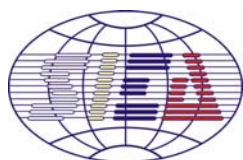




Intelligent Energy  Europe



Energy Efficiency Policies and Measures in Slovakia 2006

**Evaluation and Monitoring of Energy Efficiency in the
New EU Member Countries and the EU-25**

(EEE-NMC)

Slovak Innovation and Energy Agency
Statistical Office of the Slovak Republic

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1 Executive Summary

This report presents the case study of the Slovak Republic for the EEI project “Evaluation and Monitoring of Energy Efficiency in the New Member Countries and EU 25” (EEE-NMC) coordinated by ADEME (France), and with technical support of ENERDATA (France) for the indicators part and Fraunhofer – ISI (Germany) for the policy measures.

The report presents energy efficiency trends 1993 – 2005 in Slovakia based on indicators from the ODYSSEE database and from the database of the Statistical Office of the SR, and gives an overview of energy efficiency policies and measures based on the information supplied to and organised in the MURE database tool.

Since 1993 energy intensity of the final consumption as well as energy efficiency considerably improved in Slovakia. Throughout the monitored period, final energy improved by almost 5 %. Over the period 1998 – 2005 the energy efficiency index for the total (all sector) final energy consumption (ODEX) decreased by 7 %. Industrial sector was the main contributor to this development, above all chemical industry (37 %). In transport sector only rail transport markedly improved (22 %). One can ascribe this favourable development to the positive economic growth – GDP increase over the period 1993 – 2005 grew approximately 4,9 % p.a., with industry growth 4,3 % and private consumption 4,7 %.

Total energy intensity decreased during the monitored period down to 58 % thanks mainly to the big energy intensity decrease of the manufacturing sector (decrease down to 36 % from the initial value). The decrease of energy intensity in transport sector was less significant (down to 79 %). On the other hand, in the household sector energy intensity grew throughout almost the whole monitored period, since 2001 it started to decrease too. This decrease has been and still is influenced by the electricity and gas price increase, growing energy awareness in the population and the wider use of more sophisticated appliances with lower specific consumption. As for final energy intensity development in Slovakia from the energy carrier consumption point of view, one can see that the decrease of energy intensity is more pronounced by fuels (the decrease between the years 1993 – 2004 by more than 43 %). On the other hand, the electricity intensity decreases too (by some 26 %), this development, however, is characterised by several stagnations (around the years 1994 and 2001).

Slovakia is committed to reduce GHG emissions to fulfil its Kyoto obligation and also adopted a domestic CO₂ emissions target of further 5 % decrease compared to the year 1990 that means that Slovakia has set an objective to maintain in the 2008-2012 period the emissions at

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the level. 87% compared to the 1990 level. The actual emissions level has been for several years markedly lower compared to the year 1990. Total net CO₂ emissions decreased by more than 28 % compared with the reference year 1990. However, these emissions increased in 2004 by more than 1 % compared with the year 2002. Among the most important reasons for this increase is the recovery of the Slovak economy accompanied by the new pollution sources and a shift to solid fuels due to the increased prices of natural gas. Similar increased trend in CO₂ emissions can be seen also in the transport sector.

In Slovakia, energy policy measures aimed at increased energy efficiency, rational energy use and wider exploitation of renewable energy sources are based mostly on energy legislation; there is Energy legislation related to energy efficiency, energy conservation and wider RES utilisation consists of the four fundamental Acts: Energy Act, Heat Delivery Act, Regulatory Act and Energy Efficiency in Buildings Act. In an advanced stage of legislation process are the Bills on CHP Promotion and Energy Efficiency Act, both expected in force before the end of 2007. Industry

In industry, together with 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. Emission trading is already under way.

In household and services the effort is focused at 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.

In transport the 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 bio-fuels is in force since 2006.

By far the most efficient energy conservation measure with significant positive impact is energy price development. 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.

2 The Background to Energy Efficiency

2.1 Overall economic context

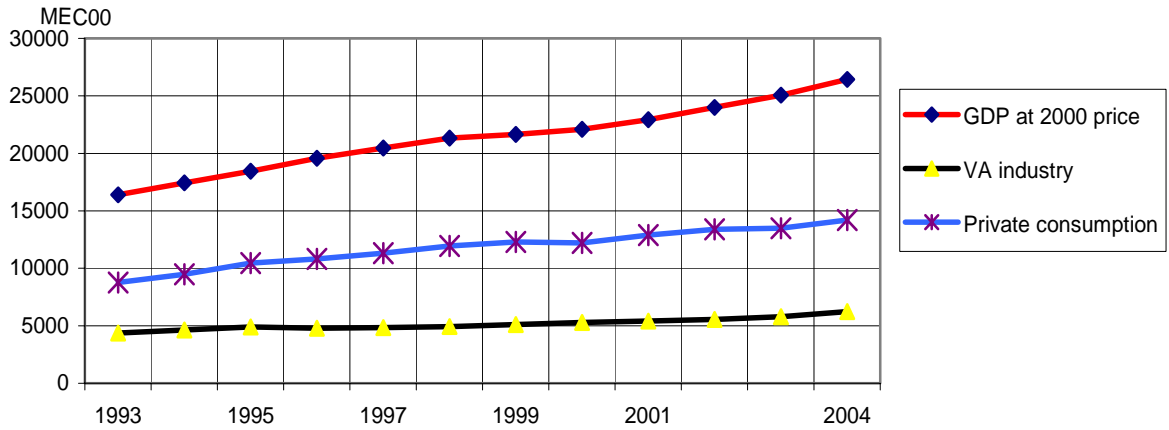
The development of the main macro-economic indicators in the Slovak Republic since its beginning in the year 1993 presents Table 2.1 and the Figure 2.1. Throughout the whole monitored time period one witnessed considerable GDP growth. On average, GDP increased by 4,9 % p.a. (year-on-year between 1,5 % up to 10,1 % for the monitored period 1993 – 2005, here one has to point out that the value 10,1 % for 2005/2004 results from the EURO conversion, in local currency SKK₂₀₀₀ the growth is 6 %). The increase of the added value in industry has been a bit slower, as significant structure change has taken place there. Only since 1999 and above all towards the end of the monitored period we can see more pronounced steady growth here (for 2005/2004 16 % growth has been registered). Profound and steady GDP growth in Slovakia influenced also the household consumption; during the whole monitored period household consumption grew with the average growth 4,7 % p.a. (with the exception of one year – 2000/1999, where growth indicator was negative: - 0,8%). Thus the household consumption growth was only a bit slower than the overall growth in the national economy.

Table 2.1: Economic and industrial growth in Slovakia

% p.a.	1993 - 1997	1997 - 2000	2000 - 2005	1993 - 2005
GDP	5,7 %	2,6 %	5,7 %	4,9 %
Industry	2,7 %	2,9 %	6,5 %	4,3 %
Private consumption	6,6 %	2,6 %	4,5 %	4,7 %

This favourable development has been brought about by suitable economic policy mainly after 1998: the reform of public finances, implemented old pensioner's reform, and simplified taxes by the introduction of unified rate for income tax and VAT (19%). Direct foreign investment (automobile industry and others) significantly improved also social conditions. Unemployment rate between the years 2000 and 2006 decreased by over 5 % (remaining still on relatively high level of 13 %), real wages increase in 2005 reached 6,3 %.

Fig. 2.1: Macro-economic development in Slovakia (1993 – 2004)

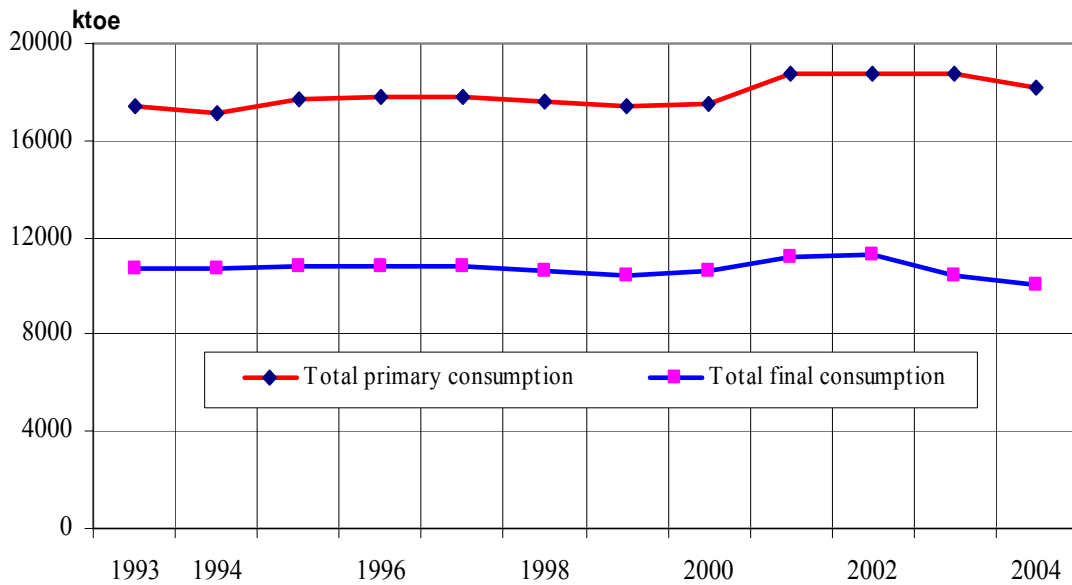


Source: ODYSSEE

2.2 Energy consumption trends

The development of total energy consumption since 1993 (primary and final) is presented in Figure 2.2. One can state that even at the significant GDP increase energy consumption is almost stagnant (primary consumption increased annually by 0,4 % on average, final consumption decreased on average annually by 0,4 %).

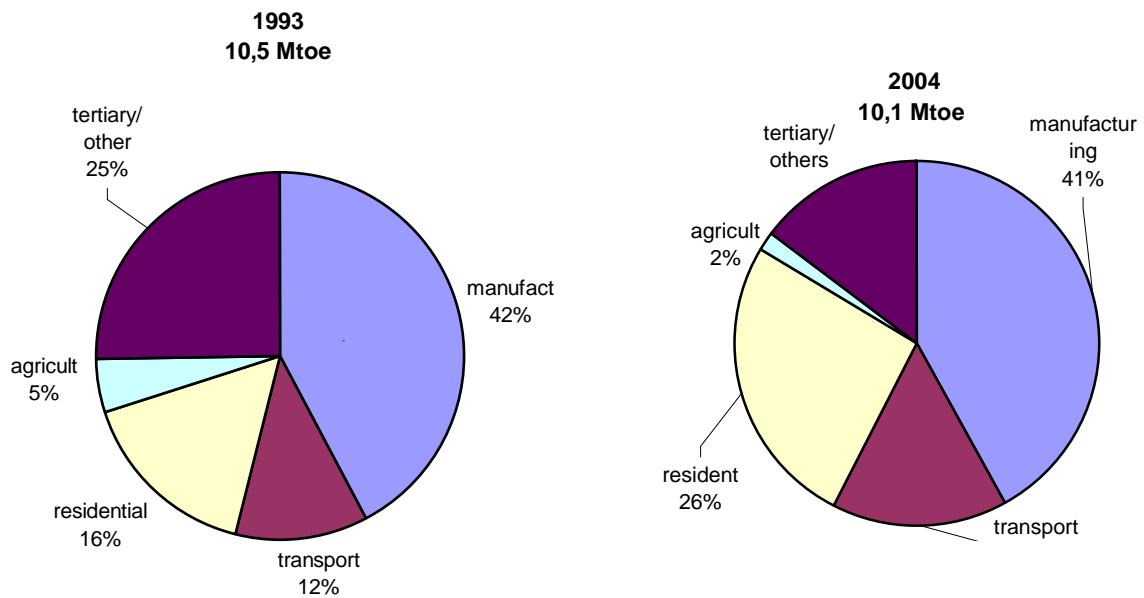
Figure. 2.2 Evaluation of total energy consumption



Source: SSO – ODYSSEE

Next Figure 2.3 illustrates the structure of final consumption in the years 1993 and 2004. Total final consumption did not markedly changed (the decrease from 10,5 down to 10,1 Mtoe, e.g. to 96 %), however, the consumption structure change in individual branches is pronounced. Most remarkable is the consumption increase in households (from 16% up to 26 %) and consumption decrease in services (from 25% to 15 %). Consumption in agriculture decreased significantly too (from 5% down to 2 %).

