



ICEG EUROPEAN CENTER

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# **NEWS OF THE MONTH**

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## THE ROLE OF HIGH-TECH EXPORTS IN V4 COUNTRIES

There are two main indicator groups used for measuring innovation: input and output ones. Research and development (R&D) expenditure is considered as the input measure of innovation. Registered patents, scientific research papers and the high-tech trade used to measure output side of innovation. High technology sectors include aerospace, computers-office machinery, electronics-telecommunications, pharmacy, instruments, electrical machinery, non-electrical machinery, chemistry and armament.<sup>1</sup>

Production and export of these products are of high importance, since the demand for them have been steadily increasing mainly due to intensive use of information and communication technologies (ICT) in all fields of economy. It is not a surprise that the most competitive countries in the world produce and export high-tech products in a large proportion. High-tech export accounts for more than one-fifth of the total export in Finland, France, the Netherlands and Switzerland; one-fourth in the USA, United Kingdom and Japan; and one-third in Ireland in 2000-2006, in average.<sup>2</sup>

Foreign trade of Visegrád (V4) countries has grown dynamically since the beginning of the nineties. Structural changes in new EU members caused changing export patterns, both in terms of products and geographical division. A shift towards manufacturing exports and trade with EU-15 happened, particularly since the accession in 2004. Moreover, trade between new member states has also intensified significantly.

**Table 1. Export Growth and High-tech Export and Import, 2004-2006**

<i>Indicator</i>	<i>Year</i>	<b>Czech Rep.</b>	<b>Hungary</b>	<b>Poland</b>	<b>Slovakia</b>
<b>Total export growth (%)</b>	<b>2004</b>	31	25	38	9
	<b>2005</b>	27	28	29	10
	<b>2006</b>	20	29	21	33
<b>Import of high-tech products (EUR million)</b>	<b>2004</b>	9 309	10 096	7 360	2 438
	<b>2005</b>	8 550	10 249	8 454	3 224
	<b>2006</b>	10 812	10 753	9 332	4 702
<b>Export of high-tech products (EUR million)</b>	<b>2004</b>	7 577	9 701	1 648	1 045
	<b>2005</b>	7 324	9 941	2 299	1 641
	<b>2006</b>	9 629	12 121	2 748	1 784

*Source: Eurostat*

### HIGH-TECH EXPORT

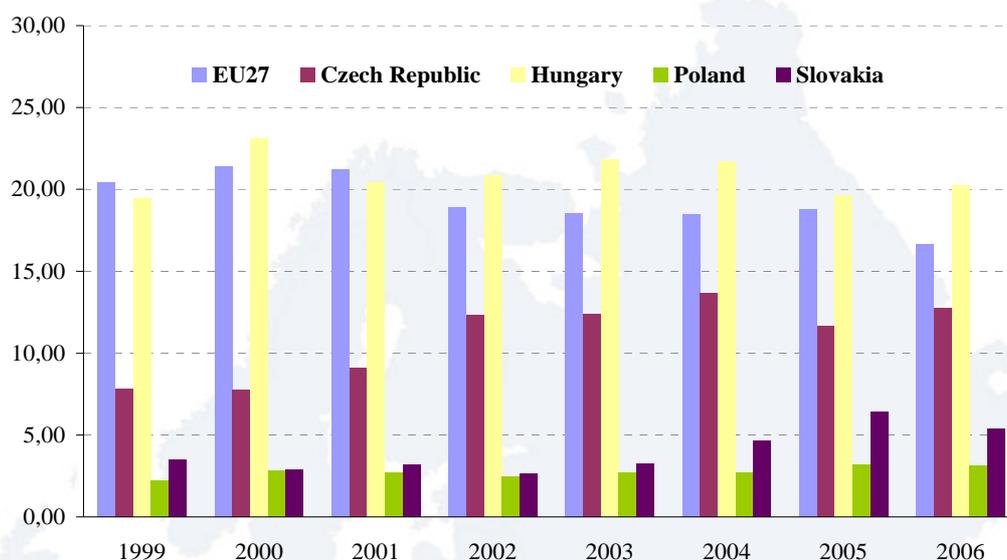
The share of V4 in high-tech trade has changed significantly in the last ten years. Slightly more than 2% of the world's total high-tech import flowed to V4 in 2005, while in 1995 it was only 1%. The Czech Republic, Hungary, Poland and Slovakia together give 1.45% of the global high-tech export in 2005, which is more than 1.1 percentage point increase in comparison to 1995. Hungary shows the most dynamic development in high-tech export performance. It produced 0.68% of the world's total high-tech export in 2005, while in 1995 the indicator represented only 0.08%.

