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Wuppertal Institute for Climate, Environment and Energy

Impact on activity and employment of climate change and greenhouse gas mitigation policies in the enlarged Europe

Final Country Report – Hungary

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The interviews have shown that there is still a significant lack of knowledge referring to climate change, suitable mitigation measures and other environmental problems. Awareness rising for both impacts of climate change in general and impacts of climate change mitigation measures on employment is crucial in the long term. Interviewees emphasise that there are hardly any experts for Kyoto instruments or general knowledge about climate change and its impacts in Hungary. Therefore a better knowledge transfer between science / industry and politics is needed.

Globalisation, rationalisation and automation of production processes have a significantly higher impact on Hungary's economy and employment than policies and measures in the framework of climate change. Furthermore, stronger climate protection policies and measures are not necessary to fulfil Hungary's obligations in the course of the Kyoto Protocol. Pursuant to the Kyoto Protocol Hungary is obliged to reduce greenhouse gas emissions within its territory by 6% compared to the average levels of 1985-87 during the period of 2008-2012. Given this 6% reduction commitment, emissions have to be reduced to 112,800 Mt CO_2 eq. Due to the process of economic restructuring between 1987 and 1992, emissions were already reduced significantly.

In the industrial sector, stakeholders think that efficiency would be already high because of the capital investment of western European companies in new and effective industrial production plants in Hungary since the early 1990s. As a result of this argument the government does not accelerate the implementation of climate protection policies. There is also a popular anxiety that more efficient industries might have a negative impact on employment. Only NGOs and scientists see a slight chance for job creation (particularly in the agricultural sector and in the insulation manufacturing industry) through stronger climate protection policies.

On the other hand, much needs to be done on the demand side in households and in the building sector, which requires skilled and trained workers. Many interviewees expect benefits for the local building trade with positive impacts on employment, if instruments were developed in order to open up the efficiency potentials in the building sector.

The transport sector in Hungary with its high share of public transport already works quite efficiently regarding carbon-use. The modal split between public transport and private vehicle use remains high, 60:40%, as compared to that of western European countries. However, stagnating development of public transport combined with the increasing pressure of private vehicle use are squeezing public transport's modal share (ECMT 2004, p. 64). In future individual traffic might gain larger proportions compared to public transport with negative effects for railway personnel and others employed in the public transport sector.

Hungary is poor on natural resources essential for heavy industry and relies strongly on imported raw materials. In 1993, industrial production accounted for only two-thirds of the 1985 level. In 1997, industrial output increased in the manufacture of road

vehicles, consumer electronics, insulated cables, office equipment and computers, steel products, aluminium metallurgy, household chemical products and cosmetics, rubber and plastic products, and paper and pulp production. Since 1990, Hungary has developed industrial strength in the automotive field as well as an expanding automotive sourcing industry in plastics and electronics.

Against this background, some interviewees fear that the current emission trading system might provide a particular incentive for the closing and relocation of some energy-intensive installations. Financially strong companies may acquire emission rights by purchasing inefficient plants and reinvest them for the expansion of in-house capacities at domestic or foreign sites, or gain profit by reselling them.

In Hungary, there is much potential for increasing energy efficiency on the supply side. In order to achieve these efficiency improvements, new technologies are going to be implemented. This development provides more employment compared to a scenario in which plants are closed due to economical inefficiency and energy imports are increased. It also provides higher / different qualifications and higher wages. Different stakeholders through all sectors emphasise the importance of nuclear energy, in spite of all the risks involved in the nuclear process chain. Except for biomass (and in a few cases also geothermic / solar energy), stakeholders argue that the potential for renewable energies in Hungary would be only small.

Many interviewees state that national measures due to the Kyoto protocol and other reduction targets for greenhouse gases have more potential for job creation respectively safeguarding of jobs than risks for employment. But for many instruments state subsidies would be needed in the short term in order to let them work efficiently in the long term. However, it seems that Hungary has practically no financial means to prepare ambitious climate protection strategies today.

All of the interviewees agree on the fact that on the one hand they will need more and more highly educated employees and that on the other hand the number of jobs for less educated people will decrease. Stakeholders emphasise that this development is independent of climate protection policies or programmes.

1 Introduction and overview

The general aim of this country report is to summarise

- The opinions and expectations of stakeholders in ministries, employers' organisations, trade unions, selected industry associations and single companies as well as in NGOs, collected by the Wuppertal Institute within face-to-face interviews,
- Published results from scientific studies, official reports and further sources (internet, literature, company reports),

with regard to the question in how far climate mitigation policies affect employment in Hungary.

Wuppertal Institute would like to thank all the interviewees who have provided data and information to this study or have presented their views on this central topic.

Sometimes, language barriers have impeded the contact to certain institutions, which had been identified for an interview. Potential interviewees were identified through internet research. Due to the fact that many websites are only available in Hungarian, research was difficult. Furthermore, language barriers occurred when calling institutions, making it impossible to explain the project topic and to request for an interview. To avoid these language barriers, an interpreter was engaged to establish the first contact to some institutions. However, even the interpreter was only partly successful and sometimes could not establish contact, but only received the general email-address of the respective institution. In addition to internet research and the support of an interpreter, the interviewees themselves have recommended some institutions or persons.

In total, 49 institutions, which had been identified for an interview, have been contacted by mail and/or by phone. All of them have been given some general information about the project and have been asked for support. In 34 cases, no interview could be conducted due to different reasons (s. table 1 in appendix).

Eventually, 14 stakeholder interviews have been carried out in Hungary and one written reply was received (s. appendix). Experts from public authorities, trade unions, employers' organisations, environmental non-governmental organisations and companies have been asked for their assessments with regard to effects of climate change mitigation measures on employment.

This country report is structured as follows:

- In chapter 2, the report focuses on the development of CO2 emissions in Hungary in general and by sector and describes national emission projections.
- In order to achieve the national emission reduction targets, policies and measures have been developed on different levels, which are summarised in chapter 3. Besides giving an overview about implemented and planned measures, the

strategies and positions of stakeholders in different sectors with regard to different types of mitigation policies and measures are presented.

- Chapter 4 deals with the impacts of mitigation policies and measures on employment in the economy as a whole and in the different sectors and branches.
- Measures to foster a social dialogue on this topic, measures to help transition for workers in the losing sectors as well as measures to support growth of winning sectors are topic of chapter 5.
- Finally, the main conclusions with regard to the question how far climate mitigation policies affect employment in Hungary are presented in the last chapter 6.

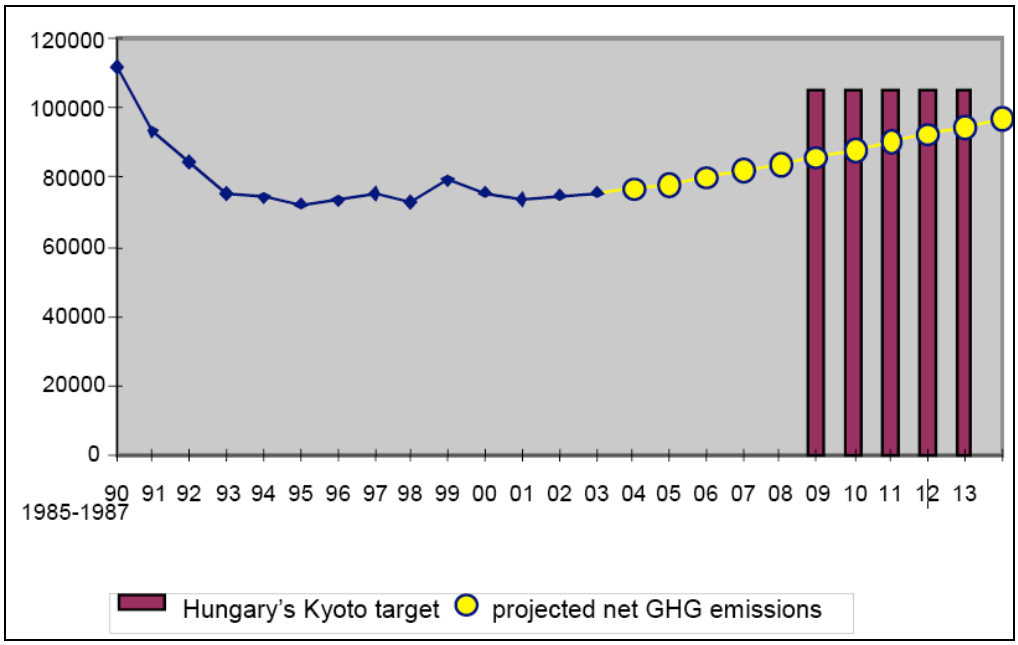
2 CO_2 emissions and emission reduction targets

Hungary ratified the Kyoto Protocol in 2002 and entered the European Union on May 1, 2004. As a member of the EU, Hungary introduced the emissions trading system on January 1, 2005 in compliance with the Community directions.

Pursuant to the Kyoto Protocol Hungary is obliged to reduce greenhouse gas emissions within its territory by 6% compared to the average levels of 1985-87 during the period of 2008-2012. From the government's point of view a Hungarian climate policy is not necessary because the Kyoto targets can be reached easily and without any restrictions.

Until 2010 Hungary plans to reach a 3.6% renewable rate in the electric energy supply, the rate of which is currently around 1% (Hungarian Ministry of Environment and Water, 2004).

Figure 1: Kyoto target and projected GHG emissions



2.1 Development of GHG emissions

The base year for Hungary was determined in the first inventory report: a reduction of its greenhouse gas emissions by 6% compared to the average emissions level of the years 1985 – 1987. Due to the restructuring of the economy forced by the political change in 1989-90 and the subsequent decline in production, considerable reduction in GHG emissions was experienced. These low levels, however, were maintained to these days, despite increasing production and GDP.

Given the 6% reduction commitment, emissions have to be reduced in 2008-12 to 112,800 Mt CO_2 eq. Due to the process of economic restructuring between 1987 and

1992, emissions were already reduced significantly (figure 1).

