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BRIEFING
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THE ENVIRONMENTAL SITUATION
IN THE CZECH REPUBLIC

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Executive Summary

The environment chapter is one of the most difficult and financially costly aspects of the adoption of the *acquis communautaire* in connection with the Czech Republic’s accession to the European Union.

The purpose of this briefing is to describe the environmental requirements to be met by the Czech Republic. The opportunities and risks involved in adopting European environmental standards are illustrated. What successes have been achieved in recent years, and in which areas is action still needed? In this context, the briefing considers individual environmental aspects and the general situation regarding environmental policy within the Czech Republic.

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1. INTRODUCTION

The Czech Republic picked up a poisoned chalice when it inherited the environmental legacy left to the former Czechoslovakia by the socialist planned economy. The country's centrally administered industry, geared solely to fulfilling the plan, had no concept of the need for industrial activity that was efficient in its use of energy and economical in its use of resources. As a result of that policy, Czechoslovakia became one of the world's most prolific emitters of pollutants and greenhouse gases.

Over twelve years have now passed since the 'Velvet Revolution', and the Czech Republic is preparing to join the European Union.

The environment chapter is one of the most difficult associated with the adoption of the *acquis communautaire*.

This study examines both the improvements that have been achieved in the field of the environment and those areas where action is still necessary. It also considers the institutional conditions existing at both national and European level. Chapter 2 describes how environmental problems have changed within the territory of the present Czech Republic, and also examines changes in environmental policy and the role of the various environmental institutions.

Chapter 3 outlines the area of influence of the *acquis* as far as environmental policy is concerned and the progress made with transposing European regulations.

As the energy generation industry is primarily responsible for most of the emissions, we also consider the advances achieved and improvements still required in that sector.

The former Czechoslovakia was the world's largest emitter of carbon dioxide. That fact, together with the ever-increasing public debate on the anthropogenic greenhouse effect and the need to reduce greenhouse gases, justifies detailed consideration of the potential effects of adopting European Union regulations relevant to greenhouse gases.

The fourth chapter is devoted to an actual study of the environmental situation in the Czech Republic; trends over recent years are broken down by individual sectors.

The section on energy is a particularly important one in view of the significance of that sector for the environmental situation, as already stated.

The report concludes with a chapter on environmental investment and taxation in the Czech Republic.

2. THE APPROACH TO ENVIRONMENTAL PROBLEMS IN THE CZECH REPUBLIC

2.1 Background and development of the environmental situation in the Czech Republic

The territory of the present Czech Republic has been highly industrialised ever since the Industrial Revolution. Although what was then the Republic of Czechoslovakia was one of Europe's most highly developed states in 1938, economic growth there was no more associated with environmental pollution than it was in other comparable countries.

During the period from 1939 to 1945, production factors and fossil fuels were depleted with no thought of the effects on the environment or the economy. From 1945 onwards, the CSSR endeavoured to reduce the economic differences existing between the regions of Bohemia, Moravia, Silesia and Slovakia; these efforts included, in particular, the intensive industrialisation of Slovakia. The main focus was on the development of heavy industry and the chemical industry, with their intensive use of raw materials and energy. By contrast, the consumer goods industry, which had been highly developed before the Second World War, was neglected and became increasingly obsolete¹.

A policy of concentrating industry in the vicinity of lignite-mining areas was pursued, which favoured the creation of 'hot spots'. Between 1945 and 1988, the mining of coal and uranium² caused substantial damage to the environment, the consequences being particularly serious in north-western Bohemia, northern Moravia and Silesia.

The lignite-fired generation of electrical power and heat played a crucial part in atmospheric pollution.

Czech industry was one of the world's worst polluters of the environment. Every year, for example, it released 210 kg of SO₂ per head into the atmosphere, 12 times as much as the former West Germany.

The effects of environmental pollution were particularly severe in the 'hot spots' (in the Bohemian sector of the 'black triangle', northern Moravia and some urban areas such as the environs of Prague). The consequences were acid rain, forest dieback, poor-quality drinking water, environmental illnesses and deaths. In some areas, life expectancy was ten years less than in the EU³.

The collectivisation of agriculture resulted in inadequate production methods: monocultures, large-scale livestock farming, inappropriate use of industrial fertilisers, etc. The fact that it was geared to the less demanding markets of the socialist states gave Czechoslovakia's planned economy no incentive to use the best and most up-to-date technology.

Increasing dissatisfaction among the population with the deteriorating economic situation was further exacerbated – in the areas most severely affected by environmental pollution – by that pollution and its effects on human health⁴.

Environmental pollution in the Czech Republic declined sharply during the 1990s.

In the years 1990–2, this trend was primarily attributable to the decline in industrial production and other economic activities. The structural change that began during that period, and the economic recession, resulted in the closure of unproductive industrial production facilities that made intensive use of energy and raw materials.

Other ecologically favourable influences have been more significant since 1992. The continuing process of transformation, high levels of expenditure on environmental protection, the

¹ Ministerstvo pro místní rozvoj [Ministry for Regional Development], 'Národní rozvojový plán České republiky' (June 2001), p. 9.

² Uranium was exported principally to the USSR.

³ Christa Randzio-Plath and Bernhard Friedmann, *Unternehmen Osteuropa – eine Herausforderung für die Europäische Gemeinschaft; Zur Notwendigkeit einer EG-Ostpolitik* (Nomos-Verlagsgesellschaft, Baden Baden, 1994), p.179.

⁴ Ministerstvo pro místní rozvoj 2001, pp. 9 *et seq.*

implementation of the government's environmental policy and increasingly active efforts by local authorities and industry have made ever-increasing contributions to the reduction of environmental pollution.

The influence of the economic transformation on the environmental situation has taken the following forms: a reduction in fossil fuel production until 1995, followed by stabilisation; less intensive use of energy by industry; a reduction of the contribution made by fossil energy sources to primary energy generation; an increase in the proportion of total petrol consumption accounted for by unleaded fuel; an increase in the number of vehicles with built-in catalysts, as a proportion of all traffic; a reduction of emissions into air and water; and a reduction in the impact of agricultural production on the environment⁵.

'The Czech Republic is responsible for about 1% of world CO₂ emissions!'⁶. It should be borne in mind here, however, that the Czech Republic has already succeeded in reducing its CO₂ emissions substantially.

Despite the significant improvements, pollutant emissions in the Czech Republic are still among the highest in the OECD comparative survey.

Comparison of atmospheric pollutants in 2000

	Czech Republic	OECD average
SO ₂ emissions (kg/head)	68.0	39.2
(kg/1000 US\$ GDP)	5.3	2.0
NO _x emissions (kg/head)	41.1	41.1
(kg/1000 US\$ GDP)	3.2	2.1
CO ₂ emissions (tonnes/head)	11.7	10.9
(tonnes/1000 US\$ GDP)	0.93	0.52

Source: OECD, *OECD Environmental Data Compendium*, Annex I.A: Selected Environmental Data (1) (2001).

2.2. Czech environmental policy

Protection of the environment was of no political significance in the CSSR.

The 'Velvet Revolution' of 1989 laid the foundations for a genuine environmental policy. The early years were a period of euphoria, as members of the environmental and citizens' movements, formerly in opposition, took up important posts in significant (environmental) institutions.

The Ministry of the Environment took up its duties in 1990. In that same year, an ambitious environmental programme known as 'Rainbow' was adopted. The main emphasis was on combating the health effects of environmental pollution. The 'Rainbow' programme still dictates the legal framework of Czech environmental legislation today.

⁵ Ministerstvo životního prostředí [Ministry of the Environment], 3. Priciny zmen životního prostředí (Prague, 17 March 1999).

⁶ European Parliament, Directorate General for Research, Directorate A: Medium- and Long-Term Research, Division for Industry, Research, Energy and Environment, STOA, Maria Velkova: 'Environment and Energy: Challenges of Enlargement' (Luxembourg, 9 January 2001).