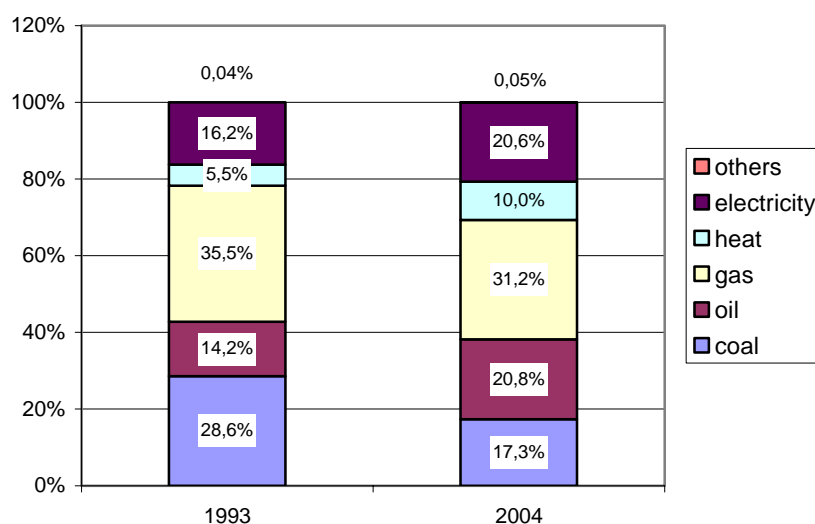
Figure 2.3: Final consumption by sectors



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At the same time the share of individual energy sources in total final consumption has markedly changed as can be seen on Figure 2.4. The share of electricity increased by 4,4 %, which is natural and in compliance with the technology development of the national economy (increased penetration of new applications of electricity). The biggest decrease occurred at coal consumption (by 10,3 %), which is the result of 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 6,6 %) can be ascribed to the significant increase of road transport (good transport and personal, displacing rail transport). Changes in the final consumption of gas and heat can be explained by the change of method of data reporting, where one statistically declares the increase of heat consumption (produced predominantly by using gas) and the decrease of final gas consumption (whereas at the same time during the monitored period the gas consumption increased by almost 12 %). 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 2.4: Final energy consumption by energy sources



2.3 The policy background to energy efficiency

2.3.1 Policy making process

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 etc.). The Ministry of Environment cares for environmental issues (such as environmental pollution through economic activities, GHG emissions and relating matters etc.). These authorities prepare legislation and relevant Decrees that implement energy policy.

The Government in January 2006 has approved the latest Energy Policy. The Energy Policy of the Slovak Republic covers the period of 25 years. The necessity to develop new energy policy was invoked by the country's admission to the EU in May 2004 and is linked with new obligations also in the sphere of the EU energy legislation of the EU. 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 Energy Policy.

2.3.2 New energy legislation

Towards the end of 2004 three new Acts were approved by the Parliament with validity as of January 1st 2005:

- Act No 656/2004 – Energy Act
- Act No 657/2004 – Heat Delivery Act
- Act No 658/2004 – Regulatory Act

Act No 656/2004 – Energy Act newly defines conditions for the enterprising in the energy branches, cares for the harmonisation of the relevant EU legislation (common market rules, cross subventions ban etc.), creates conditions for the environmental protection and further energy sector development.

Act No 657/2004 – Heat Delivery Act regulates enterprising in central heat delivery, defines rights and obligations of heat market partners, sets rules for energy conservation in heat production and distribution facilities and establishes the control function of the State in heat production and delivery. In compliance with this Act part of the powers will be gradually transferred from the Regulatory Office for Network Industries directly to municipalities (calculation and determination of delivered heat price).

Act No 658/2004 – Regulatory Act harmonises regulatory rules with EU legislation, newly defines the competences of Regulatory Office and Ministry of Economy and improves the regulation process. Important is also the authority of Regulatory Office to set fee-in prices for renewable energy sources (RES), and combined heat and power (CHP) production (previous Regulatory Act of 2001 did not care for this important item).

In the year 2005 Act no 555/2005 on Energy Efficiency of Buildings has been ratified. The Act defines the procedures and measures aiming at the improvement of the energy efficiency of buildings. It declares the minimum demand on energy efficiency of new buildings and buildings thoroughly refurbished, introduces the process and obligations linked with the “Energy Certification of Buildings” and “Energy Labelling of Buildings” the State supervision over the Act observation by those responsible (above all building owners). The Act rules that at new bigger buildings one has to use central heat delivery, heat produced by combined heat and power source or by the source utilising local heat delivery systems running on renewable energy if these alternatives are available.

2.3.3 National climate policy

The Slovak Ministry of Environment is responsible for national environmental policy including climate change and air protection issues. It has the responsibility to develop acts and amendments to existing legislation. Fundamental conceptual documents relating to the mitigation of the unfavourable climatic changes either directly, that is by the reduction of GHG emissions, or indirectly, e.g. by limitation of the negative impacts of various economic activities (energy sector, agriculture, etc.) follow:

- National Environmental Action Programme II (1999)
- Strategy of the Slovak Republic Relating to the Global Climatic Change (2000)
- Strategy of the Slovak Republic in the Fulfilment of Kyoto Protocol (2001)

Slovakia ratified Kyoto Protocol and has an obligation to reduce GHG emissions by 8 % compared to the base year 1990. At the same time, Slovakia has set an objective to maintain in the 2008-2012 period the emissions at the level lower by 5% compared to the Kyoto requirements, i.e. 87% compared to the 1990 level. The actual emissions level has been for several years markedly lower compared to the year 1990; Slovak Republic has therefore good chance to engage in emission trading on the sellers’ side. EU adopted in October 2003 Directive 2003/87/EC dealing with the scheme of emission trading. Slovakia as a EU member transferred this Directive by the Act No 572/2004 Coll. on Emission Quota Trading. Based on this Act Ministry of Environment prepared

National Allocation Plan for the years 2005 – 2007 and after some adjustment the EC approved it in October 2004. The second National Allocation Plan for the years 2008 – 2012 proposed in July 2006 is still (June 2007) under the discussion between Slovakia and the EC.

2.3.4 Energy and environmental taxation

Slovakia has already implemented some taxes on air pollution such as N_{ox} 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, however one expects also some side-effect in fuel conservation and the impetus to switch over from road to rail

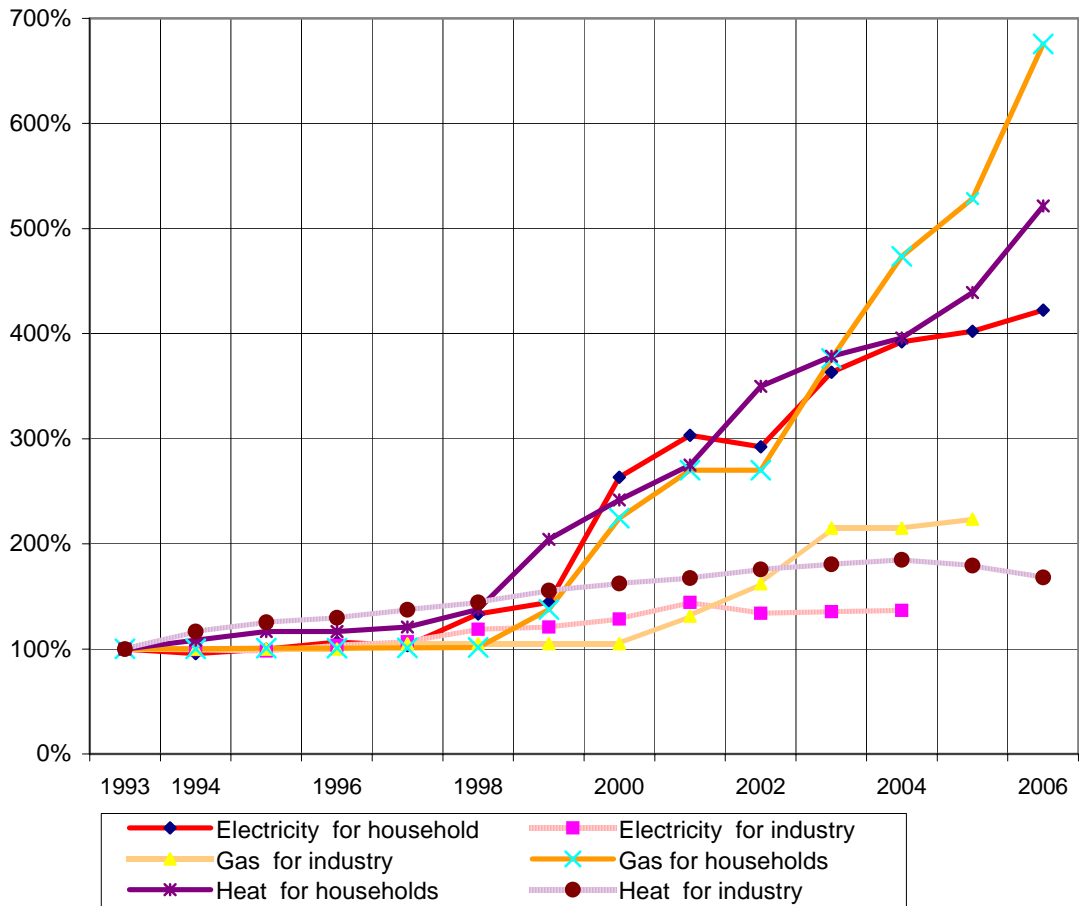
2.3.5 Energy price trends

Since the beginning of 2003 the prices of heat (by object-controlled prices), electricity and natural gas sets the independent Regulatory Office for Network Industries (RONI).

Before 2003 the Ministry of Finance regulated gas and electricity prices, but virtually until 1999 the prices for households and to a lesser extent also for big consumers (industry) almost did not change. (See Figure 2.5). The reason for this discrepancy was purely political.

As of 1995 the prices of all sorts of solid and liquid fuels for all consumers were fully liberalised. This liberalisation of solid fuel (e.g. coal) prices positive in itself had, however, negative effect for energy awareness of the population. Since it was not accompanied by similar liberalisation of electricity, gas and heat delivery, false signal has been emitted to the public. People started to switch over from the use of solid fuels including wood in the country and later also from district heat delivery in towns to the other, more comfortable media for space heating such as electricity and gas. One started to eliminate this price distortion as late as in the year 1999, naturally the price increases were then very steep.

Figure 2.5: Energy price development (1993 = 100 %)



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 heat centrally delivered plus price distortions of various fuels caused people to leave centrally delivered heat 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.

2.3.6 Nationwide, regional and local energy policy institutions

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 influences its activity covering the whole territory of the State.

Energy Centre Bratislava - Slovakia (ECB) is a non-government, not-for-profit information and consulting organisation. The mission of the Energy Centre Bratislava is to promote the rational use of energy and the utilisation of renewable sources of energy. It is strongly engaged in the dissemination of RES (mainly biomass).

There are several regional energy and environmental organisations, such as *Regional Energy Agency in Sala – Galanta (REA)* that are engaged in all activities linked with the rational energy use, energy conservation and RES. The agency provides energy audits, disseminates relevant information to general public and is active also in the schools of the region (organising environmental education). These organisations influence considerably energy policies in localities and regions.

Slovak Environmental Agency (SAZP) is a professional organisation of the Ministry of Environment of the Slovak Republic with nationwide scope of powers, which focuses on the environment protection and landscape planning in accordance with principles of sustainable development.

3 Overall Assessment of Energy Efficiency Trends

Main causes of the steadily improving energy intensity in Slovakia are the changing structure of GDP generation, environmental legislation and the development of prices of individual energy carriers.

3.1 Energy intensity trends

As can be seen in the following Table 3.1 one can state that primary energy intensity improves on average annually by 3,8 % and final energy intensity even by 4,8%. At primary energy intensity the biggest improvement occurred in the period of years 1993 to 1999. Final energy intensity most significant decrease has been observed in the years 2000 up to 2005.

Table 3.1: Variation on primary and final intensities in Slovakia

% p. a.	1993-1997	1997-2000	2000-2004	1993-2005
Primary intensity	-4,9	-3,0	-3,4	-3,8
Final intensity	-4,6	-3,8	-5,4	-4,8

Figure 3.1 presents the development of the energy efficiency in sectors. Total energy intensity decreased during the monitored period down to 58 %, thanks mainly to the big energy intensity decrease of the manufacturing sector (decrease down to 36 % from the initial value). The decrease of energy intensity in transport sector was less significant (down to 79 %). On the other hand, in the household sector energy intensity grew throughout almost the whole monitored period, since 2001 it started to decrease too.

As can be seen at the Figure 3.2 household consumption (calculated for individual household) increased up to the year 2001. Since that year we can see stagnation or even decrease tendency. The increase of electricity consumption in households was slower and lasted only up to the year 1999. This was influenced probably by the electricity price increase (see chapter 2.3.5 and Figure 2.5) and the wider use of more sophisticated appliances with lower specific consumption.