Table 1: Change in GHGs by sector, 1990 – 2002

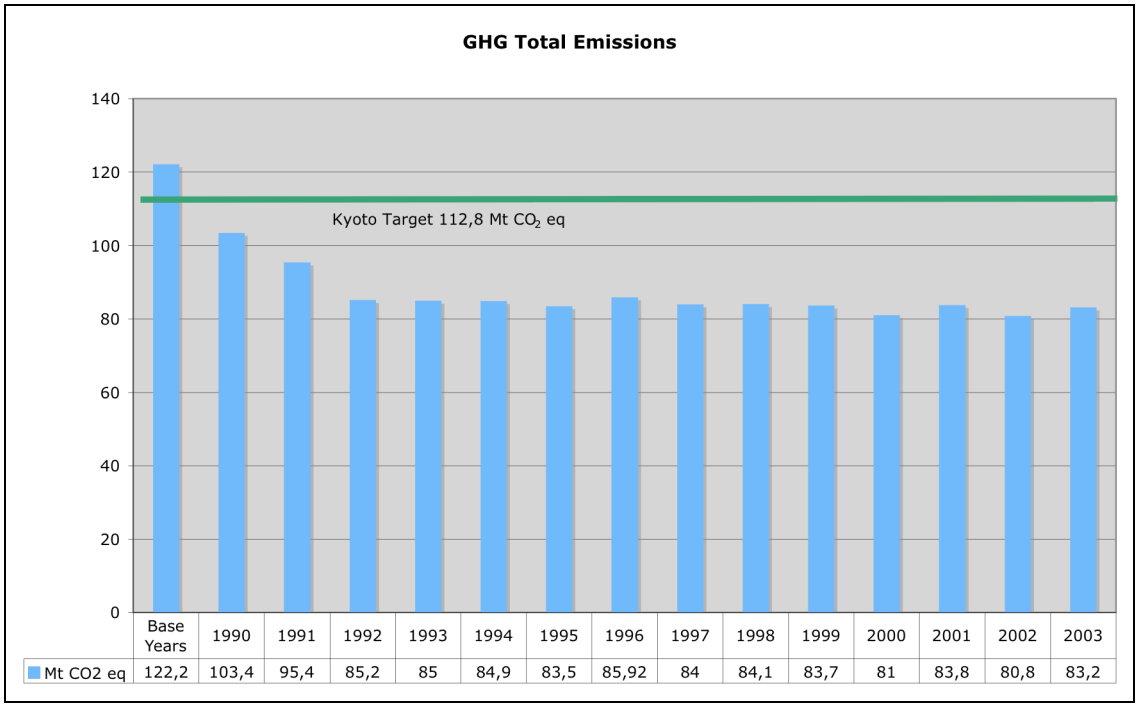
Sector	CO_2	GHG
Total	-32%	-31% (-32,2% with LUCF)
Waste		-1,9%
LUCF		-0,5%
Agriculture		-27%
Industrial processes		-19,9%
Fugitive emissions		-5,8%
Transport		17,3%
Energy use in other sectors		-28,2%
Energy use in industries		-41,5%
Energy industries		-2,4%

Source: UNFCCC, 2005

“The collapse of the centrally planned economy meant a major decline in economic production, and in line with this decline the emission of greenhouse gases also fell until the mid-nineties and then stabilised at around 83,000 Gg. by 1999. Hungary’s GDP again reached the value of the late eighties, but at the same time emission levels remained significantly lower. Thus, Hungary is expected to be able to fulfil the commitment it made under the Kyoto Protocol.” (Hungarian Ministry of Environment and Water, 2005, p. 28).

The following figure shows the development of total Hungarian GHG emissions in comparison to the Kyoto target from base years to 2003.

Figure 2: Development of GHG total emissions



Source: Hungarian Ministry of Environment and Water, 2005, p. 26

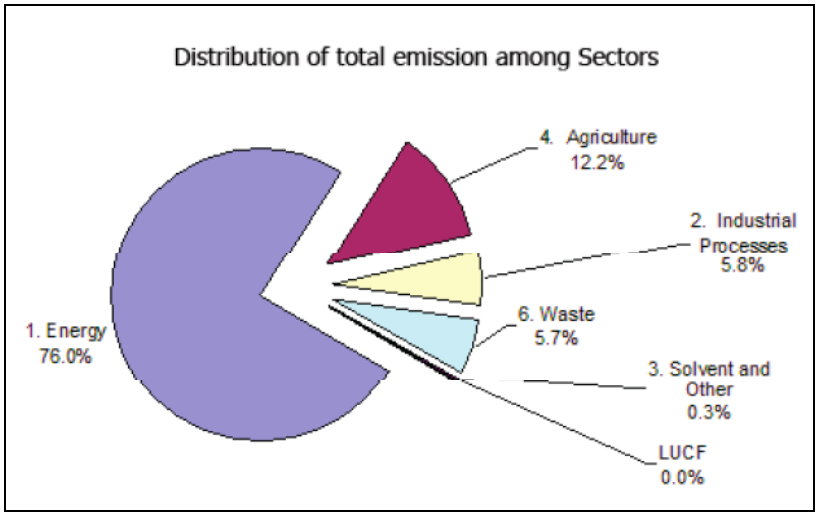
The table above indicates a reduction of more than 30%, so that Hungary will meet its Kyoto target. This perspective leads Hungary to the following position regarding the usage of flexible mechanisms:
"As projections indicate that Hungary will be able to meet its Kyoto commitment exclusively through domestic measures, it does not plan to use – through central budget funds – the flexible mechanisms of the KP in order to fulfil of its national commitments. At the same time, as a host country, Hungary continues to promote the implementation of additional individual projects that reduce emissions under the Joint Implementation mechanism." (Ministry of Environment and Water, 2004, p. 9). Compared to the 79.5 Mt CO_2 in 2001, gross greenhouse gas emissions are expected to increase to 101.9 million tons by 2012.

GHG emissions by sector

The following chapters analyses the relevant sectors of the Hungarian economy with regard to their GHG emissions.

The largest share of emissions belongs to the energy sector (76.0 %), agriculture accounts for 12.2 % of total GHG emissions, industrial processes for 5.8 %, waste for 5.7 % and solvent and other product use for 0.3 %.

Figure 3: Distribution of total emissions among sectors



Source: Hungarian Ministry of Environment and Water, 2006b, p. 36

2.1.1 Energy

Table 2 shows the distribution of CO_2 emissions within the energy sector. With 36% the energy industries account for the largest share of emissions.

Table 2: Distribution of CO_2 emissions in the energy sector

Distribution of CO_2 emissions in the scope of…	**Per cent**
Energy / Industries	36
Residential	19
Manufacturing Industries and Construction	18
Transport	17
Commercial / Institutional	8
Agriculture / Forestry / Fisheries	2

Source: Hungarian Ministry of Environment and Water, 2006b

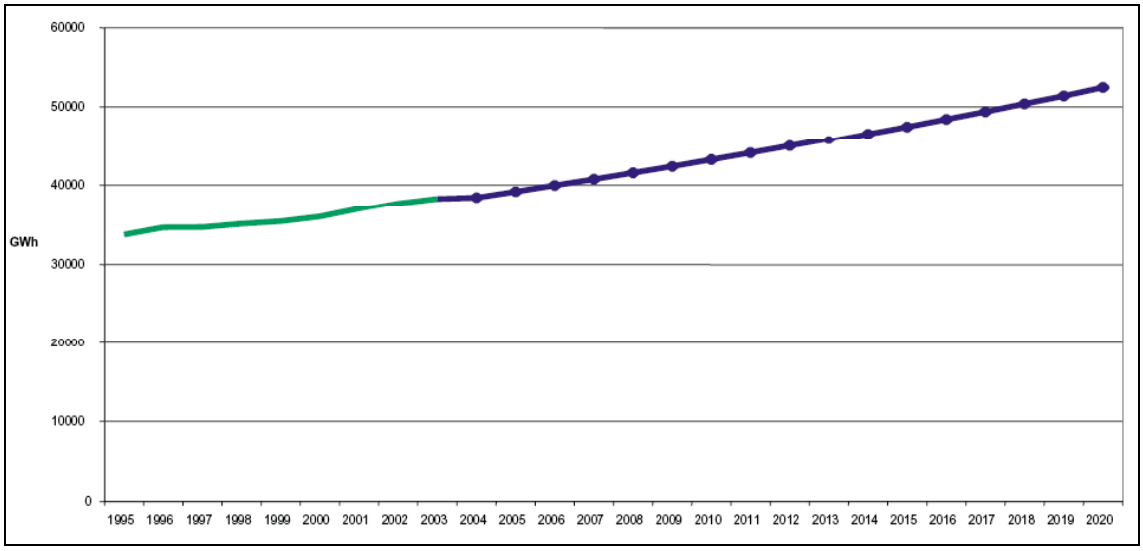
During the last 15 years most of the Hungarian coalmines stopped operating due to their low economic performance and the strong competition on the coal market. Both the industrial and household demand for coal has dropped due to fuel switch projects by some power plants as well as through the widespread use of natural gas.
The emissions of the domestic oil and gas mining have decreased due to the gradual depletion of the domestic sources. In 2002, the domestic oil mining was only 63% of the 1995 level.

The twelve-year average of natural gas consumption by the energy sector clearly shows an increasing trend with an average growth of 3.8% per year. This trend seems to characterise future consumption levels for the following reasons (Hungarian Ministry of Environment and Water, 2005, p. 19):

- economic growth causes an even more accelerated increase of electricity consumption,
- at present, the installation of natural gas combusting power plants seems to be the most feasible investment to increase capacities,
- economic growth is not going to reach a “saturation point”.

Electricity consumption in Hungary shows an increasing trend. The projected gross domestic electricity consumption will likely increase from 36,960 GWh in 2001 (EEDRB) to over 50,000 GWh in 2020 (see Figure 4). The per capita energy consumption in 2003 was about 31,874.17 kWh (EEDRB).

Figure 4: Observed and projected gross domestic electricity consumption[1], GWh



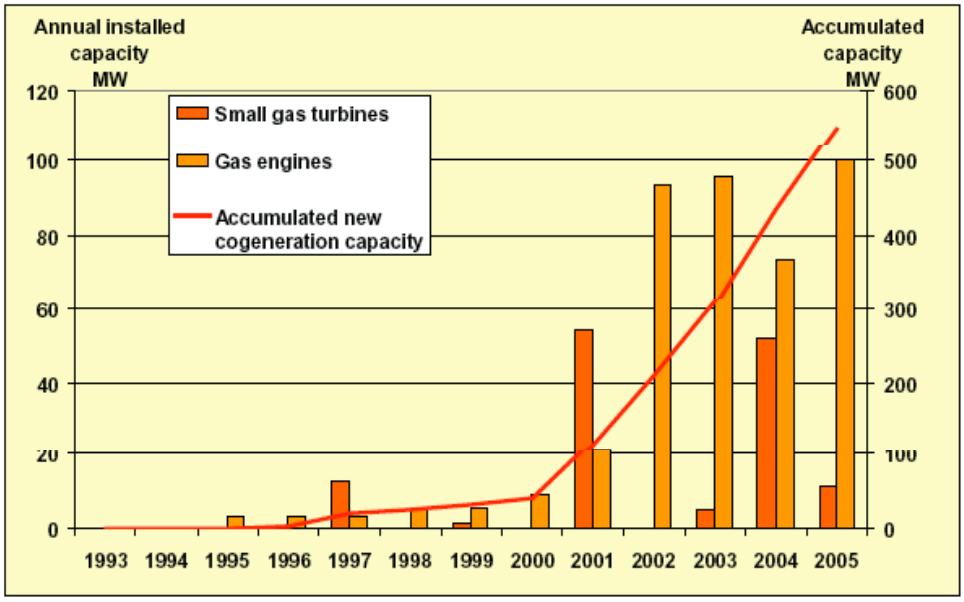
Source: Hungarian Ministry of Environment and Water, 2006, p. 74

The structure of primary energy consumption has changed during the last years: the most remarkable changes are the increasing amount of cogeneration (heat and power) and a number of fuel switch projects.

