

**Science Centre  
North Rhine-Westphalia**

Institute of Work  
and Technology



Institute for Culture  
Studies

**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 – Czech Republic

on behalf of the European Commission  
Directorate-General Environment

Ref. No. 07-0402/2005/420169/SUB/C2

coordinated by Social Development Agency (SDA) /  
European Trade Union Confederation (ETUC)

Wuppertal  
20 November 2006

**Report prepared by:**

Maïke Bunse

**With support from:**

Wolfgang Irrek

Lutz Jarczyński

Dagmar Koths

Frederic Rudolph

Wuppertal Institut für Klima, Umwelt, Energie GmbH  
im Wissenschaftszentrum Nordrhein-Westfalen  
Döppersberg 19, 42103 Wuppertal, Germany  
[www.wupperinst.org](http://www.wupperinst.org)

## Contents

<b>SUMMARY.....</b>	<b>3</b>
<b>1 INTRODUCTION AND OVERVIEW.....</b>	<b>5</b>
<b>2 CO<sub>2</sub> EMISSIONS AND EMISSION REDUCTION TARGETS.....</b>	<b>7</b>
2.1 No difficulties in meeting the Kyoto target .....	7
2.2 Development of CO <sub>2</sub> emissions .....	7
2.3 National emission reduction targets .....	10
<b>3 MITIGATION SCENARIOS, STRATEGIES, POLICIES AND MEASURES .....</b>	<b>12</b>
3.1 National scenarios .....	12
3.2 Important governmental policies and measures .....	15
3.3 Strategies and positions of stakeholders in the different sectors .....	18
3.3.1 Overview .....	18
3.3.2 Public Authorities and NGOs .....	19
3.3.3 Energy .....	20
3.3.4 Energy-intensive industry.....	21
3.3.5 Transport .....	21
3.3.6 Construction and Building Sector .....	22
3.3.7 Trade Unions .....	22
<b>4 IMPACT OF MITIGATION POLICIES AND MEASURES ON ECONOMIC ACTIVITY AND EMPLOYMENT.....</b>	<b>24</b>
4.1 General developments in the Czech economy .....	24
4.2 Sector-specific impacts.....	26
4.2.1 Energy Sector .....	26
4.2.2 Energy-intensive industry.....	28
4.2.3 Transport sector.....	30

4.2.4	Building sector .....	32
<b>5</b>	<b>SOCIAL TRANSITION .....</b>	<b>33</b>
<b>6</b>	<b>CONCLUSIONS .....</b>	<b>34</b>
<b>7</b>	<b>REFERENCES .....</b>	<b>35</b>
	<b>APPENDIX .....</b>	<b>37</b>

## Tables

Table 1:	Development of CO <sub>2</sub> emissions .....	7
Table 2:	Overview of CO <sub>2</sub> emissions per capita in some chosen EU countries .....	8
Table 3:	Sectoral development of CO <sub>2</sub> emissions in the Czech Republic.....	9
Table 4:	Difference of allocated and actual CO <sub>2</sub> emissions .....	11
Table 5:	National CO <sub>2</sub> emission scenarios .....	13
Table 6:	Short description of three different scenarios for the development of Europe's energy and and emissions until 2020/2030 .....	13
Table 7:	Overview of Scenario Preferences .....	14
Table 8:	Overview of the average of given answers concerning suitable policies and measures to reduce emissions (politics and NGOs).....	19
Table 9:	Summary of the average of answers for suitable measures for reducing emissions (business).....	23
Table 10:	Basic economic indicators in the Czech Republic.....	24
Table 11:	Structure of creation of GDP in industry (%).....	25
Table 12:	The development of the number of employed people in major Czech energy sectors	27
Table 13:	Total Gross Electricity Production .....	27
Table 14:	Employment in the Czech Manufacturing sector (thousand persons) .....	29
Table 15:	Development in the number of employees in Czech metallurgy (thousand persons) .	29
Table 16:	Cement production of the Czech Cement Association .....	29
Table 17:	Average number of direct employees .....	30
Table 18:	Average number of employees in thousand .....	31
Table 19:	Employment in the Czech Construction sector (thousand persons).....	32
Table 20:	Overview of companies, organisations and authorities contacted .....	38
Table 21:	Summary of measures affecting CO <sub>2</sub> emissions with expected benefits .....	39
Table 22:	Employed persons by industry (thous.).....	41
Table 23:	Average number of direct employees .....	42
Table 24:	Overview of interview partners .....	43

## Summary

This **country report** by the Wuppertal Institute is part of the broader study „**Impact on the activity and employment of climate change and greenhouse gas mitigation policies in the enlarged EU**“ (No. 07-0402/2005/420169/SUB/C2), co-ordinated by the **European Trade Union Confederation / Social Development Agency on behalf of the European Commission** (DG ENV). It summarises the opinions and expectations of 15 interviewed stakeholders, existing scientific studies, official reports and further sources (internet, literature, company reports and statistics) as well as own analysis by the Wuppertal Institute with regard to the question **in how far climate mitigation policies affect employment in the Czech Republic**.

The **Kyoto target for the Czech Republic** demands a **reduction of 8%** of total greenhouse gas (GHG) emissions referring to the base year of 1990 emissions. As emissions decline steadily, there is going to be no problem to achieve the target, the Czech Republic is even going to **over-achieve** the commitment. Relating to this, the allocation of allowances in the framework of the **EU ETS** does not place any burden on the covered sectors in the Czech Republic; the allocation is **based on expectations of emissions due to economic growth**.

Caused by not existing concrete reduction targets for companies or sectors, the pressure for dealing with the **topic of climate change** is **not that present** in the Czech Republic as it might be in other countries. However, most interviewees were **aware of the climate change problem**. Though, they are not convinced by the way Europe is dealing with this problem. Statements included the following:

- Europe would **need to invest more money in R&D** concerning energy and climate change;
- **Europe alone would not be able to cope with climate change**; other countries like USA, China, India, etc. would need to get involved;
- **European Emissions Trading Scheme would not be effective** – it would be too expensive and would not show remarkable results.

Different stakeholders through all sectors emphasized the **importance of nuclear energy** in spite of all the risks involved in the nuclear process chain. Except from **biomass**, stakeholders argue that the **energy and employment potential** for renewable energies in the Czech Republic would be only small.

According to the majority of interviewees, climate policy and measures would **not have any or only little impact on employment** in the Czech Republic. One possible impact was seen in rising **energy prices**. Through mitigation measures, energy prices would rise and this would lead energy-intensive industry to move eastwards and therefore to reduce or close down Czech production facilities.

The **need to make a study about mitigation impacts on employment in the Czech Republic was not seen**. It was not expected that climate change measures would play any significant role regarding employment. Some industry sectors suffer from steady

declines in employment but this was not traced back to the implementation of the EU ETS, but to **restructuring processes** caused by the accession to the EU.

Restructuring especially in the **energy and coal mining sector**, as well as **in the steel sector** in the 1990ies has substantially decreased employment in these branches. This **decrease might continue in future**. However, the common opinion was that effective climate mitigation policies would have **no or only a small impact** on employment. While this impact would be negative in the conventional energy industries, in other branches like, e.g., **renewable energies**, this impact would be slightly positive.

The importance of **training own staff** was stressed, as either candidates were not trained well enough, or new staff could not be hired. **Social dialogue** about the climate topic exists only in a small number of companies.

## 1 Introduction and overview

The **general aim of this country report is to summarise**

- the **opinions and expectations** of stakeholders in politics, ministries and other public administrations, employers organisations, trade unions, selected industry associations and single companies as well as in NGOs, collected by Wuppertal Institute by face-to-face or telephone interviews, or in writing, and
- **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 the Czech Republic.**

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

Based on investigations in the Internet, relevant institutions and **suitable interviewees** had been identified. Due to language barriers, the search was sometimes quite difficult. When necessary, an **interpreter** helped to establish the first contact to some institutions. In addition to the search in the internet and the support from the interpreter, some interviewees themselves recommended further suitable institutions or persons.

In total, **57 institutions**, which had been identified for an interview, were contacted by e-mail and/or by phone. All of them were given some general information about the project and were asked for support. In 42 cases, no interview could be conducted due to different reasons (see Table 20 in the appendix). Eventually, **15 stakeholder interviews** were carried out either via face-to-face meetings in the Czech Republic, via telephone or via e-mail (see overview of interview partners in the appendix). Experts from public authorities, trade unions, employers' organisations, environmental non-governmental organisations and companies were asked for their assessments with regard to impacts of climate change mitigation measures on employment.

In addition to the interviews, annual reports, environmental reports and online available information of the institutions interviewed were analysed, as well as official documents (e.g. National Allocation Plan, National Inventory Report, National Communications) were considered for the following country report (see References).

There are **no concrete studies or analyses** concerning the connection between climate policy and employment in the Czech Republic available. Furthermore, it was not the aim of this country analysis to carry out own economic modelling exercise. Therefore, the results of the analysis presented here are mainly based on the information, opinions and estimates of the interviewees.

In **chapter 2**, the report focuses on the development of CO<sub>2</sub> emissions and emission reduction targets in the Czech Republic in general and by sector.

In order to achieve the national emission reduction targets, policies and measures have been developed which are presented in **chapter 3**. Furthermore, the strategies

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

**Chapter 4** deals with the impact of mitigation policies and measures on employment.

Measures to help transition for workers in the losing sectors and measures to support growth of winning sectors are topic in **chapter 5**.

Finally, the main conclusions with regard to the question in how far climate mitigation policies affect employment in the Czech Republic are presented in final **chapter 6**.