Figure 3.1: Final energy intensity developments by sectors

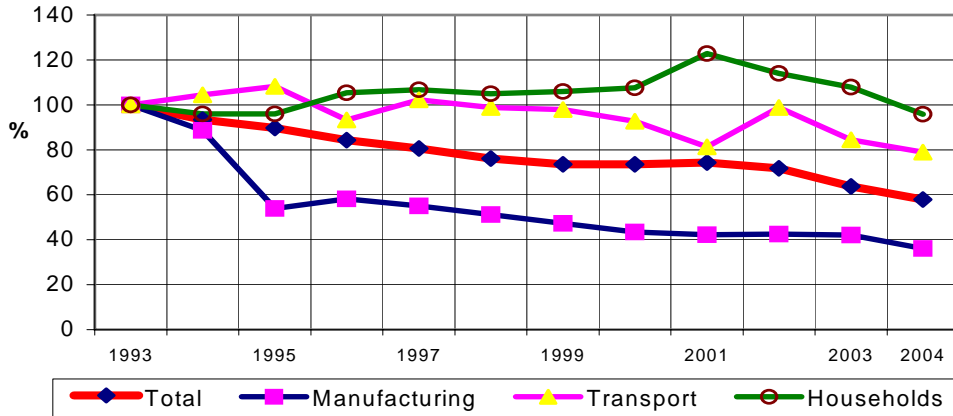
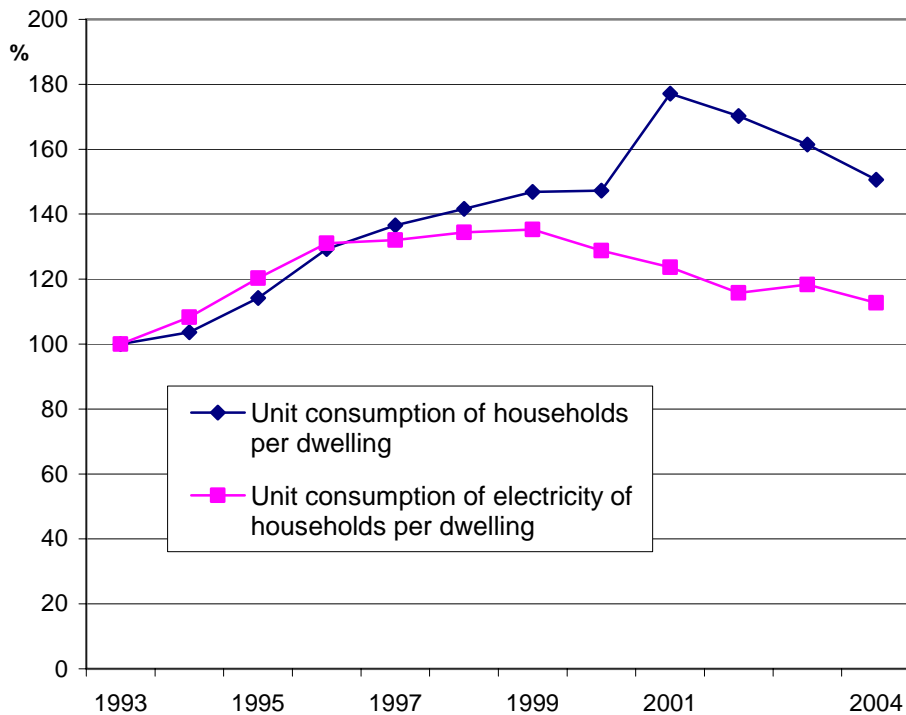


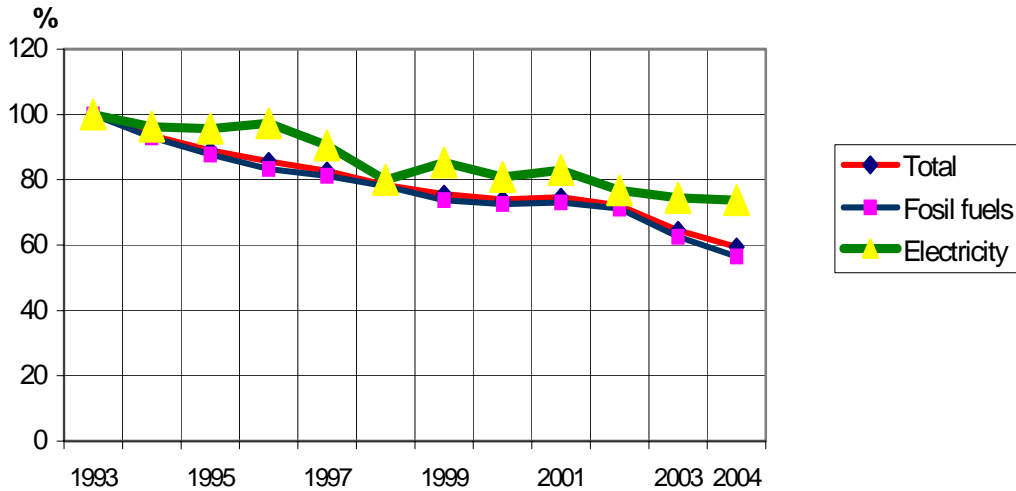
Figure 3.2: Household energy consumption development



Yet another aspect is presented by Figure 3.3, which evaluates final energy intensity development in Slovakia from the energy carrier consumption point of view. One can see that the decrease of energy intensity is more pronounced by fuels (the decrease between the years 1993 – 2004 by more

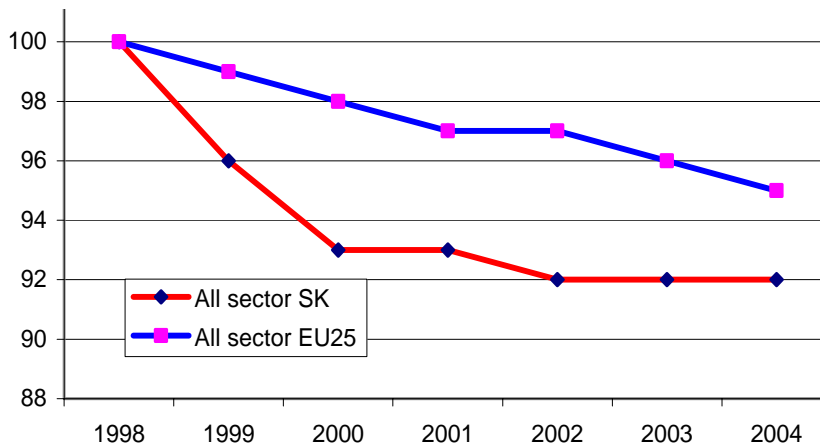
than 43 %). On the other hand, the electricity intensity decreases too (by some 26 %), this development, however, is characterised by several stagnations (around the years 1994 and 2001).

Figure 3.3: Energy intensity by energy carriers



3.2 Energy efficiency

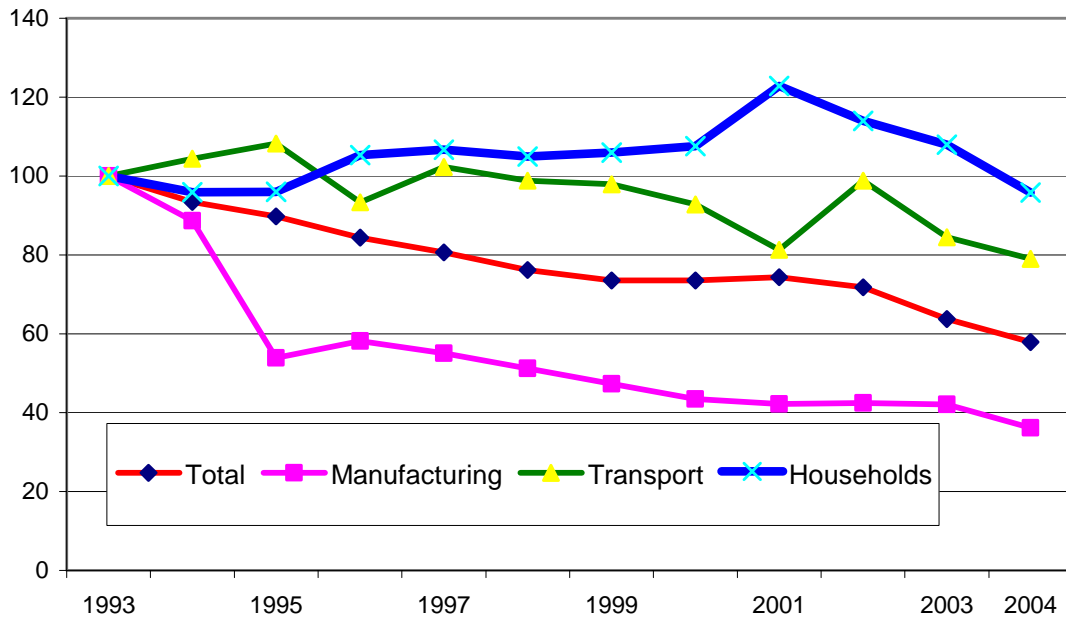
Figure 3.4: Energy efficiency index (1998 = 100 %)



Source: ODEX_rsl

Over the period 1998 – 2005 the energy efficiency index for the total (all sector) final energy consumption (ODEX) decreased by 7 %. Industrial sector was the main contributor to this development, above all chemical industry (37 %). In transport sector only rail transport markedly improved (22 %).

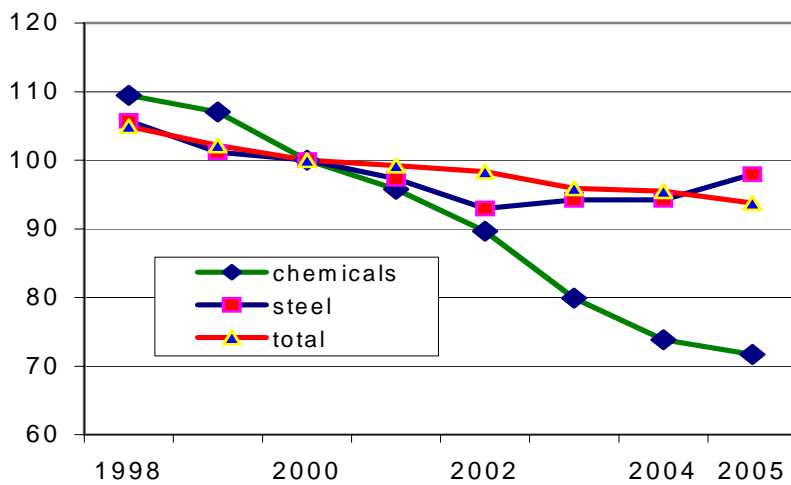
Figure 3.5: Energy efficiency index Slovakia (1993 – 2004)



Source: ODYSSEE database

Figure 3.5 shows the predominant role of manufacturing in the energy efficiency improvement (by more than 60 % related to the year 1993), in the residential sector (households) one can notice improvement after 2001 when radical price increases of gas and electricity significantly increased the energy awareness of the population.

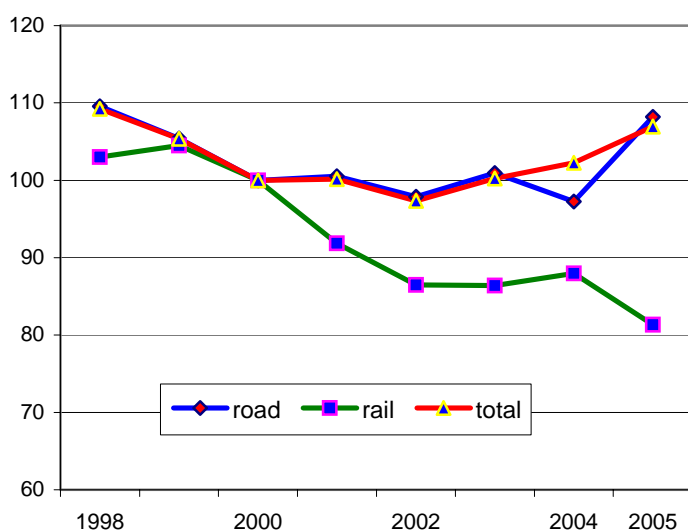
Figure 3.6 Energy efficiency in industry



Source: ODEX_rs

The share of industry sector in the total energy efficiency index improvement is predominant – 11 %, of which chemical industry achieved 37 % improvement. The cause lies in the switchover from heavy chemistry to less energy intensive production. Certain improvement is visible in steel industry (8 %), the decline 2005/2004 (4 %) has not yet been analysed.

Figure 3.7: Energy efficiency index in transport



Source: ODEX_rsl

In this sector rail transport achieved significant improvement (22 %); this, however, did not compensate poor results of road transport, where the latest three years show almost 8 % decline.

3.3 CO₂ emissions and energy efficiency

Slovakia has committed itself under the Kyoto Protocol to achieve a situation when the sum of greenhouse gas (GHG) emissions in the 2008-2012 period does not exceed 92% of five-multiple of the 1990 level. At the same time, Slovakia has set an objective to maintain in the 2008-2012 period the emissions at the level lower by 5% compared to the Kyoto requirements, i.e. 87% compared to the 1990 level. The actual emissions level has been for several years markedly lower compared to the year 1990, Slovak Republic has therefore good chance to engage in emission trading on the sellers' side.

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GHG emissions in Slovakia in 1990 were 73 378 189 tonnes of CO₂ equivalents, in the year 2004 one achieved 51 565 Mt CO₂ equivalents.