<sup>1</sup> Eurostat definition

<sup>2</sup> Eurostat

Total high-tech trade (export and import) in absolute terms was the highest in Hungary, followed by the Czech Republic, Poland and Slovakia. Hungary holds a high-tech export-leader position among V4. Only Hungary had a high-tech share of exports above the EU average in recent years. The share of high technology products in the Polish export has remained low. The share of high-tech products in total export is higher in Slovakia and in the Czech Republic in comparison to 1999.

**Chart 1. Exports of High-tech Products as a Share of Total Exports (%)**



Source: Eurostat

Value added of the high-tech manufacture as a percentage of value added of total manufacturing sector was 6.9% in the Czech Republic, 19.3% in Hungary, 6.5% in Poland and 5.1% in Slovakia in 2003. (This indicator represented 25.3% in Finland, which was the best performing country regarding value added in 2003). In relative terms, an average European enterprise in the high-tech sectors (high-tech manufactures and high-tech knowledge intensive services) generated a production value of EUR 1.9 million in 2003. The production value per enterprise in the high-tech sectors was below EUR 1 million for V4, with exception of Slovakia representing EUR 1.5 million per enterprise.

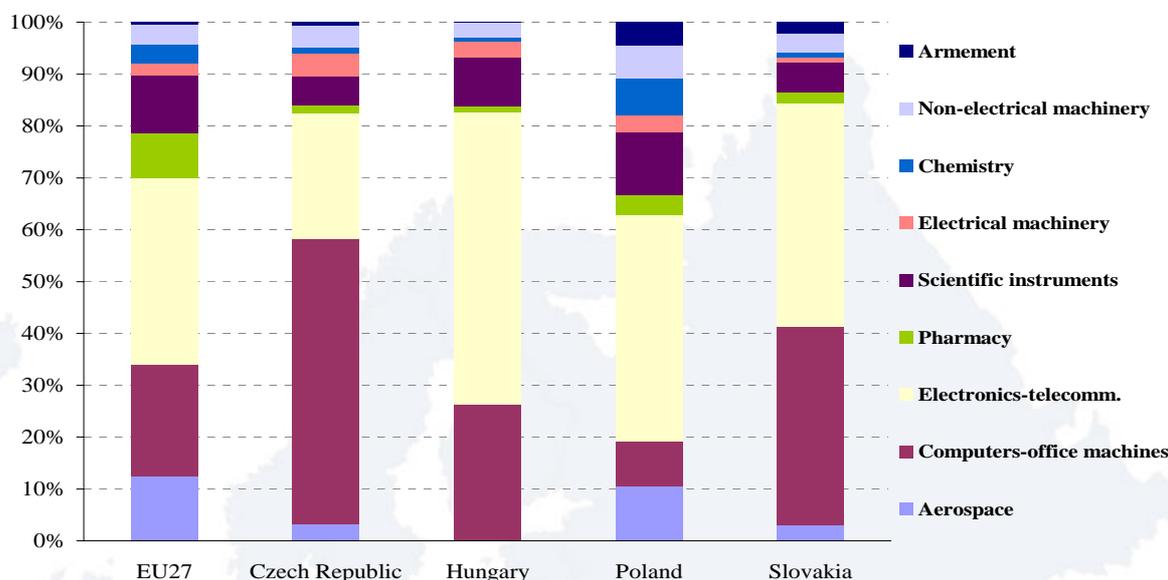
### **DISTRIBUTION OF HIGH-TECH EXPORTS**

Different high-tech products have different weights in the high-tech exports of V4. In Hungary, Poland and Slovakia the majority of high-tech export is provided by electronics and telecommunications. In the Czech Republic production and export of computers are of higher importance, 55% of the Czech high-tech export was given by this sector in 2006. Electronics and telecommunication sector is less dominant in the Czech Republic than in other V4 countries.