Following the break-up of the Federal Republic of Czechoslovakia at the end of 1992, the conservative government changed course. In the second environmental programme, known as the 'State Environmental Policy' and adopted in 1995, the state decided largely to withdraw from the field of environmental policy. No account was taken of the concept of sustainable development. Nevertheless, the aspect of climate protection was incorporated into the State Environmental Policy in 1994, and into the new energy policy in 2000⁷.

In the spring of 1999, under the new government led by the Social Democrats, the 'state environmental policy' was reviewed. The concept of sustainable development is now emphasised, as is the need to integrate environmental considerations into other areas of politics. Approximation to European environmental law has now become the priority⁸.

2.3 Czech environmental institutions

Although the institutional structures for implementing environmental protection have long existed, there is still room for further improvement in cooperation and coordination between the various authorities. Especially in the case of water conservation, but in other cases too, administrative capacity is impaired by the absence of any clear delineation of powers or by overlaps of jurisdiction⁹.

The **Ministry of the Environment** is responsible not only for the drafting of legislation but also for determining the conditions for the approval of large-scale emitters. It has nine regional departments overseeing the activities of the 72 district offices of the Ministry of the Interior. These district offices are responsible for certain environmentally relevant areas of town and country planning and for setting the emission levies for medium-sized emitters. Direct responsibility for environmental protection lies mainly with the local authorities.

In addition to the Ministry of the Environment, other ministries also have responsibilities in environmental matters. The **Ministry of Agriculture**, for example, is responsible for forestry and for undertakings established near rivers.

Town and country planning is the responsibility of the **Ministry for Regional Development**.

The **Ministry of Health** supervises the quality of drinking and bathing water.

The **Czech Environmental Inspectorate** is an authority answerable to the Ministry of the Environment and is responsible for implementing and monitoring environmental law¹⁰. It was founded in 1991 and has ten regional offices. As legislation was revised and the numbers of staff increased, the terms of reference of the Czech Environmental Inspectorate increased continuously, but have stabilised in recent years¹¹.

In general terms, the functions of the Czech Environmental Inspectorate can be said to be as follows:

⁷ OECD/IEA, *Energy Policies of IEA Countries, Czech Republic 2001 Review* (Paris, 2001), p. 45.

⁸ Ingmar von Homeyer, Stefani Bär, Alexander Carius and Szilvia Deim, *Umweltpolitik in Mittel- und Osteuropa, Analyse der EU-Osterweiterung* (Ecologic, Berlin, 2001), pp. 171 *et seq.*

⁹ Commission of the European Communities, 2001 Regular Report from the Commission on the Czech Republic's Progress towards Accession (Brussels, 13 November 2001), p. 96.

¹⁰ Ceska inspekce zivotniho prostredi, 'Uvod'.

¹¹ Ceska inspekce zivotniho prostredi, 'Charakteristika a trendy vyvoji cinnosti'.

- monitoring compliance with generally applicable law and the decisions of government authorities in the environmental sector;
- identifying environmental damage and those responsible;
- deciding upon action to eliminate any unsatisfactory situations identified;
- restriction or elimination of damaging types of behaviour by legal or natural persons;
- imposing fines for established violations of environmental obligations;
- determining obligations to be placed upon polluters and those responsible for wastes (emission thresholds, atmospheric pollution levies, waste storage, etc.);
- evaluation of ecological damage;
- approval of new plants and sites and authorisation to measure emissions and ambient air concentrations;
- confiscation of protected animals and plants unlawfully acquired.

In addition, the Czech Environmental Inspectorate produces opinions for other government institutions and is involved in the clear-up of incidents, especially those affecting water¹².

The Czech Environmental Inspectorate carries out between 12 000 and 14 000 reviews and inspections each year and issues approximately 10 000 legal decisions¹³.

In its 2001 Regular Report on the Czech Republic's Progress Towards Accession, the European Commission observed that the Environmental Inspectorate needed to do even more than it had in the past to strengthen its administrative capacities, though the Commission did give credit for the improvements already achieved. The present structure of fines is criticised: 'Obwohl die Zahl und die durchschnittliche Höhe der verhängten Geldstrafen gestiegen sind, sind die Geldstrafen weiterhin zu niedrig angesetzt, um eine starke abschreckende Wirkung zu entfalten'¹⁴.

The **Czech National Environmental Fund** was founded in 1991 to provide financial support for environmental protection and improvements in the environmental situation. It provides funding for environmental projects and non-profit organisations in this sector. The fund is financed from environmental levies¹⁵.

The Fund Bureau is the operational body, and the Fund Council evaluates the application of funds. Recommendations are used by the Ministry of the Environment as a basis for deciding on the allocation of funds. The Minister of the Environment has the ultimate power of decision on the allocation of financial resources.

The Czech National Environment Fund is responsible for water conservation, the prevention of air and atmospheric pollution, waste disposal, nature, countryside and soil conservation, and the technology and development of alternative energy sources¹⁶.

In the years 1992 to 2001, the Fund disbursed CZK 32 520 million; in 2001, the Environment Fund's expenditure totalled CZK 3 700 million¹⁷.

¹² Ceska inspekce zivotniho prostredi, 'Kompetence'.

¹³ Ceska inspekce zivotniho prostredi, '2.'

¹⁴ 'However, despite an increase in both the number and average value of fines levied, the value of fines continues to be too low to have a strong deterrent effect.', Commission of the European Communities 2001, p. 85.

¹⁵ Homeyer *et al.*, pp. 172 *et seq.*

¹⁶ Statni fond zivotniho prostredi [National Czech Environment Fund], 'Predstaveni SFZP CR'.

¹⁷ Statni fond zivotniho prostredi, 'Zakladni udaje o hospodareni SFZP CR'.

The **Czech Ecological Institute** is a government organisation which assists the Czech Ministry of the Environment with the application of environmental legislation¹⁸.

The Air Pollution Reduction Fund (for Areas Bordering Germany) provides financial assistance with the construction of industrial facilities that help to reduce pollutant emissions in the regions of the country bordering Germany. Funds are granted for the construction or conversion of heat-generating facilities, with a maximum useful output of 50 MW, that make use of alternative energy sources.

Applications may be made by legal persons and governmental institutions, provided that they are based in the Czech Republic and that the planned capital expenditure is intended for the border regions¹⁹.

3. THE CZECH REPUBLIC'S ACCESSION TO THE EU FROM THE STANDPOINT OF ENVIRONMENTAL POLICY

3.1 Preparations for EU accession

In December 1997 in Luxembourg, the Council of the European Union decided to open accession negotiations with the Czech Republic, and with Estonia, Slovenia, Hungary, Cyprus and Poland, in March 1998.

The first accession partnership between the EU and the Czech Republic came into being in March 1998 and has been updated on several occasions since. The present version derives from a proposal drafted by the Commission after consultation with the Czech Government, and is based on the analysis in the 2001 Regular Report by the Commission on the Czech Republic's Progress Towards Accession. The accession partnership forms the basis for the mechanism for assisting the candidate countries in their preparations for membership²⁰.

3.2 Implementation of the environmental policy 'Acquis'

3.2.1 The environmental policy 'Acquis'

The environmental policy *acquis* contains a wide spectrum of measures, primarily in the form of directives. EU legislation on the environment covers the safeguarding of quality standards, pollution, production processes, procedures, procedural law and the setting of product standards. In addition to horizontal legislation, such as that governing free access to information on the environment and measures to prevent climate change, quality standards are set for individual aspects of the environment such as air, water and waste management, nature conservation, monitoring of industrial pollution, chemicals and genetically modified organisms, noise, nuclear safety and radiation protection²¹.

3.2.2 General tasks of the candidate countries

The transposition of the environmental policy *acquis* into national legislation and its consistent application represent the main task confronting the candidate countries.

¹⁸ Cesky ekologicky ustav [Czech Ecological Institute], 'Zakladni informace'.

