the case of coal, and from 16 percent to 5 percent in the case of oil (2010). In 2011, cheaper coal (compared with gas) contributed to an increase in the
The share of energy-intensive industries (steel, chemical, non-metallic minerals and pulp and paper) in industrial energy consumption increased from 2000 to 2005 and is now declining (64 percent in 2011 compared with 69 percent in 2005). Steel is the largest consuming sector (28 percent of total industrial consumption). The shares of the chemical and non-metallic minerals sectors are currently 18 percent and 11 percent, respectively, from 15 percent and 11 percent in 2000. The paper industry accounts for 7 percent of industrial consumption (5 percent in 2000).

3.3. Energy intensity trends: structural changes improve industrial energy intensity

Industrial energy intensity fell at the rapid pace of 5.3 percent/year between 2000 and 2010. That improvement was mainly driven by the decrease in the energy intensity of the chemical industry (4 percent/year) and, to a lesser extent, of non-metallic minerals (2 percent/year). The steel industry also improved its efficiency, since the unit consumption of steel decreased by 1.2 percent/year.
The share of CHP in industrial electricity consumption is almost twice as high as the EU average (2011). It grew substantially between 1990 and 2000 (+24 percentage points) and has been declining since then (from 49 percent in 2000 to 34 percent in 2011).

**Figure 4: Share of industrial CHP in industrial consumption**

Between 2000 and 2010 the energy intensity of the manufacturing industry (ie excluding mining and construction) decreased sharply (-5.3 percent/year). Around 60 percent of this improvement came from efficiency gains in the different branches, while the rest was attributable to changes in the structure of industry: the share of energy-intensive sectors in the value added dropped to the benefit of equipment manufacturing, which over the same period saw its share gain more than 10 percentage points in the total value added of manufacturing.

**Figure 5: Trends in the energy intensity of manufacturing and structural effect**

Source: Enerdata