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The Energy Charter Treaty was signed in December 1994 and entered into legal force in April 1998. To date the Treaty has been signed or acceded to by fifty-one states. The Treaty was developed on the basis of the European Energy Charter of 1991. Whereas the latter document was drawn up as a declaration of political intent to promote East-West energy co-operation, the Energy Charter Treaty is a legally binding multilateral instrument covering investment protection, liberalisation of trade, freedom of transit, dispute settlement and environmental aspects in the energy sector.

The Energy Charter Conference, the governing and decision making body for the Energy Charter Treaty, meets on a regular basis to discuss policy issues affecting East West energy co-operation, review implementation of the provisions of the Treaty, and consider possible new instruments and projects on energy issues. All states who have signed or acceded to the Treaty are members of the Conference. Regular meetings of the Conference’s subsidiary groups on trade and transit, investment and energy efficiency and environment are held in between Conference meetings.

The Energy Charter Protocol on Energy Efficiency and Related Environmental Aspects (PEEREA)

The Energy Charter Protocol on Energy Efficiency and Related Environmental Aspects (PEEREA) is a legally-binding instrument that was signed together with the Energy Charter Treaty in December 1994 by the same 51 states that signed the Treaty itself. It requires its Signatories to formulate energy efficiency strategies and policy aims, to establish appropriate regulatory frameworks, and to develop specific programmes for the promotion of efficient energy usage and the reduction of harmful environmental practices in the energy sector.

Implementation of PEEREA is kept under review and discussion by the Energy Charter Working Group on Energy Efficiency and Related Environmental Aspects. A key feature of the Working Group’s activities is the development of a series of in-depth reviews of individual states’ energy efficiency policies and programmes. Recommendations to the authorities of the states concerned, resulting from these in-depth reviews, are presented to the Energy Charter Conference for discussion and endorsement.

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1 Albania, Armenia, Australia, Austria, Azerbaijan, Belarus, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, European Communities, Finland, France, Georgia, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Kazakhstan, Kyrgyzstan, Latvia, Liechtenstein, Lithuania, Luxembourg, Malta, Moldova, Mongolia, Netherlands, Norway, Poland, Portugal, Romania, Russian Federation, Slovakia, Slovenia, Spain, Sweden, Switzerland, Tajikistan, The Former Yugoslav Republic of Macedonia, Turkey, Turkmenistan, Ukraine, United Kingdom, Uzbekistan.
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Executive Summary

Background

The Slovak Republic ratified the Energy Charter Treaty (ECT) and the Protocol on Energy Efficiency and Related Environmental Aspects (PEEREA) in 1995. The Slovak Republic hosted the first in-depth energy efficiency review in 1999, which served as a pilot review for the PEEREA review process. In fulfilling its commitments under PEEREA, the Slovak Republic presented a regular review of its energy efficiency policies in November 2006.

Slovenia is one of the fastest-growing economies in the region, with GDP growth of 8.5% in 2006 and 10.4% in 2007. The Slovak Republic has made significant progress in transition with 80% of economic activity in private hands, a large degree of price liberalisation, an open foreign trade regime and a very conducive environment for attracting foreign investment.

According to the World Bank’s Doing Business report in 2007, Slovenia has been one of the fastest reformers in the world, introducing ambitious reforms in almost all areas (taxation, health care, welfare, pensions, labour markets, public finance management, market exit and decentralisation).

On 1 May 2004, Slovakia joined the European Union, and in November 2006 entered the Exchange Rate Mechanism, with the goal of joining the European Monetary Union (EMU) in January 2009.

Slovakia is an upper middle-income country with Gross National Income per capita of $9,620 in 2006. The country is now well poised to close the gap in per capita income levels with the rest of Europe.

Energy and Energy Efficiency Policy

The significant GDP increase has not led to substantial changes in primary or final energy consumption levels. Primary energy intensity improved on average by 3.8% annually and final energy intensity by 4.8% from 1993 to 2005. However, with GDP adjusted to Purchasing Power Parities, the energy intensity of Slovakia at 0.2 tonnes of oil equivalent (toe) per thousand US$ in 2000 is still 40% higher than the average of the OECD Europe countries.

Slovakia does not have significant domestic energy production, and is highly dependent on imports of crude oil, natural gas, and solid fuels. The share of net energy imports in total primary energy supply (TPES) was 67% in 2007. A large percentage of imports are natural gas and oil from the Russian Federation.
Nuclear energy dominates Slovakian domestic energy production, accounting for 68% of total production in 2007. Renewable energy (including hydro and combustible renewables and waste) also contributes a significant share of 17.7% to domestic production, being at the EU-27 average.

Market opening in Slovakia for non-household customers in both the electricity and gas sectors was implemented on 1 January 2005, while for households it was opened on 1 July 2007. Since 1 January 2004, energy prices cover economically eligible costs and suitable profit of their producers and suppliers. Prices do not contain any cross-subsidies among particular end-user categories.

Slovakia is committed under the Kyoto Protocol to limiting average annual greenhouse gas (GHG) emissions in 2008-2012 to 8% less than 1990 levels. In recent years, actual emissions have been markedly lower than this target.

The current Energy Policy has been developed pursuant to the 2004 Energy Act and was approved by the Government in January 2006. The Energy Policy covers a period of 25 years and is to be updated every five years. A key objective of the Energy Policy is to reduce the energy intensity of the economy over the long term. Specifically, the aim is to reduce the ratio of Slovakia’s energy intensity to that of the EU-15, which was 1.85 in 2004, to 1.6 by 2010, 1.3 by 2020 and 1.1 by 2030. The policy also calls for ensuring energy availability for all end-users in an economically efficient way.

The Energy Efficiency Concept of the Slovak Republic is a strategic programming document adopted in 2007 with an outlook for activities and measures until 2020. The concept supports the implementation of EU directives as well as other EU documents dealing with energy efficiency into practice in the Slovak Republic. Key goals of the Energy Efficiency Concept are to have the energy intensity gradually reduced to the EU level; to create a stimulating environment for energy-efficient behaviour of citizens and market participants while optimising state involvement; and, to provide support to sustainable energy solutions and introduction of energy-efficient technologies across all sectors of the national economy.

Energy Efficiency Programmes

The National Energy Efficiency Action Plan (NEEAP) for the years 2008 – 2010 was approved in October 2007 as an implementation of EU Directive 2006/32/EC. The NEEAP includes a range of measures to achieve an interim target of a 3% reduction in energy use from projected levels in 2010, in anticipation of achieving 9% savings by 2016. The NEEAP includes an important focus on energy efficiency “infrastructure”, including specific legislation, monitoring and analysis capacity, a consumer information campaign, regional energy services centres, and school programmes. The Plan also includes a number of more specific sectoral policy measures in industry and agriculture, transport and buildings.

The Slovak Republic has in place a number of programmes to support greater energy efficiency in the building sector. As well as insulation standards, building certification and labeling, and adoption of EU standards and labeling for appliances, financial support is available for renovations of buildings to improve energy efficiency. While there have been improvements in the efficiency of residential buildings, district heating systems are losing customers with impacts on system costs and viability.
Around half of industrial installations are covered by the EU emissions trading scheme. Requirements for energy audits of industrial premises are also being introduced, and there are plans to enhance the capacity of the domestic auditing industry. Incentives are also in place for efficient CHP, including preference in transmission and distribution and feed-in tariffs for qualifying CHP based on renewables.

EU Directives and EU financing programmes have been highly influential in developing and implementing Slovak Republic’s energy efficiency programmes. EU funds have supported financial incentives for large and small energy efficiency and renewable energy projects. For the period 2007-2013, the Operational programme “Competitiveness and Economic Growth” – priority line “Energy” and the Operational programme Environment – priority 3.2 “Minimising negative influences of climate change and supporting RES” - provide significant potential for ongoing funding. Other funding sources include de Minimis funding support for SMEs and the public sector, an environmental fund financed by environmental fees, and an EBRD funding facility that supports renewable and energy efficiency projects for industry and households. The country itself is participating with substantial funds from its own budget to improve energy efficiency. The Slovakian government is making efforts to coordinate and create synergies between the different financing mechanisms and funds.

**Renewable Energy Policy**

The Slovak Republic has set a national target to reach a share of 6% renewable energy in total energy consumption by 2010. Current renewable energy represents about 4.68% of the total primary energy consumption in the country.

The national target for the share of renewable energy in total gross electricity consumption by 2010 is 31%, in line with EU Directive 2001/77/EC. Current renewable energy represents about 17% of the total gross electricity consumption in the Slovak Republic. The Slovak Republic has set a biofuels target of 5.75% in 2010, directly in line with the 2010 target suggested in the EU Biofuels Directive 2003/30/EC. Biofuels contributed 2.5% to overall transport fuel consumption in 2006.

Nearly all existing renewable energy use is from hydropower. For small hydro there is an extended development programme with 250 selected sites for building small hydro plants, which could amount to a total installed capacity of 93 MW. Biomass is the renewable energy source with the highest additional mid-term potential of all RES, followed by biogas. Only a very small portion of the biomass potential is currently used. The Government’s priority is to use this source in remote, mountainous areas, where natural gas is not available.

Overall Assessment of Progress

Slovak Republic has achieved substantial progress over the last years in the introduction of medium to long-term energy and energy efficiency strategies, in developing specific legislation for energy efficiency, and adopting a concrete action plan, supported by the general move in the country towards EU accession and the interaction with other EU Members. On an aggregate level, progress in energy efficiency was quite significant in the period 2000-2007. While the economy grew by about 50% over this period, final energy consumption increased by only 3% and primary energy consumption by only 2%. The improvement in energy intensities was considerably larger than for the EU-27.

Generally, the integration of energy efficiency in other economic, environmental and social policies has been started, for example, by integrating energy efficiency promotion into industrial innovation funds; but continued efforts are required. While Slovak Republic’s energy efficiency strategies have been driven to a large degree by the EU, a greater focus on domestic implementation is now needed, including dedicated resources in relevant Ministries and agencies, a more comprehensive system of evaluation and monitoring, and an increase in the capacities of the private sector in energy efficiency. Transport will also require more attention as this sector is growing quickly.

Recommendations

The following recommendations are offered to promote energy efficiency in the Slovak Republic.

General Recommendations

• The government should ensure that all supply and demand options are equally considered in meeting future energy needs.

• Future energy strategies and policies should be supported by robust analysis of economic energy efficiency potentials and barriers impeding the realisation of these potentials. This will support the development of a second-phase Energy Efficiency Action Plan (EEAP) that is well targeted and allocates funds to areas delivering the greatest benefits in terms of energy efficiency.

• Future energy strategies and policies should be based on meeting long-term objectives and could consider specific measurable energy efficiency targets for key sectors.

• The government should continue the process of reforming the energy market and develop mechanisms for promoting energy efficiency compatible with the process of liberalisation and completion of the internal EU energy market.

• The passage of the proposed Energy Efficiency Act and associated Energy Efficiency Fund Act should be facilitated as the basis for a proactive approach to energy efficiency policies.
Institutional Framework

- Delivering the objectives of the Energy Efficiency Act and the Energy Efficiency Action Plan will require that adequate, certain, long-term staffing and resources be allocated to development and implementation in all relevant Ministries and agencies.
- The government should create an identifiable energy efficiency unit within the Ministry of Economy to provide the appropriate leadership within the government.
- As the Slovak Innovation and Energy Agency (SIEA) is the key implementing agency for the Energy Efficiency Action Plan and other energy efficiency activities, the Government should ensure stable and transparent funding for the SIEA. Financial resources should be bundled in visible and operational national energy efficiency programmes.
- The economic and administrative implications of meeting EU Energy Efficiency Directives should be assessed to ensure adequate resources are provided.
- Interactions between State, regional and municipal governments and their agencies should be improved to promote effective action on energy efficiency.
- The government should ensure involvement of private stakeholders, business associations and NGOs in the implementation of energy efficiency policies and activities to achieve targets.
- The Ministry of Economy should build on good coordination with other Ministries and with other governmental bodies to effectively advance the integration of energy efficiency into all State policies.

Energy Market and Pricing

- The government should continue its efforts towards energy market reforms in line with principles of efficient pricing. Where concerns arise over the social impacts of increased pricing, consideration should be given to methods other than pricing to address these (e.g. direct financial compensation or tax adjustments).
- Continued development of energy market regulation should support the development of an effective energy services market.
- The government should continue to facilitate effective disclosure of pricing and consumption information to consumers to facilitate a more competitive energy market.

Energy Efficiency Funding

- The Energy Efficiency Fund Act should be adopted and implemented as soon as possible. Alternative options for capital raising from the private sector should be explored.
- EU structural funding for energy efficiency should be directed as far as possible on steps to achieve market transformation toward investments in energy efficiency that minimise the need for ongoing government intervention. This will be assisted by the evaluation of structural funds to occur in 2008/09.
- The government should consider improved framework conditions to develop an active energy services market, including participation of industry, households, finance institutions, and other stakeholders.
- The government should accelerate the identification and removal of any barriers to the use of ESCO services.
• The government should ensure the best possible coordination of international financing (including structural funds, EBRD credit lines, etc) with domestic State-budget financing.

Specific Energy Efficiency Programmes and Measures

• Given the existence of common building types, standard packages of energy efficiency upgrades for residences in these buildings should be developed and widely distributed. Funding schemes to complete these energy efficient renovations should contain streamlined procedures and time frames.
• To allow a greater number of renovations to be supported from available State funding, consideration should be given to the conditions of project support contributed by the State.
• The government should continue to promote energy performance in the building stock while also safeguarding sustainable district heating systems, in cooperation with housing cooperatives and district heating companies.
• Municipal governments could manage demonstration programmes in constructing high efficiency buildings and using these as educational tools for the wider community.
• Energy efficiency must be included as an integrated part of transport planning. Consideration should be given to introducing energy efficiency measures in transport in parallel with completion of major new transport infrastructure.
• The Ministry of Economy and the Ministry of Transport should ensure strong coordination on energy efficiency policies.
• The government should complement the introduction of auditing requirements in the Energy Efficiency Act with measures to continuously ensure high quality, raise awareness of energy efficiency, and support movement toward a more commercial environment for improving energy efficiency in industry.

Renewables and CHP

• The government should continue to promote renewable energy, including through the proposed extension of feed-in tariffs to 15 years. The approach to feed-in tariffs could benefit from transparency in setting tariff levels to ensure optimal outcomes, including in relation to support for energy efficiency.
• The government should develop a more detailed strategy to support greater penetration of biomass to achieve long-term renewable energy targets, especially in heat production where it is most cost-effective. This should be developed through active coordination between the Ministries of Economy, Environment and Agriculture to ensure all issues in production and use of biomass are well integrated.

Data Collection and Monitoring

• The government should facilitate collection of statistical data required to establish indicators for energy efficiency.
• The government should improve its monitoring and analytic capacities in energy efficiency as a basis for future policy development, including decisions on financing.
Introduction

Slovak Republic in the Energy Charter Process

The Slovak Republic has ratified the Energy Charter Treaty (ECT) and the Protocol on Energy Efficiency and Related Environmental Aspects (PEEREA) in 1995. The Slovak Republic hosted an in-depth energy efficiency review in 1999, and it has played the role of a pilot review for the PEEREA review process. In fulfilling its commitments under PEEREA, the Slovak Republic has presented regular reviews of its energy efficiency policies in November 2006.

Purpose of the Energy Efficiency In-Depth Review

By ratifying PEEREA, countries commit themselves to formulate and implement policies for improving energy efficiency and reducing the negative environmental impacts of the energy cycle (Art.5). A guiding principle of PEEREA is that contracting parties shall cooperate and, as appropriate, assist each other in developing and implementing energy efficiency policies, laws and regulations (Art.3).

In this context, the In-Depth Review of the Energy Efficiency Policy of the Slovak Republic was undertaken in 2008. The purpose of the review is to assess the progress of the country in fulfilling its commitments under the Protocol, enhance the level of co-operation among PEEREA Parties, and promote continuous dialogue and transfer of experience and information.

The in-depth review team visited Bratislava 1-5 September 2008 and discussed a range of issues with government agencies, industry and other stakeholders. The team comprised officials from four countries who are Parties to the Protocol: Norway, Bosnia-Herzegovina, Bulgaria and Germany, supported by the Energy Charter Secretariat.

Key sources of information on the energy efficiency policies and programmes included the previous Energy Charter Regular Review of the Slovak Republic (considered by the PEEREA WG in 2006), the National Energy Efficiency Action Plan, the National Energy Strategy, the IEA Review of the Slovak Republic in 2005, information provided by the Slovak institutions during the country visit, and other relevant publications of the Slovak government, IEA, OECD, EU, etc.

The in-depth review report was discussed by the PEEREA Working Group and was endorsed by the Energy Charter Conference in November 2008.
Background

Brief Country Overview

The Slovak Republic came into existence on 1 January 1993, after the split of the former Czech and Slovak Federal Republic into the Czech Republic and the Slovak Republic.

Slovakia is a land-locked country in the heart of Europe, bordered by Austria (to the southwest), Hungary (to the south), the Ukraine (to the east), Poland (to the north), and the Czech Republic (to the northwest).

Figure 1: Location of the Slovak Republic

The total area of the Slovak Republic is 49 034 km². Total population is 5.4 million. The territory is divided into eight administrative regions, called ‘kraje’. Slovakia has a significant rural element. About 45% of the Slovaks live in towns and villages of less than 5000 people, and 14% in villages of less than 1000.

Bratislava, Slovakia’s capital and largest city, has an estimated population of approximately 430 000 inhabitants. It is the cultural, industrial and economic centre of the country, situated in the South-West of Slovakia, on the river Danube and very close to the Austrian and Hungarian borders. Bratislava generates about 30% of GDP and about 46% of Slovak exports.

The Slovak Republic has a continental climate, with four distinct seasons. Winters are typically cold and dry, while summers tend to be hot and humid. The average daily temperature range in Bratislava is -3 to 2°C in January and 16 to 26°C in July.
Temperatures tend to be cooler in the mountains. In areas of high altitude, snow is often present for as many as 130 days each year.

Since 1 May 2004, the Slovak Republic is a member of the European Union, and in November 2006 entered the Exchange Rate Mechanism, with the goal of joining the European Monetary Union (EMU) in January 2009\(^1\).

Slovakia is also a member of the World Trade Organization (WTO), the International Monetary Fund (IMF), the World Bank, EBRD, the Energy Charter and the Central European Free Trade Association (CEFTA). In 2000, Slovakia joined the Organization for Economic Co-operation and Development (OECD) and in 2007 became a member of the IEA.

**Economic Background\(^2\)**

Slovakia is one of the fastest-growing economies in the region, with GDP growth of 8.5% in 2006 and 10.4% in 2007. Services account for 64.8% of GDP, industry for 31.6%, and agriculture for 3.6%. The Slovak Republic has made significant progress in transition with 80% of economic activity in private hands, a large degree of price liberalisation, an open foreign trade regime and a very conducive environment for attracting foreign investment. The economy has benefited from substantial inflows of net FDI over the past years, particularly to the automotive sector, with per capita FDI between 1989 and 2005 amounting to USD 2,500.