Due to the gradual liberalisation of the power market, the share of imported electricity in domestic supply will increase.

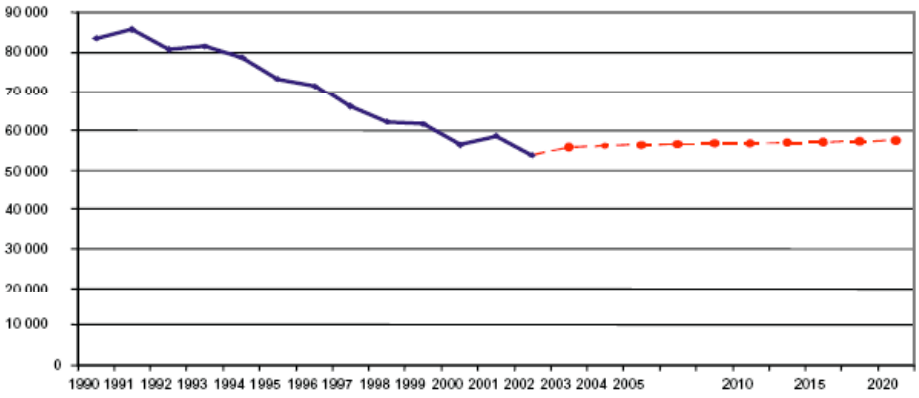
[1] Note: Gross consumption is the sum of net end-use consumption, grid losses and power plant self-consumption

Figure 5: Growth of small scale CHP in Hungary



Source: Hungarian Ministry of Environment and Water, 2006b, p. 43

Figure 6: Observed and projected district heating consumption, TJ



Source: Hungarian Ministry of Environment and Water, 2006b, p. 75

As a consequence of CO_2 regulation, the proportion of gas-fired power generation will probably further increase at the expense of coal-fired technologies.

2.1.2 Industry

Hungary is poor on natural resources essential for heavy industry and relies strongly on imported raw materials.

In 1993, industrial production accounted for only two-thirds of the 1985 level. In 1997, industrial output increased in the manufacture of road vehicles, consumer electronics, insulated cables, office equipment and computers, steel products, aluminium metallurgy, household chemical products and cosmetics, rubber and plastic products, and paper and pulp production

Since 1990, Hungary has developed industrial strength in the automotive field as well as an expanding automotive sourcing industry in plastics and electronics

Oil production, refining and the related chemical industry is highly concentrated in Hungary, there is no real chance of competition. Due to the depletion of oil stocks domestic production is gradually decreasing. The big company size is the result of a significant vertical integration. In the coke production and mineral oil processing there are two companies (MOL and Dunaferr). But there are only few actors in the related plastic raw material- and fertiliser production as well as in the pharmaceutical and rubber industry. The production of the Hungarian fertiliser and pesticide industry strongly decreased during the 90's following the consumer trends of the agricultural production. Now the level of use of these products is relatively low compared to the EU-15, therefore growth is predicted. The Hungarian pharmaceutical industry is one of the most competitive sectors of the whole economy. Rubber and plastic manufacture show a very dynamic performance, too.

The national **steel** market has a few actors, while Hungarian **coke** is produced by only one plant. The demand for coke is determined by the steel production. The domestic steel is being used mainly by construction, and demand for it is heavily dependent on the world market price.

There is a very strong price competition in the **cement production** sector. Holcim and Heidelberg Group own the main plants in Hungary. The overall utilisation of the cement production capacities is around 60%. The main consumer of cement is the construction industry.

Lime production is highly concentrated in the country: the capacity of the three factories may increase by around 25% in the coming years.

The structure of the **ceramics and porcelain industry** is quite heterogeneous. A slow growing trend of production is foreseen.

The **paper** consumption in Hungary is far below the EU average; therefore an enhancement of production is expected (Hungarian Ministry of Environment and Water, 2006b, p. 17 – 20, p. 72 – 81; Hungarian Ministry of Environment and Water, 2005, p. 7 – 27).

2.1.3 Transport

According to the report "The Fourth National Communication of the Republic of Hungary on Climate Change 2005" by the Hungarian Ministry of Environment and

Water, most emissions of the transport sector stem from road transport. There is a linear correlation between CO_2 emissions and the amount of fuel consumed by transport. Unit fuel consumption per kilometre is predicted to decrease as a result of technology improvement.

The structure of the passenger car fleet has changed during the 90's: the old passenger cars with high fuel consumption were mainly withdrawn, and currently more than 50 % of the vehicle fleet is of Western make and more modern (Ministry of Environment and Water, 2006a, p. 34). In Hungary, there is a decree (Köttem Decree 6/1990) that no private vehicles built before 1996 may be imported. The intention of this decree was to prevent large-scale imports of old western European vehicles, which would cause extensive emissions due to their technological deficits. However, this decree will possibly be abolished in the near future, because it is not compatible with EU legislation.

In Hungarian cities the modal split between public transport and private vehicle use remains high, 60:40%, as compared to that of western European countries. However, stagnating development of public transport combined with the increasing pressure of private vehicle use are squeezing public transport's modal share (ECMT 2004, p. 64).

Table 3: Number of transport vehicles by type 2000-2004

Year	2 000	2001	2002	2003	2004
Motorcycle	91 169	93 060	97 588	103 488	114 033
Passenger car	2 364 158	2 481 921	2 629 485	2 777 187	2 828 401
Bus	17 846	17 811	17 869	17 874	17 427
Van, trucks	341 925	355 117	369 276	377 092	378 069
Tractors	24 420	25 215	26 786	29 752	32 397

Source: Ministry of Environment and Water, 2006b, p. 16

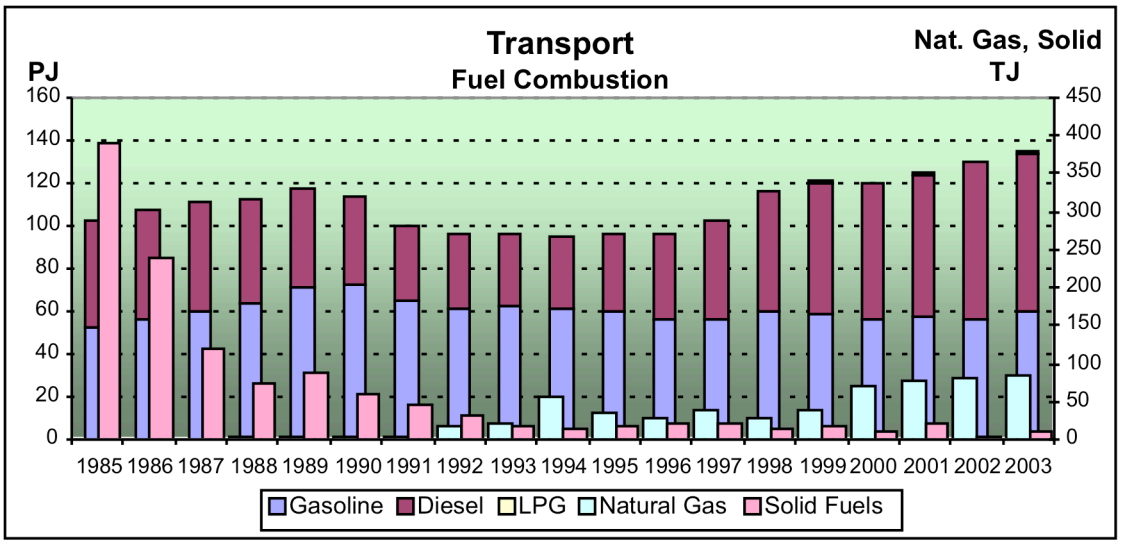
Rail transport in Hungary accounted for 2.12% of the total emissions of the transport sector in 2002. The emissions are the result of operating diesel engines and space heating in stations. The average passenger km (757.8 km) declined below the EU-15 average in 2001.

The ratio of electric traction increases, technological level of diesel engines improves; the volume of rail shipping increases, the volume of passenger transport stagnates. National ship and air transport accounted for 0.13% of the total GHG emission of the sector. National air transport is not considerable and is not expected to grow; 1% increase of fuel consumption is foreseen. In 2006, there was an attempt to establish a regular low-cost carrier connection between Budapest and Debrecen, but it turned out to be unprofitable. Hungary is obviously too small to develop major domestic air travel.

The volume of water transport was significantly reduced by the Balkan war, which blocked the Danube, the most important transport route for years.

As the following figure shows there has been a significant change in the structure of fuel type use within the transport sector during the last 20 years. While in 1985 solid fuels were the most important energy source, their share has decreased to almost zero. At the same time the use of natural gas has largely gained significance.

Figure 7: Development of fuel mix in transport sector



Source: Ministry of Environment and Water, 2006a, p. 37

2.2 National emission reduction targets

Given the 6% Kyoto reduction target, emissions have to be reduced in 2008-12 to 112,800 Mt CO_2 eq. Due to the transition to market economy between 1987 and 1992, there were significant emission reductions, accounting for 83,220 Mt CO_2 eq absolute emissions in 2003. Although national GHG emissions in 2003 were 32% below base year levels, there is no national reduction target beyond the Kyoto commitment.

However, in the scope of the European Emission Trading scheme (ETS) emission reduction targets are set for those industrial sectors and production sites, which are part of ETS. These reduction targets are listed in the National Allocation Plan.

Emission targets according to the National Allocation Plan:

The government decided to use an economic-based emission prediction study to determine the cap and the sector-allocation. The study was written by a group of independent experts and involved all emitting industrial sectors. The prediction

provides data for the period from 2002 to 2012 and it suggests economic development without emission restrictions, as GHG emissions will surely remain below the Hungarian Kyoto target.

Hence, the Hungarian NAP does not provide straight caps neither does it disclose expectable trends and policies for the second trading period.