## 2 CO<sub>2</sub> emissions and emission reduction targets

### 2.1 No difficulties in meeting the Kyoto target

The **Kyoto target** for the Czech Republic demands a **reduction of 8%** of total greenhouse gas (GHG) emissions referring to the base year of 1990 (even though the Czech Republic became an independent state not earlier than 1993) emissions, in total from 190.1 Mt CO<sub>2</sub> eq to 174.9 Mt CO<sub>2</sub> eq. As the emissions decline steadily (in 2004: 142.31 Mt CO<sub>2</sub> eq), there will be no problem to achieve the target, the Czech Republic is even going to **over-achieve** the commitment (Czech Republic 2004).

The first version of the **National Allocation Plan** for 2005-2007 submitted to the European Commission provided an allocation of allowances for 322.98 Mt CO<sub>2</sub> (107.66 Mio. annually). A Commission Decision amended this and the allocation was finally reduced to allowances of **97.6 Mt CO<sub>2</sub> per year** (EC 2005).

### 2.2 Development of CO<sub>2</sub> emissions

The development of total GHG emissions compared to the Kyoto base year of 1990 shows a **steady decline**, in 2003 a reduction of 24% was achieved; concerning CO<sub>2</sub> emissions only, in 2004 a reduction of 22.88% can be seen (Table 1).

Table 1: Development of CO<sub>2</sub> emissions

Year	CO <sub>2</sub> emissions (Mt) excluding net CO <sub>2</sub> from LULUCF	Compared to 1990
1990	165,060	100%
1991	155,261	-5.00%
1992	140,160	-15.09%
1994	131,242	-20.49%
1995	132,125	-19.95%
1996	133,863	-18.90%
1997	138,389	-16.16%
1998	129,188	-21.74%
1999	122,099	-26.03%
2000	129,017	-21.84%
2001	129,033	-21.83%
2002	124,040	-24.85%
2003	128,075	-22.41%
2004	127,297	-22.88%

Source: UNFCCC greenhouse gas inventory



Taking into account only the achieved emission reductions gives the impression of a successful climate strategy. But one reason not to forget is that the Czech Republic like other Eastern European Countries cut emissions substantially due to **industrial restructuring** after the fall of Communism in 1989. Hence the government has not decided an emissions control strategy so far, although there is a potential to reduce emissions at a relatively low cost (IEA 2005).

On closer examination, the Czech Republic faces a backlog: with CO<sub>2</sub> emissions of nearly 12 tonnes **per capita it is one of the greatest polluters** in the enlarged EU (IEA 2005a). GHG emissions are also high compared to GDP. That is caused by the high proportion of use of fuels with high carbon contents as primary energy sources and a low GDP per capital value. Currently, total GHG emissions per capital value are about 1/3 higher than in other EU member states and more than twice as high when calculated per GDP (Ministry of the Environment, 2004).

Table 2: Overview of CO<sub>2</sub> emissions per capita in some chosen EU countries

CO <sub>2</sub> / Per Capita	Czech Republic	Germany	Hungary	Slovenia
1990	14.84	12.18	6.81	6.26
1995	11.72	10.71	5.71	6.55
2000	11.50	10.15	5.44	7.26
2003	11.47	10.35	5.70	7.64

Source: IEA 2005a

With the figures shown in Table 2, the Czech Republic ranks worldwide on position 17. With a comprehensive emission strategy the country would be able to sell their surplus allowances on the market. And the Czech Republic has a big potential for energy savings in the future: While **energy intensity has only fallen by 17%** in the Czech Republic from 1990 to 2002, Hungary achieved a reduction of 23%, Slovakia 27% and Poland 39% (IEA 2005), so that the country would benefit economically from a comprehensive climate change strategy.

**CO<sub>2</sub> emissions have the greatest share in total GHG emissions** in the Czech Republic. The sectoral breakdown in 2003 shows that 47.8% are from energy industry, 30.7% from processing industry including industrial energy production, 19.9% from transport and 12.8% from population, agriculture and the tertiary sector (4<sup>th</sup> National Communication 2005).

Table 3 shows the development from the base year 1990 to 2004. It demonstrates a reduction in **fuel combustion** activities of more than 20% in the recent 15 years. The highest share in reduction derives from **manufacturing industries and construction** with -42.37%. CO<sub>2</sub> emissions from **energy industries** kept more or less the same level and contribute to total emission reductions with -0.82%. A contrawise trend can be observed in the **transport sector**; the CO<sub>2</sub> emissions of this sector increased from 1990 to 2004 of more than 100%. This is mainly due to an increase of motor vehicles and a still high average age of vehicles (2004 = 15.58 years) (Ministry of Transport 2004).

While recent studies show that emissions per car are already decreasing, either the volume of transportation from private cars as well as the intensity of truck transportation – especially after the cancellation of border controls in 2004 – are increasing (Transport Research Centre 2006). In the **residential sector**, a reduction of more than 50% from 1990-2004 was achieved.

Table 3: Sectoral development of CO<sub>2</sub> emissions in the Czech Republic<sup>1</sup>

	Base year (1990)	1998	2000	2002	2004	2004 compared to base year
	(Mt CO <sub>2</sub> )	(Mt CO <sub>2</sub> )	(Mt CO <sub>2</sub> )	(Mt CO <sub>2</sub> )	(Mt CO <sub>2</sub> )	%
<b>Total Energy (Fuel Combustion)</b>	<b>146.808</b>	<b>116.246</b>	<b>116.607</b>	<b>112.617</b>	<b>115.617</b>	<b>-21%</b>
<b>1. Energy Industries</b>	58.354	57.602	59.355	57.730	57.877	-0.8%
<b>2. Manufacturing Industries and Construction</b>	46.935	28.168	29.113	26.158	27.047	-42%
<i>- thereof Iron and Steel</i>	<i>NO</i>	<i>NO</i>	<i>NO</i>	<i>IE/NO</i>	3.176	
<b>3. Transport</b>	7.342	10.850	11.119	12.428	15.229	+107%
<b>4. other sources - Residential</b>	20.774	12.055	9.831	10.031	9.497	-38%
<b>Total Industrial Processes</b>	<b>17.702</b>	<b>12.219</b>	<b>11.699</b>	<b>10.741</b>	<b>11.049</b>	<b>-38%</b>
<b>1. Cement Production</b>	2.489	2.068	3.876	1.404	1.661	-33%
<b>2. Iron and Steel Production</b>	12.533	7.555	7.086	6.883	6.726	-46%

Source: 4<sup>th</sup> National Communication, CRF, 2006

NO = not occurring

IE = included elsewhere

<sup>1</sup> Emissions from the aluminium industry are not occurring and are therefore not mentioned.

### 2.3 National emission reduction targets

The **National Program to abate the Climate Change Impacts** in the Czech Republic (2001, approved in 2004) constitutes a national target for the reduction of specific **CO<sub>2</sub> emissions per inhabitant by 30% to 2020** compared to 2000 and for the reduction of **total aggregated CO<sub>2</sub> emissions by 25% to 2020** compared to 2000. Additionally, the share of renewable energy sources in consumption of primary energy sources should increase to 6% by 2010 and to 20% in 2030. There should also be a reduction in energy intensity of production, distribution and final consumption of energy to a level of 60-70% of current consumption by 2030 and an increase in the use of biofuels to 5.75% in 2010. According to the Program, the use of all alternative fuels in transport should reach a level of 20% in 2020 (Ministry of the Environment, 2004).

The Czech Republic takes part in the **EU Emissions Trading** (EU ETS). At the beginning of 2005 there has been a discussion about the Czech national allocation plan for the 2005-2007 trading period. The Czech Republic proposed to allocate allowances for 107.8 Mt CO<sub>2</sub> annually allowances, resulting from the expectation of rising emissions due to economic growth. The EU Commission demanded a deeper cut and the compromise set the annual limit at 97.6 Mt CO<sub>2</sub>, a cut of 9.4%.

As an **over-achievement** of the Kyoto Protocol target is expected, the allocation of allowances in the framework of the EU ETS does not place any burden on the covered sectors, it is **based on expectations of emissions due to economic growth**. These growth coefficients for individual sectors were calculated on the basis of data of the Czech Statistical Offices, analyses of the Ministry of Industry and Trade and industrial associations. They take account of a substantial rise in energy production as a result of commencement of operation of the Temilín nuclear power plant without a corresponding number of fossil-fuelled power plants being decommissioned, together with a greater amount of electricity used for export (Czech Republic 2004).

Considering the data given in the NAP, a total increase in CO<sub>2</sub> emissions of 21% in the first trading period of 2005-2007 is allowed. From the sectoral point of view, this would mean a plus of 3% for public energy production, a plus of 35% for iron and steel and a plus of 11% for cement.

Table 4 shows the difference between actual emissions of 2005 and the emissions allocation proposed in the first version and the final NAP. It can be seen, that currently – despite the downshift of allocation in the final NAP – **all sectors profit from the EU ETS**, as they receive more allowances than needed. Compared to 2005 emissions, more than 15% of total allowances are allocated more than needed. Especially pulp and paper, corporate energy production, refineries and lime benefit from the allocation.