**Figure 2: GDP development**


According to the World Bank’s Doing Business report in 2007, Slovakia has been one of the fastest reformers in the world, introducing ambitious reforms in almost all areas (health care, welfare, pensions, labour market, public finance management, market exit and decentralization).

\(^1\) The fix exchange rate was specified as 30.1260 SKK/EUR on the 8th July 2008

\(^2\) Based on publications of the World Bank, the EBRD, and the Economist.
On 1 May 2004, Slovakia joined the European Union, and in November 2006 entered the Exchange Rate Mechanism, with the goal of joining the European Monetary Union (EMU) in January 2009.

Slovakia is an upper middle-income country with Gross National Income per capita of $9,620 in 2006. The country is now well poised to close the gap in per capita income levels with the rest of Europe.

Rapid GDP growth and high inflows of net FDI have contributed to reducing the unemployment rate from about 19% in 2001 to about 16% by the end of 2005. Nonetheless, unemployment, at 13.3% (2006), remains high. There are sharp regional differences in unemployment, economic activity being heavily concentrated in the west, particularly around the capital Bratislava.

Current policy is focused on preparing Slovakia for euro adoption in 2009, and narrowing the development gap between regions by boosting infrastructure. Important challenges remain including structural changes to make the economy more competitive.

The following figure (Fig 3) presents the development of the national GDP and value added by sectors (at 2000) in the period 1995 – 2006.

**Figure 3: Indices of GDP and value added at constant prices of the year 2000**

![Graph showing indices of GDP and value added at constant prices of the year 2000](image)

Source: Odyssee database version 2007

After 1991, the industrial activity stagnated, and the share of industry in GDP was substantially reduced. During the period 1995 – 2005, the average value added growth rate in industry increased to almost 6% per year, foreign investments, mainly in the automotive sector, being the major driving force for the fast growth (Table 1). At the contrary, households’ expenses (measured by the private consumption) have been growing steadily, mainly due to much faster growth of households’ revenues in the first half of 1990s. The service sector has been expanding with a steadily growing contribution to the value added.
Table 1: Economic growth in the Slovak Republic (at constant price of the year 2000)

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<td>GDP in constant Euros of 2000</td>
<td>3.66%</td>
<td>5.19%</td>
<td>4.49%</td>
</tr>
<tr>
<td>Value added of industry in M€00</td>
<td>3.16%</td>
<td>8.83%</td>
<td>5.96%</td>
</tr>
<tr>
<td>Value added of agriculture in M€00</td>
<td>0.00%</td>
<td>11.40%</td>
<td>5.54%</td>
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<tr>
<td>Value added of tertiary in M€00</td>
<td>3.67%</td>
<td>0.38%</td>
<td>2.01%</td>
</tr>
<tr>
<td>Private consumption in M€00</td>
<td>3.13%</td>
<td>4.77%</td>
<td>4.03%</td>
</tr>
</tbody>
</table>

*Source: Odyssee database version 2007*

Table 2 presents the share development of individual sectors in GDP production according to Industrial Classification of Economic Activities.

Table 2: Share of individual sectors in GDP production according to Industrial Classification of Economic Activities

<table>
<thead>
<tr>
<th>Sector</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture, hunting and fishing</td>
<td>4.00</td>
<td>4.42</td>
<td>5.05</td>
<td>5.09</td>
<td>4.93</td>
<td>5.18</td>
<td>5.37</td>
<td>3.88</td>
</tr>
<tr>
<td>Industry</td>
<td>26.02</td>
<td>26.77</td>
<td>27.21</td>
<td>30.18</td>
<td>33.08</td>
<td>33.15</td>
<td>33.67</td>
<td>36.51</td>
</tr>
<tr>
<td>Construction</td>
<td>6.29</td>
<td>5.63</td>
<td>6.33</td>
<td>5.25</td>
<td>5.10</td>
<td>5.81</td>
<td>6.17</td>
<td>5.81</td>
</tr>
<tr>
<td>Trade, transport and communication services</td>
<td>22.42</td>
<td>23.03</td>
<td>21.25</td>
<td>21.26</td>
<td>21.54</td>
<td>21.38</td>
<td>22.15</td>
<td>21.96</td>
</tr>
<tr>
<td>Business activities and financial services</td>
<td>15.28</td>
<td>14.74</td>
<td>15.27</td>
<td>13.50</td>
<td>13.21</td>
<td>12.62</td>
<td>12.98</td>
<td>11.93</td>
</tr>
<tr>
<td>Other services (public service, army, education etc.)</td>
<td>15.16</td>
<td>15.83</td>
<td>14.97</td>
<td>14.58</td>
<td>12.05</td>
<td>11.38</td>
<td>10.70</td>
<td>11.16</td>
</tr>
<tr>
<td>Net taxes from products</td>
<td>10.83</td>
<td>9.59</td>
<td>9.93</td>
<td>10.83</td>
<td>11.38</td>
<td>12.09</td>
<td>10.63</td>
<td>10.77</td>
</tr>
<tr>
<td>Financial services indirect measured</td>
<td>0.00</td>
<td>0.00</td>
<td>-0.02</td>
<td>-0.68</td>
<td>-1.29</td>
<td>-1.61</td>
<td>-1.67</td>
<td>-2.03</td>
</tr>
<tr>
<td>Total</td>
<td>100.00</td>
<td>100.00</td>
<td>100.00</td>
<td>100.00</td>
<td>100.00</td>
<td>100.00</td>
<td>100.00</td>
<td>100.00</td>
</tr>
</tbody>
</table>

*Source: Slovak Innovation and Energy Agency*

<sup>3</sup> For GDP and Private consumption is considered period 2000 - 2006
<sup>4</sup> For GDP and Private consumption is considered period 1995 - 2006
Energy Background

Energy consumption trends

The significant GDP increase has not led to substantial changes in primary or final energy consumption levels (Figure 4). Total energy consumption is fairly constant since 1993.

Figure 4: GDP and Primary and Final Energy Consumption Development

Primary energy intensity improved on average by 3.8% annually and final energy intensity by 4.8% (Table 3). The biggest improvements in primary energy intensity occurred in the period 1993-1997. The most significant decrease of final energy intensity is observed in the period 2000-2004, significantly supported by the favourable GDP development.

Table 3: Variation of Primary and Final Energy Intensity in Slovakia

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary intensity</td>
<td>-4.9</td>
<td>-3.0</td>
<td>-3.4</td>
<td>-3.8</td>
</tr>
<tr>
<td>Final intensity</td>
<td>-4.6</td>
<td>-3.8</td>
<td>-5.4</td>
<td>-4.8</td>
</tr>
</tbody>
</table>

Source: EEE-NMC project 5

However, in real terms, the energy intensity of the Slovak economy at 710 toe/MEUR'00 is still high, compared to the EU average of 185 toe/MEUR'00 (2004). With GDP adjusted to Purchasing Power Parities, the energy intensity of Slovakia at 0.2 toe per thousand 2000 US$ is still 40% higher than the average of the OECD Europe countries (Figure 5).

Figure 5: Energy Intensity of Slovakia and OECD Europe

The almost changeless ratio of final/primary energy intensity (Figure 6) suggests only small structural changes in the national economy, or offsetting changes.

Figure 6: Primary and final energy intensity development (1990 – 2007)

Energy Balances

Nuclear energy dominates Slovak domestic energy production, accounting for 68% of total production in 2007 (Figure 7). Renewable energy (including hydro and combustible renewables and waste) also contributes a significant share of 17.7% to domestic production, being at the EU-27 average. Other important local product is coal with a share of 9.1%. The sharp increase of total domestic production and of the nuclear energy production in 1998-1999 corresponds to the commissioning of two NPP units VVER 440 in Mochovce. Respectively, the decrease after 2006 is a result of shutting down the first reactor of V-1 (440 MW) nuclear power plant in Jaslovske Bohunice. Nuclear energy production will increase after the completion of the 3rd and 4th reactor in the nuclear power plant Mochovce. However, the 3rd and 4th reactors will not be open before 2012 - 2013.

Figure 7: Domestic Energy Production in Slovakia

Slovakia does not have significant domestic energy production, and is highly dependent on import of crude oil, natural gas, and solid fuels. The share of net energy import in the total primary energy supply (TPES) was 67% in 2007. A large percentage of imports are natural gas and oil from the Russian Federation.

The energy mix of Slovakia demonstrates diversity in terms of fuels supplied, with natural gas, nuclear energy, solid fuels and oil covering the majority of primary energy supply (Figure 8).
Crude, NGL and feedstocks represented 29.83% of total primary energy supply (TPES) in 2007, followed by natural gas (24.66%), coal (20.97%), nuclear energy (19.57%) and renewable energy (4.68%). Renewable sources have increased since 2000, but their contribution in total consumption is still below the EU-27 average of 6%.

Total final consumption (TFC) did not markedly change, the annual levels being in the range of 10.6 Mtoe to 11.9 Mtoe during the period 1993-2006. However, consumption structure changes by sectors have taken place (Figure 9). Most remarkable is the two-fold increase of transport energy consumption, and the substantial decrease in the consumption of services (from 28% down to 16% of TFC). Households’ consumption has increased from 16% up to 20%. While the consumption level and share of industry has not changed much, with 3.56 Mtoe in 2007 and 32% of TFC (higher than the EU-25 average of 28%), the sector is remaining the major energy consumer in Slovakia. Consumption in agriculture/forestry decreased significantly from 5% down to 1%.

As can be seen in Figure 8 and 10, there were also substantial changes in the TPES and final energy consumption in years 1989 - 1992, due to transformation processes. However, this was before the founding of the Slovak Republic.
Figure 9: Final Energy Consumption by Sectors

![Energy Consumption by Sectors](image)


The share of individual energy sources in the total final consumption has undergone some changes in the period after 1993 (Figure 10). Nearly 60% reduction of coal resulted from the stronger environmental legislation, necessity to import most of this commodity and wider use of natural gas in industry and in the residential sector. The increase of oil consumption (by 38%) can be ascribed to the significant increase of road transport for both goods and passenger transportation, displacing rail transport. Final consumption of renewable fuels is negligible, which is, however, caused by the fact that the biomass consumption (wood, wood waste, etc.) used for heating is not sufficiently covered by official statistics.

Figure 10: Final Energy Consumption by Energy Sources

![Energy Consumption by Energy Sources](image)
Slovak Republic - 2008

Slovakia has installed electricity capacity of 8,478 MW (2004), of which 3,319 MW thermal, 2,640 MW nuclear, and 2,507 MW hydro. Gross electricity production was 27,487 GWh in 2007. Electricity produced in nuclear power plants has a share of 56% in the total gross electricity production, 20% come from coal and 16% are produced from hydro power (Figure 11).

Figure 11: Electricity Production
From 2000 to 2006, Slovakia was a net electricity exporter. The country became a net electricity importer after December 2006, when the first reactor of V-1 (440 MW) nuclear power plant in Jaslovske Bohunice was shut down and the gross electricity production decreased by about 12% in comparison with 2006. The second reactor of V-1 (440 MW) nuclear power plant in Jaslovske Bohunice is planned to be shut down after 31 December 2008. Table 4 illustrates the gross electricity production in the years 2005 – 2007 with respect to exports and import balance.

Table 4: Gross Electricity Production

<table>
<thead>
<tr>
<th>Sources of Electricity in GWh</th>
<th>Year 2005</th>
<th>Year 2006</th>
<th>Year 2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross electricity production</td>
<td>31 508</td>
<td>31 354</td>
<td>27 949</td>
</tr>
<tr>
<td>in which equipment: Hydro</td>
<td>4 724</td>
<td>4 560</td>
<td>4 588</td>
</tr>
<tr>
<td>Thermal</td>
<td>9 058</td>
<td>8 782</td>
<td>8 026</td>
</tr>
<tr>
<td>Nuclear</td>
<td>17 726</td>
<td>18 012</td>
<td>15 335</td>
</tr>
<tr>
<td>Net electricity production</td>
<td>29 316</td>
<td>29 190</td>
<td>26 035</td>
</tr>
<tr>
<td>in which equipment: Hydro</td>
<td>4 655</td>
<td>4 488</td>
<td>4 538</td>
</tr>
<tr>
<td>Thermal</td>
<td>8 283</td>
<td>8 053</td>
<td>7 325</td>
</tr>
<tr>
<td>Nuclear</td>
<td>16 376</td>
<td>16 649</td>
<td>14 172</td>
</tr>
<tr>
<td>Import</td>
<td>8 005</td>
<td>8 591</td>
<td>12 729</td>
</tr>
<tr>
<td>Export</td>
<td>11 271</td>
<td>10 920</td>
<td>11 853</td>
</tr>
<tr>
<td>Sources total</td>
<td>28 242</td>
<td>29 025</td>
<td>28 825</td>
</tr>
</tbody>
</table>

Source: Statistical Office of the Slovak Republic

Figure 12 presents heat generation and the changes during the period 1990-2006. The steep rise in heat consumption in the year 2001 may have been caused by the change of statistical methodology in 2000, continuously growing access to gas and industry development.

Figure 12: Heat output in TJ

Energy Consumption Trends by Sectors

The following chapter further analyses the trends in Final Energy Consumption in individual sectors - residential, industry, services and transport. In general, the noted total energy intensity decrease since 1993 was mainly due to the big energy intensity decrease of the manufacturing sector. During the period 1993-2004, industrial energy intensity fell by 64%, and energy intensity of the transport sector fell by 21%. Energy intensity in households followed a different trend: it rose until 2001, when it started to decrease too (Figure 13).

![Figure 13: Final Energy Intensity Developments by Sectors](image)

Energy Consumption in Residential Sector

By 2006, the residential sector was the second biggest energy consumer with share of 20.22% of total final consumption (see Figure 9). Residential energy consumption underwent substantial changes during the last 15 years (Figure 14). Since 2001, it has been constantly decreasing and was about 25% lower in 2006, probably caused by energy price growth.

Natural gas holds the biggest share in residential energy consumption with a share of nearly 56%, followed by heat and electricity with 24% and 17% respectively (Figure 15).
Heating presents about 80% of the total final energy consumption in the residential sector in Slovakia, and is greatly influenced by climate conditions, thermal-technical building properties, heating systems efficiency, and by inhabitants’ behaviour. Residential buildings are constructed according to valid Slovak technical standards requirements. The largest construction of apartments in panel buildings was done according to the older technical standards from 1970 (Figure 16). There were 292 000 flats constructed by these standards and it is necessary now to establish energy
efficiency system, improve building disrepair and solve possible social impact which can influence the environment in which these buildings are situated. The standards achieved the level of Western European countries after their updating in 1988. The last thermal insulation of building standards is valid from 2002.

There were 863,525 flats in family houses and 851,457 flats in apartment houses in 2005. There is district heating in 92% of them. Only 8% are heated independently or by local sources.

Figure 16: Apartment buildings by the year of construction

<table>
<thead>
<tr>
<th>Year Range</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>before 1900</td>
<td>10%</td>
</tr>
<tr>
<td>1900-1950</td>
<td>5%</td>
</tr>
<tr>
<td>1951-1965</td>
<td>5%</td>
</tr>
<tr>
<td>1966-1985</td>
<td>4%</td>
</tr>
<tr>
<td>1986-1990</td>
<td>21%</td>
</tr>
<tr>
<td>1991-2001</td>
<td>55%</td>
</tr>
</tbody>
</table>


Some measures have been already implemented by current legislation framework for improving energy efficiency\(^8\) of centrally heated buildings:

- There are 88% of the residential buildings, which have measuring of heat input.
- There are 57% of the residential buildings, which have hydraulic balancing of heat delivery.
- There are 55% of the residential buildings, which have heat regulating valves.

Increasing heat prices led to increased building insulation activity (Figure 17). The category “object” in the diagram represents an average multifamily building of about 45 flats with an additional insulation applied.

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\(^8\) Odyssee MURE EU27 workshop in Berlin May 29th - 30th 2008
The majority of single family houses are supplied with heat from individual sources. Natural gas is the most used fuel in regard to existing gas distribution system area. Brown coal and briquettes are used except of natural gas. The share of biomass as fuel wood has increased. A mix of different kinds of energy sources according to availability and price benefit is being often used.

Heat consumption in single family houses shows slow growth related to construction of 10,000 new flats in single family houses per year. Energy efficiency of new flats has improved because there are better thermal-technical properties of structures in the single family houses. Trends for a long time period show improvement of thermal-technical properties in single family houses constructions and reconstructions.

Household final energy consumption increased up to the year 2001, and started decreasing after that. Electricity consumption in households followed a somewhat different trend: it increased more slowly until 1999 and then started decreasing (Figure 18). This was influenced probably by the electricity price increase and the wider use of new electric appliances with lower specific consumption.

Source: EEE-NMC project
The electricity in residential sector is consumed mostly for lighting and domestic appliances operation. The share of electricity heating and domestic hot water production is relatively low because almost 90% of the population in Slovakia have access to natural gas. About 280 000 of the total 1 714 335 flats use electrical heaters and boilers. A big share of domestic appliances shows low energy efficiency. Most of them were produced before 1989 (mainly refrigerators, TV sets and washing-machines). The penetration of appliances in Slovak households is still behind the EU countries, even though their number has increased considerably in the ’90s. The investment cost is still more important in appliances purchase. Not enough attention is dedicated to operation costs because of the low public awareness; however, it seems that younger people pay more attention to energy labelling. Figure 19 illustrates the development of specific energy consumption for selected electrical appliances.

Figure 19: Energy Consumption by Selected Appliance Groups

The residential sector presents one of the largest sectors for energy efficiency measures implementation mostly in the field of heat consumption. Constantly increasing energy prices become the basic driving power for these measures. Electricity consumption should grow according to the living standard of the population and bigger available facilities for new appliances. Lately as the climate is getting warmer (higher summer temperatures), gradually the number of air conditioning units will be increased in the residential sector.

Energy Consumption in Industry

Industry has stagnated in the past years and as a result, its energy consumption decreased (Figure 20). However, industrial sector is still the biggest energy consumer with 31% of the energy consumption in the Slovak Republic in 2006 (3 506 ktoe). Electricity, coal and natural gas are the major energy carriers used, with similar shares of about 28% of industrial energy consumption (Figure 21).
Figure 20: TFC Industry


Figure 21: Individual fuels and energy consumption in industrial sector in 2006 - total 3 506 ktoe


Recent energy consumption development in industrial sector was mostly caused by industry restructuring in the ‘90s. Old companies had to be closed and new technologies implementation in new companies started. Nowadays the industrial outputs are dependent on several large-scale production enterprises in the Slovak Republic. Figures 22 and 23 illustrate energy consumption of the industry sector by subsector and the changes during the period 2001-2006. The most energy intensive industries are still the chemical, iron and steel industry, paper and pulp industry.
Only a slow growth of energy consumption in industry is foreseen in relation to new investment in the automobile industry and related supply chain development using the most modern technologies. The energy intensity is expected to improve, because of the expected GDP growth. Another important aspect is that the constant energy prices increase will force more and more companies to implement energy saving measures.
Energy Consumption in Services

Services sector involves public and commercial services. Energy consumption in this sector is specified by heat consumption in buildings and electricity consumption for lighting and electrical appliances operation. In 2006, the energy consumption was 1,877 ktoe (16.43% of the total final consumption) and the sector was the fourth biggest energy consuming sector in the country.