The development of GHG emissions in Slovakia transferred into CO₂ equivalent is presented in the next table:

Table 3.2: CO₂ emission development in Slovakia [Mt of CO₂ equivalent]

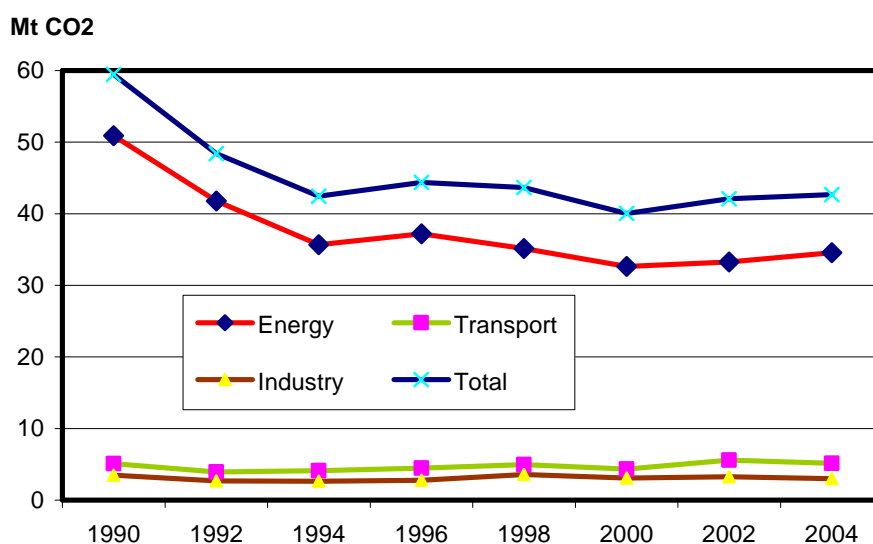
1990	1992	1994	1996	1998	2000	2002	2004
69,7	54,4	48,4	51,5	50,5	46,2	45,6	46,8

Source: The Fourth National Communication of the SR on Climate change [Ministry of Environment, 2006]

The most important source of CO₂ is combustion and transformation of fossil fuels that represent more than 95 % of CO₂ in Slovakia. Total net CO₂ emissions increased in 2004 by more than 1 % compared with the year 2002 and totally decreased by more than 28 % compared with the reference year 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 the new pollution sources and a shift to solid fuels due to the increased prices of natural gas. Similarly, increased trend in CO₂ emissions can be seen also 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 the next figure (data of 2004 not official):

Figure 3.8: CO₂ emissions by sectors in the years 1990 - 2004

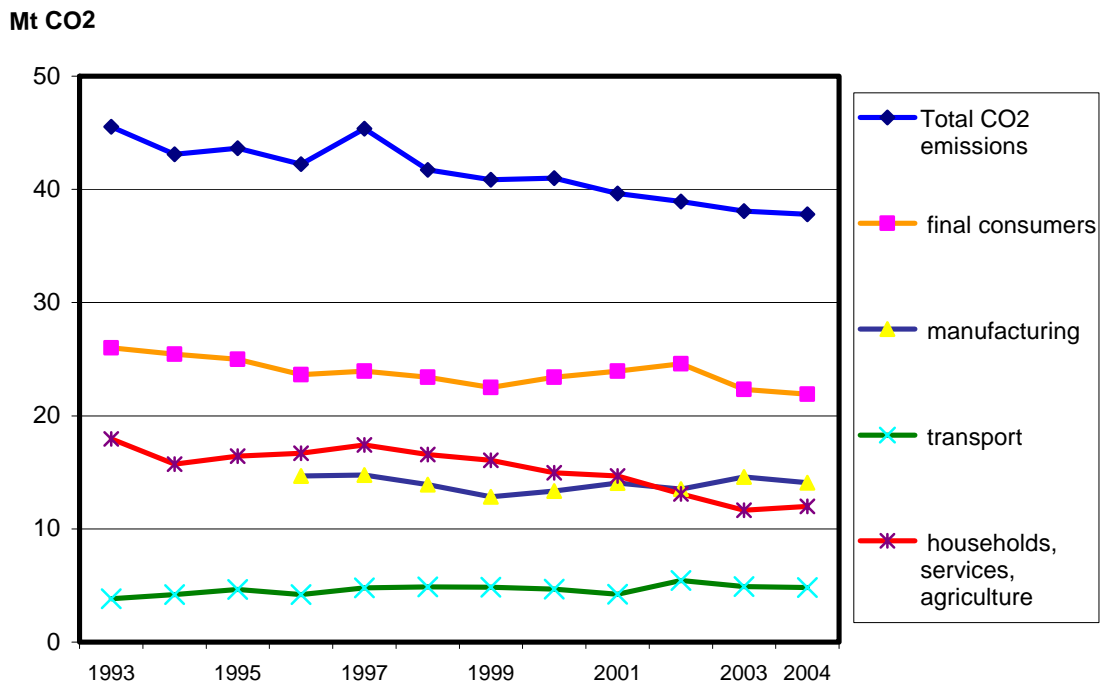


Source: The Fourth National Communication of the SR on Climate change [Ministry of Environment, 2006]

The above figure clearly shows the decisive share of energy in CO₂ emissions. Nevertheless, CO₂ emissions in the energy sector are relatively low: thanks to the high share of electricity production in nuclear power plants leading electricity producer Slovak Electric (member of the ENEL group) declares very low specific CO₂ emissions related to the electricity produced. In the year 2005 Slovak Electric j.s.c. reached only 181 kg CO₂ per 1 MWh produced.

The above table and graph are drawn from the database of the GHG inventory based on the NEIS (National Emission Information System). It differs from the data of ODYSSEE Database by somewhat different definitions of sectors and branches in the national economy. However, basic trends and developments are very similar, as can be seen on Figure 3.9, which follows:

Figure 3.9: CO₂ emission development by sectors



Source: ODYSSEE database

The main difference between the two databases appears in recent years, where the data from the 4th National Report on Climate change suggest a small increase in the latest time period, ODYSSEE shows in total emissions a small steady decrease and small increase is signalled only in combined sectors of households, services and agriculture.

4 Energy efficiency measures

4.1 Recent Energy Efficiency Measures

The measures below reflect documents, measures and activities following the year 2000

4.1.1 Residential sector

Recent fundamental measures in this sector follow the *Act No 555/2006 "On Energy Efficiency of Buildings"* and the *Decree No 625/2006*, which implements the Act No 555/2006. These documents define the procedures and measures aiming at the improvement of the energy efficiency of buildings, declare the minimum demand on energy efficiency of new buildings and buildings thoroughly refurbished, introduce the process and obligations linked with the "Energy Certification of Buildings" and "Energy Labelling of Buildings", set the state supervision over the Act observation 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 the 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 were obligatory since 1964 and 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 (validity after 1st January 2006) and this certificate & label are compulsory also 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* applies to boilers of the capacity 4 kW to 400 kW (mostly used in residential sector) and defines minimum efficiency of the boiler.

Act No 657/2004 on Thermal Energy Sector in its section 25, which is dedicated to the equipment operation efficiency declares *obligatory inspection of the heat delivery equipment* every three years. This inspection pays attention to the energy efficiency and environmental demands, labour

safety and technical security is defined elsewhere. Should there be a substantial change of technical parameters, installed capacity, heat supply or organisation of the operation, heat supplier is obliged to ensure the efficiency check-up of the equipment (including boiler inspection) within 6 months at the latest.

Similar measure was included in the former Energy Act No 70/1998 (valid till 31st December 2005), there, however, the inspection of boilers and other heat producing, delivery and distribution equipment was obligatory each year; thus the new measure is in a way step backwards.

Domestic appliances energy consumption and labelling measure is based on the two types of Government Decrees: In the first type one defines minimum requirements on energy consumption. These Decrees (4 in all) were issued in the years 2000 – 2003 and dedicate to the refrigerators, freezers and ballasts. The second type of Government Decrees states the obligation of energy labels to domestic appliances. These Decrees (9 in all) issued between the years 2000 and 2004 (validity start 2002, 2003 and 2004) cover Washing machines, Household lamps, Tumble dryers, Refrigerators, Freezers, Combined washer/drier, Dishwashers, Household electric ovens and Air-condition systems.

On the basis of the above mentioned Decrees (compatible with the Directive 92/75/EC), there is the obligation of the producer or importer of the relevant appliance to inform end consumer on the specific electricity consumption of the appliance by labels, product information and data sheets.

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

4.1.2 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 *Minimum quantity of automotive fuels produced from renewable energy sources ("Bio fuels")* as partial substitution of petrol and Diesel fuels introduced into the market of the Slovak Republic. Ministry of Economy of the Slovak Republic by its Regulation No 608/2006 set down the obligation of producers and sellers of automotive fuels to provide the Ministry with information on type and quantity of automotive fuels in general and bio fuels in particular. This Regulation enables the State administration to supervise and control the implementation of the Decree No 246/2006.

The Act No 98/2004 "*On Mineral Oils Excise Duty*" (abolishing preceding Act No 239/2001 and its amendments) is one of the important fiscal measures that (aside from the national budget

demands) support GHGs reduction and RES utilisation. The excise duty defined by the above stated Act is valid since May 1st 2004 and among other items orders preferential duties for Diesel oil used for railway transport as energy more efficient transport mode.

4.1.3 Industrial Sector

Act No 572/2004 on *Emission Trading, National Allocation Plan 2005 – 2007* (Ministry of Environment June 2004), and *National Allocation Plan 2008 – 2012* (Ministry of Environment July 2006), define the procedures of emission trading in Slovakia and the CO₂ emission goals for given periods allocated into individual emission sources.

The Kyoto Protocol sets an obligation for the Slovak Republic to achieve the sum of greenhouse gas emissions in the 2008-2012 period not exceeding 92% of five-multiple of the 1990 level. At the same time, Slovakia has set an objective to maintain in the 2008-2012 period the emissions at the level lower by 5% compared to the Kyoto requirements, i.e. 87% compared to the 1990 level.

Installations taking part in the emission-trading scheme according to the Directive 2003/87/EC had average share in national emissions 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 annual quantity of allowances allocated for the 2007-2012 period will be approx. 41,2 million tonnes of carbon dioxide.

Under Act No 657/2004 – Heat Delivery Act and relating Decree No 159/2005. The Act states that the license for the enterprising in heat production and heat delivery branch under specified conditions. One of these conditions is the mandatory function of the so called “Responsible Representative”, which in fact is 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 set in the Decree No 159/2005 of the Ministry of Economy of the Slovak Republic. The task of training and organisation of the final examination is 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.

4.1.4 Tertiary Sector

In compliance with the Act No 657/2004 Coll. and Methodology Rules of the Ministry of Economy No 952/2005 – 200 on the *Concept of municipality development in the sphere of thermal energy*.

The content of the Concept includes the analysis of current situation of 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 ...), analysis of the fuel and energy availability on municipality territory, feasibility of renewable 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.

The meaning of the measure is that together with the Act No 657/2004 it grants the 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.). According to the measure for instance municipal authorities are entitled to grant permission to install new heat production & distribution equipment, can refuse permission to disconnect from the district heating system etc.

Other measures in this sector are partially identical as those cited already in section 4.1.1 Residential (Energy efficiency of buildings, thermal insulation of buildings, obligatory inspection of heat production, distribution and delivery facilities, efficiency standards for boilers...).

4.1.5 Cross-cutting measures

Basic & general measure is *Energy Policy of the Slovak Republic* adopted by the Government Decree No 29/2006 in January 2006. The document 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.

Scheme for the Support of Energy Conservation and the Utilisation of Renewable Energy Sources is part of the Sector Operation Programme 1.4 and covers energy conservation in residential sector, in services as well as in industry; at the same time it supports wider use of renewable). Compared to previous programmes gradually implemented since 1991, current scheme is not so strictly limited by lack of financial means and can therefore cover more promising projects (currently over

50 projects are supported). Procedures for granting the support and continuous monitoring and supervision ensure the success of this measure.

Energy Performance of Buildings represents the general measure covering residential, tertiary and industry sectors. Its implementation decree No 625/2006 It declares the minimum demand on energy efficiency of new buildings and buildings thoroughly refurbished, introduces the process and obligations linked with the “Energy Certification of Buildings” and “Energy Labelling of Buildings” the State supervision over the Act observation by those responsible (above all building owners). The Act rules that at new bigger buildings one has to use central heat delivery, heat produced by combined heat and power source or by the source utilising local heat delivery systems running on renewable energy. The obligation to adhere to relevant technical standards is declared.

The use of renewable energy sources CHP production is supported by measures *Feed-in tariffs for renewable based electricity and for electricity produced by CHP* combined by *Voluntary Certificates for renewable-based electricity*. The Regulatory Office sets feed-in tariffs for Network Industries; however, 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 adjustment guaranteeing the tariff for at least 7-year period is being prepared.

4.2 Patterns and Dynamics of Energy Efficiency Measures

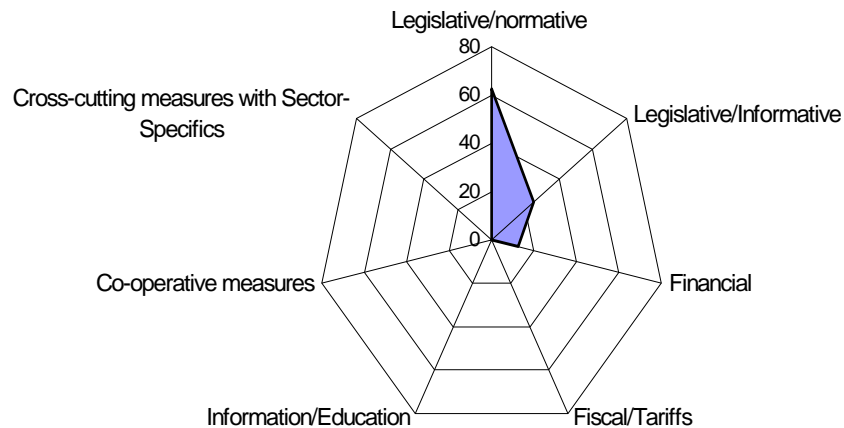
4.2.1 Residential Sector

Figure 4.1 shows the percentage of measures in the residential sector; some of them are common with the measures in the tertiary sector. Three types of measures are involved: Legislative/normative (mandatory regulations based on the Energy Efficiency Building Act), legislative/informative (building certificates, appliances' labelling) and financial (Government support programmes).

In the sphere of buildings in general and in the residential sector in particular most important problem linked with energy demand has been inadequate thermal insulation of apartment multifamily houses. Insulation standards have been steadily improved since 1964 (first standard with mandatory rules for thermal insulation), the latest standard is based on the Building Energy Efficiency Act.

Another 2 measures of legislative/normative type are concerned with regular boiler inspection and efficiency standards for boilers.

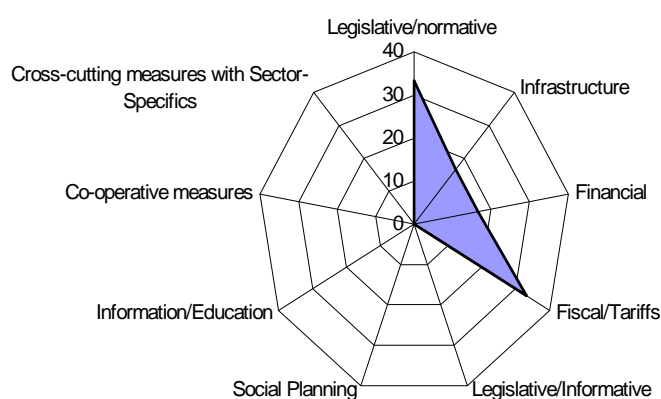
Figure 4.1: Patterns of policy measures in the residential sector (1993 – 2006)



4.2.2 Transport sector

Legislative/normative and fiscal types of measures prevail (obligatory regular emission control, obligatory exploitation of RES containing automotive fuels, mineral oil excise tax, tax on motor vehicles). Financial type is represented by the toll on highways, which at the same time provides some incentive to switch over from road to the other transport means, e.g. railway (infrastructure type).