Table 4: Difference of allocated and actual CO<sub>2</sub> emissions

Sector	CO <sub>2</sub> emissions 2005	Projected CO <sub>2</sub> emissions for 2005-2007, NAP notified to EC, October 2004	Projected CO <sub>2</sub> emissions for 2005-2007, final NAP, July 2005	Difference between emissions 2005 and NAP from October 2004	Difference between emissions in 2005 and final NAP from July 2005
	t	t	t	%	%
<b>Public energy production</b>	55 962 324	65 921 979	63 485 493	-15.11%	-11.85%
<b>Corporate energy production</b>	2 527 031	4 238 221	3 766 771	-40.38%	-32.91%
<b>Refineries</b>	996 971	1 550 000	1 370 498	-35.68%	-27.26%
<b>Chemicals</b>	4 684 701	6 435 449	5 574 288	-27.24%	-15.96%
<b>Coke</b>	238 046	310 000	249 827	-23.21%	-4.72%
<b>Iron and Steel</b>	12 225 291	17 612 497	15 455 479	-30.59%	-20.90%
<b>Cement</b>	2 553 038	3 591 411	3 047 260	-28.91%	-16.22%
<b>Lime</b>	1 008 137	1 653 699	1 341 085	-39.04%	-24.82%
<b>Glass</b>	782 407	948 571	827 848	-17.52%	-5.49%
<b>Ceramics</b>	717 173	763 601	808 166	-6.08%	-11.26%
<b>Pulp</b>	140 557	294 033	251 899	-52.20%	-44.20%
<b>Paper</b>	618 051	1 234 007	948 384	-49.92%	-34.83%
<b>All sectors</b>	<b>82 453 727</b>	<b>107 880 000</b>	<b>97 600 000</b>	<b>-23.57%</b>	<b>-15.52%</b>

Source: Centre for Transport and Energy 2006

### 3 Mitigation scenarios, strategies, policies and measures

#### 3.1 National scenarios

The foundation for national scenarios, strategies, policies and measures is laid in the **‘National Program to Abate Climate Change in the Czech Republic’**, which was approved by Government in 2004.

According to instructions of the UNFCCC, the Czech Republic conducted scenarios a) without measures, b) with measures and c) with additional measures. Under the scenario with additional measures included are (Ministry of the Environment and Czech Hydrometeorological Institute 2005)

- the full implementation of the **National Program for Sound Energy Management and Use of Renewable and Secondary Energy Sources**
- Introduction of **environmental tax reforms**
- Implementation of the **Directive on buildings**, and
- Introduction of the operational programs **„Industry and Business“** and **„Infrastructure“**.

Table 5 shows expected sectoral emissions for the scenario with measures as well as for the scenario with additional measures. These scenarios show, that **fuel combustion** will – even though a decline in emissions is expected – remain the main source of CO<sub>2</sub> emissions in future. As projections for **energy industries** as well for **manufacturing industries and construction** show a decline in CO<sub>2</sub> emissions, CO<sub>2</sub> emissions in the **transport sector** will continue to rise. Regarding **industrial processes**, no differences in emissions are expected in either scenario.

Table 5: National CO<sub>2</sub> emission scenarios

	Scenario with measures				Scenario with additional measures			
	2005	2010	2015	2020	2005	2010	2015	2020
<b>Total emissions</b>	123,382	122,944	111,866	101,162	121,341	118,514	109,116	98,396
<b>1. Energy</b> <sup>1)</sup>	116,310	115,506	104,209	92,952	114,269	111,077	101,458	90,186
- Energy industries	60,810	60,212	56,008	43,977	58,680	57,571	54,935	42,989
- Manufacturing Industries and Construction	25,012	25,015	19,672	21,583	25,293	23,691	18,369	20,701
- Transport	13,751	14,096	13,846	14,373	13,755	14,095	13,859	14,379
<b>2. Industrial Processes</b>	10,557	10,927	11,228	11,797	10,557	10,927	11,228	11,797
- Mineral products	2,193	2,443	2,443	2,991	2,193	2,443	2,443	2,991
- Chemical industry	712	646	668	702	712	646	668	702
- Metal production	7,651	7,839	8,117	8,105	7,651	7,839	8,117	8,105

Source: 4th National Communication<sup>1)</sup> fuel combustion

Separately from the scenarios of the National Communication, interviewees were asked what kind of scenario would match best for their institution's opinion or attitude. They could choose between **three alternative scenarios for the development of Europe's energy and emissions until 2020/2030**:

Table 6: Short description of three different scenarios for the development of Europe's energy and emissions until 2020/2030

<b>BAU/PRIMES-Scenario (Business As Usual)</b>	Continuation of the current policy including with its policies and measures; no focus on an active climate or energy policy, the European emission targets are not reached.
<b>Policies &amp; measures-scenario</b>	Active climate policy: first priority are energy efficiency/energy saving measures; an enforced emissions trading system, a better market penetration of renewable and combined heat and power-technologies; completion of the exit from nuclear energy that was begun in some countries; no new nuclear power plants; special focus on the transport sector; a Europe-wide eco-tax and a reform of the subsidies policy.
<b>LCEP-Nuclear-Scenario</b>	The climate protection targets can only be reached through substantial reduction of GHG outside of Europe; within Europe, energy efficiency is given first priority; a further change of the fuel-mix is only relevant on a long-term basis; intensification of emissions trading; 40-50 new nuclear power plants and re-evaluation of the nuclear-exit strategies already decided upon; fixed target quota for renewable energy; reform of the current subsidies policy; enforced promotion of research & development; increased awareness for ecological issues.

Table 7 shows a summary of the preferences of scenarios as stated by the interviewees:

Table 7: Overview of Scenario Preferences

	BAU-Scenario	WWF/WI-Scenario	Nuclear Scenario
Public Authorities		X	X
Trade Unions	X		X
Environmental NGOs		X	
Cement		X	X
Power	X	X	X
Iron and Steel	X		

Source: interviews carried out by the authors

The preferences of the interviewees are mainly divided into the **nuclear** and the **WWF/WI** scenario. However, the representative of an **NGO** who has opted for the WWF/WI scenario pointed out, that it is quite obvious that actual politics strives towards a nuclear scenario. The argument for a nuclear scenario would be usually the chance of independence from energy imports. Today the Czech Republic would export its surplus energy production but according to an NGO representative this is going to change from 2030 on: Resources of brown coal – so far the major energy resource – might drop by half till 2030, energy consumption is expected to rise and modernisation and/or replacements of old coal fired power plans are going to be necessary from 2010 on. All in all about 6000 MW would have to be replaced and this would not be possible without nuclear energy.

Regarding to a big **energy company** in the Czech Republic, the use of brown coal would be the best option at the moment. The energy company tried to use this domestic source as efficient as possible. However, they were aware of the value of carbon and this was the reason they implemented an efficiency programme. The demand of energy would rise fast and so would the energy supply. To increase supply, brown coal is going to be used more efficiently, and there were also thoughts about another nuclear power plant. Renewable energy would not going to play a substantial role, as the possibilities in the Czech Republic were limited. However, according to the representative of a big energy provider, the growing consumption could not only be satisfied by an increase of supply, there would have to be a change in energy consumption habits as well.

The Czech Republic does not have much own **energy resources**, however it is one of the biggest **energy sellers** in the world. According to an NGO, importing energy might be a suitable and sustainable way for supplying energy. For example, as the Czech Republic did not have good conditions for wind energy, they could install and own windmills in Poland for producing energy for the Czech Republic.

A representative from the **iron and steel sector** stated, that the Business As Usual scenario fits best to the company's strategy. As they currently benefited from the EU ETS, there would be no reason to change this policy.

An **airline** representative pointed out, that the provided scenarios are far away from reality and practical work, and that they were only useful for researchers and politicians.

According to a **government** representative, clean coal technology and nuclear power could be an answer to the CO<sub>2</sub> problem. The support of renewables was an important issue too, however they would not be able to close the gap that would appear without nuclear power. The resources of brown coal were declining. At the latest in 2060 the Czech Republic would need new resources. That could be nuclear power; that would also be the best solution regarding the independence from energy imports. Otherwise, there would be imports of hard coal or of energy.

Some of the companies and associations dispose of own scenarios. For example, the **cement sector** has an emissions scenario covering the next 10 years, and a representative of the **iron and steel** sector said, that his company has an emission model for one of their steel plants.

An **energy supplier** has a production scenario from which an emissions scenario is conducted. The scenario would not have much influence on the company's strategy; they would mainly react to current legislation.

### 3.2 Important governmental policies and measures

The Czech Republic does not have special programmes for emission sources that are not covered by the EU ETS exceeding the existing measures based on adoption of EU legislative under the Treaty of Accession (Czech Republic 2004). As the National Allocation Plan for the second trading period is not published yet, information about possible developments and more current policies and measures is not available.

However, there are various national programmes and regulations targeting a broader sphere, but contribute to the mitigation of climate change as well. According to the 4<sup>th</sup> National Communication, the **key measures** with the greatest expected benefit consist primarily in framework and conceptual measures related to several sectors:

- The National Program to **Abate the Climate Change Impacts** in the Czech Republic

This programme is the basis for preparation of policies and measures to reduce GHG emissions. It defines main targets and measures at the national level for ensuring the meeting of emission reduction targets, for reflecting contemporary and future social and economic conditions and for contributing to the promotion of sustainable development. Various ministries were required to include key points of the programme into their activities. The Ministry of the Environment for example implements and coordinates regular monitoring of GHG emissions, the Ministry for Industry and Trade coordinates and implements parts of the State Programme to support energy savings and the



use of renewable energy sources, and the Ministry of Transport implements policies and measures in the transport sector. The expected benefits in terms of CO<sub>2</sub> reductions are not available.

- The National Program of **Sound Energy Management and Use of Renewable and Secondary Energy Sources**

The National Programme for energy management and use of renewable sources of energy for 2006-2009 constitutes the basis for an annual implementation of state programmes in support of energy savings and the use of renewable energy sources and is implemented by 11 sectors. The amount of public expenditure for this programme will amount to about CZK 8 billion (about 280 Mio. EUR)<sup>2</sup> The programme's priorities are stated as follows:

- Maximisation of energy effectiveness and electricity effectiveness and the use of energy savings,
- Higher use of renewable and secondary energy sources,
- Higher use of alternative fuel in transport.

The targets are to increase energy effectiveness by 2.6% per year and energy savings by 11 PJ per year. Additionally, this programme should contribute to the meeting of targets concerning the use of renewable energy sources and biofuels in the transport sector (<http://www.mpo.cz/dokument12937.html>). According to the 4<sup>th</sup> National Communication, the expected benefits by the schemes under this programme are 6,332 t CO<sub>2</sub>eq per year.