Heat and natural gas present about 64% of energy consumption (Figure 24). The majority of public buildings is connected to district heating or have their own central boiler houses using natural gas. Lately, natural gas consumption has markedly decreased.

In 2006, electricity consumption has reached 28.57% of the total energy consumption. Using electric and electronic equipment in services is still lower than in the EU countries, but using electronic equipment develops rapidly.

Figure 24: Individual fuels and energy consumption in services sector in 2006 – total 1 886 ktoe

![Pie chart showing energy consumption in services sector in 2006](chart.png)

Source: Slovak Innovation and Energy Agency

The development of energy consumption in the services sector underwent substantial changes during the last years, both in volume, and in structure (illustrated in Figure 25). The basic development potential and last years trend show consumption increase connected to rapid services development, which is expected to continue in the future. A huge energy savings potential in this sector may be realised by the implementation of existing and coming European legislation.
Energy Consumption in the Transport Sector

The energy consumption in transport presented almost 20% of total energy consumption in 2005 in the Slovak Republic. The share of goods and personal transport on energy consumption is about the same. Motor fuels consumption represents roughly 95%. Electricity consumption includes electricity used for railway and urban transport (trams, trolley-buses).

After initial regress at the beginning of the ’90s the energy consumption increase index in transport was 124.2 during the years 1993 and 1997. This growth was caused by relocating the outputs to automobile transport, goods transport (trucks) as well as to personal one. The transport sector is characterised by constantly growing final energy consumption (Figure 26). This is the sector where energy consumption has increased the most. Further increase in energy consumption is envisaged, especially in road transport (Figure 27).
Figure 27: Trend in Energy Consumption of Passenger Transport by Type

Trend in energy consumption in individual modes of passenger transport until 2015

Source: Ministry of Transport, Posts and Telecommunication of the Slovak Republic
Energy Policy

Strategic and Legal Basis of the Energy Sector

The Energy Policy of the Slovak Republic is a strategic document setting out principal goals and frameworks of power industry development in long-term perspective. Energy Policy is a part of national economic strategy of the Slovak Republic, aiming at the provision of the maximum economic growth while retaining sustainable development is conditioned by reliability of energy supplies at optimum cost and adequate environmental protection.

The previous Energy Policy document was approved by the Government of the Slovak Republic on 12 January 2000. Economic development, trends in power industry liberalisation in Europe, accession of Slovakia into the European Union and adoption of new EU Directives regulating the field of power industry called for the development of a new Energy Policy.

The current Energy Policy has been developed pursuant to the Energy Act (Act No 656/2004 Coll.), and approved by the Government in January 2006. The Energy Policy covers a period of 25 years. The Ministry of Economy of the Slovak Republic shall update the Energy Policy at least every five years reviewing changes in factors directly or indirectly influencing the energy policy.

The Energy Policy long-term concept is based on permanent reduction of energy intensity of the economy. The goal is formulated in a way to ensure that by the concept implementation, energy availability is ensured for all end-users in real time and under the principle of economic efficiency.

The objective of the Slovak Energy Policy in a long-term horizon is to:

1. ensure sufficient volume of electricity production to meet demand on the principle of economic efficiency,
2. ensure, at maximum efficiency, safe and reliable supply of all forms of energy in requested quantity and quality,
3. reduce the share of gross domestic consumption of energy in gross domestic product, i.e. to decrease energy intensity.

The following priorities that are linked with energy efficiency policy, have been declared as meeting objectives of the Energy Policy:

1. adoption of measures focusing on energy savings and increasing energy effectiveness on the consumption side,
2. utilisation of domestic primary energy sources for electricity and heat production, on the principle of economic efficiency,
3. increasing utilisation of combined heat and power production,
4. environmentally acceptable option for power production,
5. increasing the share of renewable energy sources in electricity and heat production in order to provide additional sources to cover the domestic energy demand,
6. supporting the utilisation of alternative fuels in transportation.
Bases for achieving the Energy Policy objectives – resources and needs balance almost 90% of primary energy sources consumed in Slovakia must be imported, mostly outside the EU territory. The only rather substantial domestic energy source is lignite (brown coal), as domestic natural gas and oil production is insignificant. It is because of this reason that the importance of renewable energy sources ever increases (biomass, water, geothermal energy, solar energy, wind energy).

Based on long-term forecasts of gross domestic consumption, it is possible to define the following targets (Table 5):

Table 5: Slovak Energy Policy Targets

<table>
<thead>
<tr>
<th>Parameter</th>
<th>2004 (Actual)</th>
<th>2010</th>
<th>2020</th>
<th>2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross inland consumption (PJ)</td>
<td>785</td>
<td>801</td>
<td>836</td>
<td>831</td>
</tr>
<tr>
<td>Final energy consumption (PJ)</td>
<td>433</td>
<td>460</td>
<td>470</td>
<td>480</td>
</tr>
<tr>
<td>Ratio of energy intensity in Slovakia and the EU - 15</td>
<td>1.85</td>
<td>1.60</td>
<td>1.30</td>
<td>1.10</td>
</tr>
<tr>
<td>Share of renewables in PEC (%)</td>
<td>2.2</td>
<td>6.7</td>
<td>12.0</td>
<td>n.a.</td>
</tr>
<tr>
<td>CO₂ emissions (Mt)</td>
<td>39.00</td>
<td>45.80</td>
<td>57.44</td>
<td>n.a.</td>
</tr>
</tbody>
</table>

Source: MURE database

A governmental proposal for Strategy on Security of Energy Supply⁹ defines the development direction of the energy sector by 2030. The main goals of this governmental strategy are:

- to reach competitive energy that ensures secure, reliable, effective supply of all forms of energy for acceptable prices taking into consideration consumer protection, environmental protection, sustainable development, strategy of security of energy supply and technical security.

- analysis of status and proposal of solutions for: electricity sector, heat supply sector, gas sector, crude oil production, processing and transportation, coal exploitation, RES utilization and energy efficiency.

By the end of 2004, the energy sector has been regulated mainly by Act No. 70/1998 Coll. on the Energy Sector and on Amendment of Act No. 455/1999 Coll. on Individual Business (Business Act) which came into force on 1 July 1998. The act determined the business conditions in the energy sector, especially in the power sector, heat and gas manufacture. The Act on Regulation in Network Industries (Act No. 276/2001 Coll.) established an independent regulatory body - the Regulatory Office for Network Industries, and relocated on it the competences of objective price control in the energy sector.

The amendments of Acts No. 405/2002 Coll. and No. 208/2002 Coll. stated legislative premises for the liberalization of the electricity market and legislative requirements for electricity traders operation. The electricity market was opened and measures for

⁹ The document was approved by the Government on 15th October 2008.
temporary restricted electricity import were accepted by Decree no. 548/2002 Coll. issued on the basis of these acts.

New energy laws, which came into force on 1 January 2005 and are compatible with EU legislation, were approved by the National Council of the Slovak Republic on 26 October 2004. These include:

**Energy Act** (Act No. 656/2004 Coll.):
- regulates business conditions in the energy sector,
- harmonizes the legislation of the Slovak Republic with the EU one,
- forms premises for open market operation,
- establishes adequate consumer protection,
- forms conditions for environmental protection and energy development,
- accelerates schedule for liberalization of electricity and gas markets,
- regulates general economic interest,
- separates electric and gas supply from the transport route,
- allows consumer to choose supplier,
- ensures non discriminatory approach to energy and energy networks,
- ensures monitoring of electricity and gas supply safety.

The **Thermal Energy Act** (Act No. 657/2004 Coll.) regulates:
- business conditions in thermal energy,
- discretions and duties of heat market parties,
- efficiency of thermal equipment operation system,
- emergency in thermal energy,
- activity of state administration authorities and municipalities.

**Act on Regulation in Network Industries and on Amendments and Activities to some Acts** (Act No. 658/2004 Coll.) specifies and amends mainly:
- subject of regulation,
- price control,
- Regulatory Office for Network Industries’ competences and activities,
- rules for electricity and gas market operation,
- discretions and duties of regulated subject,
- price policy,
- supervision and penalties.

The executive decrees to the energy acts are progressively issued.
Energy Market Liberalisation

Market opening in Slovakia for non-household customers in both the electricity and gas sectors was implemented on 1 January 2005, while for households it was opened on 1st July 2007. Competition in both markets has not developed strongly and the main obstacle is the dominance of the incumbent companies. The transmission system operator for electricity is separate in ownership terms from the main generators and suppliers, while the gas transmission operator was legally unbundled in June 2006. Electricity and gas distribution systems had to be legally separate from generation or supply by July 2007; legal unbundling for gas has been completed earlier and in electricity it was finalized in July 2007.

Initial electricity market opening has started in January 2002 with large consumers (over 100 GWh per year), which represent 31% of the market. Consumers of over 40 GWh per year had a chance to choose a supplier since January 2003 and the same conditions were stated for consumers of up to 20 GWh since January 2004. Around 1% of consumers have changed supplier in electricity, while no switching has occurred yet in the gas sector. Table 6 presents the schedule of electricity market opening.

Table 6: Gross Electricity Production

<table>
<thead>
<tr>
<th>Eligible consumers</th>
<th>Market opening in %</th>
<th>Date of market opening</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consumers over 100 GWh per year</td>
<td>35</td>
<td>1 January 2002</td>
</tr>
<tr>
<td>Consumers over 40 GWh per year</td>
<td>37</td>
<td>1 January 2003</td>
</tr>
<tr>
<td>Consumers over 20 GWh per year</td>
<td>41</td>
<td>1 January 2004</td>
</tr>
<tr>
<td>All consumers except households</td>
<td>75</td>
<td>1 January 2005</td>
</tr>
<tr>
<td>Households</td>
<td>100</td>
<td>1 July 2007</td>
</tr>
</tbody>
</table>

*Source: Ministry of Economy of the Slovak Republic*

The main participants in the Slovak electricity market are a single, dominant generation company and three large distribution/supply companies, which cover the entire territory of the country. Slovenske Elektrarne (SE) is the main generation company with a share of production close to 84%. The three distributors/suppliers are ZSE, VSE and SSE, which are partially owned (49%) by E.ON, RWE and EDF respectively, with the remaining share being held by the Slovak government. These three companies source their supply on negotiated terms from Slovenske Elektrarne and each has a regional distribution area. Recently, competition has started to develop between them for industrial and business customers.

Supply licenses have also been awarded to 18 other companies. Several companies from the Czech Republic have entered the market, including CEZ, while suppliers are also able to source electricity from the Czech, Austrian and German wholesale markets. Apart from a few large users, there has been little meaningful customer switching to date.
The gas market in Slovakia is characterized by a high level of dependence on a single external supply source (Russia) and the dominance of a predominantly state owned vertically integrated company. Slovakia is also an important transit country for gas, with its transmission network forming a significant part of the European gas network and representing an important route for transporting natural gas to the countries of Central and Western Europe.

Slovensky Plynarensky Priemysel (SPP) is currently responsible for the supply of all gas in Slovakia, which in turn imports all its gas on the basis of contracts with Russia’s Gazprom. SPP is also the owner of the transmission and distribution networks. Following the legal unbundling of the networks, access is available to other potential suppliers but as yet there has been no penetration by other new entrants and therefore no customer switching. Approximately two-thirds of the gas consumed in Slovakia is by large industrial users and it is expected that this market will develop rapidly in the future.10

Energy Pricing Policy

Since the beginning of 2003, the independent Regulatory Office for Network Industries (RONI) sets the prices of heat, electricity and natural gas. Before 2003, the Ministry of Finance regulated gas and electricity prices, but practically until 1999 the prices for households and to a lesser extent also for big consumers (industry) almost did not change (Figure 28).

Figure 28: Energy price development (1993 = 100 %)

Source: EEE-NMC project

Since 1 January 2004, energy prices cover economically eligible costs and suitable profit of their producers and suppliers. Prices do not contain any cross-subsidies among particular end-users categories.

Since 1 January 2003, the Regulatory Office for Network Industries regulates gas price in Slovakia. The result is price adaptation, which reflects eligible costs and adequate profit from regulated activities and elimination of cross-subsidies among individual groups of consumers.

Electricity prices in Slovakia exceed the EU averages, while gas prices are below the EU averages. Average electricity prices for households have increased by 18.8% since 2004 and are currently about 13% higher than the European averages. Electricity prices for industrial users are about 3% higher than the European averages. Prices for industrial users are lower in absolute terms than for households.

Gas prices for households have increased by about 49% since 2004 and are currently about 9% lower than the European averages. Electricity prices for industrial users have increased by about 57% since 2005 and are about 7% lower than the EU-15 and EU-25 averages.

Prices of heat from centralised heat delivery for the households are approved by RONI each year based on the calculation of individual heat producers and distributors. Steadily rising prices of centralised heating plus price distortions of various fuels caused people to leave centralised heating and switch over to individual heat supply mostly by small gas boilers installed in flats or gas boilers installed in individual apartment houses. This again led to further increased costs of central heat delivery. However, this phenomenon gradually retreats as the prices of gas, electricity and heat near to real cost reflecting proportions, and at the same time new legislation makes the disconnecting from centralised heat delivery more difficult.

Energy and Environmental Taxation

Slovakia has already implemented some taxes on air pollution, such as NOx and SO\(_2\) tax, CO\(_2\) tax is still missing. The Clean Air Act and its Amendments however mitigated and postponed the tax/air pollution fee for enterprises using domestic coal.

As for the fuel taxes, Slovakia had in 2004 the highest excise tax for Diesel among the new EU member countries, with 351€ per 1000 litre of diesel oil, and similar tax is set for gasoline too; this even exceeds the minimum rate set by the EU for the year 2010. The main motivation for such high taxation lies in the fiscal sphere, but some side-effect in fuel conservation and the impetus to switch over from road to rail are expected as well.

Taxation in Slovakia includes two kinds of taxes, direct and indirect ones. Direct taxes include individual income taxes, legal entity income taxes, road tax, real estate tax, real estate-transfer tax, accession tax. Indirect taxes cover value added tax (VAT) and consumer taxes (incl. a tax on hydrocarbon fuels and oils).

Since 1 January 2004, individual and legal entity income taxes are the same for all subjects (19%). Since 1 January 2004 the value added tax, according to present legislation, is applied as the same on all kinds of products and services (19%).
Consumer tax on mineral oils is part of Act No. 98/2004 Coll. Electricity, heat, and natural gas taxation has been solved in connection with EU legislation transposition by Act No. 667/2004 Coll. This act amends and updates Act No. 98/2004 Coll. on Consumer Tax on Mineral Oil. The task of the act is to adjust particular paragraphs from Directive 2003/96/EC to the Act on Consumer Tax on Mineral Oil. Directive 2003/96/EC defines energy products, electricity taxation and extends consumer tax subject on natural gas and solid fuels (coal, coke).

The result of negotiations on Directive 2003/96/EC for Slovakia was the temporary period for adapting of taxation:

- electricity and natural gas to minimum tax rate till 1 January 2010, if national tax rate reaches 50% of EU minimum tax rate by 1 January 2007,
- solid fuels to minimum tax rate till 1 January 2009, if national tax rate reaches 50% of EU minimum tax rate by 1 January 2007.

**Institutions**

Energy and energy efficiency policy implementation is ensured by:

- central bodies of state administration,
- bodies of state administration,
- public organizations,
- local administration.

**Central bodies of state administration**

Activity and competences of central bodies of state administration are stated by Act No. 575/2001 Coll. on Organization of Government Activity and Authorities of Central State Administration and its amendments.

The Ministry of Economy of the Slovak Republic is a central body of state administration of the Slovak Republic with responsibilities, among others, for:

- industry, with the exception of food industry, construction products and manufacture of construction material,
- power engineering inclusive nuclear fuel management and storage of nuclear waste,
- heat and gas manufacture,
- exploitation and treatment of solid fuels, exploitation of oil and natural gas, exploitation of ore and non-ore raw materials and searching, survey and exploitation of radioactive materials,
- support of small and medium-size businesses,
- policy related to creation and support of business environment,
- domestic trade, foreign trade, tourism and consumer protection,
- protection and use of mineral resources inclusive chief supervision of protection, and the use of minerals,
- privatization of state property and for administration of state property in business environment.
The Ministry of Economy develops the Energy Policy document, which is updated every fifth year at least, with respect to changing of inputs, influencing energy policy directly or indirectly.

The Ministry of Environment of the Slovak Republic is a central body of state administration of the Slovak Republic for protection of the environment, including nature and landscape protection, water quality and quantity protection and its rational use, air protection, land planning and construction regulation, waste management, securing of unified information system on environment and area monitoring, geological survey and exploration. An objective of the Ministry of Environment among others is to review important developing concepts designs and general statutes, particularly in the energy sector, mining, transport, industry, forest and water industry, waste management and tourism. The Ministry of Environment co-operates with the Ministry of Economy on environmental protection in industries, especially in power engineering, heat production, metallurgy, cellulose and paper industry, oil processing and petrochemical industry.

The Ministry of Transport, Posts and Telecommunication of the Slovak Republic is a central body of state administration for railway transport, railways and trains, road and urban transport, urban railways and railways for special purposes, communications and highways, inland and sea navigation and ports, civil aviation, armed corps in transport and railway forces, railway health service, posts and telecommunication. The Ministry co-operates with the Ministry of Economy especially on plans design regarding the state economic and structural policy, plans design on the state development programme and decrements related to transport, posts and telecommunication needs, policies design on fuel consumption and energy efficiency in transport.

The Ministry of Education of the Slovak Republic is a central body of the state administration and its competence meets the energy policy in the area of basic research and development.

The Statistical Office of the Slovak Republic is a central body of the state administration for state statistics and informatics. Its major task is to develop, organize and perform statistical surveys in the Slovak Republic and provide international comparability of statistical information, and to fulfil tasks resulting from international obligations. As the Statistical Office cooperated with SIEA and understood the Odyssee methodology and database, Odyssee data were widely used in this publication. Slovak energy statistics is fully harmonized with the European System of Energy Statistics since 2001. The data in time series before the year 2001 are not fully compatible with data structure of countries EU 15 and some data are completely missing.
**Bodies of state administration**

The Regulatory Office for Network Industries (RONI) was established in 2001 as an independent body for state regulation of network industries in the energy sector. The head of RONI are a Chairman and Regulatory Council, both nominated by the President of the Slovak Republic upon recommendation by the National Council of the Slovak Republic and the Government.

State regulation in network industries means creation and support of a competitive environment, support of market powers activity in network industries, consumer protection, protection of licence holders’ interests for certain payback period achievement and providing of reasonable, profitable and better products and services supply. State regulation in network industries includes issuing of licences on regulated activities performance, price regulation according to law, decision-making on business conditions of regulated activities, issuing of preliminary approval on construction, reconstruction or cancellation of objects and equipment used for regulated activities performance, access to network decisions and government control on regulated subjects business.

Electricity productions, repurchase, transmission and distribution; gas production, repurchase, transfer and distribution and heat production, repurchase and distribution are defined as network industries. Since 1 January 2003 the competences concerning the prize regulation on production and delivery of fresh water and cleaning of sewage water (sewage and tapping) were removed also to RONI.