The role of aerospace in high-tech export is significantly lower in three of the four countries in comparison to the EU27 average (13%). In contrary, Poland's aerospace high-tech export accounted for 11% in 2006. Pharmacy is also of lower importance in the analyzed new member states. While in the EU27 pharmacy contributes to the high-tech export with 9%, it amounts for only 1-1% in the Czech Republic and Hungary, 2% in Slovakia and 4% in Poland. Export of scientific instruments is of high importance in Poland and Hungary. Other

high-tech products don't play a key role in high-tech export performance in Hungary and in Slovakia. Electrical machinery and non-electrical machinery represent each 3% in Hungarian, as well as 5% and 4% in the Czech high-tech export. Beside, non-electrical machinery, chemistry has also gained momentum in Poland's high-tech export. Poland's export share in chemistry and armament is higher than in the EU27.

**Chart 2. Distribution of High-tech Exports by Product Groups, 2006 (%)**



Source: Eurostat

Developing high-tech export performance in the V4 can be explained, on one hand by presence of multinational enterprises. The role of multinational enterprises in production and export is extremely high, especially in Hungary and the Czech Republic. Foreign direct investment can be considered as the main source of producing and exporting high technology products in the analysed countries. On the other hand, growing demand for high-tech products induced by the European economic growth held on export at a high level.

## CONCLUSIONS

High-tech production and export are of great importance, since the demand for high-tech products has growing recently and this term is expected to continue at a faster rate. Mainly due to the settlements of multinational enterprises in high-tech sectors, Visegrád countries reached better performance in high-tech export in comparison to the end of nineties. However, these EU members show diverse picture. High-tech export is proved to be significant in Hungary and the Czech Republic, while it doesn't play as a prominent role in the Polish and Slovak total export. Electronics, telecommunication made up the largest share of high-tech export in the case of Hungary, Poland and Slovakia, while export of computer-office machines represented the highest proportion in the Czech high-tech export in 2006.

## INCREASING INFLATIONARY PRESSURE IN SLOVENIA

Although 2007 started with a business friendly personal and corporate income and payroll tax cut and with the introduction of the euro, the second half of the year turns to be a very unfavourable period for Slovenia. Besides, the GDP-growth seems declining from 5.8% in 2006 to 4.6% this year (instead of the expected 6.5%) and 4.1% in 2008, the inflation forecasts must have been revised, as it got more than double of the January one. After the 2.7% between January and April, the year-on-year rise of consumer prices climbed up to 3.5% in September, then sharply to 5.1% in October, and the cumulated annual inflation seems to be 5.8% at the end of the year, following from the November year-on-year price index. The average euro-zone price increase is 2.6%.

### SOURCES OF HIGHER INFLATION

Basically, the international trends of world market prices determined the inflation in Slovenia, just as in any other open markets, but there are structural factors that strengthen the world economic impacts instead of offsetting them. The primary roots of the boosted inflation are the increase of food, oil and clothing prices. Food prices increased by further 2.2% just in October and contributed by 0.4 percentage point to monthly inflation. Increases were observed in the prices of milk, milk products and eggs (by 9.8% in total), fats and oils, and meat. Before October, food prices have already increased by 11.7% amending it with the 4<sup>th</sup> quarter inflation approximately 43% food price increase is assumable in 2007. The share of oil price increase in the extra inflation is 0.5 percentage points, in case of clothing and shoe products it is 0.2 percentage point.<sup>3</sup>

**Table 2. Details of Inflation in Slovenia**

<i>Price index</i>	<b>10.2007/ 09.2007</b>	<b>10.2007/ 10.2006</b>
<b>Consumer prices (CPI)</b>	<b>100.7</b>	<b>105.1</b>
Goods	101.3	105.1
Fuel and energy	100.3	105.4
Other	101.5	105.0
Services	99.3	104.9
<b>HICP</b>	<b>100.7</b>	<b>105.1</b>
Administered prices	100.0	105.8
Energy	100.0	105.0
Other	100.0	107.6
<b>Core inflation</b>		
Trim mean	<b>100.6</b>	<b>102.7</b>
Excluding food & energy	100.7	103.8
<b>Producer prices (PPI)</b>		
Domestic market	<b>100.6</b>	<b>106.3</b>
EMU	99.7	102.1
<b>Consumer prices in EMU</b>	<b>100.5</b>	<b>102.6</b>