- The **State Environmental Policy 2004-2010**

The priority areas of the State Environmental Policy are compatible with the Sixth Environment Action Programme of the EU and concentrates mainly on resolving ongoing and newly emerging environmental problems. The implementation of the policy requires extensive participation of the general public, partners in the business sector, NGOs, science and research and other sectors. The expected benefits in terms of CO<sub>2</sub> reductions are not available.

- The **State Energy Conception** of the Czech Republic

The State Energy Conception is a basic component of the Czech economic policy. It has four basic priorities, namely maximising energy effectiveness, the amount and structure of the consumption of primary energy sources, provision for maximum environmental soundness and completion of transformation and liberalisation of energy management. All of these topics correspond to the priorities of independence, safety and sustainable development. Targets include for example a reduction in the energy intensity of creation of GDP by 25% to 2010 and by almost 50% to 2020 compared to 2000. The expected benefits in terms of CO<sub>2</sub> reductions are not available.

---

<sup>2</sup> As the full document of the programme is only available in Czech, no detailed information can be given.

- The **Strategy of Sustainable Development** of the Czech Republic

The strategic and partial goals and instruments of the strategy are formulated to eliminate as much as possible any imbalance between the economic, environmental and social pillars of sustainability (Czech Republic 2004b). The strategy imposes a number of strategic goals; regarding the environmental goals and proposed measures, mainly measures from other environmental policies are stated. The expected benefits in terms of CO<sub>2</sub> reductions are not available.

- The **Transport Policy** of the Czech Republic for 2005–2013

The Transport Policy is concerned with improving conditions for good-quality transport services to the regions and the entire area of the country. Its priority cross-sectional tasks for reaching environmental targets consist for example in the promotion of reduction of transport intensity or reduction of the environmental impact of transport. By 2013, the fraction of motor vehicles equipped with catalysers should reach a level of 99%.

The Transport Policy also includes a set of **Transport Policy Indicators** that are going to be evaluated in 2010 and 2013 in comparison with 2005. Regarding the climate change topic, the “harmonising conditions in the transport market and user charging” is interesting. Under this heading a stagnation limit for emissions of GHGs generated by transport split into fossil resources and biomass is set until 2010, as well as a 5% decrease until 2013. The expected trend contains a stop of growth until 2010 and afterwards a start of a descending trend (Ministry of Transport 2005).

According to the 4<sup>th</sup> National Communication, a set of measures in the transport sector should reach emission reductions of **2,797 t CO<sub>2</sub> eq in 2005 and 3,917 t CO<sub>2</sub> eq in 2010**. It is not clearly stated, which measures are included into these expectations. However, a few programmes and the related emission reductions are mentioned in the 4<sup>th</sup> National Communication:

- **Energy Savings in the Transport Sector**

This programme exists since 2004 and it provides support for measures concerned with transport infrastructure, organisation of transport, support of the use of biofuels, and consulting, education and promotion of sound use of energy in the transport sector. The expected amount of CO<sub>2</sub> reduction through this programme is 65,000 t CO<sub>2</sub> in 2010, 354,000 t CO<sub>2</sub> in 2015 and 685,000 t CO<sub>2</sub> in 2020.

- **Transport Corresponding to European Emission Standards**

This programme is concerned with the development and introduction of means of transport and automotive fuels that will correspond to European emission standards. The expected amount of CO<sub>2</sub> reduction through this programme is 172,000 t CO<sub>2</sub> in 2010, 944,000 t CO<sub>2</sub> in 2015, and 1,826,000 t CO<sub>2</sub> in 2020.

### - **Programme of Support for Renewal of the Vehicles of Urban Mass Transport and Public Transport**

In 2004, financial support for this programme was provided with CZK 243.3 Mio. (8.6 Mio. EUR) from the state budget, CZK 520 Mio. (18.3 Mio. EUR) from public budgets and CZK 144 Mio. (5.1 Mio. EUR) from private sources. The expected amount of CO<sub>2</sub> reduction through this programme is 65,000 t CO<sub>2</sub> in 2010, 354,000 t CO<sub>2</sub> in 2015, and 685,000 t CO<sub>2</sub> in 2020.

### - **MARCO POLO Programme**

This programme is a financial instrument that intends to reduce congestion, and to improve the protection of environment in the framework of the transport system. The expected amount of CO<sub>2</sub> reduction through this programme is 708,000 t CO<sub>2</sub> in 2010 and 1,369,000 t CO<sub>2</sub> in 2015.

Table 21 in the appendix shows an extraction of concrete measures stated in the 4<sup>th</sup> National Communication targeting CO<sub>2</sub> emissions and its expected benefits to 2010.

In the **National Allocation Plan for 2005-2007** also a number of legislation and policy instruments linked to the EU ETS, like the CHP Directive, the Biofuels Directive or the the Directive concerning energy-saving measures in buildings, are given. However, it is stated, that "Given that the effects of the above-mentioned Directives on the level of greenhouse gas emissions in the Czech Republic up to 2008 are minimal and **will not exceed the 10% limit**, their effect is not further discussed." (Czech Republic 2004).

## **3.3 Strategies and positions of stakeholders in the different sectors**

### **3.3.1 Overview**

**Interviewees** were asked which kind of measures would be suitable for their company or branch to reduce emissions. Quite a high number of interviewees was not able to give a concrete statement about what political measures would make their company establish emission reducing strategies, neither about what measures would be suitable for the company or branch to reduce emissions. This might be caused by the fact, that Czech companies are **not faced with emission reduction targets**, and therefore these questions are currently not an issue for companies.

Despite the fact, that the Czech Republic is not going to have problems in reaching its Kyoto target, in most interviewees' opinion the current **EU Emissions Trading System** would not be sufficient enough for reaching total EU's emission target. Criticisms included a lack of financing for energy and climate change related **research and development** in the EU as well as the lack of including all important countries into a system with mandatory targets.

Most interviewees stressed especially the importance of **research and development**. It was not believed, that the EU would provide enough financial support on this issue.

Compared to the USA, the EU would seem to lack behind. The US approach for environmental production was believed to be more useful. They would support new technologies and so companies would be supported to reduce emissions.

In the following, a more detailed view on sector specific positions is given.

### 3.3.2 Public Authorities and NGOs

Representatives from **public authorities and NGOs** were asked about the impacts of policies and measures on emission reduction, economic activity and employment. Table 8 shows an overview of the average of given answers.

Table 8: Overview of the average of given answers concerning suitable policies and measures to reduce emissions (politics and NGOs)

Policies and measures to reduce emissions	until 2012	until 2020/2030	until 2050
Emission trading system	2	2	3
JI, CDM	1	2	2
Fiscal policy	1	2	1
Research and development policy in general	1	2	3
local / regional and national infrastructure policy	2	2	2
Communication and awareness raising for relevant social issues in the context of climate protection and employment	1	1	1
Social and employment policy (Regulation and social accompanying of processes bringing technological and industrial change towards low carbon technology, services and infrastructures)	1	2	2

Source: Interviews carried out by the authors.

1 = no impact, 2 = little impact, 3 = high impact

This overview shows, that benefits of measures were expected from 2020 upward. Most measures were judged to have little impacts, only emissions trading and research and development were valued to have a high impact. Communication and awareness raising were ranked as having no impact.

Government representatives were **sceptical about the success of EU climate policy**. One representative claimed, that it would be ineffective. Even if it were successful, the measures would lead to a reduction of 2% only. There were doubts that with current measures and without nuclear power plants, the EU would reach its targets. The EU ETS would be effective up to a certain level, as it would supply motivation to reduce emissions. The quota should be technically possible and reachable, so that in the mid-term it might be effective. However, especially from a global point of view, in the long

run the ETS would not be sufficient enough. One statement was, that “we are playing on our own playground” and other important players like the US are not involved.

According to an NGO representative, the **EU ETS** should be more strict, more stringent targets are needed. Additionally, long-term mandatory targets on EU and national level would be needed. However, the NGO would not be against the ETS, they thought the ETS could be the driver for changes, only the NAP 1 would not send the right signal.

For improving the effectiveness of the **EU ETS** a NGO representative supposed to decrease the allocation of allowances and to implement auctioning and benchmarking. An additional promising measure would be either an inclusion of aviation into the EU ETS or taxes regarding air transportation.

A government representative pointed out, that till 2012 no further action would be necessary. But the question would be, what the EU could do to convince other countries like China, Russia and the USA to take part **beyond 2012**. This would not only be a question of reducing emissions but also of avoiding a rise in emissions. As a broadening of the EU ETS would be too expensive, an increase of investments in other countries was proposed. This could be done for example by using the project-based mechanisms of the Kyoto protocol. They could reach a win-win situation as they support developing countries, reduce global GHG emissions and open new markets. Additionally, the Czech Republic itself as a host country for JI projects could benefit from the mechanism.

A representative of an NGO pointed out, that new technologies would be needed to achieve the emission reduction targets of 2050. To provide a stable basis for this, industry would need a long-term perspective for planning. For reaching the reduction targets, a broad market transformation would be necessary. This would be more relevant on the global level than on EU level only – production would move to other parts of the world, where energy intensive and labour intensive production would take place. The EU should face these trends and find resolutions and answers. A **global framework for GHG reductions**, integrating all the parties and unifying the policies of all countries that would lead to GHG reductions on a global level, would be desirable. Kyoto mechanisms would have a great potential that is not used to the maximum and therefore could be further exploited.

A quick agreement about the **climate policy beyond 2012** would be important. But it would be very optimistic to think that this answer would be found in the period 2008-2012. A quick agreement would lead to further economic development worldwide. Basically the efforts made by the EU would be good and should be more enforced by individual steps. Individual support for ongoing processes would be needed.