The Nuclear Regulatory Authority has a primary mission to guarantee, that nuclear energy on the territory of the Slovak Republic will be used exclusively for peaceful purposes, and that the nuclear installations are designed, constructed, operated and decommissioned in harmony with the relevant legislation. The Nuclear Regulatory Authority monitors the nuclear installations operation with respect to their safety.

The Administration of State Material Reserves of the Slovak Republic regulates state material reserves including emergency reserves of oil and oil products, which are produced in the country.

The State Energy Inspection was established by the 1998 Energy Act as a body of the state administration under the Ministry of Economy. It is a non-profit organization with location in Trenčín. The State Energy Inspection performs government supervision on the observance of the Energy Act, the Thermal Energy Act and the Act on Energy Performance of Buildings.

The Supreme Mine Office is a budgetary organization and Ministry of Economy of the Slovak Republic entity. Its tasks are to perform key supervision duties of state mine administration. The Supreme Mine Office and mining office boards perform key control (among other tasks) on the observance of Act No. 44/1998 Coll. on Protection and Use of Mineral Resources and submit measures for rational mineral deposits exploitation and safety and health protection at work arrangement and operation safety.
Public Organisations

Slovak Innovation and Energy Agency (SIEA) is a contributory governmental organisation within the competence of the Ministry of Economy of the Slovak Republic. Its activities within the energy sphere (selection):

- Independent professional authority in energy sector,
- Implementation agency for the EU structural funds,
- Consultation, dissemination and training in the field of energy conservation, energy intensity reduction, wider exploitation of RES,
- Evaluation and monitoring of the energy efficiency of energy equipment
- Co-operation with the Ministry of Economy in the legislation process (preparation of the new Bills and Decrees in the sphere of energy sector).

SIEA has a seat in the capital of Slovakia – Bratislava and 4 regional branches, which favourably influence its activity covering the whole territory of the country.

Local Administration

The Slovak Republic is administratively subdivided into 8 regions: Bratislava region, Trnava region, Trenčín region, Nitra region, Žilina region, Banská Bystrica region, Košice region, Prešov region.

The regions following Act No. 302/2001 Coll. on Self-government of Higher Territorial Units perform planning and development activities. The results of these efforts are regional plans. According to Act No. 50/1976 Coll. on Regional Planning and Building Regulation, regional plans contain policies and regulations concerning public transport and technical equipment structure, policies and regulations concerning space demands of protection and natural sources and important landscape elements use. These plans involve also strategies for technical infrastructure development, containing heat, gas and electricity supply strategies.

Obligation of municipalities to ensure municipal concepts for the development of thermal energy in harmony with the higher territorial unit concept and with the Energy Policy of the Slovak Republic is stated in Act. No. 657/2004 Coll. on Thermal Energy. The concept has to be done within the methodological regulation of the Ministry if there exists a supplier or a consumer, calculating the heat to end users in the municipality. When municipal council approves the municipal concept for the development of thermal energy, the concept enters as an obligatory part of the regional and planning municipality’s documentation. One part of the concept is also renewable energy use evaluation.
Energy Efficiency Policy

Strategic and Legal Basis

The main relevant background pieces of legislation are:

- Energy Policy of the Slovak Republic (06/2006)
- Energy Efficiency Concept of the Slovak Republic (07/2007)
- Act on Ecodesign (Act No. 665/2007 Coll.)
- Draft Energy Efficiency Act

The Energy Policy of the Slovak Republic defines targets in gross inland consumption, final energy consumption, and energy intensity in national economy, share of renewable energy sources in primary energy consumption and CO₂ emissions for the years 2010, 2020 and intentions for 2030. Energy policy put emphasis on supply side. Demand side activities are very limited.

The Energy Efficiency Concept of the Slovak Republic is a strategic programming document with an outlook for activities and measures until 2020 prepared by the Ministry of Economy of the Slovak Republic in cooperation with the Slovak Innovation and Energy Agency and selected national government bodies, public administration bodies and other relevant subjects. It is compatible with similar concepts adopted in other European Union Member States. The concept supports the implementation of EU directives as well as other EU documents dealing with energy efficiency into practice in the Slovak Republic.

The key goal of the Energy Efficiency Concept is to have the energy intensity gradually reduced to the EU level, to create stimulating environment for energy-efficient behaviour of the citizens and market participants while optimising the state involvement and provide support to sustainable energy solutions and introduction of new innovations and energy-efficient technologies across all sectors of the national economy.

This will help boost Slovakia’s economy in several dimensions. Interconnecting the individual measures may help realise considerable energy savings. In order for the measures to have a multiplication effect, an appropriate environment should be created to ensure a significant improvement in energy efficiency. Characteristic conditions of such an environment are:

- incentives for individual entities to adopt energy-saving measures and behave in an energy-efficient way;
- clearly defined responsibility for required targets and achieved results; and
- necessary economic and legal environment.
In order to accomplish the key goal of the energy concept, the following should be made:

- analyse the potential of economically justified energy savings;
- focus market’s attention to the energy efficiency issue;
- ensure a good access to information and technologies;
- enhance acceptability of new technologies and behaviour patterns;
- ensure consumers’ access to sources, products and technical assistance that enable them to make competent decisions;
- guide the interests and actions of market participants;
- create and maintain a supporting institutional and financial framework;
- establish and sustain an efficient structure of the energy market; and
- ensure the sustainability and continuity of the process


**Energy Efficiency Act**

The draft Energy Efficiency Act was proposed by the Ministry of Economy in February 2008 and is implementing the EU Directive 2006/32/EC on energy end-use efficiency and energy services into the Slovak legislation system. The Act is supplementing missing legislation in the sphere of rational energy use. The Government approved the Energy Efficiency Act on 20 August 2008.  

The Act deals with and contains the following rules and obligations:

- The energy efficiency concept and action plans of energy efficiency. Here the Ministry of Economy is obliged to prepare an energy efficiency concept, submit it to the Government, evaluate the fulfilment of the concept goals, regularly (every three years) provide action plans of energy efficiency and monitor their outcomes. The regional administration regularly prepares a regional energy efficiency plan, submits it to the Ministry of Economy, evaluates it and reports to the Ministry.
- Producers of electricity or heat are obliged at newly built or refurbished plants to provide equipment with the highest possible energy transformation efficiency. Electricity producers using combustion engines of 1 MW capacity and more or gas turbines of more than 2 MW capacity, and producers of electricity using other thermal processes with the total capacity of the energy source 10 MW and more are obliged to provide energy audit of the equipment investigating the possibility of CHP operation of such equipment.
- Power transmission system operators and distribution system operators are obliged regularly to evaluate transmission efficiency and publish this evaluation not later than on 31st March of the following year. The same obligation applies to the operators of gas, liquid fuels, delivered heat, waterworks and sewage systems.

Energy consumers are obliged to follow the rules of operation economy of energy consuming equipment, the owners of non-industrial buildings with floor space of 1000 m² and more with centralised space heating have to provide hydraulic balanced heating system in the building and thermostatic valves at heaters.

Energy audits have to be implemented at non-industrial buildings, in industry and agricultural establishments. Energy intensity resulting from the audit has to be updated every three years.

Energy auditors, energy services, competences, records and administration are defined.

Energy efficiency monitoring, data provision and processing, obligations of the energy suppliers and energy consumers, the scope of obligatory data to be monitored are defined.

Offences against the Act, including financial penalties, are enumerated.

The Energy Efficiency Act is expected to come into force on 1st January 2009 at the latest.

**Energy Efficiency Action Plan for the years 2008 – 2010**


The overall national indicative goal of energy conservation for the 9th year (2016) is to achieve savings of 9 % of final energy consumption, i.e. 37 215 TJ.

An intermediate national indicative goal of energy conservation for the 3rd year (2010), in compliance with the first Energy Efficiency Action Plan, is to achieve savings 3 % of final energy consumption, i.e. 12 405 TJ.

The task of the Energy Efficiency Action Plan is to set goals, define energy conservation measures, to ensure their implementation and monitoring. As Slovakia currently lacks some important tools to provide the environment suitable for the achievement of energy savings, measures in this first plan will provide a basic legislative environment and suitable conditions to ensure marked improvement of energy efficiency and long-term achievement of energy conservation.

Many of the measures expected to have the greatest impact are information programs or setting up of policy/programme infrastructure, e.g.: the adoption of the Energy Efficiency Act; implementation of an energy efficiency monitoring and information system; a major information campaign (Dobra rada = uspora, or Good Advice = Savings); setting up regional energy services centres; support for energy services development and energy efficiency education for schools.
The package also includes a number of more specific sectoral policies, both existing and new. Among new measures, those expected to have the largest impacts are a program to promote optimisation of energy conversion and distribution in industrial undertakings and a series of transport measures including infrastructure use fees, building of new transport infrastructure and construction of public intermodal transport terminals. Continuing measures in the industrial and appliance sectors are also expected to make significant contributions.

Overall spending outlined in the NEEAP is around 22 billion SKK (€660 million) of State budget funding, around the same from towns and municipalities, and around 34 billion SKK of private sector funding (€1 billion). Together with around 50 billion SKK (€1.5 billion) of EU funding, the total spending is around 130 billion SKK (€3.8 billion) over 3 years. A considerable portion of this funding is for “tasks to be performed by the Ministry within approved state budget limits”, so it is not clear how much is specifically on energy efficiency and how much is adjusting existing funding. 87% of the total spending is in the transport sector, with the building sector accounting for another 8%, mostly on thermal insulation of housing and reconstruction of residential buildings.

Total expected energy savings from the package are 12,473 TJ, just above the 3-year target. However, a majority of the measures have no or only partial monitoring, so it is not clear how this achievement will be calculated.

Individual sectors (as defined by the Action plan) are expected to participate in the fulfilment of the national indicative energy saving goal by the following percentage:

- Horizontal measures 31%
- Buildings 11%
- Appliances 3%
- Public sector (without buildings) 3%
- Industry and agriculture 30%
- Transport 22%.

Energy Efficiency Measures

The following section introduces the main energy efficiency measures in residential, industrial, tertiary and transport sector and CHP in Slovakia. In this section, the regulatory measures are described; financial forms of support to energy efficiency measures and actions are then further analysed in the following chapter Energy Efficiency Financing.

Residential sector

Act No 555/2006, “On Energy Performance of Buildings” and related decrees define measures aimed at the improvement of the energy efficiency of buildings, including energy efficiency requirements for new and significantly refurbished buildings, processes and obligations linked with the “Energy Certification of Buildings” and “Energy Labelling of Buildings”, and the state supervision over compliance by those responsible (above all building owners).
The Act and corresponding Decree rule that in case central heat delivery is available in the locality, one has to utilise this facility for newly built houses, and when available, heat produced by combined heat and power source or by a source utilising local heat delivery systems running on renewable energy must be used. The obligation to adhere to relevant technical standards is declared.

Thermal Insulation Standards of Buildings have been obligatory since 1964 and were regularly adjusted in 1979, 1992, 1997 and 2002. The standard STN 73 0540-2, which is valid since 2002, defines among other parameters the obligatory minimum value of thermal resistance for individual parts of the building (flat roof, inclined roof, building envelope, inner walls etc.) for newly built houses and for substantially refurbished buildings. Energy savings compared to the previous standard is estimated over 10%.

Energy Efficiency Certificates of Buildings and Energy Labels for Buildings are obligatory under the Act 555/2005 and its implementation Decree for newly built and thoroughly refurbished buildings from 1st January 2006 and this certificate & label are also compulsory for older houses when changing ownership.

Government Regulation No 433/2000 concerning Technical Demands on Efficiency of Hot Water Boilers Burning Liquid and Gaseous Fuels defines minimum efficiency standards for boilers of capacity 4 kW to 400 kW (mostly used in the residential sector).

Act No 657/2004 on the Thermal Energy Sector requires inspection of heat delivery equipment every three years. This inspection is for energy efficiency and environmental requirements, with labour, safety and technical security defined elsewhere. Should there be a substantial change of technical parameters, installed capacity, heat supply or organisation of the operation, the heat supplier is obliged to ensure an efficiency check-up of the equipment (including boiler inspection) within 6 months.

Until December 2005, the inspection of boilers and other heat producing, delivery and distribution equipment was obligatory each year; thus the new measure is in a way a step backwards.

The Domestic appliance energy consumption and labelling measure according to Act No 264/1999 Coll. defines minimum energy performance requirements for refrigerators, freezers and ballasts, and requires energy labels for washing machines, household lamps, tumble dryers, refrigerators, freezers, combined washer/drier, dishwashers, household electric ovens and air-conditioning systems. Producer or importers of the relevant appliance must inform consumers on the specific electricity consumption of the appliance by labels, product information and data sheets.

Electricity price development after 2001 significantly encouraged energy awareness and the knowledge of the label information in population. Quantification of the share of appliances’ labels in energy savings is not yet available.

There are two types of Government Decrees:

a) Defining minimum requirements on energy consumption

b) Domestic appliances energy labels.

Both are listed in Table 7 below.
Table 7: Domestic appliance energy consumption and labelling in Slovak Republic

Ad a) Energy consumption requirements

<table>
<thead>
<tr>
<th>Type of appliance</th>
<th>Government Decree No.</th>
<th>Validity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Refrigerators &amp; freezers</td>
<td>425/2000</td>
<td>01/2001</td>
</tr>
<tr>
<td>Refrigerators &amp; freezers</td>
<td>295/2002</td>
<td>07/2002</td>
</tr>
<tr>
<td>Ballasts</td>
<td>594/2002</td>
<td>01/2003</td>
</tr>
<tr>
<td>Refrigerators &amp; freezers</td>
<td>253/2003</td>
<td>08/2003</td>
</tr>
</tbody>
</table>

Ad b) Energy labels

<table>
<thead>
<tr>
<th>Type of appliance</th>
<th>EC measure</th>
<th>Government Decree No.</th>
<th>Validity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Washing machines</td>
<td>95/12/EC</td>
<td>178/2002</td>
<td>05/2002</td>
</tr>
<tr>
<td>Household lamps</td>
<td>98/11/EC</td>
<td>188/2002</td>
<td>05/2002</td>
</tr>
<tr>
<td>Tumble dryers</td>
<td>95/13/EC</td>
<td>193/2002</td>
<td>05/2002</td>
</tr>
<tr>
<td>Refrigerators, freezers</td>
<td>94/2/EC</td>
<td>199/2001</td>
<td>05/2002</td>
</tr>
<tr>
<td>Combined washer/dryer</td>
<td>97/17/EC</td>
<td>210/2002</td>
<td>05/2002</td>
</tr>
<tr>
<td>Dishwashers</td>
<td>97/17/EC</td>
<td>211/2002</td>
<td>05/2002</td>
</tr>
<tr>
<td>Household electric ovens</td>
<td>02/40/EC</td>
<td>229/2003</td>
<td>07/2003</td>
</tr>
<tr>
<td>Air-condition systems</td>
<td>02/31/EC</td>
<td>231/2003</td>
<td>07/2003</td>
</tr>
</tbody>
</table>

Source: MURE

Industrial sector


The Slovak Republic is committed to limit annual emissions over 2008-12 to no more than 92% of 1990 levels and is currently predicted to have emission levels well under this target. The EU is committed to a 20% reduction in greenhouse gas emissions by 2020, relative to 1990 levels. Responsibilities for achieving this target are shared among EU countries according to a number of factors, with some savings to be
achieved in sectors covered by the EU Emissions Trading System (ETS emissions) and some outside this system (non-ETS emissions).

Installations taking part in the current emission-trading scheme according to the Directive 2003/87/EC had an average share in national emissions of 51.6% in the year 2005. For the period 2007 – 2012 due to the primary energy sources’ structure change, the share of installations in the trading scheme will grow up to almost 66%. Some 180 enterprises will be engaged in the Emission Trading Scheme; 30 of these are in the category of big emission sources (mostly power plants, CHP plants and heat delivery plants). According to the scenario of emission development, the annual quantity of allowances allocated for the 2007-2012 period will be approx. 41.2 million tonnes of carbon dioxide.

Under proposals for longer-term emissions trading, around 58% of Slovakia’s emissions are estimated as being ETS emissions, the fourth highest level of EU countries.\textsuperscript{12} Under proposed rules for auctioning under the EU ETS scheme, Slovakia would have around 25% more allowances for auctioning than under the ETS in 2005. This is due to Slovakia’s relatively low level of GDP/capita and expected high growth. This should lead to considerable revenue from emissions auctioning; however it will not affect the overall level of ETS emissions across the EU as these will be fixed. Nor will it make national reductions easier, as any European entity will be eligible to purchase auctioned quotas. Slovakia’s target for the non-ETS sector will be a 13% increase from 2005 levels.\textsuperscript{13}

\textbf{Act No 657/2004 – Heat Delivery Act} and related decrees, set conditions for licenses for the heat production and heat delivery branch. One of these conditions is the mandatory function of the so called “Responsible Representative”, effectively an energy manager. Among his main responsibilities is the monitoring of energy consumption and energy economy in the enterprise producing or/and delivering heat. The training of energy managers for heat production and delivery branch and verification of the ability of relevant person are specified, with the task of training and organisation of the final examination covered by the Slovak Innovation and Energy Agency. The impact of this measure is difficult to quantify. The training, however, promotes better knowledge and energy awareness mainly in smaller heat production and distribution firms.

\textbf{Tertiary Sector}

Act No 657/2004 grants local governments the power to decide local energy policy in compliance with the energy policy of the country (wider use of local renewable energy sources, utilisation of local energy possibilities such as local district heating system etc.). For instance, municipal authorities are entitled to grant permission to install new heat production & distribution equipment, and can refuse permission to disconnect from the district heating system etc. The Act calls for analysis of the current situation of the municipality in general (demography, climatic conditions, etc.) and in the energy sphere in particular (the equipment for heat production and delivery for population and organisations; heat production & delivery quantification and efficiency, etc); analysis of the fuel and energy availability on municipality territory; feasibility of renewable energy

\textsuperscript{12} NEAA, 2008, Consequences of the European Climate Package on Climate and Energy.
use; environmental impacts of heat production and delivery in the municipality and expected development of the heat demand in the territory and its coverage.

Municipalities are also bound by relevant legislation covering energy efficiency and thermal insulation of buildings, obligatory inspection of heat production, distribution and delivery facilities, efficiency standards for boilers, etc.

**Transport sector**

The Slovak Government by its Decree No 246/2006 in compliance with the Directive 2003/30/EC on the support of the use of bio fuels in transport determined the minimum quantity of automotive fuels produced from renewable energy sources ("Bio fuels") as substitutes for petrol and diesel. Producers and sellers of automotive fuels must provide the Ministry of Economy with information on the type and quantity of fuels sold.

Act No 98/2004 “On Mineral Oils Excise Duty” among other items introduced preferential duties for Diesel oil used for railway transport as a more energy efficient transport mode.

**CHP**

The use of renewable energy-based CHP production is supported by measures on Feed-in tariffs for renewable based electricity and for electricity produced by CHP combined with Voluntary Certificates for renewable-based electricity. The Regulatory Office sets feed-in tariffs for Network Industries but the tariffs are valid only from one year to another. This seriously diminishes the efficiency of this measure as it makes long-term economic planning for possible investors difficult. An Act guaranteeing the tariff for at least 7-year period is being prepared.