Table 4: Historic and projected CO_2 emissions for relevant sectors in the NAP

Sector	Historic CO_2 emissions (in 1.000 tonnes)			Projected CO_2 emissions (in 1.000 tonnes)			
Year	2001	2002	2003	2005	2006	2007	Total
Energy activities							
Power production and district heating	20 832	19 480	21 287	17 822	17 632	17 892	53 346
Industrial and other combustion installations	2 106	2 270	2 311	2 673	2 755	2 846	8 274
Mineral oil refineries	1 123	1 234	1 234	1 488	1 491	1 512	4 491
Production and processing of ferrous metals							
Coke ovens, metal ore roasting and sintering; iron and steel production	2 556	2 560	2 712	2 778	2 912	2 913	8 603
Mineral industry							
Cement production	2 097	2 162	2 235	2 677	2 786	2 954	8 417
Lime production	500	450	424	479	493	512	1 484
Glass manufacturing	390	367	373	382	380	396	1 158
Production of roofing tiles, bricks refractory bricks; tiles, stoneware and porcelain	683	754	774	814	824	850	2 488
Other activities							
Production of pulp, paper and board	192	194	209	231	249	267	747
TOTAL	**30 287**	**29 183**	**31 448**	**29 344**	**29 522**	**30 142**	**89 009**
Redistribution between sectors (blast furnace gas)	235	235	235	235	235	235	705
TOTAL	**30 522**	**29 418**	**31 727**	**29 579**	**29 757**	**30 377**	**89 714**

Source: Hungarian Ministry of Environment and Water, 2004, p.14

The determination of the cap is based on the mentioned study, which predicted 87.18 Mt CO_2 emissions for the first period in the trading sectors. This cap takes 33% of the total predicted amount of GHG, and 39.5% of total CO_2 emission of Hungary in the first trading period. The share of the energy sector is 59.36 Mt CO_2, accounting for 60% of caps in Hungary.

The Hungarian NAP covers 268 installations. 24 of them (i.e. 54% of the total cap) produce electricity. 157 installations comprise district heating, warm water supply or other fossil fuel firing companies. The remaining 87 installations belong to the metal-, pulp-, glass-, cement-, ceramic- and paper-producing sectors (Ministry of Environment and Water, 2004; CANCEE, 2004 p8-9).

2% of total emission allowances are reserved for new entrants, and another 2.5% will be auctioned by the Hungarian Government in the first period. The new entrant reserve is divided within the trading period as following:

Table 5: Distribution of new entrant reserve

Year	Total amount of CO_2 (t) to be allocated for new entrants
2005	897 131
2006	598 087
2007	299 043
Total	1 794 261

Source: Ministry of Environment and Water, 2004

Forecasts on CO_2

Table 6: Projection of CO_2 equivalent in 2012

	Tg CO_2 equivalent	**%**
Base year level	113,1	
Kyoto target (-6% to base year level)	106,3	-6%
GHG emission without LUCF in 2004	78,4	-31%
Projection in 2012		
With measures	98,4	-13%
With additional measures	95,8	-15,3%

Source: UNFCCC Country Profile, HUNGARY, 2005

There are no official reduction targets for the post 2012 area yet but scenarios for a possible development. The scenario “with measures” includes the effect of the currently implemented and adopted policies and measures. It is noted, however, that some of the implemented but currently suspended policies whose future seems uncertain in the light of the past experience (e.g. support of residential energy efficiency projects) are not included here, since their forecast savings are based on arbitrary assumptions. These are included in “additional measures”. The forecast savings of the individual measures were converted to a common reference year and baseline scenario.

The scenario “with additional measures” assumes a higher rate of governmental interest and support in aiding the Kyoto emission reduction targets with the means of energy efficiency, use of renewables, and transportation and traffic redesign. This scenario was approved and amended by the experts in the governmental agencies.

Table 7: Scenarios of emission projections 2005 – 2020 on different sectors of the economy

ANNEX
NUMERICAL DATA OF EMISSION PROJECTIONS
Unit: gG CO_2 eq.

BASELINE SCENARIO

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Energy production	61 810	64 012	65 365	65 048	66 300	66 038	67 301	67 373	68 566	69 816	70 478	71 338	72 046	72 770	73 674	74 710
Industrial activities	5 795	5 900	5 379	5 498	5 611	5 724	5 881	6 048	6 153	6 249	6 318	6 386	6 501	6 594	6 717	6 863
Agriculture, land use, forestry	10 014	10 332	10 811	11 118	11 401	11 684	11 762	11 830	11 890	11 941	11 990	12 018	12 039	12 055	12 064	12 068
Waste treatment	10 220	9 198	7 576	6 101	5 109	4 684	4 728	4 730	4 779	4 832	4 886	4 968	5 077	5 220	5 283	5 515

WITH MEASURES SCENARIO

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Energy production	61 810	63 846	65 023	64 522	65 580	65 113	66 160	66 004	66 963	67 960	68 360	69 166	69 813	70 474	71 315	72 291
Industrial activities	5 795	5 900	5 379	5 498	5 611	5 724	5 881	6 048	6 153	6 249	6 318	6 386	6 501	6 593	6 717	6 863
Agriculture, land use, forestry	9 960	10 207	10 587	10 772	10 902	10 997	10 867	10 699	10 493	10 256	10 010	9 724	9 412	9 075	8 716	8 335
Waste treatment	10 220	9 198	7 576	6 101	5 109	4 684	4 728	4 730	4 779	4 832	4 886	4 968	5 077	5 220	5 283	5 515

WITH ADDITIONAL MEASURES SCENARIO

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Energy production	61 810	63 846	65 023	64 522	65 580	65 113	66 160	66 004	66 963	67 960	68 360	68 617	68 685	68 757	69 015	69 431
Industrial activities	5 795	5 900	5 379	5 498	5 611	5 724	5 881	6 048	6 153	6 249	6 318	6 386	6 501	6 594	6 717	6 863
Agriculture, land use, forestry	9 932	10 097	10 378	10 446	10 442	10 385	10 093	9 747	9 349	8 908	8 438	7 857	7 251	6 632	6 010	5 396
Waste treatment	10 220	9 198	7 576	6 101	5 109	4 684	4 728	4 730	4 779	4 832	4 886	4 968	5 077	5 220	5 283	5 515

Source: Monitoring Community 2004

3 Mitigation scenarios, strategies, policies and measures

Numerous national programmes concentrating on energy efficiency, the promotion of renewables and cogeneration as well as specific sector programmes will help Hungary to achieve the Kyoto target and build the basis for a sustainable climate policy (cp. Hungarian Ministry of Environment and Water, 2005, pp. 37-69)[2].

3.1 Energy

The Act CX of 2001 on electric Energy declares the basic rules of the electricity production, distribution and utilisation. The act defines renewable energy sources and lays down the principles of supporting renewables und cogeneration.

Promotion of CHP plants exists in Hungary since 2002 (56/2002 (XII.29) GKM). The objective is to stimulate CHP production as a highly efficient form of an energy generation tool for GHG emission reduction. On the one hand, it stipulates the mandatory purchase of electricity produced by cogeneration. On the other hand, it provides financial support for the operators of CHP plants in the form of a regulated and subsidised feed-in-tariff.

Similar to the support of CHP plants, the power production from renewable energy sources is promoted both through mandatory purchase of green power by either the national transmission company or by the distribution companies and through subsidised feed-in-tariffs (Act LXXIX of 2005 on the Degree (XII) 29). The objective of the policy is to achieve a 3.6% share of the overall renewable energy from the gross energy production and a 5% share of overall renewable energy in 2010 as a part of the general GHG mitigation policy of the EU.

In 2003, the energy tax on sales and imports of electric power and natural gas was introduced (Act LXXXVIII/2003). Sales to residential costumers were excluded from the tax. The main objectives of the tax are to internalise some of the external costs of energy use in the price of the energy, to create an incentive for energy saving and improving energy efficiency, to promote environmental awareness and the use of the best available technology. This act provides a fund for nature conservation. The levy is to be paid by the users of the environment according to their emitted pollution to the atmosphere, surface waters and soil. The act includes the emission of several toxic and non-toxic pollutants.

2 The Hungarian government has listed detailed information about the aspired environmental programmes in their fourth National Communication (cp. pp. 37-69); in Annex 1 (pp. 112-115) those measures are listed in a chart.

The revenues of the levy and tax are displayed in the next table:

Table 8: Revenues of energy tax and levy

Revenue in Million HUF (€)[3]	*2004*	*2005*
Energy tax	10 921.8 (42.0)	10 700.0 (41.2)
Energy levy	6 482.2 (25.0)	9 000.0 (34.6)

Source: Hungarian Ministry of Environment and Water, 2006b

The effects of these policy items are rather indirect: the energy tax may increase energy awareness, improve the feasibility of energy efficiency and create an incentive for energy efficiency measures. The environmental levy is supposed to create an incentive for reducing energy use and polluting activities.

In compliance with the 2003/87/EC and 2004/156/EC Acts, the Hungarian Parliament approved the emission trading scheme of greenhouse gas emission (Act XV of 2005). The detailed rules of the emission allocation and trading are covered in a Governmental Decree (143/2005 Korm.). The creation of the National Allocation Plan and the detailed Allocation List included a wide range discussion about these documents. The system is operating in the first trading period (2005 – 2007) and the detailed rules for the second period are currently under preparation.

The indirect impacts of the European ETS on the CO_2 emission reduction are not measurable yet. The most important impact of the trading system was to direct the largest companies' attention to the importance of and the possible revenues by reducing CO_2 emissions. The official analysis will be completed only after the first trading period.

The National Development Plan is prepared for the utilisation of the EU Structural Funds. One of the key elements of the long-term goals of the Plan is to increase the share of renewable energy utilisation within the energy use.

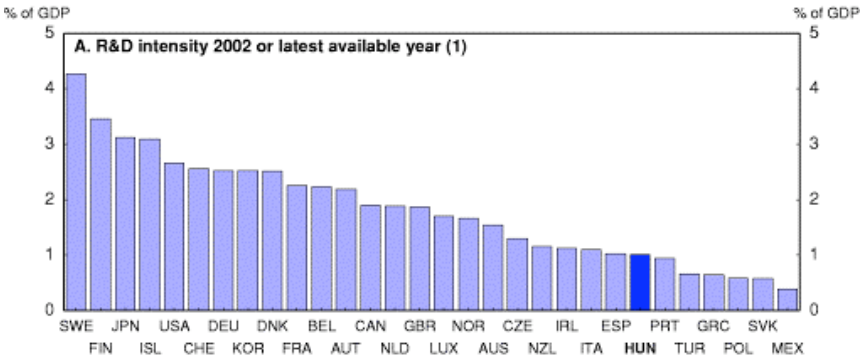
The 2nd National Environmental Programme (resolution 132/2003. (XII.11.) OGY) was adopted in 2003 for the period of 2003 – 2008 and includes a Climate Change Operative Programme, too. The primary objective is the regulation and reduction of emissions from domestic economic activities. The aims of the action programme are to improve the local and regional air quality, to disseminate environmentally friendly consumption habits and to improve the environmental quality of urban settlement.