¹⁹ Delegation of the European Commission to the Czech Republic, 'Air Pollution Reduction Fund (for Areas Bordering Germany)'.

²⁰ European Commission, *Accession Partnership* (13 November 2001), pp. 1 and 4.

²¹ Commission of the European Communities, *Negotiations of the Chapter 22 – Environment* (April 2002).

A strong, well equipped administration is essential for the proper performance of these tasks. The following functions are regarded as priorities:

- transposing the Community framework legislation into national law;
- measures relating to international conventions to which the EU is a party;
- reduction of global and cross-border pollution;
- nature conservation, geared to the safeguarding of biodiversity;
- measures to ensure a functional internal market (e.g. product standards)²².

3.2.3 Status of adoption of the environmental policy acquis

According to the European Commission's report, the Czech Republic has made good progress with the adoption of the *acquis communautaire*²³.

According to the Decision of the Council of the European Union on the principles, intermediate objectives and conditions contained in the accession partnership with the Czech Republic, the following tasks in the field of environmental protection still require further attention:

- Implementation of the *acquis communautaire*, with particular emphasis on integrated pollution prevention and control, must be completed, together with amendments to legislation in the waste and water sectors that does not yet comply with the EC *acquis*.
- The *acquis communautaire* must be implemented completely, in particular as regards environmental impact assessment, water intended for human consumption, nitrates (designation of vulnerable zones, action plans) and dangerous substances (inventories, pollution reduction programmes), nature protection (list of sites of Community importance, special protected areas) and integrated pollution prevention control (institutions, integrated permits).
- Monitoring and enforcement capacity at national, regional and local level. Particular attention needs to be paid here to clear distribution of competencies (especially in the field of water protection²⁴), improving cooperation between responsible authorities, improving the availability of training and strengthening investment planning capacity.
- Efforts must be made to continue integration of environmental protection requirements into the definition and implementation of all sectoral policies with a view to promoting sustainable development²⁵.

In January, the Czech Government adopted an updated environmental policy. This policy complies with the Community's Sixth Environmental Action Plan and forms the basis for the National Strategy for Sustainable Development.

Since January 2002, environmental impact assessment has been required by law. As a result, with the exception of the new Community Directive on strategic environmental impact assessment, the *acquis* has been fully transposed²⁶.

3.2.4 Status of transposition of the energy policy acquis

In order to achieve compliance with the *acquis communautaire* in the energy sector, the Czech Republic still has to take the following steps:

- Preparations must be made for the internal energy market, notably through completion of alignment with the electricity and gas directives, the elimination of remaining price distortions, and the strengthening of the independence and resources of regulatory bodies.

²² Commission of the European Communities, 2002.

²³ Commission of the European Communities, 2001a, p. 94.

²⁴ Commission of the European Communities 2001a, p. 96.

²⁵ Council of the European Union, *Council Decision on the Principles, Intermediate Objectives and Conditions contained in the Accession Partnership with the Czech Republic* (2001).

²⁶ Commission of the European Communities 2001a, p. 83.

- Further steps must be taken to comply with oil stock requirements, which correspond to 90 days' domestic consumption.
- Improved energy efficiency, enhanced use of renewable energy sources and stronger institutions in this area.
- Implementation of the recommendations contained in the Council report on 'Nuclear Safety in the Context of Enlargement', with due regard to the priorities assigned in the report.
- Continued efforts to ensure a high level of nuclear safety at the Dukovany and Temelin Nuclear Power Plants²⁷.

The energy chapter of the EU accession negotiations has been concluded, subject to the condition that further improvements are made by the Czechs²⁸.

3.2.5 Potential effects of regulations on GHGs

„Die hier in den Blick genommene zukünftige Entwicklung der THG-Emissionen in den Kandidatenländern Mittel- und Osteuropas aufgrund des EU-Beitritts ist nicht nur für die Kandidatenländer von Bedeutung, die ihre Verpflichtungen gemäß dem Kioto-Protokoll erfüllen müssen, sondern auch für die Perspektiven der EU-Klimapolitik und die internationale klimapolitische Rolle der EU“²⁹.

As far as the EU is concerned, the reduction of GHGs in the future Member States may be significant as regards compliance with reduction targets and the setting of targets during future negotiating periods in connection with the Kyoto Protocol.

It is expected that the transposition of climate-relevant EU regulations will have the overall effect of reducing GHG emissions in the Czech Republic and also in the other candidate states of the Luxembourg group (Poland, Hungary, Slovenia and Estonia).

With regard to the estimated effect of the EU regulations on GHG emissions in the Czech Republic and the other candidate states, there is considerable uncertainty. What the level of emissions will actually be in 2010 depends not only on the general political conditions governing measures to affect the climate but also on the course of economic events³⁰.

Apart from the imponderables of economic development and the transposition of EU law, an additional problem is that it is virtually impossible to determine how economic, political and technological conditions would have changed without the influence of the enlargement process. If that were possible, a clearer answer might be obtained to the question of the effects of EU accession, but, unfortunately, the potential initial position cannot be determined, because inter-relationships between the EU and the Czech Republic have already moved a long way forward.

The transposition of EU law may have both positive and negative effects on emission of greenhouse gases in the candidate states.

²⁷ Council of the European Union, 2002.

²⁸ Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit [German Federal Ministry for the Environment, Nature Conservation and Reactor Safety], public debate on Temelin on 11 April in Passau (Berlin, 22 March 2002).

²⁹ 'The future trend considered here with regard to GHG emissions in the Candidate States of Central and Eastern Europe as a result of EU accession is significant not only for the Candidate States, who are required to comply with their obligations under the Kyoto Protocol, but also as regards the future prospects of EU climate policy and the EU's international role in climate policy.', Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit, Dr Sebastian Oberthür, Uwe Büsgen and Dennis Tänzler, *Abschätzung der Treibhausgas-Emissionen in den EU-Beitrittsstaaten zur Vorbereitung der Verhandlungen im Rahmen des Kioto-Protokolls* (Berlin, March 2001), p. 7.

³⁰ Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit March 2001, p. 99.

The ways in which the EU regulations are likely to take effect differ in two areas. First, the reduction potential available in the sector of energy generation and conversion is particularly high in the Czech Republic, because the liberalisation of the energy markets has not yet been completed.

Secondly, methane and N₂O emissions from agriculture have fallen sharply as a result of the economic revolution of the 1990s and are well below the EU average. The extension of the CAP to the accession states could result in increased use of nitrogen fertilisers and, as a consequence, an increase in N₂O emissions. It is possible that, unless corrective action is taken, the accession states could move closer to the Member States in this area³¹.

The majority of regulations are likely to have effects such as to reduce GHG emissions, although measures associated with the structural and cohesion funds and, as mentioned above, the CAP could increase GHG emissions.

The real changes in GHG emissions will be determined by economic growth and shrinkage effects. The accession of the Central and Eastern European States may be expected to produce a growth effect, increasing CO₂ emissions in the transport sector, for example.

The starting point for considering the potential effects of EU regulations relevant to GHGs is present legislation, but changes will be forthcoming in the near future in – at least – the following areas:

The ECSC Treaty expires in 2002, and there is uncertainty regarding the future treatment of coal subsidies.

The CAP is undergoing a constant process of changes, and will have to be reformed before the Central and Eastern European candidate states join the Union because of the relative importance of agriculture in their economies. In the Czech Republic, however, agriculture and fisheries account for 5.69%³² of economic activity, lower than the average for the 15 existing Member States.

³¹ Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit March 2001, p. 101.

³² Cesky statisticky urad.

4. ENVIRONMENTALLY RELEVANT AREAS

4.1 Air pollutants and emissions relevant to climate

From the early days of Czech environment policy, great attention has been paid to the reduction of pollutant emissions. Existing legislation was revised in 1997 to harmonise it with the EU regulations.

The energy sector and industry made great efforts in advance of the deadline set for the end of 1998, and invested large sums in filters, desulphurisation units and the replacement of lignite by natural gas.