The Promotion of high efficiency cogeneration (CHP) Bill proposed by the Ministry of Economy of SR in March 2007 defines:

- Conditions for the support of high efficiency CHP production.
- Rules for the issue of certificate of the origin of electricity produced by highly efficient CHP equipment.
- Obligations of state administration bodies and CHP producers.

The Bill is aimed at CHP with output up to 1 MW electric.

High-efficiency cogeneration shall fulfil the following criteria:

- Cogeneration production from cogeneration units shall provide primary energy savings of at least 10% compared with the separate production of heat and electricity,
- Production from small scale and micro cogeneration units providing primary energy savings may qualify as high-efficiency cogeneration.

Producers of CHP electricity are entitled to preferential transmission, distribution and delivery of electricity produced through CHP equipment. System operators buy highly efficient CHP electricity (provided there is no different agreement with the producer) by a preferential fixed purchase price. Prices are set by the Regulatory Office for Network Industries for:
• Six calendar years for equipment in operation before 1.1.2008,
• Eight years for equipment refurbished after 1.1.2008, where efficiency gain reached is higher than 2 %,
• Ten years, for new equipment in operation after 1.1.2008.

Highly efficient CHP electricity producers can apply for the guarantee of origin of electricity from high-efficiency cogeneration, which will testify that electricity is produced by high-efficiency CHP process. The Bill defines input data (general and technical parameters) the application must include. The guarantee of origin is issued by the contributory organisation of the Ministry of Economy of SR after the verification of the data.

Ministry of Economy of the Slovak Republic by its Regulation/Decree defines:
• Criteria for the high-efficiency CHP,
• Calculation method for electricity produced by CHP process,
• Calculation method for the amount of exploitable heat,
• Method of calculation of the primary energy savings,
• Method of calculation of the CHP efficiency,
• Boundary and harmonised reference values for the calculation of CHP electricity and for the calculation of the CHP production efficiency and for the calculation of primary energy savings.

Ministry of Economy of the Slovak Republic will publish every four years the report on raising the share of high-efficiency CHP starting in June 30th 2008.

The Ministry of Economy of the Slovak Republic and relevant contributory organisation are entitled to request necessary data from relevant state administration bodies, which keep records of CHP electricity producers and those recording emission data. CHP electricity producers are obliged to keep the records on the CHP operation – monthly energy balance of production and delivery of electricity and heat (the Bill defines the list of necessary data in detail). After summarising the data, the CHP producer shall hand over annual data (gained from monthly energy balances) to the contributory organisation not later than on the 25th January of the following year.

Energy Efficiency Financing

Subsidies for Housing Development

This financing scheme for housing development state support was established in 1996 and amended in 2003-2004. It provides support for home building, reconstruction and renovation in multi-flat buildings and single family houses. Projects aimed at energy savings are a part of the eligible activity of „residential building renovation“, including thermal protection of residential building or single family house. Applicant for housing development support from the state fund can be a physical person, who is above 18 years old citizen of the Slovak Republic with permanent address in the country and his own regular income, and a legal entity with residence in the Slovak Republic. Loans and grants are the types of support provided, with greater focus on the loan support.
The Ministry of Construction and Regional Development of the Slovak Republic is responsible for the management of the scheme and sets the rules for granting subsidies for:

- Providing tenant flats
- Providing technical facilities
- Eliminating system failures in apartment houses

A primary role in apartment house system failure is played by inadequate thermal insulation of the building envelope, in some cases deteriorated through faulty construction technology. There are about half a million flats in such apartment houses (prefabricated building construction in the years 1955 – 1988), some of them already refurbished, most of them gradually gaining additional thermal insulation of the building envelope.

Subsidy for the elimination of system failures can be granted:

- to the municipality, housing co-operative or to the association of flat owners
- up to 50% of eligible costs
- to the maximum amount of 500 SKK/m² of flat floor area.

**Programme for the Reduction of Energy Intensity and Utilisation of Renewable Energy Resources**

From 1999 to 2003, Slovakia had a Programme for the Reduction of Energy Intensity and Utilisation of Renewable Energy Resources. This programme replaced two previous programmes that had run from 1991.

The Programme was guaranteed and co-ordinated by the Ministry of Economy and provided support for relevant projects incorporated into one of the three groups:

- Support of energy conservation in apartment houses and flats (purchase and installation of control techniques needed for energy efficient operation, refurbishment of heat delivery sources and CHP sources up to the installed power capacity of 5 MW, optimisation of central heat delivery systems and their extension,
- Promotion of RES use (Support of small hydro-power plants, solar collectors, thermal pumps, biomass combustion, wind energy utilisation, geothermal energy utilisation),
- Support of economic activities leading to fuel and energy conservation.

Beneficiaries were housing associations, flat owner associations, municipalities, owners of apartment houses, owners and operators of heat delivery sources and systems who employ less than 250 employees and where the state has 49% or less ownership share.

The support had two forms:

- a subsidy covering up to 70% of the interest from bank credits efficiently used for the project (maximum 4 million SKK),
- grants of financial aid, with a maximum 3 million SKK payable within three years.

The assessed results from the implementation of the programme are given in Table 8.
Table 8: Outcomes of the Programme for the Reduction of Energy Intensity and Utilisation of Renewable Energy Resources

<table>
<thead>
<tr>
<th>Year</th>
<th>Investments supported (10^3 SKK)</th>
<th>State participation (10^3 SKK)</th>
<th>Savings</th>
<th>Production</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Heat (Gj p.a.)</td>
<td>Electricity (MWh p.a.)</td>
</tr>
<tr>
<td>2000</td>
<td>158 879</td>
<td>28 290</td>
<td>106 831</td>
<td>159.509</td>
</tr>
<tr>
<td>2001</td>
<td>222 723</td>
<td>19 403</td>
<td>45 387</td>
<td>-</td>
</tr>
<tr>
<td>2002</td>
<td>118 290</td>
<td>14 507</td>
<td>65 635</td>
<td>-</td>
</tr>
<tr>
<td>Total</td>
<td>499 892</td>
<td>62 200</td>
<td>217 853</td>
<td>159.509</td>
</tr>
</tbody>
</table>

Source: MURE

Scheme for the Support of Energy Conservation and the Utilisation of Renewable Energy Resources (“de minimis” support scheme)


The support provider is the Ministry of Economy; Slovak Innovation and Energy Agency acts as an administrator of the support. Beneficiaries are SMEs, associations of natural and legal persons under 1000 employees and organisations of state or public administration with business activities where legal persons’ share is at least 51%.

Eligible projects:

- Energy conservation in heat delivery for apartment houses and flats,
- RES utilisation (small hydropower plants up to the installed capacity of 10 MWe, biomass utilisation, solar, geothermal, wind energy utilisation),
- Energy conservation in industrial sector (modernisation of energy management of buildings, technology equipment, utilisation of waste energy generated by technology processes),
- Energy conservation in the service sector (support will be granted to the modernisation of energy management in all services active in the national economy with the exception of financial sector)

The amount and intensity of the support differs for smaller and for bigger projects (Table 9).

Table 9: State Support Scope

<table>
<thead>
<tr>
<th></th>
<th>Minimum support</th>
<th>Maximum support</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smaller project</td>
<td>100 000 SK (about 2 600 EUR)</td>
<td>100 000 EUR</td>
</tr>
<tr>
<td>Bigger project</td>
<td>50 000 EUR</td>
<td>5 000 000 EUR</td>
</tr>
</tbody>
</table>
Within “de minimis” scheme (e.g. smaller projects) 17 projects are implemented, out of these 6 projects deal with renewable sources utilisation (1 small hydro power plant, 1 geothermal heating plant, 4 biomass utilisation), 11 projects deal with rational use of energy (4 additional building insulation, 5 modernisation or investment into heating plants, boilers etc., 2 rational fuel change).

“State Support” (bigger projects) scheme supported 34 projects. Half of them dealt with rational energy use (additional building insulation, boiler rooms modernisation, building structure improvement etc.) and another half supported renewable energy sources (small hydro power plants, geothermal heating plants, biomass utilisation).

This support scheme was closed in 2006.

**Environmental Fund**


The promotion is provided by subsidies or by soft loan grant. Legal and natural persons are eligible for this support. Financial means necessary for relevant subsidies are provided by fees and fines linked with the environmental pollution. The grants and subsidies concerning air protection include the promotion of

- Heat and hot water production using low-emission energy sources. The support is meant to achieve prescribed emission limits by means of the change of fuel used or the change of combustion technology. One supports here the projects oriented at public buildings (schools, hospitals, office buildings etc.)
- Heat and hot water production renewable energy sources (RES). One will support the construction of new RES equipment substituting original fossil fuel combustion boilers, or building the new equipment. Biomass, solar energy, heat pumps etc. will be supported.
- Support of the production of heat, hot water and electricity by the utilisation of RES (solar-thermal systems, photovoltaic panels, wind power plants, etc.). This item is oriented at natural persons.

**Slovak Sustainable Energy Finance Facility (SLOVSEFF)**

Under this new financing scheme, EBRD will provide credit lines to participating banks for a total amount of up to EUR 60 million for on-lending to private sector industrial entities for energy efficiency and renewable energy investments and for on-lending to Housing Associations for energy efficiency investments in the residential sector (see SLOVSEFF structure on Figure 29).
Eligible projects will range from energy saving measures in companies to insulation of apartment houses. The facility will be supported by grant funding of EUR 15m ("the Grant") from the Bohunice International Decommissioning Support Fund. The grant will be targeted to provide technical assistance, energy audits and financial incentives to sub-borrowers and the participating banks for the successful implementation of such projects.

Eligibility Criteria for Investments (Sub-projects):

- Reduction in energy consumption / improvement of energy performance
- Industrial investments up to €2 million
- Compliance with national environmental policies
- Minimum investment Internal Rate of Return (IRR) 12% for industrial energy efficiency projects and small renewable energy
- Minimum energy savings 15% for residential projects

EBRD signed four credit lines worth €15 million each to the leading Slovak banks Dexia Banka Slovensko, Slovenska Sporitelna, Tatra banka and VUB Banka in December 2007. Until September 2008, EUR 60 M credit line was fully allocated, total loans provided amount to EUR 15,041,000. In the residential sector, 174 projects were financed and the estimated energy savings are about 21,600 MWh/year.

Participating banks have already allocated a live pipeline of 388 projects at EUR 46 million, including 8 renewables, 35 industrial energy efficiency and 245 housing projects. Participating banks also estimated a pipeline of potential projects for EUR 207 million total cost. These potentials have given a ground for considering another credit line and expression of interest for SLOVSEFF II have been received from the four participating banks and four new banks (CSOB, OTP, UniCredit, and Volksbank).
Structural Funds

First Programme Period 2004 - 2006

The National Development Plan is a basic document regulating structural tools of the European Community in the Slovak Republic. Four specific targets and operational programmes were stated for the shortened programme period of 2004 to 2006. Projects aimed at energy savings and/or renewable energy sources use were funded under three operational programmes:

- growth of competitiveness of industry and services (Sectoral Operational Programme Industry and Services),
- support of balanced regional development (Operational Programme Basic Infrastructure),
- agricultural products efficiency and living standard of rural population increase (Sectoral Operational Programme Agriculture and Rural Development).

The support was provided by grants from EC structural funds and state budget of the Slovak Republic in the regions of NUTS II level, where the GDP per inhabitant measured by purchasing power parity in last years was very low. These are the regions of Western Slovakia (Trnava region, Trenčín region, Nitra region), Central Slovakia (Banská Bystrica region, Žilina region), and Eastern Slovakia (Košice region, Prešov region) from geographic point of view. The implementation of the funded projects under these programmes is to be completed until the end of 2008.

Second Programme Period 2007 - 2013

In the current budgetary period (2007 - 2013), energy efficiency improvements in Slovakia are funded under two Operational Programmes: “Competitiveness and Economic Growth” and “Minimization of negative influences of climatic change and support of RES”.

The Operational Programme “Competitiveness and Economic Growth” was established in 2007. The Programme in its priority line “Energy” declares the primary goal to increase energy efficiency and wider use of renewable energy sources (RES). To fulfil this goal the following activities will be implemented:

- Electricity production using RES,
- RES exploitation for the production of heat for space heating and hot water,
- Promotion of high efficiency CHP,
- Increased energy efficiency both on the energy demand as well as on the supply sides,
- Introduction of progressive technologies leading towards energy conservation in the energy sector,
- Coordination of the energy efficiency increase in Slovakia.

The support of the State will be granted to the private sector, mainly to SMEs, and to the municipalities (programme of the implementation of more efficient lighting). The support provider is the Ministry of Economy; Slovak Innovation and Energy Agency acts as an administrator of the support.
The support scope differs for smaller and for bigger projects, smaller projects receiving min. EUR 20,000 to max. EUR 200,000, and bigger projects receiving min. EUR 60,000 and max. EUR 5,000,000.

To compensate the regional development level, there are two maximum levels of support depending on the territory of the applicant:
- Bratislava region – 40% of the eligible costs of the project,
- Other regions of Slovakia – 50% of the eligible costs of the project.

Table 10: Time schedule for publication of the invitation to present projects

<table>
<thead>
<tr>
<th>Date</th>
<th>Measure of the priority line “Energy” of the Programme</th>
</tr>
</thead>
<tbody>
<tr>
<td>12.3.2008</td>
<td>2.1 - Increasing energy efficiency on the demand and supply side and progressive technologies in the energy sector</td>
</tr>
<tr>
<td></td>
<td>Scheme supporting sustainable development (de minimis support scheme)</td>
</tr>
<tr>
<td></td>
<td>700 000 000</td>
</tr>
<tr>
<td>11.8.2008</td>
<td>2.1 - Increasing energy efficiency on the demand and supply side and progressive technologies in the energy sector</td>
</tr>
<tr>
<td></td>
<td>Scheme of state support for the increased energy efficiency on the demand and supply side and progressive technologies in the energy sector by direct help</td>
</tr>
<tr>
<td></td>
<td>2 500 000 000</td>
</tr>
<tr>
<td>16.9.2008</td>
<td>2.2 - Construction and refurbishment of public lighting for municipalities and energy consultation service</td>
</tr>
<tr>
<td></td>
<td>700 000 000</td>
</tr>
</tbody>
</table>

The Operational Programme Environment – priority 3.2. Minimization of negative influences of climatic change and support of RES is implemented by the Ministry of Environment, Department of Environmental Programmes and Projects. The programme supports activities of both the public and the private sectors in heat generation and RES for reduction of greenhouses gases and other emissions (SO2, NOx, CO and solids). It also supported studies concerning climatic changes, economical cost, monitoring improvement and education in energy efficiency.
Table 11: Financial plan concerning allocation of subsidies (EUR) 2007-2013

<table>
<thead>
<tr>
<th>Priority</th>
<th>Total</th>
<th>Type of Fund</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Protection and rational using of water</td>
<td>1 077 227 136</td>
<td>Cohesion Fund</td>
</tr>
<tr>
<td>2. Protection before flood flow</td>
<td>141 176 471</td>
<td>Cohesion Fund</td>
</tr>
<tr>
<td>3. Air protection and minimization negative influences of climate change and support RES</td>
<td>211 764 706</td>
<td>European regional development fund</td>
</tr>
<tr>
<td>4. Waste management</td>
<td>570 588 235</td>
<td>Cohesion Fund</td>
</tr>
<tr>
<td>5. Protection and regeneration of natural ecosystems</td>
<td>59 714 041</td>
<td>European regional development fund</td>
</tr>
<tr>
<td>6. Technical assistance</td>
<td>57 176 470</td>
<td>Cohesion Fund</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>2 117 647 059</strong></td>
<td></td>
</tr>
</tbody>
</table>

Source: Ministry of Environment

The support scope differs for smaller and bigger projects. To compensate the regional development level, there are two maximum levels of support depending on the territory of the applicant:

- West Slovakia - 40% of eligible cost of the project,
- Central Slovakia - 50% of eligible cost of the project,
- East Slovakia - 50% of eligible cost of the project.

Energy Efficiency Fund

A draft law for establishing an Energy Efficiency Fund was developed in 2008 and is under consideration. This fund will provide grants to support a range of activities to support priorities of individual programs, especially:

- Improving public knowledge on energy efficiency (including training and information)
- Supporting energy audits in all sectors
- Support for projects in industry, services, the public and household sectors
- Short term programs to assist market transformation (e.g. heat pumps, appliances)
- Supporting development of energy efficiency services
- Cooperation with the IEA in energy efficiency R&D

600 million SKK (€18 million) will be allocated to the fund in the first three years, with around half of this notionally allocated to a monitoring and information system (120 million SKK), support for energy services development (45 million SKK), replacement of white goods (81 million SKK) and energy audits in industry (80 million SKK). From 2010, it is expected that much of the ongoing financing of the fund will come from compulsory contributions of energy companies (through implementation of the EU energy services directive) and penalties for non-compliance with the Energy Efficiency Act.

14 Subsidies are financed 85% from CF or ERDF and 15% from national budget.
The Ministry of Economy of the Slovak Republic is responsible for the energy efficiency policy. The Ministry has assigned its energy efficiency responsibilities to a very small staff within the Department of International Relations in the Energy Section.

Other central bodies of state administration also contribute for developing energy efficiency policy:

- Ministry of Construction and Regional Development (residential sector, industry for building materials, creation of regulation in the building industry),
- Ministry of Environment (air protection),
- Ministry of Transports, Posts and Telecommunications (energy efficiency in transport, bio-fuels use),
- Ministry of Agriculture (agriculture, forestry and food-processing industry),
- Ministry of Education (research and development).

The Slovak Innovation and Energy Agency is the only national agency dealing mainly with energy efficiency. Slovak Innovation and Energy Agency - SIEA is the national energy agency in the Slovak Republic, established by decree of the Minister of Economy. SIEA gains, proceeds and disseminates information concerning activities of private and legal entities in the energy sector and efficient usage of energy sources with respect to protection of environment as well as in accordance with requirement on reduction of energy intensity of national economy in order to ensure sustainable growth.

SIEA acts as an advisory body of the Ministry of Economy as well as of the Regulator and is involved in creation of proper legal framework for energy efficiency. SIEA participates on development of local and regional policies and cooperates with other state administration bodies on development of legal and economic instruments supporting efficient and environmentally friendly utilisation of energy.

SIEA also serves as an implementation body of the operational programme “Competitiveness and Economic Growth - priority line Energy”. This programme supports energy efficiency projects from EU funds. Most of SIEA employees are engaged in operational programme and respective processes.

The Slovak Innovation and Energy Agency has been steadily growing over the past decade from a few persons in the beginning to around 110 persons today. However, only minority of SIEA employees can afford to devote their time to systemic work on energy efficiency as e.g. energy efficiency strategy, legislation, action plans and monitoring. The Ministry of Economy of the Slovak Republic has no other department or permanent working team aimed to this goal. SIEA remains the only organization focussed on energy efficiency activities in the Slovak Republic.
The Regulatory Office for Network Industries is partly concerned with energy efficiency in connection with reviewing heat prices.