The objectives of the Energy Saving and Energy Efficiency Action Programme (Resolution of the Government 1107/1999. (X.8) Korm.) are: 3.5% annual reduction of energy intensity, 75 PJ annual saving of primary energy use, 5 Mt CO_2 emission

[3] Exchange rate: 1€=260 HUF

reduction per year, and an increase of the renewable energy production. The most relevant policy measures are: enhancement of energy awareness, Research and Development (R&D) for energy efficiency and renewables, energy audits in industry, improvement of municipal energy management, as well as demand side management programmes on modernisation. In matters of R&D-activities in general, Hungary is below the average of OECD countries (see next figure).

Figure 8: R&D intensity in different OECD countries



Source: OECD, 2005

Important items of the Energy Saving and Energy Efficiency Action Programme:

The Hungarian government supports energy audits in industry and in the communal sector. The Energy Saving and Energy Efficiency Action Programme allocates financial support in the form of a soft loan. Communal or municipal energy audits were supported in the framework of the Municipal Energy Efficiency Programme and the "Széchenyi Plan". Further financial support mechanisms for energy audits were Energy Efficiency Credit Fund, Phare Co-Financed Loan Programme. The energy audits will receive further support before 2010 and possibly onwards.

The objectives of these measures are to identify energy saving opportunities, to use energy efficiency expenditures in an efficient way and to increase energy awareness. The Hungarian government prepares the legislation to set out appropriate provisions on the minimum energy performance requirements regarding especially new buildings. The regulation will introduce new standards for the energy performance of buildings in line with the principles of the Directive 93/76/EC and Directive 2002/91/EC.

The Energy Saving and Energy Efficiency Action Programme is to assist reaching the overall objectives by providing state-of-the-art information and promoting the use of energy efficiency labels in order to increase energy awareness. One of the actions of the Action Programme is to encourage the Research and Development (R&D) for energy efficiency and renewables, including demonstration projects. The Action Programme provides support for the improvement of industrial energy efficiency. The main objectives of the action are the modernisation of energy processes of industrial production, improving thermal insulation and improving the efficiency of energy

generating and consuming equipment. The Action Programme also emphasises the promotion of residential and communal energy efficiency projects. Support to these projects is given through direct grants. The saving target is 10 PJ/year until 2010. The primary tools of implementation are the annually revised energy efficiency programmes. The residential and communal energy efficiency projects are being included in other support schemes, e.g. Energy Saving Loan Fund or the Phare Co-financed Loan Programme. The emission reduction in 2005 is estimated to be 81 kt CO_2, in 2010 97 kt CO_2 and in 2015 112 kt.

Moreover, the Action Programme promotes the use of renewable energy sources. On the one hand it supports alternative firing systems, on the other hand its aim is to increase the share of utilisation of renewables in general. The total emission reduction achieved is 29 kt CO_2 (of which 8 kt is from power generation projects and 21 kt from heat generation). The projections for CO_2 emission saving in 2010 are 38 kt CO_2 and 46 kt CO_2 in 2015.

District heating systems are an important element of the Hungarian heating and hot water supply. The modernisation of these systems was included in the Action Programme, too. The quantitative target for saving is 10 PJ/year until 2010. The result of this programme was 94 kt CO_2 emission saving in 2005 and further 20 kt CO_2 is projected until 2010 and another 15 kt CO_2 until 2015 (Hungarian Ministry of Environment and Water, 2005, pp. 37-69; Biannual report, p. 8-41).

3.2 Transport

In line with the European Directive 2003/30/EC Hungary had to increase the share of automotive bio-fuels to 2% until 2005 and establish a yearly growth rate of 0.75% in order to reach a 5.75% share in 2010. The Hungarian Government introduced a subsidy system (Government Decree 18/2003. (II. 19.)) for bio diesel and provided a safe market for it. In order to meet Hungary's international commitments, the Government agreed that the share of renewable fuels shall reach 2% of the total automotive fuel consumption by 2010 (Government Resolution No. 2233/2004 (IX.22.) Korm.). The 2233/2004 GOH Decree has set a national target of 0.4 – 0.6% of biofuel of the total fuel use in 2005 and 2% for 2010. Later, the 65/2005 Hungarian Parliament Decision set a 2% goal for 2007 and 4% for 2010.

The Hungarian legislation kept the 100% use of bio diesel and the blended use of bio-ethanol (ETBE) tax-free from 2003 to the end of 2004. (However, there was no commercial production and utilisation in this period of time.) The amendments of the Act on Excise Tax (CXXVII/2003) recognise only the blending use of biofuels and terminated the tax-free status of pure use of bio diesel. A tax privilege for biofuels is defined for the period 2004 – 2007.

The relatively well-organised public transport in Hungary is an inheritance of the socialist era, but during the 15 years since the political change there has been a

noticeable reduction of public transport use. On the one hand tickets are very low priced pursuant to governmental regulation (compared to western European fares), on the other hand the Hungarian Railway and also the BKV Ltd. (Budapest Transport Company) face extensive losses. Hungarian public transport traditionally offers large discounts for various low-income users like students or senior citizens. However, these rebates will presumably be cut, which might lead to a further decrease in the share of public transportation.

Another important specific and operative objective within the Action Programme for Urban Environmental Quality is the reduction of urban environmental problems. The Action Programme promotes comprehensive transport plans, organisation and management to reduce traffic in inner-city areas, development of urban and agglomeration public transport and increase of its quality, as well as other project investments to prevent the propagation of harmful impacts. However, there are no concrete quantitative targets to these actions.

A transport related objective within the Action Programme of Climate Change is to accelerate the modernisation rate of the vehicle stock, to moderate the environmental impacts of freight transportation and to support environmentally sound solutions. The ambitiously targeted emission reductions are: CO_2 15%, NO_X 70%, CO 60%, CH 50% and particles 70%. Furthermore, plans exist to promote the infrastructure for combined transport and to limit the use of heavy road transport (Biannual report, p. 42 - 45).

Like in other sectors, the economic and political re-orientation in the early 1990s had a profound impact on the structure and activity of the transport sector. In this context, the European Conference of Ministers of Transport (ECMT, 2004, p. 15) pointed out the following aspects:

- A decrease in passenger and freight transport in line with economic contraction, with an expected upturn as the economy continues to improve and with EU accession.
- A shift in commercial traffic from East to West.
- A drop in overall freight volumes resulting from the breaking up of large state-owned companies, many in Eastern Hungary, along with a decline in total freight tonne-kilometres as trade with former COMECON partners slowed.
- A re-orientation of modal preferences for transport in favour of private means of travel, as illustrated by sharp increase in car fleet, especially in recent years.
- A distressed transport infrastructure network – particularly that of rail – due to insufficient investment and maintenance over a prolonged period of time.

The stakeholders' opinion that the share of public transport is one of the highest within Europe (cp. Chapter 3.6) is reconfirmed by the fact that the density of Hungary's rail network, 8.2 route km/100 km^2, is almost twice that of the OECD Europe average (4.2 km/100 km^2), but the quality of the system needs to be improved. Regarding the

technical condition of the rolling stock, the Hungarian State Railways remain inadequate for use on the international network (ECMT 2004, p. 15f).

3.3 Industry

The industrial production is exposed in a wide range of factors. Therefore, there is no specific mitigation policy. The most important measures are the introduction of the EU Emission Trading Scheme, the general environmental protection measures, the energy tax and the environmental levy, waste management legislation and programmes, a support programme for cogeneration and the promotion of efficiency measures (Hungarian Ministry of Environment and Water, 2006b, p. 62; Biannual report, p. 46 - 48).

3.5 Construction

Construction has a very low share in the GDP in Hungary; only around 5 % of the GDP were produced in this sector in 2005. However, it shows a tendentious growth: in 2005, the sector produced 60% more than in 2000. 52% of the sectors output belonged to building construction, but the share of other construction is dynamically growing. In 2005, 30% of the building construction was housing.

Lately the share of housing has been decreasing and at the same time a further increase can be observed in the non-housing construction. Despite the overabundance of supply, more modern office blocks were built in order to rent them out.

The opening of some new regional branch plants after the EU accession and the expansion of some industrial parks and logistical centres also increased the incomes of the building sector. There is a significant rise in the construction of commercial buildings both in Budapest and in some big cities in the countryside. The town reconstructions and the building reconstruction programmes also showed their favourable influence.

In the share of other constructions, there was a significant rise through the construction of new highways, bypasses, restoring of old ways, the renovation of the underground line 2 and the construction of a new one in Budapest. In the countryside further infrastructural investments can be observed. There were some important investments to set up new amusement and holiday parks (Központi Statisztikai Hivatal, 2006, p. 19 – 21).

3.6 Strategies and positions of stakeholders in the different sectors

Stakeholders were asked to assess the different mitigation measures with regard to suitability for their company/organisation. Many of them were not able to give a precise evaluation of the measures. This is mainly because Hungarian companies are not required to reduce emissions, as the Kyoto target will be easily reached, so the question, which would be the most suitable policy, is currently not an issue.

In general, stakeholders think that governmental promotion of climate protection measures should be increased.

Power sector: As power companies undertake long-term investments, they fear short-term knowledge about allocations. In Hungary, after the breakdown of socialism, the power sector was completely modernised. Nowadays, the power plants in Hungary have good energy efficiency, and in the short to medium term no supplementary investments will be made. So power companies claim that they are not able to do more for climate change mitigation than they have already done with their early actions. In their opinion, they will be losers of the ETS if in the future allocations get more stringent than their current emissions. Independent experts are of the opinion that the electricity network needs to be modernised in order to increase its efficiency and reduce transport losses. Some interviewees emphasised that the Hungarian power sector has an extremely powerful lobby.

Cement sector: As CO_2 emissions in the cement sector depend strongly on the demand, Hungarian cement industry representatives demand more emission allowances for the Kyoto period, as they forecast an increase of demand until 2012.

Transport sector: The share of public transport is one of the highest within Europe (Zoltán Szabó). Efforts have to be made to maintain this modal split.

Almost every interviewee emphasises the need for nuclear power in Hungary. Renewable energies are regarded as providing too little potential in Hungary. Only the share of biomass is expected to grow.

One representative of an industrial organisation stated that climate change was in fact a desirable development with positive impacts for the economy. He claimed that jobs would be created due to adaptation to climate change (e.g. in the air-conditioning industry, which would face a higher demand because of the climate change).

4 Impact of mitigation policies and measures on economy and employment

Hungary is a landlocked country located on the Danube River Basin in Central Europe. Hungary's border countries are: Austria, Croatia, Romania, Serbia, Slovakia, Slovenia and Ukraine.