Figure 4.2: Patterns of policy measures in the transport sector (1993 – 2006)



4.2.3 Industrial sector

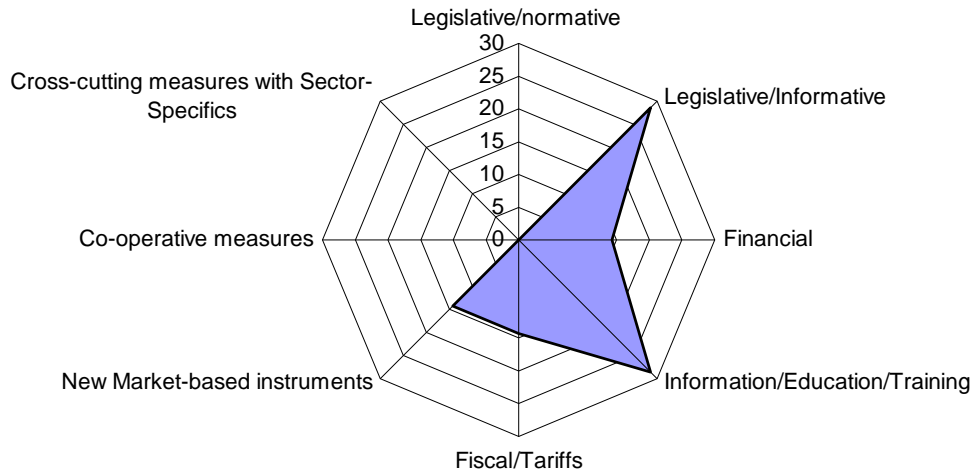
The sector of industry in Slovakia has a long tradition in energy consumption monitoring and energy conservation. Its relatively high energy intensity is largely due to the high share of energy intensive branches (iron & steel industry, non-ferrous metal industry, chemical industry etc.). The measure types are oriented at education/training and at the same time legislative (boiler efficiency, energy managers), fiscal (income tax exemption for RES and CHP), financial (support programmes) and new market-based instruments (CO₂ emission trading). The measure of tax exemption ended in 2003, and as of 1st January 2004 unified income tax of 19 % was introduced with no exceptions. Still, there is now some compensation for the producers of electricity from RES and CHP by the measure of obligatory minimum feed-in tariffs.

The legislative/normative measure relating to minimum boiler efficiency is common also to the tertiary sector.

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Percentages of policy measures in the industrial sector are presented in Figure 4.3.

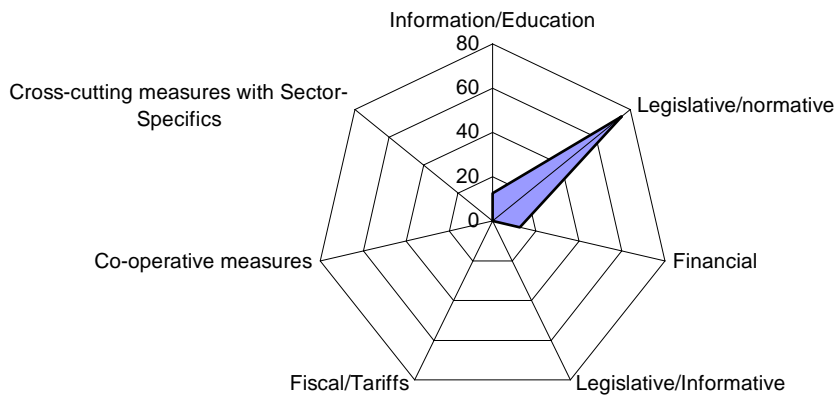
Figure 4.3: Patterns of political measures in the industrial sector (1993 – 2006)



4.2.4 Tertiary sector

Percentage of policy measures in tertiary sector presents the following figure:

Figure 4.4: Pattern of political measures in the tertiary sector (1993 – 2006)

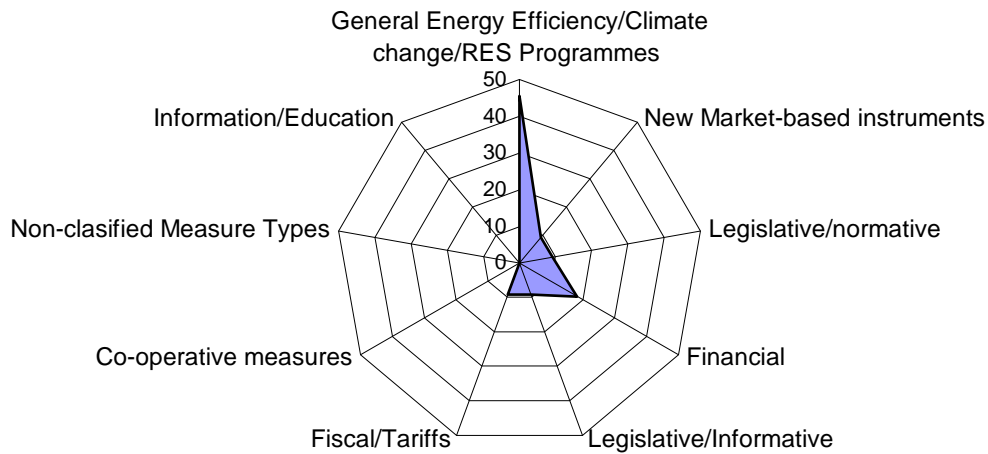


Measures in the tertiary sector are partially shared with the residential sector and even with industrial sector (efficiency standard of boilers). Legislative/normative measures prevail (energy performance standards for buildings, minimum thermal insulation standards, obligatory inspection of boilers, obligatory development concept for municipality in the sphere of heat delivery).

4.2.5 Cross-cutting measures

Most of these measures belong to the type „General Energy Efficiency/Climate change/RES Programmes“. Other types (legislative, financial, fiscal, new market based instruments follow.

Figure 4.5: Percentage of political measures in general (1993 – 2006)



4.3 Innovative Energy Efficiency Measures

Most of the energy policy measures are well known types of measures usually found in other countries (Energy policy documents, building regulations, boiler inspections, emission controls, financial subsidies, automotive fuel tax, etc.).

Recent couple of measures closely linked together are feed-in tariffs and green certificates, both applied to RES and CHP production.

However, the most important political measures not included in this survey took place in the first half of the nineties – gradual elimination of energy price regulation and the establishment of the Regulatory Office of Network Industries (RONI) in 2001. Unfortunately, price liberalisation of solid and liquid fuels in the nineties along with the still regulated prices of electricity and gas and strongly subsidised prices of heat delivery for the significant segment of the population (those taking heat from the district heating delivery) meant wrong signal mainly for the residential sector (see chapter 2.3.5 and Figure 2.5).

Thus most important political measure was the establishment of functional RONI (price definition of electricity, gas, heat delivery and water supply), elimination of cross subsidising of electricity, gas and heat delivery prices and liberalisation of other energy carriers.

4.4 Semi-quantitative Impact Estimates of Energy Efficiency Measures

The evaluation of the impact of the majority of the measures has not yet been made. Detailed evaluation of some of these measures is under way and might bring some assessment in the future, other measures, however important and beneficial, can hardly be quantified at all.

4.5 Lessons from Quantitative Energy Efficiency Measure Evaluations

4.5.1 Evaluation of building standards impact (*Example*)

In Slovakia there are some 1,75 million flats, 858 thousand (49 %) in multifamily (apartment) houses. 96 % flats have been built after the year 1945, more than 85 % of flats have been built in apartment houses by means of mass construction technology (panel houses). Most of the existing apartment houses (and other buildings such as administrative buildings, hospitals etc.), were built in the period 1946 – 1980 – at that time the consumption of energy used for space heating was an unimportant quality evaluation factor.

Thus the very first standard that prescribed the insulation quality of the building envelope was issued in 1964 and there was no direct demand on maximum energy consumption for a standard flat (71 m² of floor area).

The following adjustments/editions of this standard CSN 73 0540, later STN 73 0540 had already the value of maximum permissible energy consumption for new buildings, at first related to the so called “standard flat” , later as maximum permissible energy consumption per m² and year. Next table 4.1 presents the development of energy demands for space heating and an estimate of improvement compared to the previous standard and to the existing building stock.

Table 4.1 Building standard impact assessment

		*	Standard			
			CSN 73 0540		STN 73 0540	
	Valid from	1964	1984	1992	1997	2002
Multifamily house	MWh/dw.year	12	9,3	7,3	6,1	4,6
Improvement related to the preceding standard edition	%		22	20	15	22
Improvement related to the sixties	%			39	49	62

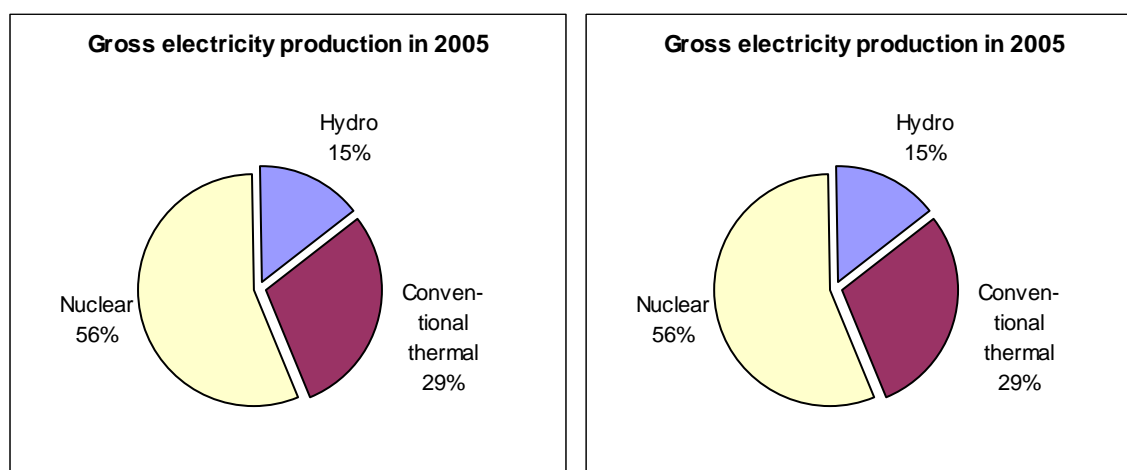
* Most of the building stock was built in the sixties by the prefabricated panel technology with the approximate heat consumption of the average flat around 12 MWh/dw.year. Data in the last line are related to this huge majority of buildings.

5 In-depth View on the Industrial Sector

Current development of energy consumption in industry was influenced particularly by restructuring of industry in the nineties that demanded closing of old enterprises and also introduction of new technologies in new companies. In context of new investments mainly to areas of automobile industry and relating development of outsourcing enterprises and provided that the newest technologies will be used, only relatively slight increase in energy consumption in this sector is assumed, this was reflected already in consumption in 2005. Energy efficiency should be much more improved, since considerable increase in GDP production is expected.

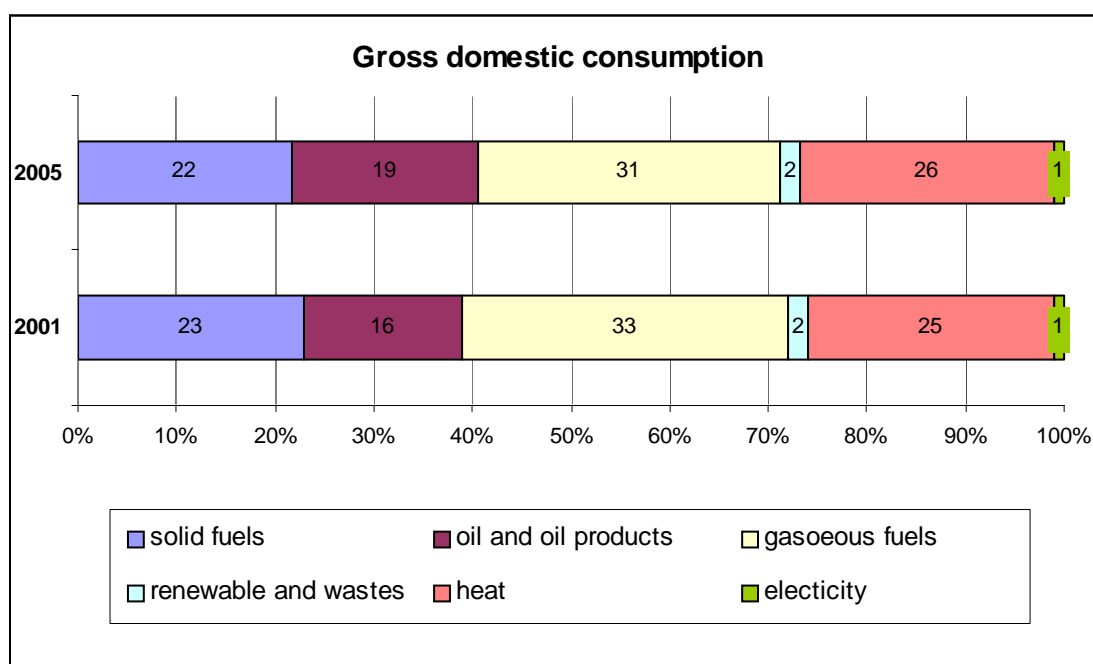
In sources of energy balance of the SR the most important part is import, mostly of oil, gas, petrochemical products and coal. Own production of lignite, oil and gas comprises only 4,2 % of gross domestic consumption. Electricity production comprises a significant component of production, of which great part is produced in the SR in nuclear power stations. Share of production of nuclear power do not change markedly neither after shutdown of one of nuclear reactors in power station Jaslovské Bohunice in connection to the EU Accession Accord in 2006 and nor after putting into operation of two reactors in new power station Mochovce.