As a representative of non-governmental organisations, there is the Energy Centre Bratislava (ECB). The mission of the ECB is to promote the rational use of energy and the utilisation of renewable energy sources. The ECB was set up in 1993 under the MoE within the framework of the EC Thermie and Joule-Thermie programmes. It has been independent since 1999. 15

The ECB manages a number of activities to promote energy efficiency, including:

- transfer of innovative energy technologies and support in implementation;
- participation in national and international RTD projects concerning energy efficiency;
- data collection and elaboration of energy information;
- direct advising and consulting services to industry, SMEs and private households;
- organisation of seminars, training courses, workshops, trade fairs and conferences;
- promotion and dissemination of new energy technologies by publications, brochures and leaflets; and information for the media.

Renewable Energy Policy

Current Penetration of RES

About 4.68% of total primary energy consumption in Slovakia is from renewable energy sources. Despite the increase in utilizing renewable energy (Figure 31), the share of RES in energy supply has fallen slightly in recent years and is still below the EU average of 6%. There is limited opportunity for new large-scale hydro, leaving biomass as the most promising source of an increase in RES.

Figure 31: Total Primary Energy Supply of Renewable Energy Sources


Current Penetration of RES electricity

In the Slovak Republic, large-scale hydro energy is the only renewable energy source with a notable share in total electricity consumption. Between 1997 and 2004, this market share has stabilised. The share taken up by small-scale hydro energy has decreased by 15% per year on average over the same period (Table 12). Renewable energy represents about 17% of the total gross electricity consumption in the Slovak Republic in 2006.

With the exception of hydropower the contribution of RES-electricity did not grow significantly during the last decade. Hydro power capacity grew significantly during the first half of the ’90-s, due to the building of the 720 MWe Gabcikovo hydro power plant on the Danube. The total installed capacity of hydro power stations is around 1590 MW.
As of today, there are no large scale wind farms. There is currently only 5.1 MW of wind capacity installed. Currently very small wind turbines with a size of one, three, and seven kW are produced locally for battery charging, water heating, and connections to the public grid. Another local manufacturer is in the process of developing a 100 kW turbine with 20 metre rotor diameter. There is some contribution to RES-E from solid biomass (Table 12).

### Table 12: RES-electricity production in 1997 and 2004

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Biogas</td>
<td>0</td>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td>Solid Biomass</td>
<td>0</td>
<td>79</td>
<td>-</td>
</tr>
<tr>
<td>Biowaste</td>
<td>0</td>
<td>15</td>
<td>-</td>
</tr>
<tr>
<td>Geothermal electricity</td>
<td>0</td>
<td>0</td>
<td>-</td>
</tr>
<tr>
<td>Hydro large-scale</td>
<td>3,935</td>
<td>3,990</td>
<td>0%</td>
</tr>
<tr>
<td>Hydro small-scale</td>
<td>202</td>
<td>65</td>
<td>-15%</td>
</tr>
<tr>
<td>Photovoltaics</td>
<td>0</td>
<td>0</td>
<td>-</td>
</tr>
<tr>
<td>Wind on-shore</td>
<td>0</td>
<td>4</td>
<td>-</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>4,137</strong></td>
<td><strong>4,155</strong></td>
<td>0%</td>
</tr>
<tr>
<td>Share of total consumption [%]</td>
<td>17.9%</td>
<td>14.53%</td>
<td></td>
</tr>
</tbody>
</table>

**Current Penetration of RES-heat**

Biomass is the most important source for RES-H in the Slovak Republic and its utilisation for RES-H is currently growing at 27% per year on average (Table 13). Geothermal waters in the Slovak Republic are being utilised in several locations to heat structures, swimming pools and greenhouses (at the town of Galanta geothermal energy heats 1,240 flats and one hospital). Solar thermal heat utilisation in the country is at a low level.

### Table 13: Production of RES-heat in the Slovak Republic in 1997 and 2004

<table>
<thead>
<tr>
<th>Type of RES-heat</th>
<th>Penetration 1997 (ktoe)</th>
<th>Penetration 2004 (ktoe)</th>
<th>Av. Annual growth [%]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biomass heat</td>
<td>50</td>
<td>265</td>
<td>27%</td>
</tr>
<tr>
<td>Solar thermal heat</td>
<td>2</td>
<td>2</td>
<td>-4%</td>
</tr>
<tr>
<td>Geothermal heat incl. heat pumps</td>
<td>46</td>
<td>72</td>
<td>7%</td>
</tr>
</tbody>
</table>

**Current Penetration of Biofuels**

In 2005, 69 ktoe of biofuels were produced in the Slovak Republic. Biofuel production in the country is entirely biodiesel at present. Production capacity for biodiesel in the Slovak Republic stands at 89 kt per year in 2006, the third highest of the new EU Member
Slovak Republic - 2008

States after the Czech Republic and Poland. There was a large increase in biodiesel production from 2004 to 2005, but no new production capacity has been added in 2006. Slovakia appears to be falling behind its targets for biofuels penetration.

RES Targets

The Slovak Republic has set a national target to reach a share of 6% renewable energy in total primary energy consumption by 2010. In 2007, renewable energy represented 4.68% of the total primary energy consumption in the Slovak Republic. Under the EU Renewable Energy Supply target of 20% by 2020, Slovakia’s target translates to 14% of gross primary energy consumption by 2020.

The Slovak Republic has set a national target to reach a share of 31% renewable energy in total gross electricity consumption by 2010 according to directive 2001/77/EC.

Biofuel: the Slovak Republic has set a biofuels target of 5.75% in 2010, directly in line with the 2010 target suggested in the EU Biofuels Directive 2003/30/EC. Targets for interim years are 2.5% in 2006, 3.2% in 2007, 4% in 2008 and 4.9% in 2009.

The Strategy of Higher RES Utilisation in the Slovak Republic (2007) includes expected RES targets for the electricity and heat generation until 2015, including 95% RES generation from large-scale hydro and RES share of 7%, except for large-scale hydro, in total gross electricity consumption in 2015. Mid-term prospects of the strategy, concerning electricity generation from RES in Slovak Republic in 2015, are presented in Table 14, and concerning heat generation – in Table 15.

Table 14: Mid-term Prospects for RES electricity generation according to the Strategy

<table>
<thead>
<tr>
<th>Source / Year</th>
<th>2010 [GWh]</th>
<th>2015 [GWh]</th>
<th>Generation increase [GWh]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small hydro electricity plants</td>
<td>350</td>
<td>450</td>
<td>100</td>
</tr>
<tr>
<td>Biomass</td>
<td>480</td>
<td>650</td>
<td>170</td>
</tr>
<tr>
<td>Wind energy</td>
<td>200</td>
<td>750</td>
<td>550</td>
</tr>
<tr>
<td>Biofuel</td>
<td>180</td>
<td>370</td>
<td>190</td>
</tr>
<tr>
<td>Geothermal energy</td>
<td>30</td>
<td>70</td>
<td>40</td>
</tr>
<tr>
<td>Solar energy</td>
<td>0</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Total</td>
<td>1 240</td>
<td>2 300</td>
<td>1 060</td>
</tr>
</tbody>
</table>

Source: Ministry of Economy

16 Gross electricity consumption of 32,900 GWh is expected in 2015.
Table 15: Mid-term Prospects for RES heat generation according to the Strategy

<table>
<thead>
<tr>
<th>Year</th>
<th>Heat generation (PJ)</th>
<th>Biomass (PJ)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td>2010</td>
<td>27</td>
<td>25</td>
</tr>
<tr>
<td>2015</td>
<td>43</td>
<td>35</td>
</tr>
</tbody>
</table>

Source: Ministry of Economy

Available Potential of Renewable Energy Resources

The total available potential of individual types of renewable energy resources enables to increase their share in the overall energy supply (Table 16).

Table 16: Available Potential of Renewable Resources

<table>
<thead>
<tr>
<th>Source</th>
<th>Available potential</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PJ</td>
</tr>
<tr>
<td>Water energy</td>
<td>23.8</td>
</tr>
<tr>
<td>Large hydro-electric power plants</td>
<td>20.2</td>
</tr>
<tr>
<td>Small hydro-electric power plants</td>
<td>3.6</td>
</tr>
<tr>
<td>Biomass</td>
<td>75.6</td>
</tr>
<tr>
<td>Dendromass</td>
<td>47.0</td>
</tr>
<tr>
<td>Agricultural biomass</td>
<td>28.6</td>
</tr>
<tr>
<td>Bio-fuels</td>
<td>5.0</td>
</tr>
<tr>
<td>Biogas</td>
<td>6.9</td>
</tr>
<tr>
<td>Wind energy</td>
<td>2.2</td>
</tr>
<tr>
<td>Geothermal energy</td>
<td>22.7</td>
</tr>
<tr>
<td>Solar energy</td>
<td>18.7</td>
</tr>
<tr>
<td>TOTAL</td>
<td>154.9</td>
</tr>
</tbody>
</table>

Source: Slovak Energy Policy, Ministry of Economy of the Slovak Republic

The current use of renewables without considering hydropower is negligible. For small hydro there is an extended development programme with 250 selected sites for building small hydro plants, which could amount to a total installed capacity of 93 MW. Biomass is the renewable energy source with the highest additional mid-term potential of all RES, followed by biogas. Only a very small portion of the biomass potential is currently used (Figure 32). The Government’s priority is to use this source only in remote, mountainous, rural areas, where natural gas is not available.
Main Policies Supporting Renewable Energy

**RES-electricity**

The main relevant background pieces of legislation are:

- Energy Policy of the Slovak Republic (1/2006);
- Programme Supporting Energy Savings and Utilisation of RES (2000);
- Act No 656/2004 Coll. on Energy (obligatory purchase);
- Renewable Energy Concept (2003);

The 2004 Energy Act guarantees the priority regarding transmission, distribution and supply of RES-E and the issue of Guarantees of Origin. The Programme supporting Energy Savings and Utilisation of RES (2000) aims to create favourable conditions for investments in energy efficient technologies and utilisation of RES. Eligible projects include: construction of small hydro power plants, energy use from biomass, installation of solar collectors, the use of geothermal energy, and use of wind energy.

For renewable electricity sources different types of support schemes exist in the Slovak Republic. The first is a tax relief on the use of RES for electricity production. The tax exemption is valid for the calendar year, in which the facility commenced operation, and then for five consecutive years. In April 2003, the Ministry of Economy adopted further programmes, which aim to promote RES-E based on subsidies. This programme provides financial support of up to €100,000 for the (re)construction of RES-E facilities and it is supposed to be in force until the end of 2006.

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17 Renewable Energy Sources in the New Member States of the EU, Germany and Italy, December 2004
In 2005, a fixed feed-in tariff for RES-E was introduced. Decree No. 2/2005 of the Regulatory Office for Network Industries (2005) (RONI) set out the fixed feed-in tariffs available for RES-E. The example of feed-in tariffs in 2006 and 2007 is shown in Table 17. Current values for feed-in tariffs are published in the Decrees of RONI.

Table 17: Feed in tariff for individual type of RES

<table>
<thead>
<tr>
<th>Technology</th>
<th>2006 (SKK/MWh)</th>
<th>2006 (€/MWh)</th>
<th>2007 (SKK/MWh)</th>
<th>2007 (€/MWh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wind</td>
<td>1950 - 2565</td>
<td>55 - 72</td>
<td>1700 - 2940</td>
<td>51 - 88</td>
</tr>
<tr>
<td>Hydro &lt;5 MW</td>
<td>1950 - 2750</td>
<td>55 - 78</td>
<td>2000 - 2820</td>
<td>60 - 84</td>
</tr>
<tr>
<td>Solar</td>
<td>8200</td>
<td>231</td>
<td>8410</td>
<td>251</td>
</tr>
<tr>
<td>Geothermal</td>
<td>3590</td>
<td>101</td>
<td>3680</td>
<td>110</td>
</tr>
<tr>
<td>Biogas</td>
<td>2560 - 4200</td>
<td>72 - 118</td>
<td>2190 - 2650</td>
<td>65 - 79</td>
</tr>
<tr>
<td>Biomass combustion</td>
<td>2050 - 3075</td>
<td>58 - 87</td>
<td>2630 - 4310</td>
<td>79 - 129</td>
</tr>
</tbody>
</table>

Source: RONI (www.urso.gov.sk)

The prices have been set so that a rate of return on the investment is 12 years when drawing a commercial loan. These fixed prices will be increased for the next year by the core inflation index published by the Statistical Office of the Slovak Republic.

If some kind of EU fund or SK financial subsidy to build an electricity power plant is used, then price of feed in tariffs decreases. The price cuts down according to the level of subsidy (Table 18).

Table 18: The price cuts down according the level of subsidy

<table>
<thead>
<tr>
<th>Subsidy (total price of investment)</th>
<th>Percents down from the fixed tariff</th>
</tr>
</thead>
<tbody>
<tr>
<td>up to 30 %</td>
<td>4 %</td>
</tr>
<tr>
<td>up to 40 %</td>
<td>8 %</td>
</tr>
<tr>
<td>up to 50 %</td>
<td>12 %</td>
</tr>
<tr>
<td>above 50 %</td>
<td>16 %</td>
</tr>
</tbody>
</table>

Government regulation No.124/2005 enforcing the rules for the operation of the electricity market states that Guarantees of Origin will be issued by the Regulatory Office for Network Industries.

18 Exact level of feed in tariff depends on exchange rate. Here 1€ = 33.467 SKK
Voluntary certificates for renewable-based electricity (“Green certificates”). Direct support for the use of renewable energy sources for electricity generation is stipulated by the Government Decree No.124/2005. The measure defines conditions for renewable electricity producers, which must be fulfilled to obtain the certificate attesting the origin of electricity (“Green Certificate”).

Such a certificate entitles the producer to claim preferential fixed purchase prices from the purchaser (network operator) for the electricity produced. These prices for e.g. the years 2006 and 2007 are defined by the Amendment 1 of the RONI Order No.2/2006 of “On the scope of price regulation in the electricity sector”.

**RES-heat**

The Programme supporting Energy Savings and Utilisation of RES (2000) is also relevant for RES-H as eligible technologies include: energy use from biomass, installation of solar collectors, the use of geothermal energy, and the use of heat pumps.

In April 2003, the Ministry of Economy adopted a programme, which aims to promote energy savings and RES. This programme offers financial support of up to €100,000 for the (re)construction of renewable energy facilities. The support can cover up to 100% of bank interest rates, up to 75% of investment costs or up to 25% of non-investment costs of the relevant facility. The amount depends on the site and region where the facility is placed.

An act on RES and combined heat and electricity generation support is proposed. The designed way for the support of electricity generation:

- Setting fixed electricity prices based on installed capacity of a facility,
- Guaranteeing these prices for the period of 15 years,
- Changes in prices based on core inflation,
- Compulsory electricity take-off,
- Responsibility shift for 2MW discrepancy.
Environmental Policy Related to Energy

General Trends and Objectives

Actual Strategy of Slovakia in the area of environment protection can be briefly characterized as transfer from environment damage and pollution impacts disposal to pollution reasons disposal in harmony with the principle of subsidiarity and “polluter - pays principle”.

Supreme conceptual materials elaborated define policy of bad impacts on environment reduction by emission of pollutant and greenhouse gases decreasing, negative energy impacts limitation, agriculture and other economy activities. These materials are:

- Strategy, principles and priorities of Environmental policy of the Slovak Republic,
- National environmental action plan of the Slovak Republic I and II,
- Strategy of the Slovak Republic on Kyoto Protocol obligations fulfilment,
- Measures and recommendations of Strategy of the Slovak Republic on Kyoto Protocol obligations fulfilment.

Strategy, Principles and Priorities of Environmental Policy of the Slovak Republic

Document was approved by Government Resolution No. 619 of 7 September 1993 and Resolution of the National Council No. 339 of 18 November 1993. The document determined state policy priorities and defined long-term, medium-term and short-term strategy of environment protection performance. Content and time limits presented in particular targets were defined in connection with international agreements, EU directives and recommendations of UN bodies. Short-term strategy explicitly included national programme on greenhouse gases emission reduction and its implementation within 2000 ÷ 2010. The subject of the document regarding energy is mostly air and ozone layer protection and nuclear safety. The document appoints to:

- complete integrated system of legal regulations on air and ozone layer protection in harmony with EU law.
- reduce emission of basic air pollutants (SO₂, NOx, CO, CxHy, solid pollutants), volatile organic compounds, persistent organic compounds, heavy metals, CO₂ and other emission gases causing greenhouse effect in harmony with EU law and relevant international agreements.
- develop and implement national programmes aimed at CO₂ emission and other greenhouse gases not related to Montreal Protocol on substances invaded ozone layer reduction.
- introduce smog warning and regulatory systems and unified emergency system, protect of smog generation.
- use more fuels and various types of transport not polluting environment (e.g. gas, electricity, unleaded fuel).
• complete global monitoring and information system of environment – air.
• complete unified modern system of legal regulations, economy and moral barriers in protection against danger factors and nuclear safety.
• decrease noise impact, health harmful radiation, vibrations, electromagnetic field and acceptable heat pollution on population.
• create evaluation environmental risks system, review and indicate environmental availability of technologies and products.
• increase safety of nuclear and radiological nuclear equipment and workplaces with radioactive substances.
• complete global monitoring and information system of environment – radiation and other physical fields.

National Environmental Action Programme of the Slovak Republic I and II

The first national environmental action programme (NEAP I) includes measures targeted by the Strategy in all ten sectors of environment protection. The programme was accepted by the Slovak Government Resolution No. 350/1996. 9 regional (KEAP) and 79 district environmental action programmes (OEAP) are related to NEAP I. NEAP II was approved by the Slovak government in December 1999 and it assesses the fulfilment of its short- and medium-term goals and considers the feasibility of the other goals in the constantly changing environmental and general conditions of the country, Europe and the world. Air protection against pollutants, mostly greenhouse gases, global environmental safety, problems concerning rise, use and proper waste disposal belong among priorities of state environmental policy.

Strategy of the Slovak Republic on Kyoto Protocol obligations fulfillment

The document involves unified strategy of the Slovak Republic exclusively aimed at solving problems related to climate change and greenhouse gases emission reduction. Overall target of international community within UN Frame Agreement is stabilization of greenhouse gases in atmosphere concentration at level not having danger impacts on climatic system. The Slovak Republic will participate in these efforts and perform obligation admitted in harmony with world wide division of responsibilities. Three general aims – long-term, medium-term and short-term ones were defined for overall target achievement. By the year 2005, the aim of medium-term goals is achievement of greenhouse gases emission development allowing documented fulfilment of Kyoto Protocol obligation. Action plan on Kyoto Protocol obligations fulfilment is closely related to this strategy. The plan reports about measures, quantification of its effect on greenhouse gases emission reduction together with costs estimation for measures implementation, competences suggestion and schedule for measures introduction.
Measures and recommendations of Strategy of the Slovak Republic on Kyoto Protocol obligations fulfillment

Analysis was especially aimed at burning and transformation of fossil fuels sector crucially contributing to total CO₂ generation, but presenting the greatest possibilities for this emission reduction at the same time. On base of CO₂ emission generated by combustion and transformation of fossil fuels view, SR has a real chance to fulfill reducing obligation according to Kyoto Protocol in the case of relative balanced economy development. Analysis target within Action plan was searching for other reducing potential allowing tightened obligation performance in another target period as well as utilization of emission reducing reserve within flexible mechanisms for investments and technologies innovation.