Figure 9: Map of Hungary

Source: CIA 2006

After an overview of general developments of the Hungarian economy, some sector specific impacts for relevant branches and industries are given in the following chapter.

4.1 General developments of the Hungarian economy

Hungary's population amounts in 2006 to 10.1 million[4] (Eurostat). Table 9 gives an overview of basic indicators of the Hungarian economy.

[4] 1995=10.3

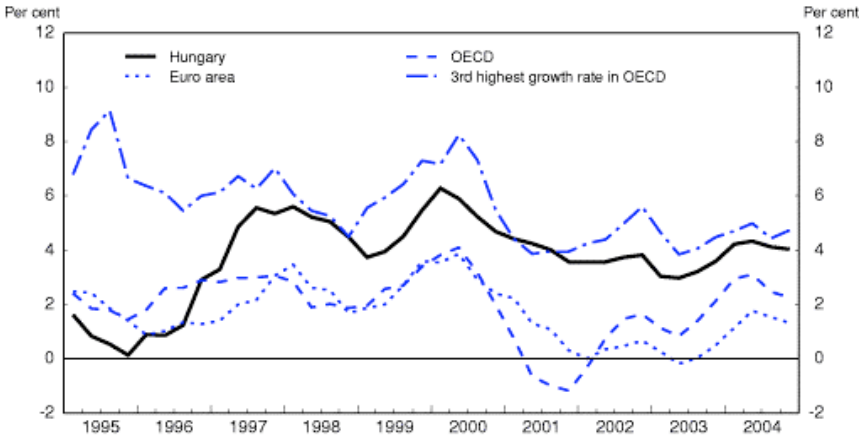
Table 9: Basic economic indicators in Hungary

	1990	1993	1995	2000	2001	2003	2004	2005	2006
GDP (growth in %)	-3.3	-0.8	1.5	5.2	3.8	3.4	5.2	4.1	4.2
Unemployment rate (%)	2.1	12.1	10.4	6.4	5.7	5.9	6.1	7.2	7.3 (May-Jul)
Gross nominal earnings (%)						12.0	6.1	8.8	7.2 (Jan-Jun)
Net real earnings (%)						9.2	-1.0	6.3	5.4 (Jan-Jun)
Industrial output (%)						6.4	7.4	7.3	10.5 (Jan-Jul, prelim.)
Inflation (%)	28.9	22.5	28.2	9.9	9.3	4.7	6.8	3.6	3.5 (Aug)

Source: Hungarian Ministry of Economy and Transport, 2006a. The Fourth National Communication of the Republic of Hungary on Climate Change 2005, p. 3

As the following figure shows, the Hungarian economy has been characterised by dynamic growth since the mid-nineties. The GDP growth rate has stabilised around 4% in recent years, by far exceeding the average performance of Euro area countries.

Figure 10: Development of Hungarian GDP growth compared with OECD countries and Euro area



Source: OECD, 2005

The Hungarian labour market suffered a phase of restructuring during the 1990's due to the transition to a market based economy. Both the employment rate and the participation rate decreased until 1997, followed by a slight recovery and from 2000 onwards a phase of stagnation. There has been a significant change in the employment structure since the beginning of the 90's, as shown in the following table:

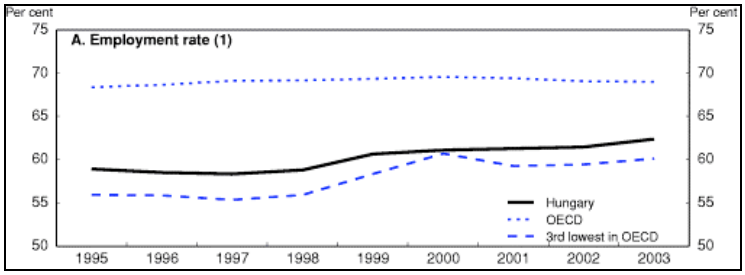
Table 10: Share of employed persons per sector

	1990	2005
Agriculture	11.0%	5.3%
Industry	35.5%	32.4%
Services	53.0%	62.6%

Source: Hungarian Ministry of Economy and Transport, 2006b

Although the Hungarian employment rate remains far below the OECD average, it displays an albeit small but steadily rising trend, as can be seen in the following figure.

Figure 11: Employment rate compared with OECD countries



Source: OECD, 2005

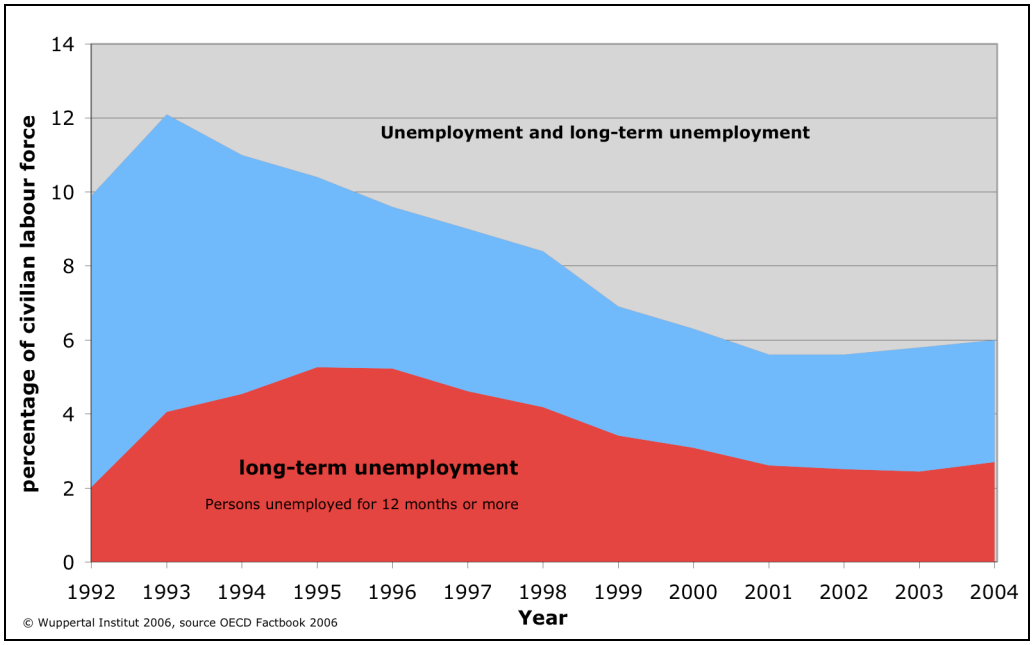
At the end of the 90's a shift of structure within the industry sector could be observed: during a dozen years the weight of the energy sector was halved – mainly due to radical cutbacks in mining. The food and textile industry also suffered significant employment decrease. Winning branches were machinery, some areas of manufacturing and the construction industry.

The position of unskilled and semi-skilled workers has deteriorated while the proportion of employees with a college or university degree has risen from 14.5% to 21% within 10 years. This development shows that the labour market's demand side is expecting higher qualifications.

At the beginning of the 90's, the unemployment rate was as high as 12% due to the restructuring process and the closing of installations. Between 2001 and 2004 it went down to 6% and now Hungary is facing an unemployment rate of 7.2%, which means there was a sharp increase in 2005. However, this was mainly due to a considerable growth of the labour market participation rate, which is a favourable development as the participation rate in Hungary is traditionally low.

While the total number of unemployed has decreased significantly since the early 90s, the development of long-term unemployment is not as favourable.

Figure 12: Development of unemployment and long-term unemployment



Nominal gross wages have risen to more than 11.5-fold of the 1990 level, but wages on real terms stayed below this level until 2002. In general, an accelerating wage growth can be observed, especially in the private sector. For 2006, an increase of net real wages by 3-4% is expected (Hungarian Ministry of Economy and Transport, 2006b).

In general, stakeholders think that climate protection measures will have very low to no impact on economic activity and employment.

From the trade unions' point of view, it is important to put more focus on local disparities. Underdeveloped regions need an increased promotion and also more flexibility when it comes to implementing environmental standards. Counselling as well as general information on climate change issues for trade union officials should be offered in a more decentralised way, i.e. on municipal level. Hereby, potentials and needs regarding the qualification of employees could be revealed.

4.2 Sector-specific impacts

In this chapter the specific impacts of climate change mitigation measures on the relevant sectors are described. It is common to all sectors that the economic effects of the transition from planned to market based economy are so dominant that other policies and measures have hardly any influence so far.

4.2.1 Energy

Privatisation in the energy sector began very early. The Competition Law and the Electricity and Gas Acts of 1994 brought Hungary's energy market close in line with the EU directives. Since 1995, many gas and electricity companies were sold to foreign companies (e.g. RWE, E.ON and Electricité de France) and strategic investors.

The prices of electricity and gas remain controlled. The policy aiming at keeping energy prices low for certain categories of consumers for social reasons has detrimental effects.

In 2003, as a first step towards the liberalisation of the electricity market, the Government decided on a 30-35% authorisation level in order to facilitate partial liberalisation of the market. From 2004 onwards, all consumers other than households shall be authorised consumers in the member states of the EU, while from 2007, households shall also be authorised, i.e. the market shall be 100% liberalised. By the end of 2005, the share of free market consumption was as high as 35% of total consumption, with a yearly volume of 11,000 GWh. (Source: Homepage of Hungarian Energy Office) Low prices have discouraged investment by domestic energy firms such as MVM and the Hungarian oil and gas company (MOL) because the policy has caused financial losses.

Hungary's renewable energy potential, though limited, is currently underdeveloped. By 2010, the government aims to increase its share of renewables in primary energy consumption to 5%. This target is part of the government's Energy Conservation and Energy Efficiency Improvement Action Programme. The government is mainly interested in potential benefits from renewable energy, such as:

- Reducing external energy dependency through the exploitation of locally available energy resources.
- Contributing to energy security through energy diversification.
- Generating employment.

The Hungarian energy industry has partly developed its own emission scenarios (Pannonpower), in which the long-term development of changing the Hungarian energy mix until 2030 is pursued.

There is a strong need for further qualification of employees especially in the upstream production. For the operation of a large **biomass power plant**, a special qualification programme for agriculturists was conducted. Further measures are needed to qualify personnel in the sourcing industries of the biomass sector in order to guarantee quality assurance. The training of the power plant's own staff is conducted in cooperation with local job centres. The employment impact of a biomass power plant is significantly higher than that of a conventional one. For the biomass plant about twice the number of personnel is needed. Also, jobs would be created through the increasing logistical

effort and of course the domestic agriculture and forestry sector would experience a positive employment effect.

Moreover, high potentials for climate protection as well as for job creation are seen in the further expansion of decentralised CHP installations.