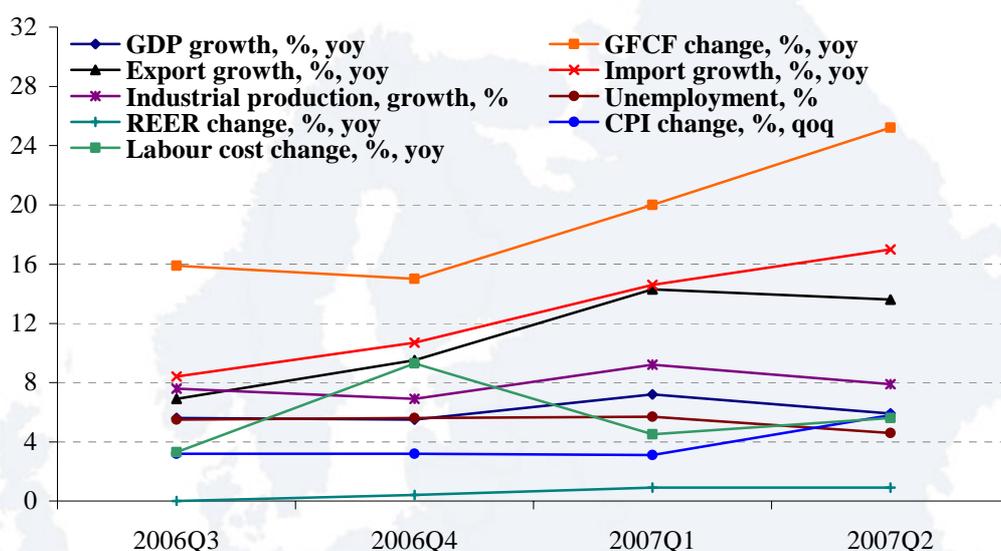
*Sources: Institute for Macroeconomic Analysis and Development*

A comparison of price increases in the EMU over the last few months shows that this external shock had a much stronger impact on consumers in Slovenia than in other EMU countries. It

<sup>3</sup> Institute of Macroeconomic Analysis and Development *Slovenian Economic Mirror* - November 2007, [www.umad.gov.si](http://www.umad.gov.si)

seems that Slovenia was not completely ready for the single currency from structural point of view. When monetary adjustment would be necessary, the economy cannot offset the absence of national interest rate competence neither through wages nor through fiscal policy. Since the ECB rate is 4%, the 5.8% inflation resulted in negative real interest rate what encourage borrowing. The process can be followed by increased amount of consumption loans and, as a positive impact, by very sharp increase of gross fixed capital formation. The latter one is also motivated by the decreasing tax rates and the improved unit labour cost as a result of tax cuts, but, in addition, the increasing demand for tangible assets in production has inflationary side-effect.

**Chart 3. Changes of Slovenian Indicators Related to Inflation (%)**



Source: Institute for Macroeconomic Analysis and Development

Because of rigidity, fiscal adjustment cannot help. The government launched a comprehensive tax reform to ease the burden on labour and profit, that resulted a slight decrease in revenues, meanwhile the expenditures are untouchable till late 2008, the next general election. Although in 2007, the budget deficit to GDP will be lower (1.3%) than proposed in the national convergence program, but the deficit target for 2008 was raised up to 1.3% from 1% that indicates the prevailing political business cycle. The World Bank<sup>4</sup> recommended 0.6% deficit to counterweight the inflation pressure with fiscal tightening when the projection on inflation was only 2.8%, but in the present political and fiscal circumstance it is not expectable.

The labour market reactions are not price stability friendly too. The pace of real wage increase is quickening and the trade unions pressing strongly the employers and the government with general strikes for ongoing rise. Notwithstanding, the increasing employment and the 4.8% rise of real wage, the more than a decade old social and political consensus – that determined real wage increase always below the real GDP growth – begins to break up.<sup>5</sup> This creates increasing demand pressure in the commodity market and results in price increase.

Another unfavourable aspect of inflation is that the pace of imports' increase started to outrun the increase of exports. This is because of sharply increasing import demand rooted in real

<sup>4</sup> World Bank EU8+2 Report 2007/September, [www.worldbank.org](http://www.worldbank.org)

<sup>5</sup> Slovenia Times: [www.sloveniatimes.si](http://www.sloveniatimes.si)

wage rise. One more very important aspect: the euro is too strong for Slovenia. By the global world market inflation in energy resources and food and by the start of general, cyclical world economic slow-down, the risk of the Slovenian economy increased just like her rivals in the Central European region, but the risk of the euro-zone is determined by the significant member states like Germany, France, Italy or Spain. Thus the euro-zone demands less monetary rigour than the Slovenian economy. Besides, the national fiscal and wage mechanisms are not yet mature to substitute the monetary channel for adjustment. The inflation quickening far beyond the euro-zone average is just an indicator of structural deficiencies that emerge by negative world economic shocks.