Despite the significant fall in pollutant emissions from 1990 onwards – 55% by 1998³³ – the Czech Republic is still a significant emitter. Thus, although NO_x emissions fell by 43% between 1990 and 1999, the Czech Republic still emits 3.2 kg of NO_x per US\$ 1 000 of GDP each year, leaving it in second place in the OECD table (behind Australia, with 5.5 kg of NO_x per US\$ 1000 GDP)³⁴.

The pattern of nitrogen oxide emissions is shaped by two conflicting trends. On the one hand, emissions from thermal power stations and industry are falling as a result of the fitting of denitrification units. On the other hand, they are rising as a result of the increase in motorised transport. Overall, however, the downward trend is prevailing as far as NO_x emissions are concerned³⁵.

The specified thresholds of 80 micrograms/cubic metre, averaged over the year, were exceeded in 2000 only in two districts of Prague (98.8 and 87.5) and in Decin (85.5).

SO₂ emissions are falling steadily. In no locality covered by the monitoring programme did the SO₂ concentration exceed one quarter of the specified threshold of 60 micrograms/m³. The average concentration in 2000 was the lowest since 1991 at all measuring points³⁶.

The quantity of SO₂ emitted per km² in the Czech Republic (1999: 3.4 tonnes) has moved close to the EU average (3.3 tonnes). The ratio is less good if the SO₂ emissions are related to GDP or calculated on a per capita basis³⁷. With 5.3 kg per US\$ 1 000 of GDP, the Czech Republic still occupies a high place in the OECD survey.

Nevertheless, credit should be given for the fact that SO₂ emissions were reduced by 63% between 1990 and 1999³⁸.

Particle emissions were reduced by 86% between 1990 and 1999. The threshold for dust and dust-borne metals (60 micrograms/m³) was exceeded only in Prague (80.4) in 2000³⁹.

³³ OECD/IEA 2001, p. 51.

³⁴ OECD 2001 a.

³⁵ *Umweltschutz, Das Manager-Magazin für Ökologie und Wirtschaft*, 'Chancen gibt es wirklich weltweit' (July–August 2001), p. 2.

³⁶ Statni zdravotni ustav Praha, 'System monitorovani zdravotniho stavu obyvatelstva Ceske republiky ve vztahu k zivotnimu prostredi, Souhrnna zprava za rok 2000; Vysledky subsystemu 1: zdravotni dusledky a rizika zneclisteného ovduši' (Prague, July 2001).

³⁷ OECD/IEA 2001, p. 50.

³⁸ OECD 2001a.

³⁹ Statni zdravotni ustav (Prague, 2001).

Between 1990 and 1998, GHG emissions fell by over 21%. The highest proportion of GHG emissions is accounted for by CO₂, with almost 87%; the proportion of CH₄ is 7.5% and that of N₂O 5.7%⁴⁰.

In the OECD survey, the Czech Republic, with 0.85 tonnes per US\$ 1 000 GDP, still ranks second as a CO₂ emitter (behind Poland, whose CO₂ emissions amount to 1.0 tonne per US\$ 1 000 GDP). The OECD average is 0.5 tonne per US\$ 1 000 GDP.

The energy generation and conversion sector releases the most GHGs – especially CO₂ – which is attributable to the continuing high proportion of energy generation dependent on coal.

68% of CO₂ emissions result from the use of coal, compared with 17% for oil and 15% for gas⁴¹.

In the industrial processes and services sectors, GHG emissions fell significantly between 1990 and 1998.

The government's priority for CO₂ reduction is to increase energy efficiency, which also offers the greatest potential for reduction.

In view of the substantial advances made in reducing greenhouse gas emissions, the Czech Republic will be able to fulfil its international commitments under the Kyoto Protocol. Even so, efforts to avoid CO₂ emissions must be continued, and indeed increased in the transport sector⁴².

4.2 Transport

„Bei der Modernisierung des Verkehrs sollte man sich insbesondere auf eine Modernisierung des öffentlichen Verkehrs und einen Ausbau des Schienennetzes konzentrieren, anstatt neue Autobahnen zu schaffen“⁴³. However, a substantial increase in the volume of road traffic can be observed. This is attributable to the increase in private transport and the shift in freight transport from rail to road.

Thus, the number of motor vehicles increased by 45.5% between 1990 and 1999. The Czech Republic has 37 motor vehicles per 100 inhabitants, which is below⁴⁴ the OECD average of 51 motor vehicles per 100 inhabitants⁴⁵.

In recent years, however, quality improvements have been achieved in the transport sector. For example, in 1990, the proportion of total petrol sales accounted for by unleaded petrol was only 0.84%, but by 1997 it had already risen to 62.5%. The use of catalysts has also increased significantly: whereas 0.8% of motor vehicles were fitted with catalysts in 1990, the figure had risen to 20.6% by 1997⁴⁶.

⁴⁰ Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit 2001, p. 18.

⁴¹ OECD/IEA 2001, p. 45.

⁴² OECD/IEA 2001, p. 52.

⁴³ 'Investment in the transport sector will have to focus on modernising public transport and developing rail networks rather than building motorways.', Opinion of the Committee of the Regions on the 'Communication from the Commission to the Council, the European Parliament, the Economic and Social Committee, the Committee of the Regions and the candidate countries in central and eastern Europe on accession strategies for environment: meeting the challenge of enlargement with the candidate countries in central and eastern Europe' (22 February 1999).

⁴⁴ If the 1998 private car density in the 15 EU Member States is compared with that in the Czech Republic, the EU figure is higher, with 451 cars per 1000 inhabitants as compared with the Czech Republic's 339. Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit, Dr Sebastian Oberthür, Uwe Büsgen and Dennis Tänzler (2001), p. 59.

⁴⁵ OECD, *OECD Environmental Data Compendium*, Annex I.B: 'Selected economic data (1)' (2001).

⁴⁶ Ministerstvo zivotniho prostredi 1999.

The Act on the Conditions for Operation of Vehicles on Roads, which came into force in July 2001, transposed into national law EC legislation on the quality of petrol and diesel fuel⁴⁷.

The European Commission, when called upon to do so by the Council of Environment Ministers, set a target in 1995 for reducing by 2005 the average fuel consumption of new cars to 5 litres of petrol or 4.5 litres of diesel per 100 kilometres, representing an increase in efficiency of 30–40% by comparison with the mid-1990s.

The 1998 and 1999 voluntary agreements with car makers in Europe (ACEA), Japan (JAMA) and Korea (KAMA) are regarded as the most important instrument for achieving this target. They envisage a reduction in CO₂ emissions from new cars to 140 g of CO₂/km (equivalent to 6 litres of petrol or 5 litres of diesel per 100 km) by 2008 (ACEA) and 2009 (JAMA, KAMA) respectively⁴⁸.

There is no certainty as yet that the voluntary agreements with the car industry applicable in the EU will be extended to the accession States, but it is assumed that they will be adopted.

Any estimate of the effects of these agreements on the Czech Republic's GHG emissions is made more difficult by a number of imponderables.

Because of the relatively low vehicle density and the relatively low level of GHG emissions caused by transport (EU 20.5%, CR 7.5%)⁴⁹, the increase in the number of cars on the road and in GHG emissions caused by transport is expected to be higher in the Czech Republic, and in the other accession States, than in the EU.

The reductions in emissions achieved as a result of the voluntary agreement are very likely to be more than offset by growth effects, so that emissions in the transport sector will increase. Substantial contributions will be made to this both by the economic growth expected as a result of EU accession and by the infrastructural measures assisted by the EU. An additional factor is the longer service life of cars, as a result of which the voluntary agreements with the car industry will be slower to take effect than in the EU⁵⁰.

4.3 Waste management

The framework for waste management activity in the Czech Republic is Agenda 21 and European and national policies.

The EU's Environment Action Plan entitled 'Environment 2010: Our Future, Our Choice' is of fundamental importance at the strategic planning level. This document sets out the aims of avoiding waste, recycling it and using it for energy recovery. The target is to reduce the quantity of waste – based on waste levels in 2000 – by 20% by 2010 and by 50% by 2050. The Czech government has adopted these guidelines and is basing its action on them⁵¹.