The following table shows the distribution of energy sources within the Hungarian Total Primary Energy Supply (TPES) and the changes in the energy mix between 1990 and 2002. The shares of oil and especially coal have decreased significantly during this period, whereas there was a strong increase in the use of gas, which has become the most important energy source in Hungary.

Table 11: Total Primary Energy Supply (TPES) by energy sources

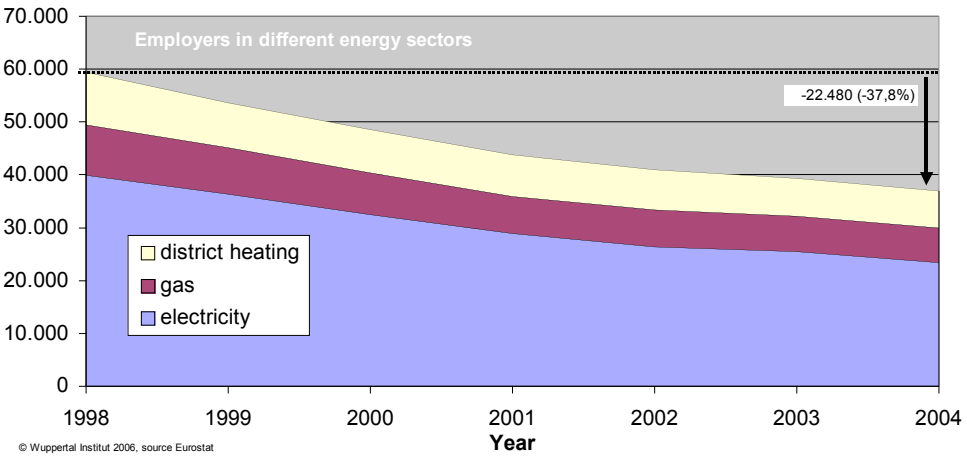
	Mtoe	Mtoe	Change	Share in TPES (%)	Share in TPES (%)
	1990	2002	%	1990	2002
Oil	8.51	6.49	-23.7	29.8	25.5
Coal	6.12	3.62	-40.8	21.4	14.2
Gas	8.91	10.8	21.2	31.2	42.4
Hydro	0.02	0.02	0.0	0.05	0.07
Nuclear	3.58	3.65	2.0	12.5	14.3
Combustible renewables/waste	0.38	0.41	7.9	1.3	1.6
Non-combustible renewables	0.086	0.088	2.3	0.3	0.3
Other (Electricity trade)	0.96	0.37	-61.5	3.4	1.4
TPES	28.6	25.4	-10.8	100.0	100.0

Source: UNFCCC, 2005

From the trade unions' point of view, an enforced expansion of geothermal energy use could lead to positive impacts on employment. In this context, it is especially helpful that the oil industry's existing know-how regarding the necessary drilling activities can be used. Furthermore, decentralised heat pumps have potentials for developing positive job effects.

Next figure shows that about 37,8 % of the jobs in the energy sector were lost in since 1998 due to modernisation.

Figure 13: Development of employment in different energy sectors



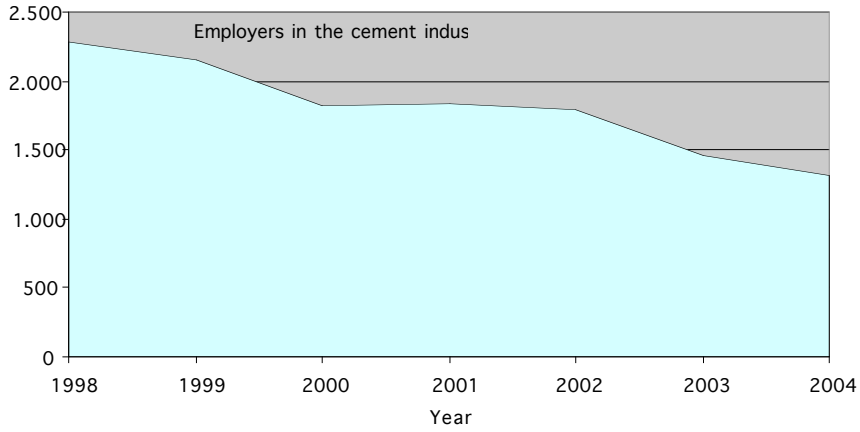
4.2.2 Energy-intensive industry

Due to low and subsidised prices for energy in the times of central planning, the energy-intensive industry played a significant role in the Hungarian economy before the political change in the 1990's. The transition into a market-based economy had dramatic consequences for the iron-, steel- and aluminium industries as well as for other energy-intensive sectors like heavy chemical industry etc. Many companies went bankrupt (Mr. András Kémeri). After the restructuring and modernisation of the domestic economy, non-energy-intensive industries (automotive industry, electronics, telecommunication etc.), services and trade have gained in importance. The most important energy-intensive industries now are the clinker-, cement- and bricks production.

Nowadays, Hungary's energy-intensive industry is dominated by enterprises with head office in Western Europe. There were many company acquisitions after the political change in 1989 which on the one hand led to substantial investments, but on the other hand also to numerous closing downs of installations. Some brownfields were converted into trade areas or business parks. The result of numerous interviews to this battery of questions is that in the course of economic restructuring many jobs were lost in the energy-intensive industry, which could not be compensated by new settlements of trade enterprises.

In the cement sector interviewees stated that increasing imports of cement from the Ukraine are causing a negative effect on the domestic labour market (the Ukrainian energy prices are still subsidised by the state).

Figure 14: Development of employment in the domestic cement industry



Source: Eurostat

The topic of „climate protection“ has by now often become part of the companies' own mission statement (e.g. bricks-, clinker- and cement industry).

In future a new technology, which uses biomass in drying installations could slightly reduce CO_2 emissions and create jobs in agriculture and forestry at the same time. The same is true for secondary fuels, which also have the potential to create jobs in preparation production/sourcing industry (i.e. recycling of waste materials and biomass-products). There are also some rare experiments with energy grass. In this context an increased governmental promotion of R&D activities would be advisable.

Altogether, the potentials for the mostly very specific CO_2 reduction are regarded as minor.

As the acting firms in the field of energy-intensive industries are internationally active corporate groups, they perform their qualification programmes in their own academies / qualification centres, which explains the existing expertise regarding climate change related issues.

The table below shows the time-series production data for 1985 through 2004 in the domestic clinker and cement industry.

Table 12: Time-series production data clinker and cement in tonnes

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Clinker	3,097,894	3,069,549	3,352,126	3,245,463	3,242,680	3,210,357	1,987,550	1,598,345	1,905,663	2,154,048
Cement	3,670,844	3,845,186	4,150,812	3,871,359	3,856,815	3,932,790	2,851,722	2,245,610	2,521,316	2,759,268
	1995	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**
Clinker	2,233,157	2,078,989	2,193,773	2,261,112	2,270,595	2,532,397	2,522,017	2,687,086	2,694,459	2,494,756
Cement	2,874,904	2,745,032	2,806,176	3,003,359	2,985,789	3,444,679	3,452,397	3,503,047	3,564,870	3,266,680

Source: Hungarian Ministry of Environment and Water, 2006a

Another energy-intensive industry is the aluminium industry. Hungary is one of the few European countries where bauxite is available and production is profitable. During the 90s, the capacity of the Hungarian aluminium sector decreased gradually. Some companies were closed, others were privatised. The privatisation of the aluminium industry started in 1995. Nowadays, there are only few big market actors (e.g. MAL-Group, ALCOA-Köfem) producing for the domestic as well as for the international market. The capacity of the Hungarian aluminium industry is slowly increasing (Magyar Aluminium, 2004).

4.2.3 Transport sector

Unfortunately, no interview partners could be found in this sector. Therefore, the following statements are based on expert information from other sectors, NGOs, and from document analysis.

The transport and communications sector is responsible for approximately 6% of GDP and employs roughly 127,000 persons (ECMT 2004, p. 14). Further development of urban public transport, as required in the government's Action Programme for Urban Environmental Quality (cp. Chapter 3.2), might have a positive effect on employment.

An important detail, which provides incentives for reducing private vehicle use, is that Hungarian law obliges employers to reimburse a certain proportion of the costs of their employees' inter-urban travel passes: 86% for railway travel passes and 80% for bus passes. However, this obligation does not apply to urban public transport (ECMT 2004, p. 50).

Some of the interviewees emphasised that an increasing use of bio-fuels could lead to a rise in agricultural employment. There is an excellent opportunity for agriculture to valorise residual materials for the second generation of bio-fuels within the EU directives. Before 2004, there was no commercial biofuel production or utilisation in Hungary. The production of rapeseed in Hungary is less favourable and more than half of the rapeseed crop is regularly exported. There are two existing but commercially not operating bio diesel factories in Hungary. The technology used in these factories is out

of date. According to the 2005 autumn planting figures, the Hungarian production of rapeseed did not increase much, although the Hungarian gasoline company (MOL Rt) expects to increase its long-term consumption of bio diesel. Hungary has lots of agricultural products and grain origin raw materials for bio-ethanol production. The distilling industry's current capacities are about 93,000 MT of alcohol per year. In 2005, the bio-ethanol production was about 10,000 MT, however only 40% has been used in Hungary (the rest is either on stock or used in the neighbouring countries). In the future, Hungary may become an important producer of bio-ethanol.

Further development of urban public transport, as required in the government's Action Programme for Urban Environmental Quality (cp. Chapter 3.2), might also have a positive effect on employment.

The industrial relations in the Hungarian rail sector can be characterised by a highly fragmented union structure. Collective bargaining takes place only at company level. The Hungarian State Railways Co. (Magyar Államvasutak Rt., MÁV) is the service provider for the whole railway system. MÁV is a joint stock company, with the Hungarian State being an exclusive shareholder. The second railway company is the Györ-Sopron-Ebenfurt Railway Co. (Györ-Sopron-Ebenfurti Vasút Rt., GYSEV). The majority of GYSEV shares are owned by the Hungarian State (61%), a minority by the Austrian State (33%), and the rest by a few companies. MÁV is by far the largest company. Since 1990, dramatic job losses can be observed at MÁV. Between 1990 and 2000, about 63,000 jobs were lost, about 15,000 of which were contracted out. While in 2000 MÁV employed 58,000 persons, there are currently only about 52,000 employees left. It is also noteworthy that MÁV was one of the companies most susceptible to strikes in the 1990s. The effective governmental restructuring plan foresees a further 20% reduction in the forthcoming 4-year period. GYSEV had 1,800 employees in 2000 and counts currently about 1,600 gainfully employed person. The four recently established private companies employ only a handful of people (Tóth / Neumann, 2005).