Graph 5.1 Structure of electricity production in 2001 and for January – April 2007



In 2001 – 2005 it did not come to significant changes in the structure of gross domestic consumption. Position of oil and oil products strengthened in consumption and consumption of gaseous fuels decreased.

Graph 5.2 Structure of gross domestic consumption in the SR in 2001 – 2005

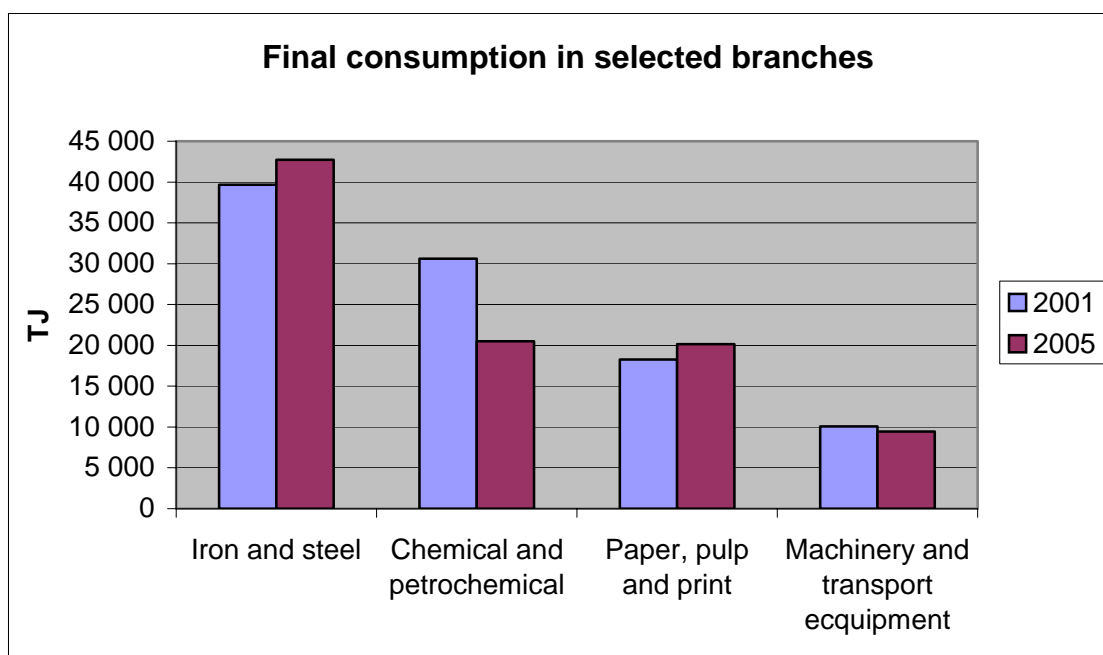


Industrial sector is the greatest consumer of energy. Final energy consumption in industry in 2005 comprises about 34,34 % of final energy consumption in Slovakia. Fuels comprise a substantial part of energy consumption in industry.

Chemical and petrochemical industry, metallurgy and steel industry, paper and pulp industry are energetically the most demanding sectors of industry. Large share of production of raw materials and semifinished products generates small added value in high energy efficiency due to historically given structure of industry.

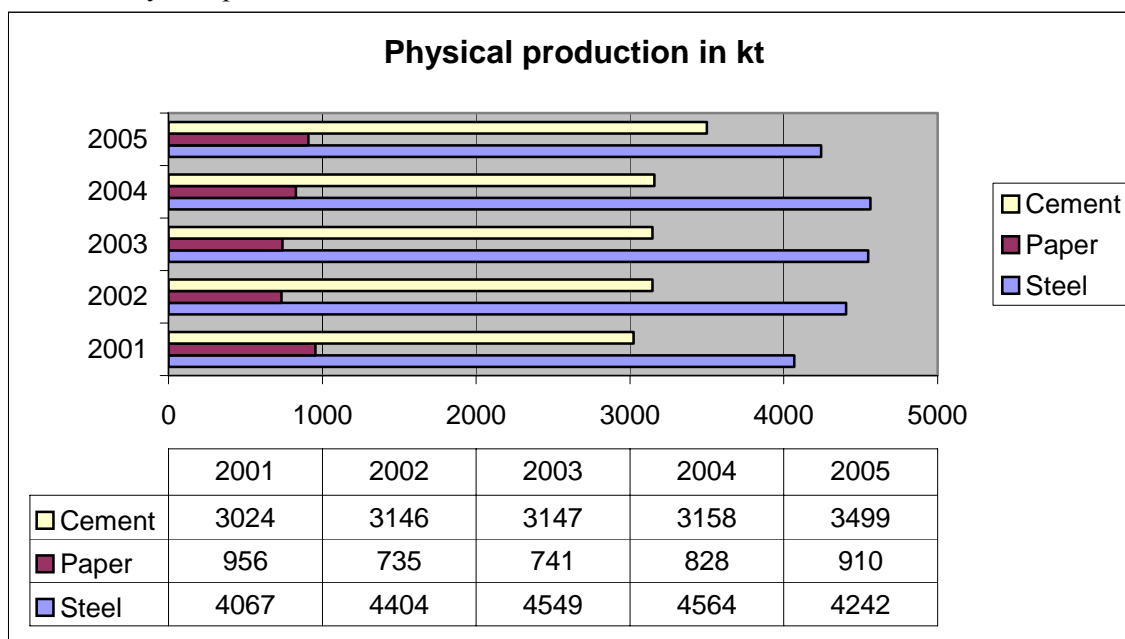
In structure of final energy consumption in 2005 industrial sector comprised 36 %, households 26 %, transport sector 18 % and other sectors 20 %. From final energy consumption in industry steel industry comprised 29 %, chemical industry, construction material industry and pulp industry equally 14 %. Trend of final consumption in connection to development of production indicate slight savings of consumption in production of steel and iron, in mining of metals and in textile and leather industry compared to 2001.

Graph 5.3 Final consumption in selected branches



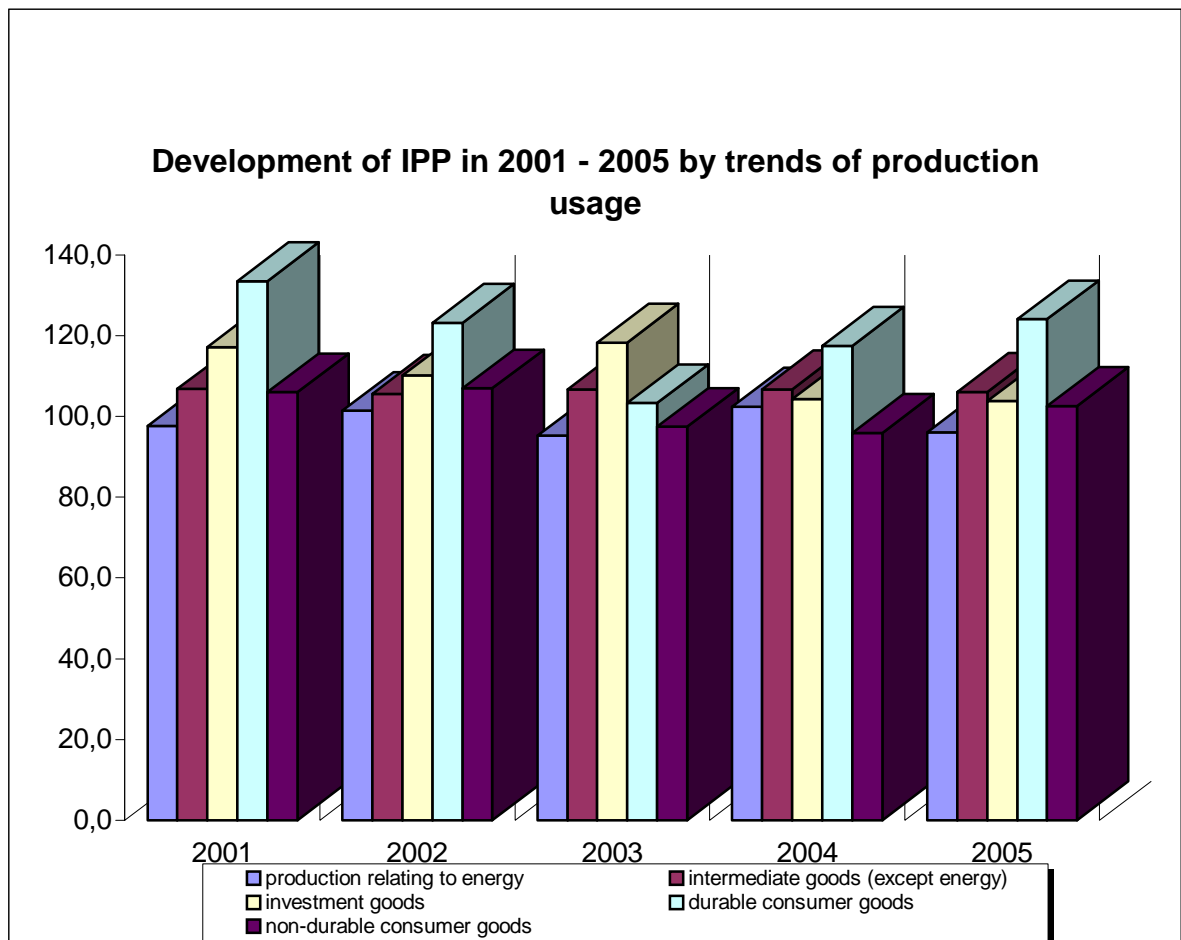
Production in physical measure units in energetically most demanding sectors (production of cement and steel) increased gradually from 2001, but production of steel slightly decreased year-on-year in 2005. Production of paper decreased considerably in 2002 – 2003 in relation to 2001 above all as a result of restructuring of production capacities. From 2004 it increases, but it does not reach the level of base year 2001.

Table 5.1 Physical production in kt



Harmonized industrial production index (Industrial Production Index = IPI) increased by 28,9 % in 2005 compared to base year 2000, manufacturing recorded the most considerable rise of 40,8 % , while mining, electricity, gas and water supply decreased by 11,6 % and mining and quarrying was by 9,4 % lower in relation to base year 2000. Within sectors of manufacturing manufacture of electrical and optical equipment (by 122,5 %) increased more than doubly in assessed 5 years, manufacture n.e.c. rose by 99,1 %, manufacture of machinery and equipment by 69,8 %, manufacture of other non-metallic mineral products by 66,3 %, manufacture of transport equipment by 57,2 %. Other sectors increased production in interval from 27,8 % (manufacture of wood and wood products) to 1,4 % (manufacture of food, beverages and tobacco) in relation to base year. Only manufacture of textiles and textile products get by 4,2 % below the level of base year for the first time from 2000.

Graf 5.4 Industrial Production Index 2001 – 2005



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In terms of production use (Main Industrial Groupings) production of durable consumer goods (by 147,6 %) and production of investment goods (by 64,9 %) increased in the fastest rate in 2001 - 2005. Intermediate goods in assessed period increased by 36,1 % and production of non-durable consumer goods by 8,7 %. Production relating to energy decreased by 7,3 %.

Development trends from 2005 will continue also in following years (starting of production in new automobile companies, building of industrial parks, development of electrical engineering industry). Increase in production in manufacture of metal, machinery and in manufacture of transport equipment will continue in slight rates. Also industry of plastic materials, paper industry and production of mineral fibres count among development sectors. Slighter increases are expected in food industry, chemical industry and in some sectors of consumer industry. In connection with drawing of resources from European funds development and modernization of infrastructure is assumed on nationwide and regional level. In this context further development of construction and continuation of increase in investment construction and residential building is expected.

Indicated energy efficiency trends result from a change of structure of the Slovak economy that is modernized and restructured. Savings in energy consumption in business sphere as well as in household sector are expected. Trend of certification of new buildings, legislation amendments, changes of opinion of population as well as companies tending towards more economic approach to usage of energy sources are expected. Change of consumer habits, e.g. in purchases of appliances with higher energy categories is an assumption for effective usage of energy sources. But total consumption of energy sources do not reach more considerable savings mostly considering the global warming and increased need of using air-conditionings and refrigerating equipments in public buildings as well as in households.

Considering significant industrial investments mostly to automobile and electronic engineering industry decrease of absolute energy consumption is not assumed in next years. But application of effective production systems and procedure is expected and therefore it will come to a considerable decrease of energy efficiency of GDP production. The greatest capacity of absolute savings is contained in manufacturing industry (chemistry, iron and steel, pulp), but usage of this capacity requires significant investments, as it relates to change of technological processes. Increase in prices of energy that forces business subjects to realization of economic measures is another important aspect.

6 Outlook: Future National Developments under the EU Energy Efficiency Directive

The Directive 2006/32/EC on Energy end-use efficiency and energy services entered into force in May 2006. Member countries must transpose the Directive into their legislation by May 2008.