⁴⁷ Commission of the European Communities 2001a, p. 83.

⁴⁸ Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit 2001, p. 58.

⁴⁹ Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit 2001, pp. 12–18.

⁵⁰ Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit 2001, pp. 59–62.

⁵¹ Ministerstvo životního prostředí, odbor odpadu, 'Koncepce odpadového hospodářství České republiky' (Prague, November 2001), p. 2.

The Waste Act, which came into force in January 2002, provides the legislative framework for the reform of the current waste management system. In addition, secondary legislation concerning the quotas for the recovery and recycling of packaging wastes has been adopted and an inventory of equipment containing PCBs/PCTs has been drawn up⁵².

In transposing the Community waste regulations into national law, the Czech Republic has obtained approval for a transitional period until the end of 2005 for implementing the Directive on the recovery of packaging waste⁵³. In accordance with the Czech government's implementation plan for environmental protection, the focus will be on the development of the waste separation system, improving the quality of sorting and developing the market for secondary raw materials.

The system for the take-back and recovery of packaging will cost approximately CZK 600 million per year. The development of the recovery facilities will cost CZK 2 billion, sorting installations CZK 300 million and the purchase of collection and transport containers CZK 1.8 billion⁵⁴.

In 2000, 43.6 million tonnes of waste were produced, representing an increase of 2.1 million tonnes over 1999. The increase in the quantity of waste was caused exclusively by industry, which in 2000 produced a total of 40.2 million tonnes. The total quantity of waste given included 2.6 million tonnes of hazardous wastes (0.2 million tonnes more than in 1999). Although the quantity of waste produced by the local authorities did not increase during that period, the quantity of hazardous wastes produced by them doubled from 13 000 to 27 000 tonnes⁵⁵.

Methane is released in the waste sector, and together with the other greenhouse gases contributes to the anthropogenic greenhouse effect.

Council Directive 1999/31/EC of 26 April 1999 on the landfill of wastes is the EU legislation with the greatest potential for influencing methane emissions in the waste sector. The accumulation and migration of landfill gas must be controlled at all landfills. Landfill gas from all landfills receiving biodegradable waste must be collected, treated and used. If the gas collected cannot be used to produce energy, it must be flared.

In the Czech Republic, methane emissions from the waste sector fell from 2.205 Gg CO₂ eq in 1990 to 2 058 Gg CO₂ eq in 1998, representing a reduction of 6.7%. The waste sector in the Czech Republic is responsible for 1.4% of GHG emissions; in the EU, the waste sector causes approximately 3% of all GHG emissions. One possible explanation for this difference is the reduced quantity of waste in the Czech Republic by comparison with the EU. Efforts to reduce the production of refuse and to use landfill gas have not been in force for long. In view of the waste policy, it must be assumed that a total of 80% of methane emissions from waste can be avoided by implementing the landfill directive (in the period 1990 to 2010).

It must be noted, however, that the data on methane emissions from waste, and the data on the quantity of waste produced, certainly cannot be regarded as reliable. Until 1998 there was no compulsory reporting on refuse quantities⁵⁶.

⁵² Commission of the European Communities 2001a, p. 94.

⁵³ *ENDS Environment Daily, Europe's environmental news service*, 'Three more EU accession deals struck', Issue 101 (1 June 2001).

⁵⁴ 'Implementacni plan pro oblast zivotniho prostredi' (2001); Podoblast I, 'Jaderna bezpecnost radiacni ochrana' (19 February 2002).

⁵⁵ Cesky statisticky urad, 'Odpady, 2002'.

⁵⁶ Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit 2001, pp. 68–72.

4.4 Water management

The planned economy, geared to achieving quantitative production targets, paid little attention to water management or to the consumption of energy and resources. Low prices meant that the population had little incentive to be economical in the use of water. This resulted in excessive depletion of natural reserves of water and inadequate waste water treatment. The restructuring of the economy significantly decreased water pollution⁵⁷.

Average water consumption before 1990 was approximately 500 litres per person per day (including industry)⁵⁸. Average per capita water consumption in 2001 fell by 5.7 litres compared with 2000 to 163.4 litres per day⁵⁹.

The fall in water consumption is primarily attributable to rising prices.

87.3% of the population are connected to the public water supply, and 93% have the possibility of connection. As far as water quality is concerned, the new Water Supply Act was adopted in July 2001, bringing Czech law into line with EC legislation.

Although there is still much room for further improvement of water quality, some successes must be recorded, such as the return of fish stocks to rivers that were formerly biologically dead⁶⁰.

In the view of the Czech Ministry for the Environment, the implementation of the European water directives will be the biggest task among the environmental investments, both as regards the many problems to be solved and as regards the financial capacities needed. The investment necessary to implement the EU directives on municipal waste waters and water for human consumption in the Czech Republic is estimated at from € 2 to 3.9 billion⁶¹.

‘Nevertheless, gaseous emissions and discharge of pollutants into the water supply declined dramatically in 1990–2000, with the annual number of environmental accidents to surface and ground water falling from 598 to 166 during this period’⁶².

Also significant is the government’s decision to declare the entire national territory of the Czech Republic a ‘sensitive area’⁶³. For example, the EU is supporting the development or construction of the water supply and waste water system in northern Moravia to the tune of € 9 million, which represents 60% of the costs of (re-)constructing the region’s infrastructure. With this assistance, the country will be able to comply with the EU directives on waste water treatment and the quality of water for human consumption.

Improving the water quality of the Bela, into which the effluents from the city of Praded are discharged, will produce a cross-border effect, because the catchment area of the Bela represents a reservoir of water for human consumption in the Polish border regions⁶⁴.

⁵⁷ Homeyer *et al.* 2001, p. 26.

⁵⁸ Vera Pieper, Rami Schmidt, Peggy Thode and Heinrich Wollny, *Die Umweltpolitik in den Transformationsstaaten Mitteleuropas* (Berlin, September 2000), p. 60.

⁵⁹ Czech News Agency, ‘Water losses km of Czech networks sink 50% since 1995’, 6 June 2002.

⁶⁰ Czech News Agency, ‘Salmon, other fish, returning to Czech waters’, 15 April 2002.

⁶¹ *Umweltschutz, Das Manager-Magazin für Ökologie und Wirtschaft* (2001), p. 3.

⁶² The Economist Intelligence Unit, ‘Country Profile Czech Republic, Resources and Infrastructure: Natural resources and the environment’ (10 June 2002).

⁶³ Commission of the European Communities 2001a, p. 83.

⁶⁴ Czech News Agency, ‘EU supports construction of water, sewage system in North Moravia’ (19 July 2002).

The Czech Republic has applied for and been granted a transitional period until 2010 for implementing the Urban Waste Water Treatment Directive⁶⁵.

4.5 Forestry and agriculture

The Czech forests suffered severely in the past as a result of the high concentration of atmospheric pollutants and the resulting problem of acid rain. The adverse effects on the environment were made worse by the fact that the forests were to a large extent spruce monocultures, which react sensitively to environmental influences⁶⁶.

Although the damage caused by acid rain has declined greatly in recent years as a result of the reduction of sulphur dioxide emissions, forest regeneration is a slower process. The danger exists that the affected areas of forest will be further damaged by future environmental influences⁶⁷.

The decline in agriculture is having a beneficial effect on the environmental situation. Livestock numbers fell during the period 1992–7, by 32.7% in the case of beef cattle and 13.1% in the case of pigs.

Average consumption of lime-containing fertilisers rose by 26.7% between 1992 and 1997, though consumption was only 11.6% of what it had been in 1989.

The use of pesticides in 1997 was no more than 44% of what it had been in 1990. In addition, more efficient pesticides are now being used, and these also exhibit greater environmental compatibility⁶⁸. In the period 1990 to 1998, methane emissions from agriculture fell by 40.7%⁶⁹.