Environmental Policy Implementation

Ministry of Environment is responsible for the environmental policy implementation in the Slovak Republic. Slovak Inspectorate of the Environment supervises performance of the acts in the field of environment protection. Slovak Environmental Agency is active in the field of consulting, providing analyses, coordinating activities and projects.

Integrated prevention and control of environmental pollution is specified in Act No. 245/2003 Coll. on Integrated Prevention and Control of Environmental Pollution and on Amendments of Some Acts. This act regulates integrated prevention and control of environmental pollution, discretions and duties of operators of industrial activities operations and bodies of public administration tasks in integrated prevention and pollution control, information system of integrated prevention and pollution control, conditions of specialized skills for professional consulting provided in the field of integrated prevention and pollution control.

Environmental Levies and Taxes

Act No. 401/1998 Coll. on Levies for Air Pollution and its Amendments determines facilities polluting operators to pay obligatory levies depending on amount and sort of pollutants. The facilities with worse environmental efficiency (with higher level of emission limits – B category) are obliged to pay progressive higher levies (according to indexes defined for every year) by 2007. After this date, the facilities in B category will have to follow the same emission limits as the ones in A category. The operation of this facility will not be possible if the conditions are not fulfilled.

Environmental Fund

Act No. 587/2004 Coll. on Environmental Fund institutes an environmental fund for state support for environmental protection. The fund’s resources can be provided and used to support activities aimed at achieving state environmental policy targets at state, regional or local level; survey, research and development support, oriented at environment determination and improvement; environmental education, training and publicity support; support for handling extremely serious environmental situations,
removal of accidents’ effects and degradation of waters extremely endangering or
damaging the environment; fund administration; providing loan instalment by banks
and other legal entities and its interests. The fund is regulated by the Ministry of
Environment of the Slovak Republic.

**CO₂ Emissions and Energy Efficiency**

Slovakia is committed under the Kyoto Protocol to limiting average annual greenhouse
gas (GHG) emissions in 2008-12 to 8% less than 1990 levels. In recent years, actual
emissions have been markedly lower than this target. The EEA has estimated that,
with current and planned measures, GHG emissions in 2010 will be 23% below 1990
levels, or 15% below the target. The Slovak Republic therefore has a good chance
to engage in emission trading on the sellers’ side. To date, Slovak Republic has hosted
one JI project, with a size of 13,000 ERUs.

In 2004, GHG emissions in Slovakia were 51.6 Mt CO₂ equivalent, compared to 72.1 Mt
of CO₂ equivalent in 1990 (Table 19).

Table 19: CO₂ emission development in Slovakia (Mt of CO₂ equivalent)

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<tr>
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<tbody>
<tr>
<td>1990</td>
<td>72.1</td>
<td>58.6</td>
<td>51.7</td>
<td>54.0</td>
<td>52.4</td>
<td>48.6</td>
<td>50.9</td>
<td>51.6</td>
</tr>
</tbody>
</table>

Source: The Fourth National Communication of the Slovak Republic on Climate change, Ministry of Environment, 2005

The most important source of CO₂ is combustion and transformation of fossil fuels
that represent more than 95% of CO₂ in Slovakia and around 80% of total GHG
emissions. Total net CO₂ emissions increased in 2004 by more than 1% compared
with the year 2002, but were still 28% lower than the reference year of 1990. The
most important changes occurred in the energy sector: a significant increase by over
1 Mt of CO₂ emission compared to 2002 was caused by stationary sources. Among the
most important reasons is the recovery of the Slovak economy accompanied by new
pollution sources and a shift to solid fuels due to the increased prices of natural gas.
Similarly, an increased trend in CO₂ emissions can be seen in the transport sector.

The development of CO₂ emissions in energy (combustion & energy industry), transport
and industrial processes (mineral products & metal production) is presented in Figure 33.

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20 In 2002, energy production and use accounted for 80% of total national Greenhouse Gas Emissions – 66% from Electricity and Heat Production, 11% from Transport and 3% from Fugitive Emissions.
Although the energy sector has a decisive share of CO₂ emissions, the level of these emissions is relatively low due to the high share of nuclear power plants in electricity production. The leading electricity producer Slovenske Elektrarne (member of the ENEL group) declares very low specific CO₂ emissions related to the electricity produced: 181 kg CO₂ per MWh produced in 2005.
Overall Assessment of Progress

Since the last Energy Charter In-Depth Review in 1999, Slovak Republic has seen enormous changes in its economy and its energy sector. Major policy changes have been introduced in relation to taxation, regulation, employment and the looming introduction of the Euro, providing one of the most dynamic policy environments in Europe.

The Slovak economy has grown very strongly without any concurrent increase in energy use, leading to significant declines in energy intensity. Over 10 years, the Slovak economy has grown by around 50% while energy use has remained largely stable.

A substantial movement of energy prices toward market levels for all users has introduced a much better market environment for energy efficiency, although fully efficient pricing has yet to be achieved.

It is evident that the energy efficiency policy framework and the corresponding secondary legislation have been continuously improved in the time since 1999, in particular through the EU accession process. Slovak Republic has made considerable progress in implementing a range of relevant EU energy efficiency directives in a relatively short time. There is a fairly complete policy framework for energy efficiency now in place. The preparation of an Energy Efficiency Action Plan and Energy Efficiency Act are important steps forward in the development of Slovak Republic’s Energy Policy. A focus on further development and implementation is becoming a priority.

The indicators quantify the progress achieved by Slovak Republic with the best results being recorded in the industrial sector. The transport sector is the furthest away from achieving progress in energy efficiency. The challenge for energy efficiency policy makers will be to ensure efficient implementation of the policy measures and coherence among the various sectoral instruments in the next years.

As a consequence of the introduction of this broad policy framework, the Ministry of Economy as well as the Slovak Innovation and Energy Agency have undertaken substantial efforts to review the policy progress in energy efficiency and to determine gaps.

Comparing the current situation with the key recommendations from the First In-depth Review of Slovak Republic in 1999, it becomes evident that although the progress is important, there are still areas where progress is still modest and further efforts are needed (see Annex 5).

Progress Evaluation by Key Energy Efficiency Indicators

On an aggregate level, progress in energy efficiency was quite significant in the period 2000-2007 (Figure 34): while the economy (GDP) grew by 6% annually in real terms on average during this period, the increase of final energy consumption (FEC) amounted to 0.41% per year and that of the primary energy consumption by 0.25%
per year. These substantial differences in growth of the economy and of the energy consumption led to a decrease of the final energy intensity (FEI) by 4.5% annually, and the primary energy intensity (PEI) by 5.4%. These improvements in energy intensities were considerably larger than the average for the EU27. Still, the absolute levels of primary intensities are still much higher in Slovak Republic than in the EU27 on average.

Figure 34: Aggregate progress indicators for energy efficiency

Aggregate indicators are influenced by many factors such as structural changes in the economy or comfort factors. For this reason the Odyssee project for energy efficiency indicators has introduced a composite index which eliminates factors not directly linked to energy efficiency (as much as the statistical basis of a country allows for it). The figures below show the overall ODEX and the sectoral energy efficiency indices for the Slovak Republic compared to the EU27 countries and its average (Figure 35). The energy efficiency index ODEX is calculated as a weighted average of the unit energy consumption index of each sub-sector or end-use, with a weight based on the relative consumption of each sub-sector in the base year. A decrease means an energy efficiency improvement. Overall, given the relative dominance of energy use in industry in Slovak Republic and the good indicator for this sector, the Slovak ODEX was decreasing twice as much as for the EU27 in the period 2000 – 2004/5.
While the industrial energy efficiency index (Figure 36) shows a slightly better performance than the same index for the EU27, (influenced by the rapid re-structuring and modernization of the Slovak economy over the past years), improvements to the index for the residential sector slowed in recent years, ending with a similar performance as for the EU27 on average (Figure 37). Given the high energy consumption of the sector, this progress is not yet sufficient. For the transport sector, there is a slightly better performance than the same index for the EU27 (Figure 38).
Energy efficiency legislation, policies and programmes

Slovak Republic has achieved progress over the last years in the introduction of a set of medium to long-term strategies, specific legislation for energy efficiency, and concrete action plans, supported by the general move in the country towards EU accession.
and the interaction with other EU Members. This is evidenced by the multitude of supporting programmes for the residential and industry sector.

In the frame of the energy efficiency law and in particular with the introduction of the First National Energy Efficiency Action Plan required by the EU Directive on Energy Efficiency and Energy Services, Slovak Republic has developed a detailed Slovak Energy Policy, which was approved in January 2006, and includes measures in all key sectors. In this context, Slovak Republic is also working to introduce suitable policy and progress monitoring provisions.

Generally, the integration of energy efficiency in other economic, environmental and social policies has been started, for example, by integrating energy efficiency promotion into industrial innovation funds but it requires continued efforts. While this progress has been very positive, there is still a need for a more robust system of evaluation to ensure programs are effective and that strategies are comprehensive and well-targeted.

**Institutional framework**

The Ministry of Economy has located its energy efficiency responsibilities to a small staff within the Department of International Relations in the Energy Section. This has worked well during the period of adapting the EU Directives into national legislation. However, the large and increasing scope of energy efficiency policy requires a different institutional setting. The leadership and coordination role the Ministry of Economy has to play in relation to energy efficiency policies across all sectors may require specific, more visible and more operational capacity and resources.

For Slovak Republic to continue and improve on its energy efficiency performance will require strong implementation of existing policies and programs, and of energy efficiency legislation currently before the Parliament or being developed. This will require dedicated resources in the Ministry of Economy and sufficient resources in this and other Ministries to achieve desired outcomes. Better integration of energy efficiency in transport policy will also be required.

The role of the Slovak Innovation and Energy Agency as a central body in the implementation of energy efficiency in the country has been continuously strengthened over the years. This is evidenced by the efforts to adapt the structure of the agency to new challenges and by its steady growth. Further challenges are ahead. In particular the organization of the market for energy services in the frame of the Energy Service Directive will require further development of the agency and of other stakeholders, in particular at regional level. The Slovak Innovation and Energy Agency has a very important role in the implementation of the Operational Programme “Competitiveness and Economic Growth” – priority line “Energy”.

**Energy markets and pricing**

Market opening in Slovakia for non-household customers in both the electricity and gas sectors was implemented on 1 January 2005, while for households it was opened on 1st July 2007. Competition in both markets has not developed strongly and the main
obstacle is the dominance of the incumbent companies. The transmission system operator for electricity is separate in ownership terms from the main generators and suppliers, while the gas transmission operator was legally unbundled in June 2006. Electricity and gas distribution systems were legally separated from generation or supply by July 2007; however, legal unbundling for gas has been completed earlier and in electricity was finalized in January 2007.

Since the beginning of 2003, the independent Regulatory Office for Network Industries (RONI) sets the prices of heat, electricity and natural gas. Since 1 January 2004, energy prices cover economically eligible costs and socially acceptable profit of their producers and suppliers. Prices do not contain any cross-subsidies among particular end-users categories.

Energy efficiency funding

The Slovak government is making efforts to coordinate and create synergies between different financing mechanisms and funds in order to implement energy efficiency programmes. There are several different funding instruments to support energy efficiency in Slovak Republic. Energy efficiency is generally integrated into the national energy policy and is subject to annual financing from the state budget. There are obvious opportunities to use EU structural funds, combined with national budgetary resources.

Legislation setting up an Energy Efficiency Fund is being developed, and its passage would allow for more stable and adequate financing for energy efficiency. Mechanisms will also need to continue to develop to ensure private sector financing for energy efficiency continues to grow.

Renewable energy, district heating and cogeneration

The 2004 Energy Act guarantees the priority regarding transmission, distribution and supply of RES-E and the issuance of Guarantees of Origin. In 2005, fixed feed-in tariffs for RES-E were introduced. A proposed act to support RES and combined heat and electricity generation will guarantee feed-in-tariffs for electricity generation for a period of 15 years. This will provide greatly improved security of investment.

The Slovak Government by its Decree No 246/2006 in compliance with the Directive 2003/30/EC on the support of the use of bio fuels in transport determined the minimum quantity of automotive fuels produced from renewable energy sources (“Bio fuels”) as substitutes for petrol and diesel. While these measures will lead to significant increases in the share of renewable energy, further policies will be required to meet long-term targets for the contribution of renewable energy to national energy supply.
Data collection, monitoring and forecasting

Slovak energy statistics are fully harmonized with the European System of Energy Statistics from 2000. Before this year, other methodologies of data collection and processing were applied, making data in time series to 2000 not fully compatible with data structure of EU 15 countries and some data are completely missing.

Through the participation of the Slovak Innovation and Energy Agency in the European monitoring project Odyssee-MURE for energy efficiency, much effort has been undertaken to improve the data situation and to collect previously scattered data in a homogeneous database. However, the statistical data still present gaps, which may require dedicated examination in order to better understand energy efficiency trends in the country.

The Slovak governmental institutions provide important information about energy efficiency activities to the national and international public through Internet and publications in Slovak and English language. More efforts are needed to better structure, further develop, profile, and present the information, in order to address different target groups, including the general public.
Recommendations

The following recommendations are offered to promote energy efficiency in Slovak Republic.

General Recommendations

- The government should ensure that all supply and demand options are equally considered in meeting future energy needs.
- Future energy strategies and policies should be supported by robust analysis of economic energy efficiency potentials and barriers impeding the realization of these potentials. This will support the development of a second-phase Energy Efficiency Action Plan (EEAP) that is well targeted and allocates funds to areas delivering the greatest benefits in terms of energy efficiency.
- Future energy strategies and policies should be based on meeting long-term objectives and could consider specific measurable energy efficiency targets for key sectors.
- The government should continue the process of reforming the energy market and develop mechanisms for promoting energy efficiency compatible with the process of liberalization and completion of the internal EU energy market.
- The passage of the proposed Energy Efficiency Act and associated Energy Efficiency Fund Act should be facilitated as the basis for a proactive approach to energy efficiency policies.

Institutional framework

- Delivering the objectives of the Energy Efficiency Act and the Energy Efficiency Action Plan will require that adequate, certain, long-term staffing and resources be allocated to development and implementation in all relevant Ministries and agencies.
- The government should create an identifiable energy efficiency unit within the Ministry of Economy to provide the appropriate leadership within the government.
- As the Slovak Innovation and Energy Agency (SIEA) is the key implementing agency for the Energy Efficiency Action Plan and other energy efficiency activities, the Government should ensure stable and transparent funding for the SIEA. Financial resources should be bundled in visible and operational national energy efficiency programs.
- The economic and administrative implications of meeting EU Energy Efficiency Directives should be assessed to ensure adequate resources are provided.
- Interactions between State, regional and municipal governments and their agencies should be improved to promote effective action on energy efficiency.
- The government should ensure involvement of private stakeholders, business associations and NGOs in the implementation of energy efficiency policies and activities to achieve targets.
The Ministry of Economy should build on good coordination with other Ministries and with other governmental bodies to effectively advance the integration of energy efficiency into all State policies.

**Energy Market and Pricing**

- The government should continue its efforts towards energy market reforms in line with principles of efficient pricing. Where concerns arise over the social impacts of increased pricing, consideration should be given to methods other than pricing to address these (e.g. direct financial compensation or tax adjustments).
- Continued development of energy market regulation should support the development of an effective energy services market.
- The government should continue to facilitate effective disclosure of pricing and consumption information to consumers to facilitate a more competitive energy market.

**Energy efficiency funding**

- The Energy Efficiency Fund Act should be adopted and implemented as soon as possible. Alternative options for capital raising from the private sector should be explored.
- EU structural funding for energy efficiency should be directed as far as possible on steps to achieve market transformation toward investments in energy efficiency that minimize the need for ongoing government intervention. This will be assisted by the evaluation of structural funds to occur in 2008/09.
- The government should consider improved framework conditions to develop an active energy services market, including participation of industry, households, finance institutions, and other stakeholders.
- The government should accelerate the identification and removal of any barriers to the use of ESCO services.
- The government should ensure the best possible coordination of international financing (including structural funds, EBRD credit lines, etc) with domestic State-budget financing.

**Specific energy efficiency programmes and measures**

- Given the existence of common building types, standard packages of energy efficiency upgrades for residences in these buildings should be developed and widely distributed. Funding schemes to complete these energy efficient renovations should contain streamlined procedures and time frames.
- To allow a greater number of renovations to be supported from available State funding, consideration should be given to the conditions of project support contributed by the State.
- The government should continue to promote energy performance in the building stock while also safeguarding sustainable district heating systems, in cooperation with housing cooperatives and district heating companies.
- Municipal governments could manage demonstration programs in constructing high efficiency buildings and using these as educational tools for the wider community.
Energy efficiency must be included as an integrated part of transport planning. Consideration should be given to introducing energy efficiency measures in transport in parallel with completion of major new transport infrastructure.

The Ministry of Economy and the Ministry of Transport should ensure strong coordination on energy efficiency policies.

The government should complement the introduction of auditing requirements in the Energy Efficiency Act with measures to continuously ensure high quality, raise awareness of energy efficiency, and support movement toward a more commercial environment for improving energy efficiency in industry.

**Renewables and CHP**

- The government should continue to promote renewable energy, including through the proposed extension of feed-in tariffs to 15 years. The approach to feed-in tariffs could benefit from transparency in setting tariff levels to ensure optimal outcomes, including in relation to support for energy efficiency.
- The government should develop a more detailed strategy to support greater penetration of biomass to achieve long-term renewable energy targets, especially in heat production where it is most cost-effective. This should be developed through active coordination between the Ministries of Economy, Environment and Agriculture to ensure all issues in production and use of biomass are well integrated.