## CHANGING FACTORS OF ELECTRICITY MARKET IN SLOVAKIA

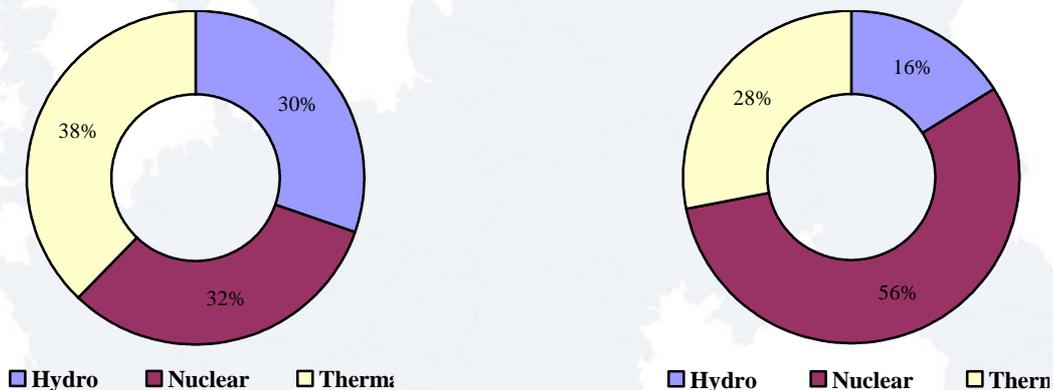
Slovakia faces significant changes in electricity production capacities in the coming years that will reshape its electricity trade structure, through possibly decreasing production in the short run and parallel increasing consumption. The position however can be altered by improving energy and electricity intensities.

### ELECTRICITY PRODUCTION

By latest Eurostat data, net available electricity production capacity of Slovakia was 8.3 GW. The division of capacities by the method of production is quite balanced, as traditional thermal (37.5%), nuclear (32%) and hydro (30%) power plants. However the role of water, as renewable energy source is a remarkable speciality in comparison with other Visegrád Countries. The dominant market player is the Slovenské Elektrárne with foreign owner ENEL that possess 7 GW, 85% of all capacities by its two nuclear, two coal heated thermo, and more than sixty hydro power plants.

The proportion of mentioned methods in electricity generation differs from its capacities. (*Chart 4*) Nuclear power plants generate the overwhelming share of electricity, followed by traditional thermal (28%) and hydro (16%) ones. Within the group of thermal plants, coal (39.2%), natural gas (24.2%), lignite (22.4%) and oil (8.2%) are the main types of production.

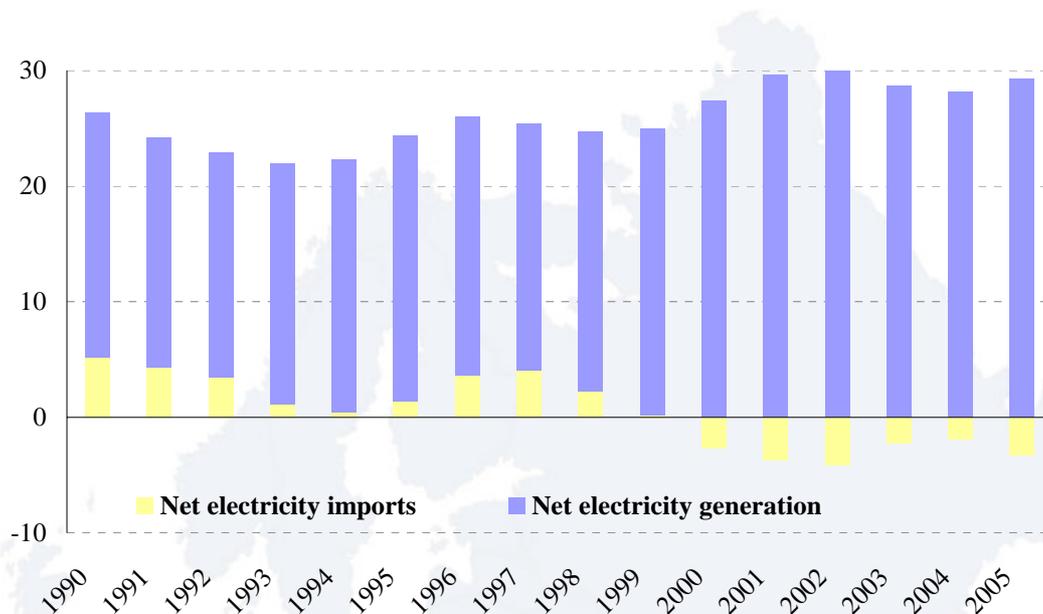
**Chart 4. Electricity Capacities (left) and Generation (right) by Main Sources, 2005 (%)**