### 3.3.3 Energy

A representative of a big **energy company** claimed that it did not receive enough allowances for a business as usual energy generation. Therefore, they would have had

to adapt to the situation, like switching fuels, switching power plants or not generating from the dirtiest sources. However, all in all, the allocation was sufficient. A representative of a **district heating company** said, that the opportunity of the energy industry would be, that if companies would not have enough allowances, they would have the possibility to insert the costs into their prices, so that it would not make any economic difference.

Suitable measures for reducing emissions, according to a representative of a **big energy company**, would be investments, organisational measures and conversion of the production process. However, as investment resources would be limited, until 2012 there would be no investments just for the reason of reducing CO<sub>2</sub> emissions.

### 3.3.4 Energy-intensive industry

All interviewees from industry sectors covered by the EU ETS were content with the received amount of allowances. For giving an impression on the number of over-allocation on the company level, for example a big company of the **steel sector** in 2005 was allocated with allowances of about 1 Mt CO<sub>2</sub> more than actually needed.

However, sectors like the **cement industry** were concerned, that in future, especially beyond 2010 the EU ETS would place a burden on the sector. The building sector in the Czech Republic would be rapidly growing (about 6% a year) and this would have great influence on the cement industry. Therefore, the need for allowances in the cement sector would be growing. They would either have to buy allowances or import cement. As the cement industry has a direct impact on the generation of CO<sub>2</sub> (production of 1 tonne of cement leads to about 0.77 tCO<sub>2</sub>), the amount of emissions could only be changed by decreasing production or by supplying cement of lower quality. Another option would be to change fuel use from heavy oil and gas to stone coal and waste. So far, these energy sources would be too expensive.

A representative of an **industry association** did not believe in the trading system, as it would not improve the environmental situation in the country. Of course the association would agree that climate change is an important issue and that things would have to change, but they would have to change in the whole world, not only in the EU. The risk would be that some processes and products in the EU would become too expensive due to environmental legislation, and that as a consequence the production would move somewhere else, probably eastwards. Some Czech industry branches would already be under high pressure, for example from Belarus, as they would not have strict environmental laws.

### 3.3.5 Transport

For a representative of the **aviation sector**, one suitable measure for reducing emissions in this branch would be a **development in manufacturing**, for example an improvement in airplane design, in engines, etc. However, such developments would need time, and not every year new planes would be bought. Additionally, **technical**

**breakthroughs** were not expected before 2012. Other technical measures would also be suitable – not at the airplanes, but for example **energy efficiency measures** in the administration buildings.

Another possibility for reducing CO<sub>2</sub> emissions in the aviation sector would be through an **improved navigation**; this could lead to fuel savings of up to 10%. The problem associated with this option would be a lack of coordination in handling the navigation in the EU, as too many different authorities have responsibilities on this issue. However, the aviation sector would set hopes into the **Single European Sky** initiative, a European framework for aviation.

### 3.3.6 Construction and Building Sector

For the Czech Republic, interviewees pointed out, that in the **building sector** many chances for emission reductions would be available, one interviewee spoke about up to 15%. The potential was seen in the change of building material, heat consumption and energy efficiency.

### 3.3.7 Trade Unions

Most Czech **companies and associations** were not totally against the EU ETS, however they were not comfortable with every detail. The opinion of Czech **trade unions** showed a different picture. They claimed to be strong supporters of the European Union in itself, but they would be totally **against the Emissions Trading Scheme**. They would see the ETS as contra productive and as a threat. They did not think that this policy would lead to a reduction of CO<sub>2</sub> emissions, but to high windfall profits for the state. The Czech Republic would be confronted with strong competition from the East and if only the Czech Republic / the EU would have to pay the costs for climate protection, that would be inequitable. Table 9 shows a summary of the average of answers of representatives from **companies and trade unions**.

Table 9: Summary of the average of answers for suitable measures for reducing emissions (business)

Measures for reducing emissions	until 2012	until 2020/2030	until 2050
<i>Emissions target, set by the council of European ministers (2005)</i>	- 8 %	- 30 % (until 2020)	- 60 to - 80 %
aa) Investments in technical measures for energy efficiency	2	2	2
ab) organisational measures to improve energy efficiency	2	2	2
b) Conversion of the production process (products and processes) With carbon capture and storage?	2	2	3
c) Closing or reducing of capacities and/or production sites	1	2	2
d) important technological breakthrough	2	2	2
e) instruments of the Kyoto protocol Purchase of emissions certificates on the European CO <sub>2</sub> -market CDM, JI Projects	2	2	1
f) other measures (please elaborate)			

Source: Interviews carried out by the authors.

1 = no impact, 2 = little impact, 3 = high impact

It can be seen, that in most cases, measures were expected to have only **little impact** on reducing emissions. The only measure labelled with “3” as having high impact, was a **conversion of the production process and carbon capture in storage** in the long term.



## 4 Impact of mitigation policies and measures on economic activity and employment

### 4.1 General developments in the Czech economy

The **Czech Republic** was established on January 1st, 1993 following the splitting of the Czech and Slovak Federative Republic. Czech **population** accounts to 10.2 million, placed 14th in Europe in terms of population. The Czech republic is a quite **densely populated** country with 129 inhabitants per km<sup>2</sup>.

Table 10 gives an overview of the basic economic indicators of the Czech Republic.

Table 10: Basic economic indicators in the Czech Republic

	2004	2005	2006 <sup>(x)</sup>
<b>GDP (growth in %)</b>	4.7	4.9	4.5
<b>GDP's share as compared with EU (EU 15 = 100, in %)</b>	65	67	69
<b>Industrial production (%)</b>	9.9	5.8	5.0
<b>Prices of industrial products (%)</b>	5.7	3.1	1.0
<b>Net inflation (%)</b>	2.8	1.9	2.6
<b>Unemployment rate (%)</b>	8.3	7.9	7.6

Source: Ministry of Industry and Trade 2006

Note: <sup>(x)</sup> Forecast

The **Gross Domestic Product** (GDP) per capita in purchasing power parity in 2004 was 70,1 (EU-25 = 100) (Czech Statistical Office 2005). In the 4<sup>th</sup> National Communication it is stated, that future GDP is going to show a **decrease in the contribution of industry** and agriculture and will show an **increase in the sector of services**. It is also expected, that GDP growth would be faster and that this would result in a **higher rate of industry restructuring**, greater inflow of foreign investments, connected with a boom in the **construction industry**, and faster developments in the sector of services. It is expected, that the structure of creation of GDP is going to show a **decline of energy production** and **energy-intensive sectors** like metallurgy (Table 11). Especially the machine industry is expected to have a higher share in GDP in future.

Table 11: Structure of creation of GDP in industry (%)

	2000	2005	2010	2015	2020	2025	2030
Energy production	15.11	12.86	12.63	12.39	12.14	11.90	11.80
Chemistry	7.59	7.82	8.00	8.19	8.39	8.50	8.60
Light industry	11.33	11.31	11.37	11.44	11.51	11.60	11.70
Machine industry	25.22	28.45	29.21	29.98	30.80	31.20	31.60
Metallurgy	11.16	11.15	10.71	10.28	9.81	9.60	9.20
Mineral materials and construction	17.83	17.45	17.35	17.22	17.10	17.00	17.00

Source: 4th National Communication

Table 22 in the appendix shows a general **overview of employed persons per sector**. It can be seen, that employment in manufacturing declines, whereas employment in the service sectors increases. In the second quarter of 2006, employees in the **services sector** account to 56,0% of total employed persons; the share of employed persons in **industry** is 40,1% (Czech Statistical Office 2006).

For several years the unemployment rate in the Czech Republic balanced between 3-4%. Since 1999 it is higher and reaches 8-9%. The **unemployment rate** in the second quarter of 2006 was between 7.1 and 8.2%, depending on the methodology used (Czech Statistical Office 2006). It can be expected, that when the structural changes will have been completed in sufficient extent, the unemployment can again return to a low but qualitatively different level (Czech Statistical Office 2005a).

Czech **labour costs** are increasing at one of the fastest paces in the EU. In the second quarter of 2006, wages and other labour costs in the Czech Republic rose by more than 10% compared to the previous year (Eurostat 2006). **Wages** have been growing equally in almost all sectors; employees in industry, construction as well as in services benefit from the development.

The Czech Republic displays a **low inequality of income distribution** and shows the **lowest poverty rate** of all EU Member states. In 2003 only 8% of households in the Czech Republic lived below the poverty line, in the EU-25 as a whole, the average is 16% (ECFIN 2006).

According to the majority of interviewees, climate policy and measures would **not have any or only little impact on these tendencies of economic activity and employment** in the Czech Republic. This is due to the impression, that many interviewees did not feel that employment in their company/sector is being related to climate issues.

Since many climate mitigation policies and measures were only implemented in recent years, have no need to be very ambitious keeping in mind current emissions and the Kyoto reduction target, promising therefore only limited impacts, there are **no studies**

dealing directly with the connection of climate policy and employment available yet. Additionally, most ex-ante analyses of policies and measures did not implement forecasts about their impacts on employment. Therefore, the content of the following sub-chapters with some sector-specific impacts is mainly based on the opinions of interviewees.

## 4.2 Sector-specific impacts

### 4.2.1 Energy Sector

**Primary energy consumption per GDP** decreased due to GDP growth; however it is still too high, being in contradiction with the State Energy Policy, that seeks to reduce energy intensity of the economy and to increase the share of renewable energy sources. There is a lack of adequate economic instruments motivating energy consumers to save energy and to optimise energy consumption.

The **Czech electricity market** is dominated by state-owned CEZ, with an installed power capacity in 2005 of 12,153.04 MW; total installed power capacity in the Czech Republic accounts to 17,412.20 MW (Energy Regulatory Office 2005).