**Data collection and monitoring**

- The government should facilitate collection of statistical data required to establish indicators for energy efficiency.
- The government should improve its monitoring and analytic capacities in energy efficiency as a basis for future policy development, including decisions on financing.
Annexes

Annex 1: General economics and energy data

Table 20: Energy Balance

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<tbody>
<tr>
<td>Total Primary Energy Production</td>
<td>5284</td>
<td>5043</td>
<td>6326</td>
<td>6685</td>
<td>6821</td>
<td>6590</td>
<td>6452</td>
<td>6609</td>
<td>6619</td>
<td>5956</td>
</tr>
<tr>
<td>Net imports</td>
<td>18480</td>
<td>14229</td>
<td>15243</td>
<td>15864</td>
<td>16380</td>
<td>16477</td>
<td>17422</td>
<td>17456</td>
<td>17315</td>
<td>17677</td>
</tr>
<tr>
<td>Total Primary Energy Supply (TPES)</td>
<td>21315</td>
<td>17818</td>
<td>17770</td>
<td>18624</td>
<td>18779</td>
<td>18673</td>
<td>18380</td>
<td>18869</td>
<td>18679</td>
<td>18084</td>
</tr>
<tr>
<td>Total Final Consumption (TFC)</td>
<td>15751</td>
<td>10825</td>
<td>11151</td>
<td>11837</td>
<td>11964</td>
<td>11409</td>
<td>11319</td>
<td>11748</td>
<td>11428</td>
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Table 21: Total Primary Energy Supply Structure

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<td>-194</td>
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Total Primary Energy Supply | 21317 | 17819 | 17770 | 18625 | 18778 | 18672 | 18380 | 18871 | 18678 | 18085 |

### Table 22: Total Final Energy Consumption

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<td>1021</td>
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<td>1004</td>
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### Table 23: Basic Energy Related Indicators

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<td>5.40</td>
<td>5.38</td>
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<td>5.38</td>
<td>5.38</td>
<td>5.38</td>
<td>5.38</td>
<td>5.39</td>
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<tr>
<td>GDP (billion 2000 US$)</td>
<td>18.95</td>
<td>17.30</td>
<td>20.40</td>
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<td>22.00</td>
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<td>GDP (billion 2000 US$ PPP)</td>
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<td>63.80</td>
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<td>0.88</td>
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<td>TPES/Population (toe per capita)</td>
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<td>3.42</td>
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<td>4 945</td>
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<td>5 050</td>
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<sup>23</sup> CO2 emissions from fuel combustion
Table 24: Electricity generation

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Table 25: Heat production

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Annex 2: Selected end-use data tables

Table 26: Total Final Energy Consumption by Sector

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Table 27: Final Energy Consumption of the Residential Sector

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### Table 28: Final Energy Consumption of the Service Sector

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<td>1327</td>
<td>1376</td>
<td>1360</td>
<td>972</td>
<td>722</td>
<td>397</td>
<td>316</td>
<td>901</td>
<td>996</td>
</tr>
<tr>
<td>Coal and Coal Products</td>
<td>1604</td>
<td>497</td>
<td>133</td>
<td>120</td>
<td>184</td>
<td>1</td>
<td>95</td>
<td>27</td>
<td>78</td>
</tr>
<tr>
<td>Combustible Renewables&amp;Waste</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>20</td>
<td>3</td>
<td>2</td>
<td>5</td>
<td>2</td>
<td>5</td>
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<tr>
<td>Total Services Sector</td>
<td>3681</td>
<td>2611</td>
<td>2180</td>
<td>2092</td>
<td>1857</td>
<td>1229</td>
<td>1476</td>
<td>1757</td>
<td>1886</td>
</tr>
</tbody>
</table>

25 Source: Odyssee database version 2007 and the year 2006 according to Slovak Innovation and Energy Agency

### Table 29: Final Energy Consumption of the Industry Sector

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
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<tbody>
<tr>
<td>Coal and coal products</td>
<td>1897</td>
<td>1498</td>
<td>1122</td>
<td>1014</td>
<td>999</td>
<td>1093</td>
<td>1075</td>
<td>1021</td>
<td>1014</td>
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<tr>
<td>Crude, NGL and feedstocks</td>
<td>12</td>
<td>0</td>
<td>0</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<tr>
<td>Petroleum products</td>
<td>1361</td>
<td>139</td>
<td>219</td>
<td>372</td>
<td>418</td>
<td>344</td>
<td>300</td>
<td>313</td>
<td>252</td>
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<tr>
<td>Natural gas</td>
<td>1333</td>
<td>1089</td>
<td>1117</td>
<td>1060</td>
<td>1249</td>
<td>1005</td>
<td>855</td>
<td>969</td>
<td>954</td>
</tr>
<tr>
<td>Combustible renewables and waste</td>
<td>174</td>
<td>11</td>
<td>23</td>
<td>252</td>
<td>223</td>
<td>275</td>
<td>294</td>
<td>294</td>
<td>256</td>
</tr>
<tr>
<td>Electricity</td>
<td>1291</td>
<td>787</td>
<td>838</td>
<td>832</td>
<td>776</td>
<td>882</td>
<td>922</td>
<td>949</td>
<td>1019</td>
</tr>
<tr>
<td>Heat</td>
<td>18</td>
<td>29</td>
<td>18</td>
<td>21</td>
<td>25</td>
<td>155</td>
<td>99</td>
<td>82</td>
<td>66</td>
</tr>
<tr>
<td>Total Industry Sector</td>
<td>6086</td>
<td>3553</td>
<td>3337</td>
<td>3551</td>
<td>3690</td>
<td>3754</td>
<td>3545</td>
<td>3628</td>
<td>3561</td>
</tr>
</tbody>
</table>
Table 30: Energy Consumption of the Industry Sector by Subsector

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Iron and Steel</td>
<td>2065.35</td>
<td>1842.92</td>
<td>1882.13</td>
<td>1709.85</td>
<td>1771.87</td>
<td>2024.49</td>
<td>1998.29</td>
<td>1921.00</td>
</tr>
<tr>
<td>Chemical and Petrochemical</td>
<td>751.34</td>
<td>625.95</td>
<td>643.32</td>
<td>717.90</td>
<td>677.20</td>
<td>523.99</td>
<td>493.89</td>
<td>440.31</td>
</tr>
<tr>
<td>Non-Metallic Minerals</td>
<td>436.33</td>
<td>461.47</td>
<td>517.32</td>
<td>499.54</td>
<td>460.33</td>
<td>451.77</td>
<td>408.32</td>
<td>496.45</td>
</tr>
<tr>
<td>Non-Ferrous Metals</td>
<td>161.23</td>
<td>171.22</td>
<td>160.38</td>
<td>165.21</td>
<td>172.30</td>
<td>204.40</td>
<td>234.65</td>
<td>241.01</td>
</tr>
<tr>
<td>Food and Tobacco</td>
<td>259.26</td>
<td>272.15</td>
<td>192.77</td>
<td>208.54</td>
<td>289.38</td>
<td>235.34</td>
<td>200.37</td>
<td>210.62</td>
</tr>
<tr>
<td>Mining and Quarrying</td>
<td>10.66</td>
<td>11.35</td>
<td>9.03</td>
<td>10.23</td>
<td>8.77</td>
<td>8.60</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Machinery</td>
<td>351.79</td>
<td>293.57</td>
<td>253.35</td>
<td>236.17</td>
<td>224.68</td>
<td>264.64</td>
<td>205.95</td>
<td>226.08</td>
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<tr>
<td>Construction</td>
<td>17.70</td>
<td>11.44</td>
<td>11.44</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Textile and Leather</td>
<td>192.72</td>
<td>136.22</td>
<td>88.82</td>
<td>61.24</td>
<td>68.46</td>
<td>75.64</td>
<td>79.21</td>
<td>65.35</td>
</tr>
<tr>
<td>Paper, Pulp and Printing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-specified/Other</td>
<td>1592.43</td>
<td>370.03</td>
<td>249.37</td>
<td>209.11</td>
<td>253.04</td>
<td>266.01</td>
<td>210.24</td>
<td>276.19</td>
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<tr>
<td>Total Industry Sector</td>
<td>5810.45</td>
<td>4201.89</td>
<td>4010.25</td>
<td>3828.03</td>
<td>3927.49</td>
<td>4055.05</td>
<td>3839.52</td>
<td>3877.01</td>
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</tbody>
</table>

26 Odyssee database version 2007
Annex 3: Energy Prices\textsuperscript{27} and Taxation\textsuperscript{28} in Slovakia

Figure 39: Price electricity for household in 2007 - Comparison among countries EU27

Table 31: Structure of average electricity price for household

<table>
<thead>
<tr>
<th>Price\textsuperscript{29}</th>
<th>type of service</th>
<th>2007</th>
<th>2008</th>
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<tbody>
<tr>
<td>Generation</td>
<td>Power electricity</td>
<td>1 656</td>
<td>1 809</td>
</tr>
<tr>
<td></td>
<td>Tariff for system operation</td>
<td>127</td>
<td>88</td>
</tr>
<tr>
<td></td>
<td>System service</td>
<td>323</td>
<td>293</td>
</tr>
<tr>
<td>Network charge</td>
<td>Distribution and transfer of electricity including losses</td>
<td>1696</td>
<td>1721</td>
</tr>
<tr>
<td>Total price</td>
<td></td>
<td>3 802</td>
<td>3 911</td>
</tr>
</tbody>
</table>

\textsuperscript{27} Source: Regulatory Office for Network Industries
\textsuperscript{28} Source: Ministry of Finance of the Slovak Republic
\textsuperscript{29} Exchange rate between € and SK is 30.126 SK/€ for joining the European Monetary Union (EMU) in January 2009
Figure 40: Structure of average electricity price for household in 2008 – total price

- Distribution and transfer of electricity including losses: 44.00%
- System service: 7.49%
- Tariff for system operation: 2.25%
- Power electricity: 46.25%

3911 SK/MWh

Figure 41: Comparison of Development of average gas price for household for countries EU27
Figure 42: Comparison of Development of average gas price for Industry for countries EU27

Figure 43: Structure of average gas price for household in 2008
**Figure 44: Development of Average price of heat**

**Table 32: Energy Taxes in Slovakia**

<table>
<thead>
<tr>
<th>ESA 95, % of GDP</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
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</thead>
<tbody>
<tr>
<td>Total taxes</td>
<td>19.4</td>
<td>18.3</td>
<td>18.0</td>
<td>18.7</td>
<td>17.9</td>
<td>18.1</td>
<td>16.9</td>
<td>17.1</td>
<td>16.5</td>
</tr>
<tr>
<td>Energy taxes</td>
<td>2.0</td>
<td>1.7</td>
<td>1.9</td>
<td>2.2</td>
<td>2.2</td>
<td>2.3</td>
<td>2.2</td>
<td>2.0</td>
<td>1.9</td>
</tr>
<tr>
<td>Excise duty on mineral oil</td>
<td>2.0</td>
<td>1.7</td>
<td>1.9</td>
<td>2.1</td>
<td>2.2</td>
<td>2.1</td>
<td>2.0</td>
<td>1.8</td>
<td>1.7</td>
</tr>
<tr>
<td>Excise duty on natural gas</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.0</td>
</tr>
<tr>
<td>Excise duty on electricity</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.0</td>
</tr>
<tr>
<td>Excise duty on coal</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.0</td>
</tr>
<tr>
<td>Perc. of energy taxes in total taxes</td>
<td>10.2</td>
<td>9.4</td>
<td>10.5</td>
<td>11.5</td>
<td>12.5</td>
<td>11.7</td>
<td>11.7</td>
<td>10.6</td>
<td>10.5</td>
</tr>
</tbody>
</table>

**Others (in 2008)**
- Motor vehicle tax (0.2% of GDP)
- Air pollution taxes (0.1% of GDP) – responsibility of Environmental Fund
- Nuclear facility tax (0.0% of GDP)
- Payment for mining area, water,...(0.0% of GDP)
- Paym. for storage of gasesor liquids (0.0% of GDP)

**Energy security (including RES and ENEF):**

**Energy policy:**
Energy Policy of the Slovak Republic (01/2006)

**Energy efficiency in general:**
Energy Efficiency Concept of the Slovak Republic (07/2007)

**RES:**
Strategy of the Higher Utilisation of RES (04/2007)
Programme for support of utilization of biomass and solar collectors (09/2007) (unofficial document, without any financial resources)
National report on progress by achievement of goals for year 2007

**Biofuels:**
Report on use of biocomponents in engine fuels for 2007
Draft Concept of higher utilization of biofuels in transport in conditions of the Slovak Republic (informative document 04/2008)

**Regulatory policy:**
Regulatory policy for 2009 - 2011
Decree of RONI No. 2/2008 (feed-in tariffs)

**Buildings:**
Energy Performance of Buildings Concept (06/2008)

**Acts (mostly with amendments):**
Energy (gas and electricity): 656/2004 on energy + regulations in force
Energy (heat): 657/2004 on thermal energy + regulations in force
Regulatory Act: 276/2001
Energy Labelling & minimum energy efficiency requirements of equipment:
Governmental decrees
RES & Cogeneration: Draft in preparation after ISC
Annex 5: Recommendations from the In-depth Review of Slovak Republic in 1999

This Annex provides the review team’s assessment of progress against the recommendations of the In-Depth Review of Slovak Republic undertaken in 1999. In making this assessment, the team recognises the many changes in the economic and policy environment in the country. The team also recognises the fact that the 1999 review was the first In-Depth Energy Efficiency Review completed by the PEEREA Working Group and did not, for example, group recommendations by category. The recommendations from the first review are evaluated with respect to their achievement in three categories: A signifies “largely achieved,” P signifies “substantial progress was made,” M recommendation only moderately achieved.

Recommendations

• while discussion on the new energy policy includes energy efficiency as a policy, there is a need to ensure that other elements of energy policy (nuclear, liberalisation of markets, privatisation) and energy efficiency objectives are coordinated; P

• there is a need to define more clearly how to measure success of the energy efficiency programme. There is a need to have measurable targets and independent monitoring of the programmes; M

• government objectives and priorities should be supported by relevant budgets for energy efficiency; P

• analysis is needed to know to what extent energy efficiency can make up the planned closure of two nuclear units (total loss of 800 MW) in 2006-2008; P

• efforts to decrease subsidies on end-use prices must continue; there is need to ensure that subsidies at all elements of the energy cycle are identified and eliminated. Social problems arising from market pricing should be solved in the context of social policy; P

• every effort needs to be made to harmonise data definitions and data collection as part of the Slovak Republic’s compliance with the acquis communautaire of EU legislation and in line with IEA requirements; A

• selling excess electricity to the grid must be monitored during the process of price liberalisation to avoid barriers for auto-producers gaining access; A
• energy inspection audits need to give greater attention to motivating the economic actors, identifying possible solutions to improved energy efficiency and disseminating best practices;

• greater emphasis should be placed on identifying and removing barriers to the use and promotion of ESCOs and third party financing (including improvements to the system of drawing up contracts in this area). This is particularly true for the public sector;

• development of a programme for public sector buildings and energy use should be considered;

• actions for improving metering for individual dwellings should be stimulated;

• emissions fees should be reviewed to better encourage companies to invest in energy efficiency measures, while at the same time maintaining or enhancing the competitive position of the industries;

• the government’s climate change programme, and the instruments used by the Ministry of Environment, need to incorporate a greater degree of focus on improving energy efficiency as one of the most cost-effective options available;

• re-assessment needs to be undertaken of the potential impact, priorities and resource requirements of existing and planned energy efficiency measures to maximise their cost-effective contribution to meeting the Kyoto climate change target;

• development of government policy on JI which balances the need for foreign investments, to meet emissions targets and the need to make best use of domestic financial resources;

• adequate human and material resources are required for effective implementation, notably through the SEA, of government energy efficiency measures;

• there should be an analysis of the potential and barriers to CHP, eventually leading to a strategy for promoting CHP.
Energy Efficiency Policies and Programmes

Annex 6: ODYSSEE – Energy Efficiency Profile Slovak Republic

Energy Efficiency Profile: Slovakia

October 2008

Energy Efficiency Trends

Overview
Over the period 1998 – 2006 the energy efficiency index for the total (all sector) final energy consumption (ODEX) decreased by 16%. Industrial sector was the main contributor to this development. Because of the limitation of available data and methodological changes that occurred during the monitored period, this index is quite approximate.

Industry
The energy efficiency improvement in industry is 16% since 1998, of which more than 40% for chemicals. The cause lies in the switchover from heavy chemistry to less energy intensive production. Certain improvement is visible in steel industry (10%).

Households
Between 1998 and 2006 the energy efficiency index in the household sector has decreased by 7%. In this sector contradictory developments can be observed: severe price increase of electricity, gas and heat delivery for the households (electricity and gas price increases started in 1999); better housing conditions (increased floor area of the new flats), increased comfort and utilisation of more and better appliances.

Transport
In this sector road transport achieved significant improvement (21%); on contrary rail transport realized poor results.

Source: ODYSSEE data base


**Institutions and programmes**

Key responsibility for the energy policy preparation and introduction in the Slovak Republic lies on the Ministry of Economy; the policy is approved by the Government and implemented by relevant ministries (Ministry of Environment, Ministry of Construction and Regional Development). Energy Ministry of Environment cares for environmental issues linked with energy.


**Industry**

Together with the general energy conservation measures set by the legislation (obligatory energy managers, obligatory boiler checks and minimum boiler efficiency) there are programmes subsidising energy conservation and RES utilisation and the support of RES through Green Certificates and obligatory feed-in tariffs. The Programme on the Support of Energy Conservation and RES Utilisation is in operation since 2008. Emission trading is already under way.

**Households, Services**

The effort is focused on the energy consumption of buildings. Thermal insulation standards exist since the early sixties, but more stringent regulations started in the nineties. The labelling of domestic appliances has started in 2002 and the awareness of the population about this information means is already significant. Under the programme “Subsidies for Housing Development” energy conserving activities go on since 2007.

**Transport**

Highway toll, motor vehicle tax and excise tax on motor fuels could help to conserve energy and in some cases to switch over from road to rail, however, no significant effect of these has been observed so far. Prescribed minimum quantity of biofuels is in force since 2006.

**Energy prices and taxes**

Until 1999 prices of electricity and gas for households were practically stable, unrealistically low and cross subsidised. One started to eliminate this price distortion as late as in the year 1999, naturally the price increases were then very steep and this brought about strong energy awareness and energy conservation in the households. Similar, though not so high price increases, produced similar energy conservation effects in industry and services.

---

**Selected Energy Efficiency Measures**

<table>
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<tr>
<th>Sectors</th>
<th>Title of the measure</th>
<th>Valid*</th>
</tr>
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<tbody>
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<td>Industry</td>
<td>Mandatory Energy Manager in Heat Delivery Branch</td>
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</tr>
<tr>
<td>Industry</td>
<td>Efficiency Standards for Boilers</td>
<td>2005</td>
</tr>
<tr>
<td>Industry</td>
<td>Feed-in Tariffs for RES based Electricity and CHP</td>
<td>2008</td>
</tr>
<tr>
<td>Households and tertiary</td>
<td>Energy Efficiency Certificates for Buildings</td>
<td>2006</td>
</tr>
<tr>
<td>Households and tertiary</td>
<td>Subsidies for housing development</td>
<td>2007</td>
</tr>
<tr>
<td>Transport</td>
<td>Minimum Quantity of Automotive Fuels Produced from RES</td>
<td>2006</td>
</tr>
<tr>
<td>Transport</td>
<td>Regular Emission Inspection of Vehicles</td>
<td>1996</td>
</tr>
<tr>
<td>General Cross-cutting</td>
<td>Support of Energy Conservation and RES Utilisation</td>
<td>2008</td>
</tr>
</tbody>
</table>

*The table contains the latest edition of the measure, some measures were introduced much earlier*
Annex 7: List of abbreviations

CF      Cohesion Fund
CHP     Combined Heat and Power Generation
EEAP    Energy Efficiency Action Plan
EBRD    European Bank of Reconstruction and Development
ECT     Energy Charter Treaty
ERDF    Fund for Regional Development
ETS     EU Emission Trading Scheme
EU      European Union
GDP     Gross Domestic Product
GHG     Greenhouse Gases
IEA     International Energy Agency
JI      Joint Implementation
ODEX    Odyssee Energy Efficiency Index
OECD    Organisation for Economic Cooperation and Development
PEEREA  Protocol on Energy Efficiency and Related Environmental Aspects
RES     Renewable Energy Sources
RONI    Regulatory Office for Network Industries
SF      Structural Funds
SIEA    Slovak Innovation and Energy Agency
TFC     Total Final Consumption
TPES    Total Primary Energy Supply
IN-DEPTH REVIEW
OF ENERGY EFFICIENCY
POLICIES AND PROGRAMMES

SLOVAK REPUBLIC
2008

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