4.6 Energy

4.6.1 Energy efficiency

The sector of energy generation and conversion bears a large share of responsibility for environmental problems: for example, 40% of CO₂ emissions are produced by the energy sector.

This can be attributed to the high proportion of energy generation based on coal (70%) and the fact that efficiency in the use of energy is still poor.

Although substantial improvements have been achieved in the field of energy use during recent years, the Czech Republic still consumes 1.6 times as much energy per unit of GDP as the EU average⁷⁰.

Energy intensity comparison: 1998

	Czech Republic	OECD average
Energy intensity (tonnes/US\$ 1 000 GDP)	0.32	0.22

⁶⁵ ENDS *Environment Daily*, Issue 1001 (2001).

⁶⁶ European Forest Institute, *Spruce Monocultures in Central Europe – Problems and Prospects* (Joensuu, 2000), p. 81.

⁶⁷ European Forest Institute 2000, p. 28.

⁶⁸ Ministerstvo životního prostředí 1999.

⁶⁹ Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit 2001, p. 18

⁷⁰ IEA/PRESS(01)24, 'IEA Commends Czech Republic for energy supply security, calls for further efforts on regulatory reform and energy efficiency' (Prague, 12 November 2001).

OECD 2001b

The reasons for the far higher energy consumption in the Czech Republic by comparison with the other IEA States are: a lower GDP (40% lower than the EU average)⁷¹, greater dependence on solid fuels and a high proportion of energy-intensive production processes (metallurgy, production of construction materials, etc.); lower standards of buildings and equipment; low energy prices and hence few incentives to save energy.

Substantial potential savings are available from renovation of buildings to save heat. In the short term, such measures could reduce Czech energy consumption by from 42 to 80 petajoules per year, though the capital outlay required to do so would be from € 7 to 14 billion⁷².

Energy consumption fell by an average of 1.5% per year from 1973 to 1990.

The steady reduction in energy consumption per unit of GDP amounted to a yearly average of 2.4% between 1990 and 1999.

In the period between 1973 and 1990, energy efficiency increased in the housing, services and industrial sectors. However, energy intensity in the transport sector has risen steadily since the early 1990s, owing to the partial shift of freight from rail to road and the increase in individual transport⁷³. Transposition of the Directive concerning integrated pollution prevention and control⁷⁴ may produce beneficial effects on energy consumption, GHG emissions and industrial pollutant emissions. Under the Directive, permits are required to operate installations in the following six categories: energy industries, production and processing of metals, mineral industry, chemical industry, waste management and various other branches of industry (cellulose, paper, textiles, etc.). In addition to other environmental requirements, energy efficiency criteria approximating as closely as possible to the best available techniques ('BAT') must be taken into account in both new and existing installations.

In the Czech Republic, the transposition of this directive is likely to have a powerful effect in reducing GHGs because of the low level of energy efficiency and the obsolete technologies.

In particular, the energy and steel industries have very great potential for reduction because of their high levels of energy intensity and low energy efficiency⁷⁵.

4.6.2 Liberalisation of the energy market

The intention is that the internal market in electricity in the individual EU Member States will be at least 33% liberalised by 2003. For the gas market, the target is 43% liberalisation by 2010.

Liberalisation of the internal energy markets is essentially taking place within the framework of two directives: the Directive of the European Parliament and of the Council concerning common rules for the internal market in electricity⁷⁶, adopted in 1996, and the Directive concerning the internal market in natural gas⁷⁷, which came into force in August 1998. The aim of the two directives is to allow all suppliers free access to the energy market, based on a transparent and objective permit and tender procedure.

⁷¹ Parliamentary Documentation Centre, Jens Dalsgaard, *Task Force Enlargement*, Statistical Annex (June 2002), p. 3.

⁷² *Umweltschutz, Das Manager-Magazin für Ökologie und Wirtschaft* 2001, p. 2.

⁷³ OECD/IEA 2001, pp. 31 *et seq.*

⁷⁴ 'IPPC' Directive, 96/61/EC.

⁷⁵ Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit 2001, pp. 55 *et seq.*

⁷⁶ Directive 96/92/EC.

⁷⁷ Directive 98/30/EC.

These directives may produce both positive and negative effects in practice.

The following can be expected:

- elimination of barriers to market access for electricity generated from renewable sources and by means of cogeneration;
- greater pressure of competition will cause operators to increase the profitability and efficiency of their installations;
- competition will bring price cuts, which in turn may result in increased use of natural gas⁷⁸,
- however, the reduction in prices could reduce the incentive to make economical use of energy⁷⁹.

The Czech Energy Act hitherto offers only inadequate compliance with the requirements of the EU directives. For example, fair and non-discriminatory third-party access to the energy markets is not yet guaranteed – the state has a *de facto* monopoly in this sector.

As far as the cogeneration of heat and power is concerned, this technology is already widely used, so that it cannot be expected that the transposition of relevant EU regulations will have the effect of reducing emissions⁸⁰.

Natural gas has hitherto played a minor role in power generation in the Czech Republic. This is an area where there is considerable potential for reducing CO₂ emissions, by reducing the proportion of coal used in power generation in favour of natural gas.

The heat efficiency of the Czech power stations is well below the EU average, and here again there is great potential for improvement.

The possibility that prices for energy might fall as a result of liberalisation of the energy markets probably does not exist in the Czech case, because despite substantial increases in recent years energy prices still do not cover costs.

Prices increases for electrical energy and natural gas are intended to improve cost-effectiveness and bring an increase in energy efficiency. The cost of domestic electric power was increased by 14% in 2001 alone, and natural gas prices by nearly 36%. Sharp increases in energy prices are also planned for subsequent years. The *de facto* costs necessarily incurred for the generation, transmission and distribution of energy are to be reflected. This procedure, however, also entails some negative consequences. The most cost-effective type of energy for private households at present is lignite⁸¹. Some private households are reverting to coal because of the increase in natural gas and district heating prices. In rural regions, more use is again being made of wood for heating purposes. These trends are undermining the government's efforts to reduce greenhouse gases.

In 1996, 76.5% of electricity was produced from fossil energy sources (97% being coal-based), 20% from nuclear power and the remainder from hydroelectric power. In the Czech Republic, CO₂ emissions from the energy and energy conversion sectors fell by 37% between 1990 and 1998.

⁷⁸ Natural gas is a more climate-friendly energy source than coal or oil.

⁷⁹ Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit 2001, p. 25.

⁸⁰ Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit 2001, p. 33.

⁸¹ Petr Kopáč, 'Energiewirtschaftliche Situation in der Tschechischen Republik', 11th Zittau Seminar (October 2001).

The transposition of the EU regulations on the energy markets can result in the avoidance of 10% of all Czech emissions of CO₂ and 8.6% of all GHG emissions (reference point 1998)⁸².

4.6.3 Nuclear energy

The four-block Dukovany nuclear power station in southern Moravia has been in operation since 1984 and it produces 20% of the Czech Republic's electrical power (as of 1999).

The two reactors of the Temelin nuclear power station, which are currently still at the testing stage, have a capacity of 1.8 GW and will increase the contribution made by nuclear power to all energy generation to 40%.

Originally, the CSSR government planned to install four Soviet VVER-1000 blocks at Temelin. Construction of the first two blocks began in 1986, but in 1990 the government decided that only two blocks would be completed.

In 1993, the Czech government decided to bring the reactors into line with international safety standards. These modifications delayed completion, and vastly increased the costs. The total costs for Temelin now amount to some CZK 109 000 million (€ 3 620 million)⁸³.

The second block is expected to come on stream in 2004.

There are still reservations regarding the safety of the power station. One subject of criticism is that the documents made available by the Czechs for the environmental impact assessment (EIA) procedure were insufficient to assess the impact that the structural modifications applied for would have on the safety of the nuclear power plant⁸⁴.

According to a statement made by the German environment minister, Jürgen Trittin, defects were found in the safeguards for the main steam and feedwater lines and in individual safety valves.