Source: Eurostat

In 2005, Slovakia's total gross generated electricity was 31.5TWh, while the net generation reached 29.3TWh. In 1990-1999, net electricity generation fluctuated around 25TWh. Since 2000, mainly due to full implementation of new nuclear facilities of Mochovce, electricity generation stabilised on a higher level of 27-30TWh. This new capacities made possible for Slovakia to be a net electricity exporter since 2000. (Chart 5)

**Chart 5. Electricity Generation and Net Imports, 1990-2005 (TWh)**



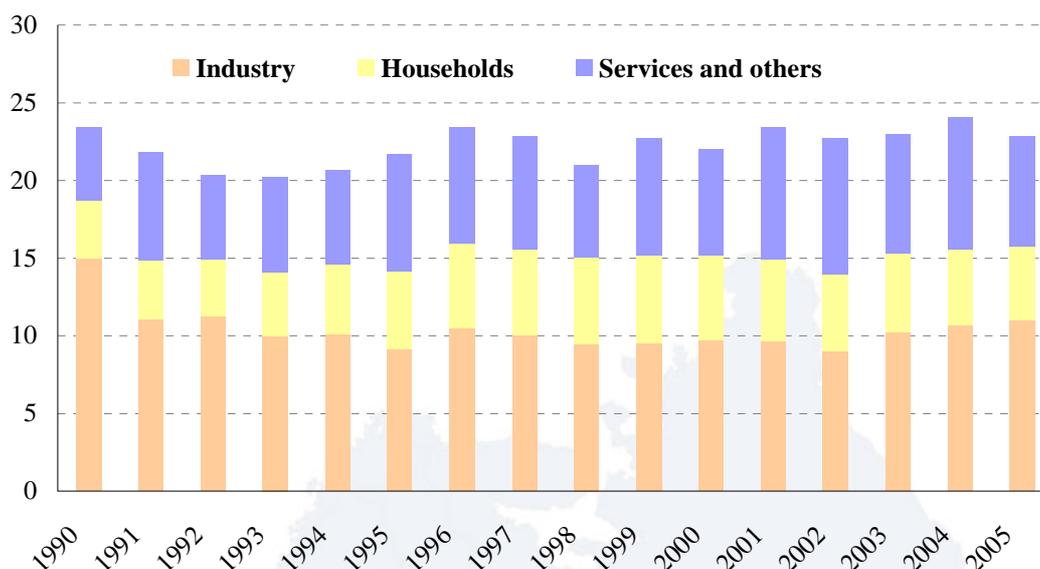
Source: Eurostat

By UCTE data Slovakia exported 83TWh and imported 66TWh electricity in 1990-2006, while exported 12.3TWh and imported 10.8TWh in 2006. Its main export destinations are Hungary (9.6TWh) and Ukraine (2TWh). Main importers to Slovakia are the Czech Republic (6.9TWh) and Poland (3.8TWh).

### **ELECTRICITY CONSUMPTION**

Developments of demand side and its structure could clarify our picture on Slovakian electricity market. There are no determined trends of consumption time series shown by Chart 6. The level of consumption is relatively stable and bobbles within 20-23TWh (16 years average is 22.3TWh).

What is more spectacular, the structural changes of it, that was mainly affected by structural transition of the economy. The role of industry decreased considerably until 2002, when Slovakia started to attract high amount of industry related FDI, especially in energy intensive production. The role of service sector increased, while not so much, as its role in contribution to GDP, but this is in line with low energy intensity of mainly privately owned service sectors. The share of households also increased, mainly due to favourable prices.