The Directive sets an indicative target of a 9 % decrease in energy use related to BAU, within the nine years 2008 – 2017. The target is calculated from the average final energy use, monitored in the years 2001 – 2005. Early energy saving measures and their impact can be taken into account from 1995 onwards (or in some cases from 1991 onwards).

Under the Energy end-use efficiency directive member countries must draw up three action plans for energy efficiency, the first of them must be submitted by the end of June 2007.

The first Energy Efficiency Action Plan should show the national overall target for energy saving for the whole 9-year period as well as the intermediate target for the first three years. It should also describe the early actions, measures that are currently used and planned measures with their preliminary impact assessment.

In Slovakia the Ministry of Economy is responsible for the implementation of the Directive 2006/32/EC. Currently the Ministry of Economy of SR prepared for the Government the document “Concept of Energy Efficiency in the Slovak Republic”, the first National Energy Efficiency Action Plan has been presented for the Government session in June.

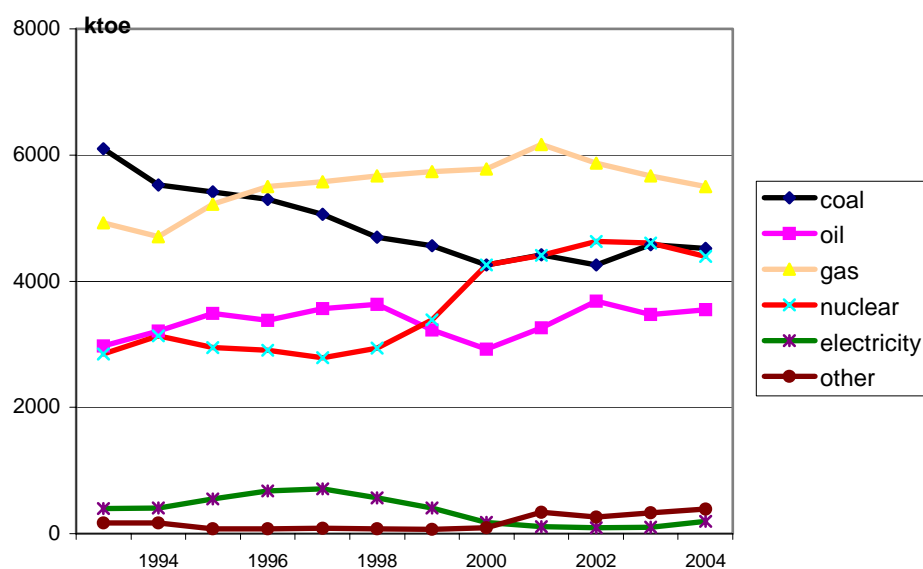
As a result of the Directive the following legislation the Ministry of Economy is preparing measures:

- Energy Efficiency Act to be presented in the Parliament in the fourth quarter of 2007
- CHP Promotion Act – (in Parliament in the third Quarter of 2007)
- Professional Ability in Energy Sector Act (2008)
- Decree on minimum thermal insulation for heat production and distribution facilities (2008)
- Legislation on energy audits (2008)
- Amendment of the Energy Efficiency of Building Act (respecting the prepared Energy Efficiency Act, in Parliament early in 2008).
- Amendment of the Regulatory Act (most important here is the possibility to declare feed-in prices for RES and CHP electricity for a longer time period, e.g. 7 or more years)

Annex 1

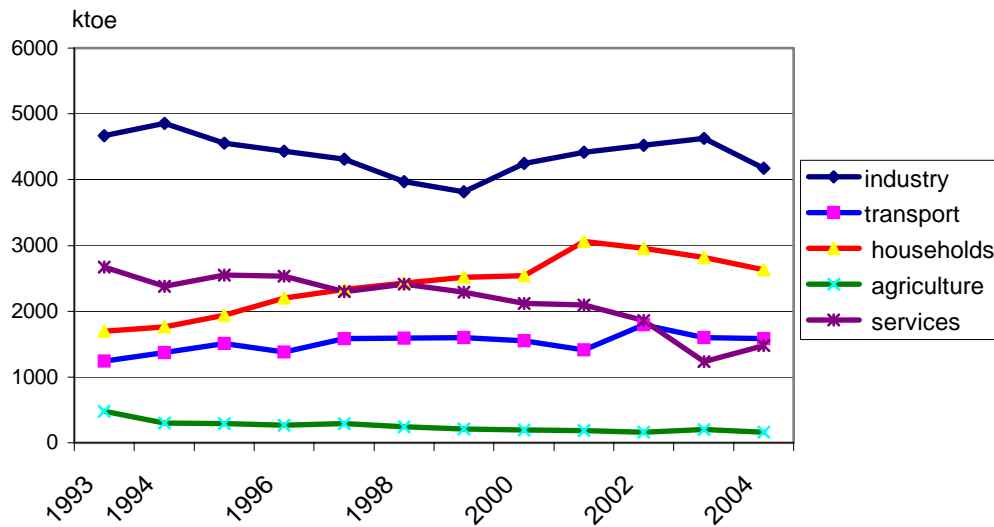
Selected Graphs on Energy Efficiency Trends (for sectors not covered; short comments on graphs)

Development of primary energy consumption



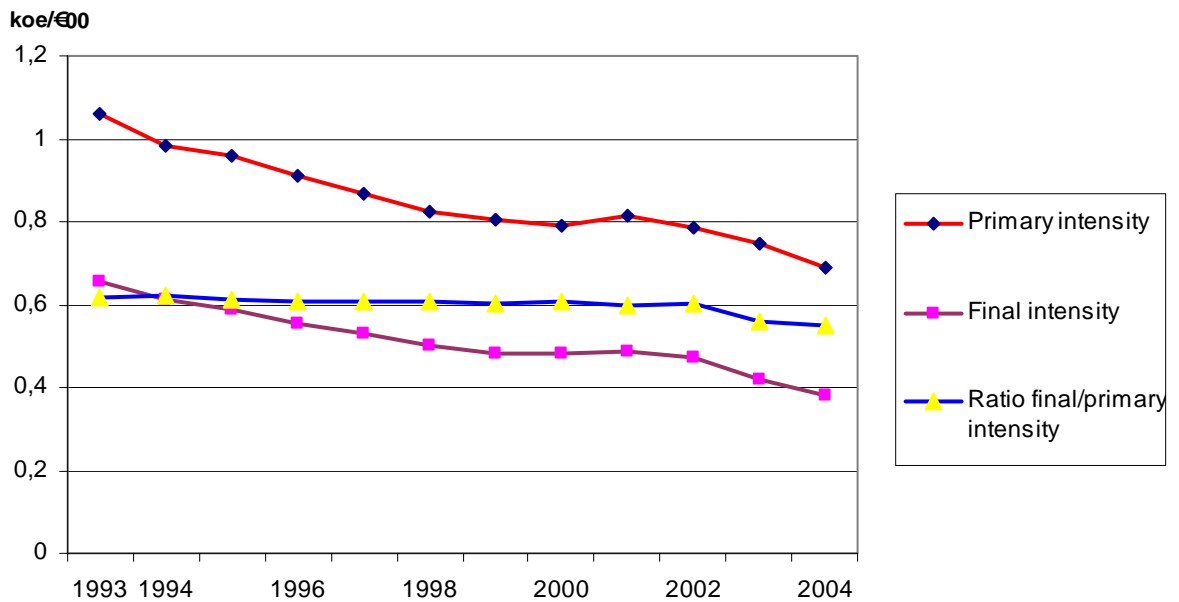
The above figure shows significant retreat of coal consumption, which, however has stopped in 2002 and some recovery has appeared. Due to the price increases of gas and electricity mainly households returned back to coal again. The gas consumption has started to decrease for the same reason since 2001 when the first significant natural gas price increase took place. The increase of nuclear energy in the middle of the monitored period corresponds to the commissioning of two NPP units WWER 440.

- **Development of final consumption by sectors**



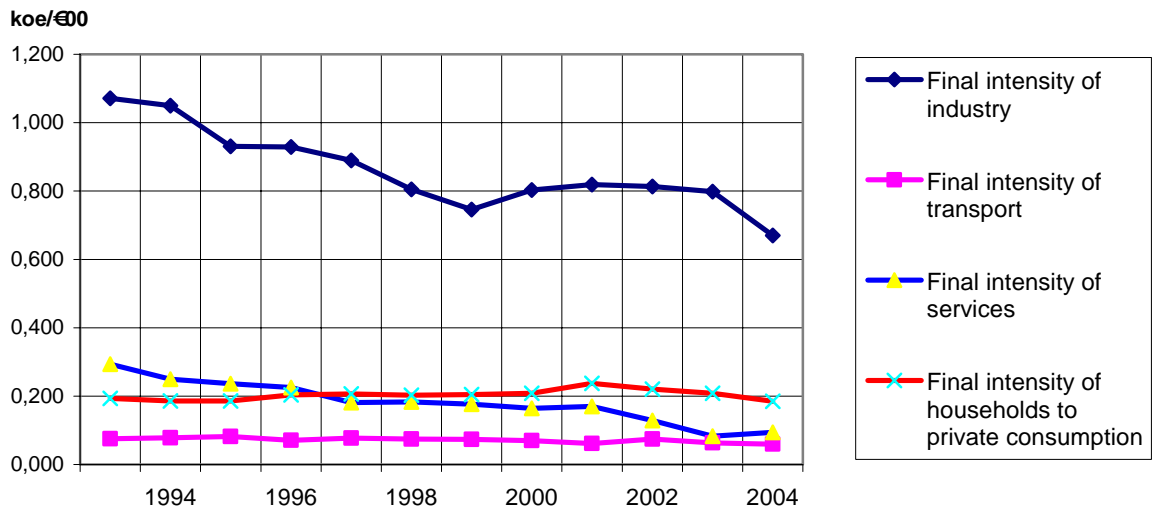
As in the previous figure, also here there is the turnover point in the final consumption of households corresponding to the sudden steep energy price change.

Primary and final energy intensity development (1993 – 2004)



The development of energy intensity shows the decrease, in the years 2002 – 2004 significantly supported by the favourable GDP development. The almost changeless ratio final/primary energy intensity suggests only small structure changes in the national economy.

The development of final energy intensity in sectors



The figure illustrates predominant role of the industry sector both by its size and also by the marked decrease.

Annex 2**Energy Efficiency Measure Summary by Country****MURE - Synthesis of Energy Efficiency Policy Measures by sector****HOUSEHOLD**

Measure code	Measure Title	Status	Measure Type	Subsector	Target Audience	Starting Year	Ending Year	Semi-quantitative impact
SK1	Domestic appliances energy consumption and labelling	ongoing	Legislative/Informative	Appliances	Manufacturers, Retailers	2002		Medium
SK2	Programme for the Reduction of Energy Consumption in Apartment Houses and Flats	completed	Financial - Grants/Subsidies	Hot Water, Heating	Building professionals, General public, Owners - occupiers	1991	1999	
SK3	Energy Efficiency Certificates for Buildings	ongoing	Legislative/Normative, Legislative/Informative	Hot Water, Heating	Building professionals, Housing associations, Owners - occupiers	2005		Medium
SK4	Maximum Indoor Temperature Limits in the Heating Period	ongoing	Legislative/Normative, Legislative/Informative	Heating	Building professionals, Owners - occupiers, Tenants	2005		Medium

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MURE - Synthesis of Energy Efficiency Policy Measures by sector

TRANSPORT

Measure code	Measure Title	Status	Measure Type	Subsector	Target Audience	Starting Year	Ending Year	Semi-quantitative impact
SK1	Minimum Quantity of Automotive Fuels Produced from Renewables	ongoing		Passengers, Goods	Energy suppliers, transport companies	2006		Unknown
SK2	Mineral Oil Excise Duty	ongoing	Fiscal - Taxation - Mineral Oil Tax	Passengers, Goods	Existing vehicles, Individual passengers, Industry / commerce, New vehicles, Transport companies	2004		Medium
SK5	Regular Emission Inspection of Road Vehicles	ongoing	Legislative / Normative	Passengers, Goods	Existing vehicles, Fleets Owners, Individual passengers, Transport companies	1996		Low
SK6	Tax on Motor Vehicles	ongoing	Fiscal - Taxation - Annual vehicle Tax	Passengers, Goods	Existing vehicles, New vehicles, Transport companies	1999		Medium

Energy Efficiency Policies and Measures in Slovakia 2006

TRANSPORT (Continuation)

SK7	Toll on Highways and Selected Roads	ongoing	Financial - Tolls	Passengers, Goods	General Public, Transport companies	1996		Low
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MURE - Synthesis of Energy Efficiency Policy Measures by sector

INDUSTRY

Measure code	Measure Title	Status	Measure Type	Subsector	Target Audience	Starting Year	Ending Year	Semi-quantitative impact
SK2	Programme Supporting Economic Activities Leading to the Fuel, Energy and Imported Raw Material Conservation	completed	Financial - Grants, Soft Loans		Energy Suppliers, SMEs	1992	1999	Medium
SK5	Income Tax Exemption for Renewable Energy and CHP	completed	Fiscal / Tariffs		Energy Suppliers	1993	2003	High
SK6	Emission Trading in the Slovak Republic	ongoing	New Market-based Instruments	All sectors	Energy Managers / Account., Large Enterprises	2005	2012	Unknown

Energy Efficiency Policies and Measures in Slovakia 2006

INDUSTRY (Continuation)