The **development of employment in the energy sector** shows a deep decline in the number of employees in nearly all energy branches (Table 12). A **further decrease** may be expected as:

- The volume of brown coal and lignite extraction will further decrease,
- The even higher decrease will be for black coal extraction,

which will consequently result in a decreasing number of employed people in the power production sector.

Partly due to **measures of the Czech Energy Policy** established in 2000 a considerable fall in employment in the energy sectors could be observed. The number of about 150,000 employees in 1990 dropped to 61,000 employees in 2002 (with the largest drop being in the coal sector, from 106,000 to about 35,000). This decrease was partly **caused by the transfer of supporting activities to other sectors** (Ministry of Industry and Trade 2004).

In the second quarter of 2006, employees in **electricity, gas and water supply** accounted to 75,000 or **1.6%** of total employment (Czech Statistical Office 2006). Despite a decline of employment in coal mining (in the second quarter of 2006: 55,600 employees in mining and quarrying = 1.2%, Czech Statistical Office 2006), **brown coal** has still the highest share in the **Czech energy mix**, followed by nuclear power (Table 13). **Renewable energy** plays a minor role in the energy mix. Only wind power had a small share of 21 GWh in 2005; solar and geothermal energy systems are not installed in the Czech Republic.

Table 12: The development of the number of employed people in major Czech energy sectors

Sector/year	1990	1995	1996	1997	1998	1999	2000	2001
Brown coal and lignite mining	38,616	27,197	23,807	22,446	20,666	18,654	16,397	15,421
Black coal mining	68,032	39,451	38,879	36,252	33,288	28,269	25,417	24,888
Power production (only state-owned CEZ)	26,690	11,664	11,280	11,157	10,314	9,266	8,795	7,552
Electricity distribution	16,362	15,442	15,026	15,087	14,608	14,172	14,151	12,598
Gas industry	8,626	6,111	6,330	6,276	6,244	6,276	6,242	6,126

Source: Annual reports of concerning companies

Table 13: Total Gross Electricity Production

	2004	2005
	GWh	GWh
<b>Total Combustible Fuels</b>	55,422	54,760
<b>-thereof Gas and Gas Turbines</b>	2,612	2,623
<b>Hydro</b>	2,564	3,027
<b>Nuclear</b>	26,325	24,728
<b>Wind</b>	10	21
<b>Solar</b>	0	0
<b>Geothermal</b>	0	0
<b>Other</b>	14	43
<b>Total</b>	<b>84,335</b>	<b>82,579</b>

Source: Ministry of Industry of Trade 2006

If there would be a positive impact on employment, **government representatives, energy industry, energy-intensive industry and NGOs** expected, that it would occur in the renewable energy sector. A more intensive use of **biomass and energy crops** could influence employment positively. Planting energy crops could provide farmers, especially in regions with high unemployment, with a profitable option. As the production of renewable energy technology already exists, some Czech industries may be involved but only to a low share. The expected share of renewable sources under the State Energy Policy's green scenario of 16.9% in 2030, which would mean an increase of more than 10% from 2005 upwards, supports the suggestion of a rising number in employment in the renewable energy sector.

The **State Energy Policy** sets the basis for programmes solving the social consequences of employment reduction in the **coal and electricity sub-sectors**. That development is said to be analysed and conditions for solutions as part of measures and programmes for creating new jobs should be created. Preparation and implementation

of these measures should involve cooperation with the local self-administration bodies (Ministry of Industry and Trade 2004).

A representative from a **district heating company** claimed, that there would be no impact on employment, as their branch would not depend on emissions trading but on weather. But concerning the EU as a whole, mitigation measures would have an impact as energy costs would increase and therefore production would move eastwards.

According to a representative of a **big energy company**, the only measure that would influence employment substantially would be closing down a power plant. Regarding the restructuring in the energy sector in the last years and the corresponding decline in coal mining, such a development can be seen in the employment numbers of the energy industry.

**Trade Unions** representing energy branches were highly concerned of a possible negative impact of emission reductions on the employment of their member companies. They reasoned that their task would be to maintain employment and to raise salaries. They acknowledged that it could not be done at the expense of environment; however, the workers would not understand if trade unions would act on their expenses.

According to a representative of an **NGO**, climate change mitigation measures would have a positive impact concerning employment for services and industries dealing with **energy efficiency**, for **consulting** companies and for **trading** companies. The NGO representative expected further negative impacts on **coal mining**, what would be a burden, as the sector was already dealing with high unemployment rates. The decreasing numbers of employment in the energy sector and the increasing numbers of employment in the services sector support this assumption.

#### 4.2.2 Energy-intensive industry

In the Czech economy a **gradual change in industrial sectors**, with an increase in processing industry and a decrease in heavy industry, can be observed. Especially the mining industry faces a decrease in the extraction of black and brown coal and related reduction in production of briquettes, coke etc (4<sup>th</sup> National Communication).

The Czech **manufacturing industry** has a **significant share in creation of GDP**: in 2004 it was 27%. In total receipts of industry it shared 90.2% in 2004 (89.7% in 2003), (Ministry of Industry and Trade 2005).

Employment in the Czech manufacturing sector shows a steady decline (Table 14). Despite of the decline, **manufacturing** has the highest share of employment in Czech industry, with 1,363.4 thousand employees or 28.25% of total industry employment in the second quarter of 2006 (Czech Statistical Office 2006).

Table 14: Employment in the Czech Manufacturing sector (thousand persons)

	1995	1998	2000	2001	2002	2003	2004	2005
<b>Manufacturing</b>	1,421.6	1,340.8	1,281.5	1,310.4	1,318.2	1,294.3	1,274.2	1,296.1

Source: Czech Statistical Office 2006

A decrease of employment in heavy industry is related to an ongoing **restructuring process** that was agreed as part of the country's accession to the EU. This is especially apparent in **metallurgy**. Investments as well as other governmental subsidies and advantages were sharply reduced. Table 15 shows an overview of the development of the past years and shows also an outlook of the proposed development.

Table 15: Development in the number of employees in Czech metallurgy (thousand persons)

	1989	1992	1995	1998	2000	2001	2002	2005	2010
<b>Metallurgy</b>	136.6	104.7	77.1	58.4	43.5	30.6	29.8	26.6	23.7

Source: Gottvald, J. 2003

Three steel companies dominate 90% of the metallurgy sector of the Czech Republic. The biggest company in the **Czech steel sector** is Mittal Steel (Ministry of Finance has a share of 13%), followed by Vítkovice Steel, which is owned by Osinek whose only shareholder is the Ministry of Finance. Besides Mittal and Vítkovice, the industry is also led by the privately-owned Trinecké zelezárny.

As one interviewee of the **steel sector** pointed out, climate mitigation measures surely would have no positive impact on employment in the metallurgy sector, as they were forced to continually reduce the total number of employees.

Most interviewees agreed, that **further climate policy measures would lead to additional costs**. This would be shown for example in higher energy prices and it was feared, that some energy intensive industries would move eastwards and therefore would be forced to reduce or close down Czech production facilities.

Members of the **Czech Cement Association** are Ceskomoravsky cement (Heidelberg Group), Holcim, Lafarge Cement and Cement Hranice (part of the German Dyckerhoff concern). After a steady decline in production of cement from 1998 to 2002, the production started to rise, as can be seen in Table 16.

Table 16: Cement production of the Czech Cement Association

	2001	2002	2003	2004	2005
<b>Cement production (kt)</b>	3550	3217	3465	3709	3850

Source: Czech Cement Association <http://www.svcement.cz/data2005.html>

In contrast to the recent positive development in cement production numbers, the number of employees declines (Table 17).

Table 17: Average number of direct employees

	2004	2005
<b>Manufacture of cement</b>	1,422	1,369

Source: Ministry of Industry and Trade 2006a

The interviewee of the **cement industry** did not expect climate policy going to have large influence on employment in this sector; however, it might lead to lower investment in plants.

Though the **aluminium industry** is represented in the Czech Republic, like Nematik or Hydro, production as well as emissions do not seem to be very high, as production numbers can not be found in statistics and in the 4<sup>th</sup> National Communication it is stated, that emissions from aluminium industry do not occur.

More detailed information or concrete data of the impact of climate mitigation measures on employment could not be presented by interviewees, and respective studies do not exist.

#### 4.2.3 Transport sector

The transport system in the Czech Republic is based on a **combination of railway and highway transport**. The density of the railway network is one of the highest in OECD countries. However, **railway transport and its infrastructure require modernisation**, which has already been started and partly completed.

The entry of the Czech Republic into the EU in 2004 has substantially influenced the transport sector, especially **road and air transport**. The performance of international airports increased year-on-year by one third in 2004, and the number of passengers grew by more than 2 million (Ministry of Transport 2004).

In 2004, employment in the transport sector had a share of about 6% of total employment in the Czech Republic. Since 1995 a decrease in employment in the transport sector can be seen in Table 16. While employment in **land and water transport decreased**, an **increase in air transport and especially in supporting and auxiliary transport activities** (including logistics and travel agencies) is shown.

Table 18: Average number of employees in thousand

	1995	2000	2001	2002	2003	2004 <sup>1)</sup>
<b>Total number of employees in the Czech Republic</b>	<b>3,239.3</b>	<b>3,222.3</b>	<b>3,217.0</b>	<b>3,184.6</b>	<b>3,225.3</b>	<b>3,198.9</b>
<b>Transport, storage, post and telecommunications</b>	288.2	264.8	263.8	263.1	264.8	258.4
<i>of which</i>						
<b>Land transport, transport via pipelines</b>	181.2	161.3	161.2	159.8	159.8	157.3
<b>Water transport</b>	3.3	1.3	1.0	0.8	0.6	0.4
<b>Air transport</b>	4.9	4.6	5.0	5.0	5.1	5.5
<b>Supporting and auxiliary transport activities</b>	19.3	27.9	28.5	28.3	32.1	31.3
<b>Transport total</b>	<b>208.7</b>	<b>195.1</b>	<b>195.7</b>	<b>193.9</b>	<b>197.6</b>	<b>194.5</b>

Source: Ministry of Transport, Transport Yearbook 2005

<sup>1)</sup> preliminary data

A representative of the **aviation** sector said, that any technical measures and investments for energy efficiency would depend on the payback period. If too much was invested, it might result in a drawback for economical activities. In general, he was of the opinion, that **mitigation measures would improve economic activity**, but the whole process would be too complex to go more into detail. Otherwise, if aviation would fall under the **EU ETS**, ticket prices would increase, and this in turn would lead to a decrease in the number of passengers.