The Czech Minister for the Environment, Libor Ambrozek, told the national newspaper *Pravo* on 31 July 2002 that the government's statement envisaged the abandonment of the nuclear programme. Temelin would be the last Czech nuclear power plant. Ambrozek emphasised that priority would be given to making greater use of renewable energy sources⁸⁵.

4.6.4 Renewable energy sources

In 1999, only 2% of energy was generated from renewable sources.

Of this, biomass accounted for 70% and hydroelectric power for 17%, the remainder coming from the use of biogas, waste and other negligible sources.

A programme for the promotion of renewable energy sources has existed in the Czech Republic since 1991.

⁸² Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit 2001, pp. 34 *et seq.*

⁸³ OECD/IEA 2001, pp. 77 *et seq.*

⁸⁴ Commission for the Environmental Impact Assessment for Temelin Nuclear Power Plant, *EIA Report on Temelin* (Prague, April 2001).

⁸⁵ Czech News Agency, 'Envimin against more nuclear power plants in Czech Republic' (31 July 2002).

Biodiesel, for example, has been exempted from taxes, import duties on capital goods associated with renewable energy sources have been reduced, investment aid is available for installations of this type, there is a five-year tax exemption for capital expenditures on renewable energy sources, etc. The paper on energy policy published in January 2000 – which is compatible with the EU's energy policy – states the objective of increasing the percentage of all electrical power generation accounted for by renewable energy sources. The Czech government intends to increase that percentage to 5–6% by 2010 and to 8–10% by 2020.

In addition to reducing GHG emissions, this is expected to produce positive effects on local and regional development.

According to estimates, increasing the proportion of all electrical power generated from renewable energy sources to 6% by 2010 will require capital expenditures in the sum of CZK 242 000 million⁸⁶.

5. ENVIRONMENTAL INVESTMENTS AND LEVIES

The total costs (capital and operating costs) of accession, as far as the environment is concerned, were originally estimated by the Czech Ministry for the Environment at approximately € 7 billion, but in April 2002 that figure had to be revised upwards to approximately € 9 billion⁸⁷.

Revising the capital cost requirement has brought the Czech estimates more into line with those of the World Bank (€ 7.2–9.8 billion) and the European Commission (€ 11.4–14.4 billion)⁸⁸.

More than half of the investment cost, which is based on an eight-year period, has to be contributed by the private sector, the remainder coming from central government and the regions. The majority of the sum will have to be invested in water resources management.

Although the environment is one of the most expensive areas to be brought into line with the EU regulations, it must be emphasised that the money invested in the environment by the Candidate States for the purposes of implementing European environmental standards will – according to the European Commission's Environment Directorate – not only be beneficial for the environmental situation.

According to estimates, the Central and Eastern European accession States will have to invest between € 80 and 120 billion in order to achieve full transposition of the environmental *acquis*. A study commissioned by the European Commission shows that the Candidate States can expect significant improvements in health and reduced damage to forests, agricultural land, fisheries and buildings. The restructuring of waste management also offers potential savings.

The financial benefit generated by the EU directives for the Candidate States as a whole will be between € 134 and 681 billion⁸⁹. The Czech Republic will be the biggest beneficiary among the accession States, followed by Romania and Slovakia. On complete implementation of the European

⁸⁶ OECD/IEA 2001, pp. 47–50.

⁸⁷ Interfax News Agency, 'Czech Republic must spend \$ 9.18 bln to meet EU environment requirements' (3 April 2002).

⁸⁸ Homeyer *et al.* 2001, p. 185.

⁸⁹ Commission of the European Communities 2002.

environmental directives, the Czech Republic will, it is estimated, be able to expect a resulting 4.8% increase in GDP⁹⁰.

Expenditure on environmental protection in the 1990s was appropriate, in scope and energy, to the environmental situation after the Velvet Revolution. More than 80% of total capital expenditures went to the priority sectors of improving air and water quality. These are also the areas in which the most significant successes have been recorded⁹¹.

In the mid-1990s, government capital spending on the environment amounted to 2.4% of GDP, but in the year 2000 this fell to 1.04% of GDP (CZK 20.3 billion/€ 600 million).

The State Environment Fund has provided CZK 2.8 billion/€ 81.5 million) for environmental projects, particularly for the areas of water and air pollution⁹². However, the government's contribution to environmental investment, disregarding spending on the drinking water sector in 1995, is only 14% and falling steadily. Meanwhile, the private sector, together with the local authorities, is responsible for the majority of capital spending on the environment. In 1992, the private and local authority sectors contributed 27%, but by 1996 this had risen to approximately 84%. It must be emphasised that the power plant operators contributed particularly heavily⁹³.

‘Moreover, although total environmental spending by the central government has fallen by 50% since 1995, this largely reflects a shift in total expenditure to private firms, only 14% of which express concerns about their ability to bear the costs of fulfilling EU regulations’⁹⁴.

There is an extensive system of environmental levies in the Czech Republic. The highest income is generated by the levies on atmospheric emissions and discharges into bodies of water. Levies are also raised on the conversion of agricultural land, wastes and mining.

Apart from the water levies, however, the levies are too low to prompt any actual changes in behaviour patterns. In most cases they were low even when first introduced, and have not been adjusted to inflation. Not only that, but reduced emissions mean that income is falling. Most of the income received goes to the Environment Fund.

The general rate of value added tax in the Czech Republic is 22%, but VAT is charged at only 5% on some environmentally friendly products⁹⁵.

The adoption of European standards may also generate positive effects in the field of taxation. It is assumed, for example, that complete transposition of the European Directive on excise duties on mineral oils⁹⁶, which lays down minimum rates of tax on petrol and diesel (albeit at a low level), will result in a fall in consumption and hence a reduction of GHG emissions.

Although the taxation of energy products was introduced by the Commission in 1997 as a proposal for a directive, that proposal has never been adopted (as of 2001). The proposal envisages extending

⁹⁰ *ENDS Environment Daily, Europe's environmental news service*, Issue 1085 (19 October 2001), ‘Accession countries to win from EU green laws’.

⁹¹ Ministerstvo životního prostředí 1999.

⁹² Commission of the European Communities 2001, p. 95.

⁹³ Ministerstvo životního prostředí 1999.

⁹⁴ *The Economist Intelligence Unit*, ‘Country Profile Czech Republic, Resources and Infrastructure: Natural resources and the environment’ (10 June 2001)

⁹⁵ Homeyer *et al.* 2001, pp. 176 *et seq.*

⁹⁶ 92/81/EEC.

the obligatory minimum taxation to all energy products, including mineral oils, natural gas, coal, peat and electricity, and provides for a progressive increase in tax rates.

It is true both of the current directive and of this proposal that the reductive effects on energy consumption and, as a result, emissions of GHGs and pollutants in the Czech Republic can be expected to be far greater than in the existing Member States. The reason for this is that tax rates in the Czech Republic are still significantly below EU levels, and the continuing low level of energy efficiency means that there is additional room for reductions in energy consumption⁹⁷.

⁹⁷ Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit, pp 63–7.

ANNEX

I. Basic data on the Czech Republic and the European Union

	European Union	Czech Republic
Surface area (1 000 km ²)	3 191.1	78.9
	100%	2.47%
Population (millions, 2001)	376.0	10.3
	100%	2.74%
Life expectancy, women	81.2	78.3
Life expectancy, men	74.9	71.6
GDP 2000 (in € 1 billion)	8 525.9	55.0
Per capita GDP in purchasing power standards (EU = 100)	100	60
Economic growth 2000	3.3%	2.9%
Economic growth 2001	1.7%	3.6%
Inflation 2000	2.1	3.9f
Inflation 2001	2.3	4.7
Unemployment 2001	7.6	8.1
Unemployment 2002	7.8	8.8
Cars (in millions, 1990)	143.2	2.41
Cars (in millions, 1998)	169.0	3.49
Change 1990/1998	+11%	+45%

Parliamentary Documentation Centre, Jense Dalsgaard, *Task Force Enlargement*, Statistical Annex (2002), p. 3 / Český statistický úrad, *Aktualní informace, nejzadanejší údaje o ČR v roce 2001*.