SK7	Mandatory Manager for Energy Branches	completed	Legislative/Informative, Information/Education/Training	All sectors	Energy Managers / Account., Large Enterprises, SMEs	1998	2004	Low
SK8	Mandatory Energy Manager in Heat Delivery Branch	completed	Legislative/Informative, Information/Education/Training	All sectors	Energy Managers / Account., Large Enterprises, SMEs	2005		Low

Energy Efficiency Policies and Measures in Slovakia 2006

MURE - Synthesis of Energy Efficiency Policy Measures by sector

TERTIARY

Measure code	Measure Title	Status	Measure Type	Subsector	Target Audience	Starting Year	Ending Year	Semi-quantitative impact
SK1	Thermal Insulation Standards in Buildings	ongoing	Legislative/Normative - Mandatory Standards for Buildings	All sectors, Commercial offices, Distribution and warehousing, Public buildings	Building Professionals, Energy Managers / Account., Energy Suppliers, Public Estates	2002		High
SK3	Mandatory Inspection Boilers (completed measure)	completed	Legislative/Normative - Regulation for Building Equipment	Total Sector	Building Professionals, Public Estates	1998	2004	Medium
SK4	Mandatory Inspection Boilers (ongoing measure)	ongoing	Legislative/Normative - Regulation for Building Equipment	Total Sector	Building Professionals, Public Estates	2005		Medium

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TERTIARY (Continuation)

SK5	Efficiency Standards of Boilers	ongoing	Legislative/Normative - Regulation for Building Equipment	Total Sector	Building Professionals, Energy Managers / Account., Energy Suppliers, Public Estates	2001		Medium
SK7	Concept of Municipality Development in the Sphere of Thermal Energy	ongoing	Legislative/Normative - Mandatory Standards for Buildings	Commercial offices, Commerce	Local authorities	2005		Medium
SK8	Energy Audit Training Programme	ongoing	Financial - Grants, Information/Education/Training	Central government, Energy Agencies	Energy Managers / Account., Large Enterprises, Public Estates, SMEs	1996		High

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MURE - Synthesis of Energy Efficiency Policy Measures by sector

CROSS CUTTING

Measure code	Measure Title	Status	Measure Type	Starting Year	Ending Year	Semi-quantitative impact
SK1	Feed-in Tariffs for Renewable-based Electricity and for Electricity Produced by CHP	ongoing	Fiscal Measures/Tariffs	2006	2007	Unknown
SK7	Programme for the Reduction of Energy Intensity and Utilization of Renewable Energy Resources	completed	General Energy Efficiency / Climate Change / Renewable Programmes	2000	2003	Medium
SK8	Sectoral Operational Programme 1.4: Support of Energy Conservation and the Utilization of Renewable Energy Resources	ongoing	General Energy Efficiency / Climate Change / Renewable Programmes	2004		Medium
SK9	Voluntary Certificates for Renewable-based Electricity	ongoing	General Energy Efficiency / Climate Change / Renewable Programmes, Market-based Instruments	2006		Unknown

Annex 3

Country Profile

Energy Efficiency Trends in Slovakia

Overview

Over the period 1998 – 2005 the energy efficiency index for the total (all sector) final energy consumption (ODEX) decreased by 7 %. Industrial sector was the main contributor to this development. In transport sector, the improvements were slower (3%) .

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 11% since 1998, of which 34 % for chemicals. The cause lies in the switchover from heavy chemistry to less energy intensive production. Certain improvement is visible in steel industry (7 %).

Households

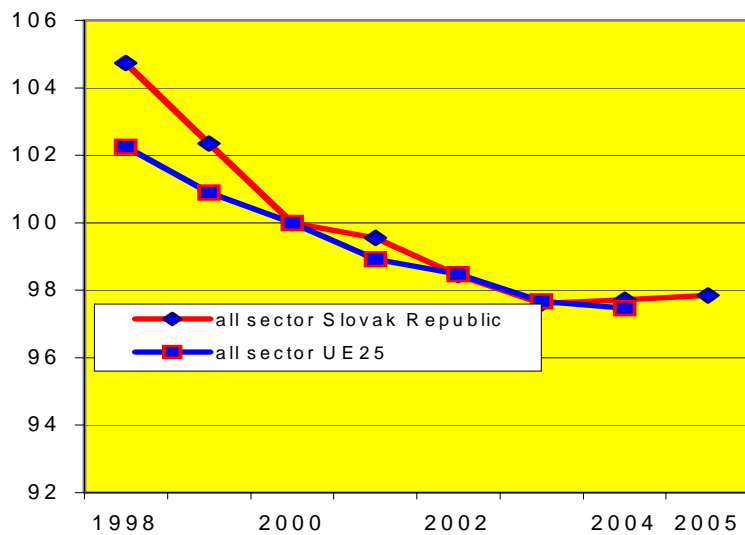
Between 1998 and 2003 the energy efficiency index in the household sector was stagnant; over the last three years, there has been a slight improvement (2 %). In this sector contradictory developments can be observed: severe price increase of electricity, gas and heat delivery for the households (electricity 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

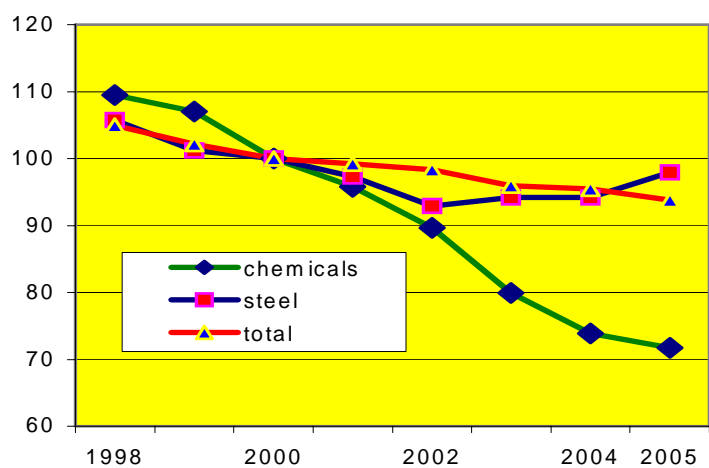
In this sector rail transport achieved significant improvement (21 %); this, however, did not compensate for the poor results of road transport, where the improvement is only 3% since 1998.

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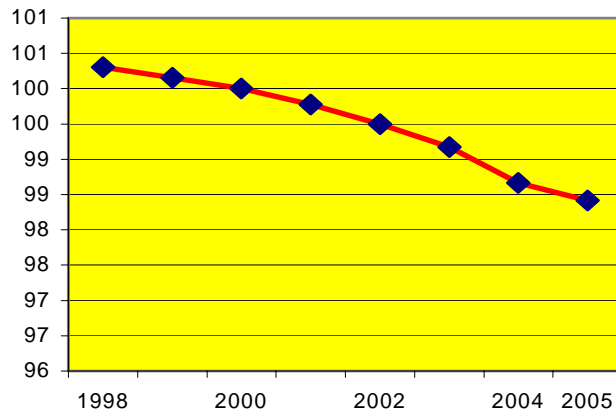
All sectors



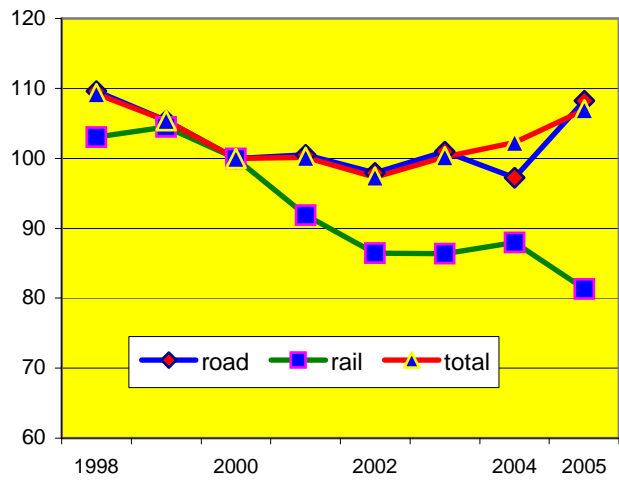
Industry



Households



Transport



Energy Efficiency Policy Measures

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.

The Slovak Government in January 2006 has approved the latest Energy Policy of the Slovak Republic. The Energy Policy of the Slovak Republic covers the period of 25 years and is gradually updated. National climate policy is based on the Strategy of the Slovak Republic Relating to the Global Climatic Change.

Energy legislation related to energy efficiency, energy conservation and wider RES utilisation consists of the four fundamental Acts: Energy Act, Heat Delivery Act, Regulatory Act and Energy Efficiency in Buildings Act. In an advanced stage of legislation process are the Bills on CHP Promotion and Energy Efficiency Act, both expected in force before the end of 2007.

Industry

Together with 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. Emission trading is already under way.

Household and services

The effort is focused at 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.

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 bio-fuels 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

Sectors	Title of the measure	Valid*
Industry	Emission trading in the Slovak Republic	2004
Industry	Mandatory Energy Manager in Heat Delivery Branch	2005
Industry	Efficiency Standards for Boilers	2005
Industry	Feed-in Tariffs for RES based Electricity and CHP	2006
Households and tertiary	Insulation Standards in Buildings	2002
Households and tertiary	Domestic Appliances Labelling	2002
Households and tertiary	Energy Efficiency Certificates for Buildings	2006
Transport	Minimum Quantity of Automotive Fuels Produced from RES	2006
Transport	Regular Emission Inspection of Vehicles	1996

* The table contains the latest edition of the measure; some measures were introduced much earlier

Annex 4

Data Situation and Data Quality

Data of the SO SR were the main source of data for projects, i.e. directly or mediately as data of Eurostat obtaining them from the SO SR.

Slovakia has currently well-established harmonized statistical system of obtaining and processing of data on energy. For the field of data on energy consumption we used mostly energy balances processed by the SO SR.

It is necessary to put some basic facts for explanation of some differences in time series. It came to significant changes in Slovakia from 1990, above all in the field of property and total structure of economy. In 1993 it came to division to two independent states. All these changes reflected on quality and completeness of data.

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

During data processing for project following problems occurred:

- **Industry sector**

Data for industrial production index are available only from 1998, when harmonized survey PRODCOM was introduced and a follow-up was starting of calculation of industrial production index according to CR 1165/1997 on Short-Term Statistics.

Data for steel production are confidential (dominance of one company); therefore published data of the International Iron and Steel Institute were used.

The SO SR does not report data on paper production distinctively; therefore published data of FAO UN were used.

- **Transport**

Decrease in number of vehicles in 2004 was caused by new registration regulation and old not roadworthy vehicles were not registered.

Number of motorcycles from 1999 does not include mopeds.

Number of LDV for 2001,2002 and 1993-98 is an estimate of the SO SR

Number of distances (in km) by trucks is without tradesmen.

Number of transported passengers in air transport is in enterprises that are registered as transport enterprises.

Transported load in road transport for 1995-1999 is without tradesmen and in 1990 – 1994 only in enterprises that are registered as transport enterprises.

Data on consumption of electricity, fuels and transport of passengers in municipal transport companies are individual, because we have only two of such enterprises.

○ **Households**

Data on number of households, on number of permanently occupied dwellings, permanently occupied family houses and on number of total housings is an estimate of the SO SR, because these surveys are conducted only in a form of censuses that are carried out in 10-yearly cycles. The latest Census of population and housing was conducted in 2001.

Data Situation and Data Quality – ODEX

In order to provide transparency and also to qualify the ODEX indicators, national teams rank the data used as follows:

1. the quality of the data source is given a mark of A, B and C

A: Official statistics

- Official statistics/surveys (national statistical office, Eurostat etc.),
- Model estimations used as official statistics,
- Data “stamped” by Ministries.

B: Surveys/ modelling estimates (consulting, research centres, universities, industrial associations)

C: Estimations made by national teams (for the project)

2. data quality is ranked 1,2 and 3

For official sources: national teams in collaboration with the source of data make a subjective appreciation and a grade of 1 or 2 is assigned.

For surveys: the quality grade depends on the size of the sample for example a large sample receives a grade of 1 etc.

For estimates made by national teams the quality grade depends on the method: formal modelling is ranked as being a higher quality (1 or 2) than expert estimate (2 to 3).

For Slovakia data used to contact ODEX has been ranked as follows:

General data

	Data Source Quality	Data Quality
Value added, GDP	A	1
Population	A	1
Primary and final energy consumption by sector	A	1
Electricity generation by energy carriers	A	1
Degree days	A	1

Industry

	Data Source Quality	Data Quality
Energy consumption		
chemicals, rubber & plastics	A	2
chemicals	A	2
rubber & plastics	A	2
primary metals	A	2
steel	A	2
other	A	2
non metallic mineral	A	2

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paper	A	2
food	A	2
textiles	A	2
equipment	A	2
machinery	A	2
transport vehicles	A	2
fabricated metals	A	2
production		
production index (IPI)	A	1
production of steel	B	1
production of paper	B	1
production of cement	A	1

Transport

	Data Source Quality	Data Quality
Energy consumption		
road	A	2
cars	A	2
goods transport	A	2
buses	A	2
rail transport	A	2
air	A	2
total	A	2
Data on traffic, stock		
Stock of cars and kilometres	A	2
Stock of buses	A	2
stock of motorcycles	A	2
number of air transport passengers	A	2
rail traffic	A	2
rail traffic of goods	A	2
rail traffic of passengers	A	2

Households

	Data Source Quality	Data Quality
Stock of permanently occupied dwellings	A	1
number of new houses	A	1
Annual new dwellings	A	1
floor area	A	1
percent of dwelling with central heating	B	2
share of space heating	B	2
Energy consumption		
consumption of households	A	2
electricity consumption of households	A	2
fuel consumption of households	A	2