Concerning **GDP**, the representative of an airline claimed, that there would be a close link between aviation and GDP: 1% increase in aviation would mean an increase of 6% in GDP (for example, faster connection between places). If there would be a burden placed on aviation – like the EU ETS or taxes, this in turn would mean placing also a burden on GDP.

The representative of the aviation sector also claimed, that it would be **difficult to assess the impact on employment** due to climate mitigation measures. He assumed that there would be only small changes, probably by replacing human workers with machines. Regarding the aviation sector, it could be assumed, that simpler airplanes would need less mechanics.

More detailed information or concrete data of the impact of climate mitigation measures on employment could not be presented by interviewees and respective studies do not exist.



#### 4.2.4 Building sector

The **construction industry** is one of the most **important economic branches** in the Czech Republic with about 7% of value added and about **9% of total employment**. Since 2000, a continuous growth of this sector can be seen (Ministry of Industry and Trade 2006b).

The **output of construction work increased** about 250% from 1994 to 2005. In the second quarter of 2006, the construction output at constant prices was up by 6.5% compared to the previous year. Also for the second quarter of 2006, following increases in construction can be seen:

- new construction, reconstruction and modernization +7.0 %
- repair and maintenance +7.6 %
- building +6.9 %
- civil engineering +7.2 %
- output abroad + 59.2 %

This development is mainly due to **low interest rates** and **continuing financial flows** from local budgets (Czech Statistical Office 2006a).

Table 19: Employment in the Czech Construction sector (thousand persons)

	1995	1998	2000	2001	2002	2003	2004	2005
<b>Construction</b>	455.4	472.0	439.0	427.7	425.2	438.7	435.6	458.5

Source: Czech Statistical Office 2006

Changes were influenced by progression, restructuring of enterprises and by the growth of productivity of labour (Ministry of Industry and Trade 2006b).

In the second quarter of 2006, construction enterprises with 20+ employees employed 162,587 persons (+0.6% compared to 2005), of which manual workers made up 104,421 persons (-1.8%) (Czech Statistical Office 2006a).

While there was an **increase of revenues and profit** in 2005 in the sector of **building materials**, the trend of a **decreasing number of employees** continued in 2005. An exemption is only „manufacturing of concrete, plaster, lime or cement elements“, where employment increases of 5.7% compared to 2004 (Ministry of Industry and Trade 2006b). Table 21 in the appendix shows the average number of direct employees in the building materials sector.

Most interviewees stated, that there would be a high potential for **energy efficiency measures** in the building sector. More detailed information or concrete data of the impact of climate mitigation measures on employment could not be presented by interviewees and respective studies do not exist.

## 5 Social transition

The Czech Republic by taking part in the EU Emissions Trading Scheme can provide a **number of climate experts**, especially from politics, NGOs and large companies that are covered by the EU ETS. However, the climate issue is currently **not a major topic** in the Czech Republic. In particular, representatives of **trade unions** pointed out, that the climate issue has no influence in their work at all, as they have different issues and worries. They dealt with energy policy, but never touched the issue of climate policy.

As in all industry sectors no CO<sub>2</sub> reductions are required and in the majority of companies no reductions are planned, it was **difficult** for many representatives **to give a statement concerning the topic of internal communication or social transition**.

However, there are a few examples to be explicitly mentioned from companies or branches affected by the emission trading scheme:

- The **cement sector** said that a social dialogue has already started and a good communication with staff and trade unions exists. According to the representative, the cement sector needs highly qualified staff. The problem would be, that persons with a university degree usually would not want to work in cement plants, but it would be necessary to know the production. Therefore, training the existing staffs would be important. They also would have to know how to trade CO<sub>2</sub> and how to save emissions. This last aspect should also apply for other sectors.
- In the **energy sector** the awareness of the climate topic was also high. In one district heating company for example, an environmental management system is implemented and therefore personnel are trained well. It was stated, that such internal certificates help to raise awareness. Managers got trained on environmental issues and they in turn would train their own staff.
- A representative from a big **energy company** admitted, that there would not be an emission reduction strategy available yet; however, it was planned to set up a communication plan for power plants to train people in efficiency and climate issues. One of its main functions would be to improve the internal communication and to raise awareness.
- Several other representatives of different organisations claimed, that the **training of own staff** would be most important. Reasons ranged from difficulties to find qualified persons on the market to a necessity of an increased emphasis on research and development potential.

## 6 Conclusions

The main result of the interviews is, that in the Czech Republic there is still a **demand for information and education concerning the impacts of climate change** and climate protection measures. Despite numerous experts are to be found among NGOs, public authorities and the energy sector, especially trade unions and companies not involved in emissions trading still lack know-how.

**Security of energy supply** and the **independence from energy imports** is an important issue in the Czech Republic. Therefore existing and also possible new **nuclear power plants** are of high importance for some of the stakeholders, and in spite of all risks involved in the nuclear process chain. Except from **biomass**, stakeholders argue that the **energy and employment potential** for renewable energies in the Czech Republic would be only small.

A further result was a clear demand to **broaden the scope of the EU ETS** and to either include or to set targets for other non-European polluter countries. Another attempt was to set **strict boundaries for economic impacts** of climate change measures and to balance them equally for all EU member states, not only for those participating in the EU ETS. This would be necessary to avoid an increase of energy prices and a **shift of production eastwards**. However, in this context, it has to be clearly differentiated between **process-related emissions** where emission reduction potentials and their economics and impact on employment clearly differ from **energy-related emissions** within industry.

All in all, the common opinion was, that **climate mitigation measures would have no or only a small impact on employment** in the Czech Republic.

## 7 References

- 4<sup>th</sup> National Communication (2005): Fourth National Communication of the Czech Republic on the UN Framework Convention on Climate Change and Demonstrable Progress on Implementation of the Kyoto Protocol.
- CEZ Group (2006): Annual Report 2005. Available at [http://www.cez.cz/presentation/eng/instance\\_view.jsp?instance\\_id=90985&folder\\_id=9307](http://www.cez.cz/presentation/eng/instance_view.jsp?instance_id=90985&folder_id=9307)
- Commission of the European Communities (2005): Commission Decision of 12/IV/2005 concerning the national allocation of greenhouse gas emission allowances notified by the Czech Republic in accordance with Directive 2003/87/EC of the European Parliament and of the Council. Brussels, 12 April 2005. COM(2005) 1083 final.
- Czech Republic (2004): National Allocation Plan of the Czech Republic. 2005 to 2007. Compromise Draft of the Deputy Prime Minister for Economy, MZP and MPO.
- Czech Republic (2004b): Strategy for Sustainable Development. Prague, November 2004. Available at [http://www.vlada.cz/assets/en/rvk/RUR/final\\_sds\\_cr\\_-\\_eng\\_2.pdf](http://www.vlada.cz/assets/en/rvk/RUR/final_sds_cr_-_eng_2.pdf)
- Czech Statistical Office (2005): Statistical Yearbook Czech Republic, 2005.
- Czech Statistical Office (2005a): Long-Term Development of Unemployment and GDP with a special focus on part-time jobs. Available at <http://www.czso.cz/eng/csu.nsf/informace/akra05111505.doc>
- Czech Statistical Office (2006): Employment, Unemployment. Available at [http://www.czso.cz/eng/redakce.nsf/i/employment\\_unemployment\\_ekon](http://www.czso.cz/eng/redakce.nsf/i/employment_unemployment_ekon)
- Czech Statistical Office (2006a): Construction in the second quarter of 2006. 2006/08/14. Available at <http://www.czso.cz/eng/csu.nsf/informace/asta081006analyza06.doc>
- Energy Regulatory Office (2005): Annual Data Summary of Electric Power System in the Czech Republic. Installed power capacity in CR. Available at [http://www.eru.cz/rz\\_05/annual/index.htm](http://www.eru.cz/rz_05/annual/index.htm)
- European Commission's Directorate-General for Economic and Financial Affairs (2006): ECFIN Country Focus. Social cohesion in the Czech Republic: a blessing or a trap. By Marek Mora. Volume III, Issue 10, 08.09.2006.
- Eurostat (2006): Euro area labour cost up by 2.4%. Euro-Indicators. News release. 120/2006 – 14 September 2006.
- Gottvald, Jaromír (2003): Industrial Restructuring: The Case of Ostrava Region. Regional Forum "Social Aspects and Financing of Industrial Restructuring". International Labour Organisation, United Nations Economic Commission for Europe. 26 and 27 November 2003, Moscow, Russian Federation. Topic 6. Regional dimension of industrial restructuring.
- International Energy Agency (2005): Energy Policies of IEA Countries – Czech Republic – 2005 Review.
- International Energy Agency (2005a): CO2 Emissions from Fuel Combustion. 2005 Edition, II.181. Paris.
- Ministry of the Environment (2004): National Program to abate the climate change impacts in the Czech Republic.

Ministry of the Environment of the Czech Republic and Czech Hydrometeorological Institute (2006): 2006 Annex I Party GHG Inventory Submissions. Common Reporting Format. Available at [http://unfccc.int/national\\_reports/annex\\_i\\_ghg\\_inventories/national\\_inventories\\_submissions/items/3734.php](http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/3734.php)

Ministry of Industry and Trade (2004): State Energy Policy of the Czech Republic. Approved by Government Decision No. 211 or March 10, 2004.