4.2.4 Energy-efficiency industry

In 2000, a study on indirect costs and benefits of greenhouse gas mitigation projects was conducted (Zilahy et al., 2000). In this study, an exemplary calculation was made on how insulation of buildings might have impact on employment in Hungary. The authors assumed an 8% increase of window replacement in households for 10 years through an awareness rising campaign, leading to a supplementary installation of 80,670 windows in Hungary. For the respective households, this meant no additional costs because of the energy saved through this measure. The study concluded that on the supply side an average 750 new jobs in the construction industry would be created for the ten years of the project, 600 of them for former unemployed persons. The maximum annual savings in energy production would be 1.3% of total Hungarian energy production as a result of this project. This size of decrease in energy production

was considered to be marginal to the employment structure of energy producing industry. But the authors state that if greater efforts to save energy were made, negative effects on employment in the energy sector would significantly reduce the reported positive effects.

Regarding the energy efficiency techniques “energy-saving lamps” and “solar thermal heating”, the study comes to the result that the market launch of such products has only very small effects on the labour market. An aggravating circumstance is that these techniques have a high import ratio, whereby positive job effects would develop to a majority outside of Hungary.

4.2.5 Energy service companies (ESCOs)

Hungary is a success story for Energy service companies ESCOs in Central & Eastern European (CEE) countries (Ürge-Vorsatz et al., 2003). At present there are approximately two dozen companies specialising in the provision of energy services in Hungary, with another 200 companies engaging in some activities in this field. Most ESCO activities are concentrated in the public sector, with some recent projects starting in the industrial sector as well. The projects’ focus is on public lighting, combined heat and power, and district heating.

The driving factors for the Hungarian success, which can be replicated in other CEE countries, are (Ürge-Vorsatz et al., 2003):

- the early and extensive bank sector and energy sector reforms
- the important spin-off effect of a few large-scale multilaterally supported ESCO development projects
- the significant budgetary and legal autonomies of cities (allowing ESCOs to enter into performance contracts directly with public institutions)
- favourable feed-in tariffs for CHP
- state support schemes for ESCOs and third-party financing
- the partial liberalisation of the heat price (using a price cap formula)

The International Energy Agency (IEA) asserts, that the Hungarian Energy Efficiency Co-financing Programme (HEECP) and the Global Environmental Facility (GEF) programmes facilitated the establishment of ESCOs and maintained the stable economic conditions for their development. The assistance of international funding agencies (international aid programmes) also played an important role in Hungary (IEA 2003, p. 46).

Experts are of the opinion that this trend for ESCOs will continue in the future, because large untapped efficiency potentials are still waiting to be harvested in Hungary. Like all CEE economies, the Hungarian economy is still less energy-efficient than the EU-15. In 2001, the Hungarian primary energy intensity, expressed in purchasing power parities (PPP), was approximately 20 % higher than the EU-15 average. Nevertheless,

this is a good status compared to other CEE countries (Slovak Republic 80 %, Poland more than 40 %, Czech Republic more than 60 %) (Ürge-Vorsatz / Langlois / Rezessy 2004). Ürge-Vorsatz / Langlois / Rezessy arrive at the conclusion that various reforms, governmental plans and programmes, international help and local support made it possible for ESCOs to work successfully in Hungary.

5 Social transition

Social dialogue on climate change issues

The participation process during the elaboration of the NAP and its allocation caps was very transparent. All stakeholders were involved and their comments were taken into account. Only trade unions have hardly participated in the elaboration process of the NAP.

Since Hungary has no problems to fulfil its reduction obligations, they did not see benefits for themselves. Moreover, there is a lack of expertise within the trade unions about potential impacts of climate change mitigation measures on employment. This could generate a problem for the representation of their interests in the long run, when climate measures may become more ambitious.

There was a conference, organised by the Ministry of Environment and Water and the Ministry of Economy and Transport, on March 18, 2004, during which the ETS and the whole NAP-developing process were presented to the affected companies. The principles of the NAP could be commented on at the end of June, and the emissions prediction study was available at the end of August. The draft allocation plan was made open to the public on September 22, 2004. Some NGOs complained that the public had only one week to make notes, remarks, and reflections on the NAP (CANCEE, 2004 p. 8-9).

Measures to support emergence/growth of winning sectors

According to the persons interviewed, the largest potentials for higher employment through climate change measures can be found in the field of energy efficiency: households (white ware) and insulation of buildings. A government subsidy for building insulation and construction has been abolished due to lack of government funds, even though many old buildings from the socialist era are badly insulated. The demand for renovation exists and could easily be increased through this state subsidy. As renovation measures are job intensive, this could generate positive effects on both climate protection and on employment. Skilled worker knowledge for an optimum of insulation needs to be improved.

There is also much potential for improving energy efficiency on the supply side. In order to achieve improvements, new technologies are going to be implemented. This development provides more employment, higher / different qualifications, and higher wages.

Many interviewees state that in general national measures pursuant to the Kyoto Protocol and other reduction targets for greenhouse gases have more potential for job creation than risks for employment. For many instruments, however, state subsidies are needed in the short term in order to let them work efficiently in the long term. However, Hungary has practically no financial means to prepare ambitious climate protection strategies because of its precarious budgetary situation.

Measures to help transition for workers in loosing sectors

So far, mitigation policies and measures to reduce GHG emissions have no crucial impact on the economy and on employment in view of the persons questioned. This attributes to the NAP of Hungary, which does not provide stringent allocations for the companies. Since Hungary can easily fulfil its Kyoto commitments, there is no pressure for stringent allocations until 2012. Since the break-down of the Hungarian socialistic economy, economisation, rationalisation, new technologies and automation in general have led to the closing of plants or reducing of capacities and will further lead to losses of jobs. Hence, the interviewees state that qualification demands are generally getting higher. However, the higher qualification structure of the employees also results from general further developments (e.g. automation), and further training becomes increasingly important for the employees. Many interviewees call for an improvement of the educational level at schools and universities.

All of the interviewees agree on the fact that on the one hand they will need more and more highly educated employees and that on the other hand the number of jobs for less educated people will decrease.

6 Conclusions

The principal finding of the interviews is a great demand for information and education concerning the impacts of climate protection measures, emission trading and further policies for the domestic labour market in Hungary. While numerous experts can be found in energy intensive sectors, trade unions and associations still lack know-how for small and medium-sized enterprises in particular. The representatives of these organisations thus expressed demand for training, in order to protect their clients against tendentious information policies by the employers. Interviewees emphasise that there are hardly any experts for Kyoto instruments, therefore a better knowledge transfer between science/industry and politics is needed.

It should be stressed that all interview partners agreed on the appraisal that large potentials might be developed in the field of households in particular. Hence, it can be concluded that specific instruments should be developed in order to open up these unemployed potentials. The main focus should be on the energy performance of buildings, as this was congruently assessed as beneficial for the local building trade. Skilled worker knowledge for an optimum of insulation needs to be improved. There is a great demand for education and training to enable skilled workers in this case. However, the immigration of cheap labour from Transylvania was also observed, when local skilled workers could not reach a high quality workmanship.

A further deficit of the present system stems from the increasing import of energy intensive goods from countries which are not participating in emission trading yet. The geographic closeness of Hungary to Eastern countries which have not ratified the Kyoto protocol has led to rising imports of cement. This might result in a further shift of cement production to possibly more inefficient plants as well as in an impairment of the domestic cement industry, entailing negative impacts on the labour force in this sector.

The transport sector in Hungary is well developed and public transport is broadly accepted. The experts expressed the apprehension that individual traffic might gain larger proportions compared to public transport in future. In this context, it has to be referred to the conflict of goals that emerges in consequence of numerous projects for the expansion of road networks financed by the EU. Better logistics between rail traffic and inland water transport is necessary.

A particularly important conclusion of this country report is that for the implementation of an efficiency strategy a forced and purposeful promotion of industrial innovations is needed, in order to create new jobs in this sector. The examples of active solar water heating systems and of the energy-saving lamp technology show that the high import rate of these technologies significantly reduces the chances for domestic job creation through energy efficiency promotion. The positive effects on employment and other macro-economic indicators could be much higher if a government aid were to support both sides of the market: the demand- and the supply-side. Increasing the demand through subsidies and at the same time supporting the domestic supply-side of innovative technologies could be an auspicious way for Hungary.

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Appendix

Table 13: Overview on contacted companies, organisations and public authorities in Hungary

Sector	Number of companies/ organisations/ authorities contacted	Number of interviews conducted	Number of written replies	Negative answers / rejection	Reasons for rejection
Public Authorities	7	2	0	5	(b) (c)
Trade Unions	4	2	0	2	(b)
Employers Organisations	3	2	0	1	(g)
Environmental NGO	5	3	0	2	(b)
Steel Companies	3	0	0	3	(b) (f) (g)
Aluminium Companies	2	0	0	2	(e)
Cement, Building Materials Companies	2	1	0	1	(d)
Electric Equipment	4	0	0	4	(a) (f)
Building, construction & refurbishment	1	1	0	0	-
Power	12	3	0	9	(a) (b) (c) (g)
Oil, gas	5	0	1	4	(b)
Transport	1	0	0	1	(b)
Hydrogen	0	0	0	0	-
Others	0	0	0	0	-
TOTAL	**49**	**14**	**1**	**34**	**-**

Reasons for rejection:

(a) No interest to take part in study
(b) No reply at all
(c) Not responsible for topic
(d) No time for interview/written response
(e) No reply after email/phone contact
(f) Company to small
(g) Cannot answer the questionnaire

Table 14: List of interviewees in Hungary

Stakeholder group	Institution	Name of interviewee	Date
Public Authorities	University Corvinus, Faculty of Business Administration	Prof. Dr. Sándor Kerekes	7 July 2006
	Hungarian Ministry of Environment and Water	Dr. Tibor Faragó	5 September 2006
Trade Unions	TU LIGA	Mr. József Kóhan	4 September 2006
	National Federation of Workers Council	Dr. István Balogh	5 September 2006
Employers' Organisations	Hungarian Industrial Organisation	Mr. András Kémeri	6 July 2006
	Confederation of Hungarian Employers and Industrialists	Mr. László Dzubay	7 September 2006
Environmental NGO, Research Institutes	WWF Hungary	Mr. Matjaz Prommer	6 July 2006
	Regional Environmental Centre	Ms. Zsuzsanna Iványi	4 September 2006
	Clean Air Action Group	Mr. Zoltán Szabó	5 September 2006
Cement	Duna Drava Cement Kft.	Dr. László Szabó	7 September 2006
Building construction and refurbishment	Wienerberger	Mr. János Szohr	4 September 2006
Power	Budapesti Erömü Rt.	Mr. Balázs Major	6 July 2006
	Atel Csepeli Áramtermelö Kft.	Mr. Gábor Briglovics	6 September 2006
	Pannon Power Rt.	Mr. György Sugár	8 September 2006
Oil	MOL	Ms. Eszter Király	Written reply 26 October 2006