**Chart 6. Electricity Consumption<sup>6</sup> by Main Sectors, 1990-2005 (TWh)**

Note: others include agriculture and transport

Source: Eurostat

All in all, industry lost 16 percentage points and reached 48%, services (including agriculture and transportation<sup>7</sup>) share increased by 11 percentage points to 31%, while households' reached 21%, rising by 5 percentage points in 1990-2005.

### INTENSITY

The key issue of electricity market processes in Slovakia is the development of energy and electricity intensities. Slovakia still consumes too much relative to its level of economic development. The energy intensity is worse than the electricity intensity. (*Chart 7*)

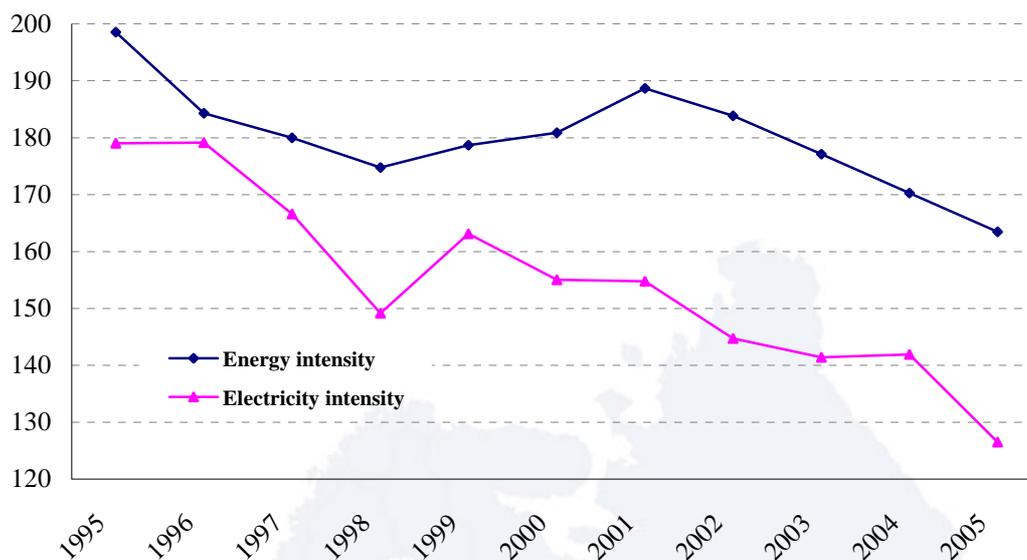
In 2005, energy consumption relative to GDP in PPS was 160% of EU-27 average, while the same indicator concerning electricity consumption was 126%. Besides the recent high paces of real GDP growth, the more productive industrial production and the relative to incomes low household consumption led to better intensities.

### EXPECTATIONS

By the data of *Slovakian Energy Policy*, *UCTE* and *Eurostat*, implemented capacities of Slovakia will experience significant changes. Until 2010, two units of nuclear, four units of thermal and other smaller power plants are planned to remove, reducing the country's capacities by 1.8GW. To compensate these losses, until 2015, a big hydro, two new units of nuclear and several "renewable" power plants are going to be introduced, increasing total capacities by 2.7GW.

<sup>6</sup> Without the consumption of energy sector and without storage and distribution losses

<sup>7</sup> The share of agriculture and transportation decreased by 3-3 percentage points to 2-2%, respectively. So the share of services without these increased by 17 percentage points and reached 27% in 1990-2005.

**Chart 7. Energy and Electricity Intensities relative to EU-27, 1995-2005 (%)**

Source: Eurostat

This means that for a short period of time Slovakia will lose its export positions and have to reshape its contracts with importers because of decreased electricity generation, naturally depending on domestic consumption trends. Slovakian Energy Policy estimates balanced consumption growth that is driven mainly by dynamic industry, and more moderate household and service sectors consumption and further decreasing agricultural and transport consumption. However, 2008-2011 will be critical from the point of view concerning trade.

Improving energy intensity through increasing productivity, efficiency and better consumer attitudes plays significant role in shaping electricity market processes, mainly through influencing demand side trends. Advancing intensities are strategic objectives not only of Slovakia, but of the EU as a whole. The dependence of EU-27 on third countries is very high and increases in time. The best way of doing this, ensuring sustainable real GDP growth and improving productivity.