Ministry of Industry and Trade (2005): Panorama of the Czech Industry 2004.

Ministry of Industry and Trade (2006): VII. Progress report on the implementation of the "Czech Steel Sector Restructuring Programme" for the European Commission.

Ministry of Industry and Trade (2006a): Energy Statistics. Available at <http://www.mpo.cz/en/energy-and-raw-materials/statistics/>

Ministry of Industry and Trade (2006b): Czech Construction Industry 2006. Available at <http://www.mpo.cz/dokument16968.html>

Ministry of Transport (2004): Transport Yearbook 2004. Available at <http://www.sydos.cz/en/yearbooks.htm>

Ministry of Transport (2005): Transport Policy of the Czech Republic for 2005-2013. Available at <http://www.mdcr.cz/en/Strategy/>

OECD (2004): Economic Survey of the Czech Republic. Chapter 7, Environmental Issues for Sustainable Development.

Transport Research Centre (2006): Study on Transport Trends from environmental viewpoints in the Czech Republic 2005. Available at [http://www.cdv.cz/text/szp/studie\\_mzp/studie\\_mzp\\_2006.pdf](http://www.cdv.cz/text/szp/studie_mzp/studie_mzp_2006.pdf)

UNFCCC: Greenhouse Gas Inventory. Available at <http://ghg.unfccc.int/index.html>

## **Appendix**

Table 20: Overview of companies, organisations and authorities contacted

Sector	Number of companies/organisations/authorities contacted	Number of interviews conducted	Number of written replies	No answers / rejection	Reasons for rejection
Public Authorities	4	2	0	2	(a)
Trade Unions	4	2	0	2	(b)
Employers Organisations	4	1	0	3	(a) (c) (e)
Environmental NGO	3	2	0	1	(c)
Steel Companies	4	1	0	3	(e)
Aluminium Companies	1	0	0	1	(b)
Cement / Building Materials Companies	4	1	0	3	(e)
Electric Equipment	4	2	0	2	(e) (f)
Building, Construction & Refurbishment	2	0	0	2	(a) (g)
Power	6	2	0	4	(a) (g)
Oil/Gas	9	0	1	8	(a) (e) (g)
Transport	7	1	0	6	(b) (e) (g)
Hydrogen	1	0	0	1	(e)
Others	4	0	0	4	(b) (g) (e)
<b>TOTAL</b>	<b>57</b>	<b>14</b>	<b>1</b>	<b>42</b>	<b>-</b>

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 too small; (g) Cannot answer the questionnaire

Table 21: Summary of measures affecting CO<sub>2</sub> emissions with expected benefits

Name of measure	State of the measure	Expected benefit (tCO <sub>2</sub> eq)	
		2005	2010
Act of Protection of the air	implemented	n/a	n/a
Energy Act	implemented	n/a	n/a
Act on Energy Management	implemented	n/a	n/a
Implementation of the Directive on the energy performance of buildings	prepared	10	230
State Program to Promote Energy Savings and the Use of Renewable Sources of Energy, Part A – Czech Energy Agency Programs	Implemented	147	200
State Program to Promote Energy Savings and the Use of Renewable Sources of Energy, Part B – SEF Programs	implemented	128	99
Support of the State Environmental Fund of the Czech Republic in air protection	program	1000	1000
GEF Efficient lighting initiative	implemented	425	425
Program to Support Reconstruction and Restoration of Panel Buildings	program	n/a	n/a
Preferential purchase tariffs for electricity produced from renewable sources	prepared	1057	985
Environmental tax reform	prepared	0	900
Implementation of the Directive on cogeneration	Implemented	n/a	n/a
Set of measures in the transport sector	Implemented	2797	3917
The Act on Integrated Prevention	implemented	n/a	n/a
National Allocation Plan	commencing	n/a	n/a
Industry and business operational program	prepared	0	2130
Support for afforestation of unused agricultural areas	implemented	84	84
Implementation of the Directive on biofuels	implemented	60	997
Use of landfill gas and biogas from waste water treatment plants	implemented	n/a	n/a
Act on packaging and Act on wastes	implemented	n/a	n/a
AIJ project – Skoda Mladá Boleslav	implemented	272	272
AIJ project Hostytín	implemented	49	49



---

Jl project – BTG Group	implemented	263	244
Jl projects in the framework of PCF	implemented	0	1300
Portfolio of projects	prepared	30	70

Source: 4<sup>th</sup> National Communication

Table 22: Employed persons by industry (thous.)

	1995	2000	2001	2002	2003	2004	2005
<b>Total</b>	<b>4,962.6</b>	<b>4,731.6</b>	<b>4,727.7</b>	<b>4,764.9</b>	<b>4,733.2</b>	<b>4,706.6</b>	<b>4,764.0</b>
<b>Agriculture, hunting and related service activities</b>	264.1	190	177.8	184.2	172.1	162.9	150.7
<b>Forestry, fishing and related service activities</b>	61.6	50.5	47.4	43.7	41.1	39.4	38.7
<b>Mining and quarrying</b>	97.3	70.4	67.1	61.1	53.3	58.6	49.3
<b>Manufacturing</b>	1,421.6	1,281.5	1,310.4	1,318.2	1,294.3	1,274.2	1,296.1
<b>Electricity, gas and water supply</b>	102.0	77.5	87.3	83.8	77.1	76.2	76.6
<b>Construction</b>	455.4	439.0	427.7	425.2	438.7	435.6	458.5
<b>Trade, rep. of mot. Vehicles, pers. and househ. goods</b>	618.6	612.9	604.9	619.8	627.8	630.9	614.8
<b>Hotels and restaurants</b>	153.9	156.3	158.7	170.5	170.7	174.8	181.7
<b>Transport, storage and communication</b>	381.8	373.2	362.6	367.6	358.8	364.0	359.7
<b>Financial intermediation</b>	91.5	99.6	101.4	95.2	96.3	93.6	96.5
<b>Real estate, renting and business activities</b>	245.4	266.0	256.0	269.1	284.9	281.5	288.3
<b>Publ. administration, defence, compul. soc. security</b>	302.3	342.9	339.3	325.7	331.9	322.5	333.2
<b>Education</b>	309.2	298.9	300.0	309.1	287.8	279.0	296.6
<b>Health and social work</b>	283.0	290.7	304.3	304.2	306.9	323.6	328.1
<b>Other community, social and personal services</b>	170.4	175.8	178.2	179.4	185.1	184.4	189.8

Source: Czech Statistical Office, 2006

Table 23: Average number of direct employees

	<b>2004</b>	<b>2005</b>
<b>Quarrying and preparation of stone</b>	/	/
<b>Quarrying and preparation of aggregates, sands, gravel sands, kaolin, clays</b>	3,032	2,499
<b>Manufacture of refractories</b>	2,276	2,064
<b>Manufacture of ceramic floor or wall tiles</b>	/	/
<b>Manufacture of burnt bricks, roofing, tiles, etc.</b>	1,999	1,746
<b>Manufacture of cement, lime or plaster</b>	2,034	1,975
<b>- of which cement</b>	1,422	1,369
<b>Manufacture of concrete, plaster, lime or cement elements</b>	8,313	8,785
<b>Manufacture of other non-metal mineral products</b>	3,203	3,087
<b>Total</b>	<b>24,299</b>	<b>24,008</b>

Source: Industry of Ministry and Trade 2006b

Table 24: Overview of interview partners

Stakeholder group	Institution	Name of interviewee	Date
<b>Public Authorities</b>	Ministry of the Environment of the Czech Republic	Mr. Tomáš Chmelík, Director Department of Climate Change	2006-06-21
	Ministry of Industry and Trade	Mr. Ladislav Pazdera, Director Department Eco-energy	2006-06-19
<b>Trade Unions</b>	Czech Union of Mine, Geology and Oil Industry Workers	Mr. Vlastimil Altner B. Soc., Secretary, health and safety supervisor	2006-08-17
		Mr. Jan Sáběl B. Soc., President	
	Trade Union Echo	Mr. Jirí Kubíček, Vice-President	2006-06-20
<b>Employers' Organisations</b>	Czech Cement Association / Research Institute of Binding Materials	Mr. Ing. Jan Gemrich, Executive Director of Association / Managing Director	2006-08-15
	Confederation of Industry	Mr. Josef Zboril, Member of European Economic and Social Committee	2006-08-14
<b>Environmental NGOs</b>	Centre for Transport and Energy	Ms. Klara Sutlovicova, Co-ordinator of the Climate Protection Programme	2006-08-16
	SEVEEn, The Energy Efficiency Center	Mr. Tomáš Vorisek, Consultant	2006-06-20
<b>Steel</b>	Mittal Steel Ostrava a.s.	Mr. Ing. Petr Baranek, TO – Environmental Protection	2006-10-11
<b>Power</b>	Pražská Teplárenská	Mr. Ing. Ludvík Baleka, Head of Environmental Department	2006-08-17
		Ms. Ing. Marika Morávková, Manager EMS	
		Ms. Ing. Markéta Palečková, Manager CO <sub>2</sub> emission trading	
	CEZ	Mr. Martin Cmíral, Environmental Manager	2006-08-16

## Country Report Czech Republic

<b>Gas, Oil</b>	PARAMO, a.s.	Ms. Ing. Eva Lastovicková, Manager CO2 emission trading	2006-09-26
<b>Transport</b>	CSA - České Aerolinie	Mr. Jan Koubsky, Environmental Manager	2006-08-17
<b>Electrical Equipment</b>	Astris s.r.o.	Mr. Radek Kotoucek, General Manager	2006-10-10
	Halla	Mr. Ing. Tomáš Sousedík, Commercial Director	2006-08-16