II. Changes in pollutant emissions in the Czech Republic, 1980–2000

Year	Solids		SO ₂		NO _x		CO		C _x H _y	
	tonnes/year	%	tonnes/year	%	tonnes/year	%	tonnes/year	%	tonnes/year	%
1980	1 267 241	100.0	2 148 409	100.0	730 816	100.0	894 452	100.0	134 937	100.0
1985	1 014 683	80.1	2 161 390	100.6	794 984	108.8	899 267	100.5	136 407	101.1
1990	631 402	49.8	1 875 694	87.3	741 915	101.5	890 815	99.6	225 215	166.9
1995	201 031	15.9	1 091 056	50.8	412 486	56.4	874 002	97.7	164 046	121.6
2000	57 405	4.5	264 749	12.3	397 287	54.4	649 304	72.6	148 800	110.3

Český hydrometeorologický ústav, *Usek ochrany čistoty ovzduší*.

GHG emissions by sectors in the Czech Republic and the European Union, 1998

Sector	European Union	Czech Republic
Energy + conversion	27.0%	40.0%
Industry	15.1%	25.3%
Transport	20.5%	7.5%
Services, private consumption, etc.	17.3%	13.9%
Oil and gas production	1.2%	-
Coal production	0.8%	3.8%
Industrial processes	5.4%	2.6%
Waste	2.9%	1.7%
Agriculture	9.8%	5.3%

Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit 2001, app./18.

III. Waste production in the Czech Republic, 2000

Waste category	Hazardous	Other	
Industrial waste production	2 603	37 560	40 163
of which:			
Agricultural waste	34	11 784	11 818
Mining waste	11	2 667	2 678
Industrial waste	1 637	7 981	9 618
Energy generation waste (excluding radioactive wastes)	459	7 507	7 966
Construction waste	160	4 923	5 083
Transport waste	18	367	385
Waste water disposal and urban cleaning wastes	210	757	967
Municipal waste	27	3 407	3 434
Total waste production	2 630	40 967	43 597

Cesky statisticky urad, *Produkce odpadu podle skupin OKEC c roce 2000.*

IV. Environmentally relevant data, Czech Republic and OECD

	OECD average	Czech Republic
Area		
Land area (1 000 km ²)	34 777	79
Nature conservation areas (% of total)	12.4	16.2
Nitrogen fertiliser use (t/km ² arable land)	6.5	6.6
Pesticide use (t/km ² arable land)	1.25	0.12
Forests		
Forested areas (% of total)	33.9	34.1
Use of forest resources (harvest/growth)	0.5	0.7
Imports of tropical timber (US\$ per capita)	5.1	0.1
Endangered animal species		
Mammals (% of known species)	-	33.3
Birds (% of known species)	-	55.9
Fish (% of known species)	-	29.2
Water		
Water withdrawal (% of annual availability)	11.9	15.6
Connection to waste water treatment (% of population)	59	59
Air		
Sulphur dioxide emissions (k per capita)	39.2	68
(kg/US\$ 1 000 GDP)	2	5.3
Change from 1990 to end 1990s in %	-24	-63
Nitrogen oxide emissions (k per capita)	41.1	41.1
(kg/US\$ 1 000 GDP)	2.1	3.2
Change from 1990 to end 1990s in %	-3	-43
Carbon dioxide emissions (k per capita)	10.9	11.7
(t/US\$ 1 000 GDP)	0.52	0.93
Change from 1990 to end 1990s in %	-9	-20
Energy		
Total energy consumption, 1998 (Mtoe)	5 114	41
Change 1990/1998 in %	13.2	-13.4
Energy intensity, 1998 (t/US\$ 1000 GDP)	0.22	0.32
Change 1990/1998 in %	-6.3	-4.2
Structure of energy generation, 1998 in %		
Solid fuels	23.9	52.5
Oil	41.9	20.2
Natural gas	20.6	18.6
Nuclear power	10.9	8.3
Renewable energy sources	2.8	0.4
Road traffic		
Road traffic volume, 1998 (1 000 km per capita)	7.9	3
Vehicle stocks, 1998 (in 10 000 vehicles)	56 605	377
Change 1990/1998 in %	20.1	45.5
Vehicles per 100 inhabitants	51	37
Volume of wastes		
Industrial wastes (kg/US\$ 1 000 GDP)	70	288
Urban wastes (kg per capita)	500	310
Radioactive wastes (t/Mtoe of TPES)	1.6	1

OECD 2001a.

V. Total capital expenditures on environmental protection by focal point

Year (1)	Total	Of which						
		Water conservation (excluding ground water)	Air and climate protection (2)	Ecological waste recovery	Soil reclamation	Nature and countryside conservation (3)	Reduction of influence of physical factors	Soil and ground water conservation
1995	32 252	10 246	17 886	2 772	374	-	974	-
1996	37 036	10 011	21 475	3 449	-	659	567	875
1997	40 503	11 275	22 323	4 765	-	1 081	455	604
1998	35 160	8 291	20 141	4 698	-	1 162	313	555
1999	28 956	8 839	15 762	2 597	-	1 091	241	426

(1) Financial investments only until 1994

(2) Protection of air quality until 1995

(3) Soil reclamation until 1995

Cesky statisticky urad, *Celkove investice na ochranu zivotniho prostredi podle programoveho zamereni*

VI. Changes in GHG emissions in the Czech Republic 1990/1998 (by sectors)

Greenhouse gas	CO ₂			CH ₄			N ₂ O			Total		
	1990	1998	Change in %	1990	1998	Change in %	1990	1998	Change in %	1990	1998	Change in %
Emissions sector												
Energy + conversion	94 090	58 705	-37.6	1 239	483	-61	5 952	961	-83.9	101 281	60 149	-40.6
Industry	23 104	38 037	64.6	-	-	-	-	-	-	23 104	38 037	64.6
Transport	7 959	10 779	35.4	-	-	-	248	434	75	8 207	11 213	36.6
Services	35 948	19 973	-44.4	336	126	-62.5	62	217	250	36 346	20 316	-44.4
Oil + gas production	-	-	-	676	592	-12.4	-	-	-	676	592	-12.4
Coal production	-	417	-	7 600	5 314	-30.1	-	-	-	7 600	5 731	-24.8
Industrial processes	5 417	2 661	-50.9	-	-	-	1 023	1 209	18.2	6 440	3 870	-39.9
Agriculture	-	-	-	4 284	2 541	-40.7	713	5 394	6456	4 997	7 935	58.8
Waste	-	357	-	2 205	2 058	-6.7	-	186	-	2 205	2 601	18
Total	166 518	130 929	-21.4	16 338	11 109	-32	7 998	8 401	5	109 854	105 439	-21.2

Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit 2001, p. 18.

VIII. Changes in GHG emissions for the Czech Republic (and the Candidate States of the Luxembourg group) as a result of transposition of relevant EU regulations (estimates for 2010)

Regulation [GHG]	Potential effect versus 1998 in Gg CO ₂ equivalents	
	Czech Republic	All Candidate States (Estonia, Poland, Slovenia, Czech R., Hungary)
Energy market liberalisation (CO ₂)	Downward effect (up to 13 000 Gg)	Downward effect (up to 60 000 Gg)
Directive on large combustion plants and revised version (CO ₂)	Slightly downward effect (non-quantifiable)	Slightly downward effect (non-quantifiable)
ECSC: coal subsidies (CO ₂)	Tendency to downward effect (slight)	Downward effect (up to 14 500 Gg)
Directives and voluntary agreements on consumption standards (CO ₂)	Downward effect	Downward effect (up to 4 000 Gg)
Voluntary agreements on CO ₂ emissions from cars	Downward effect	Downward effect (up to 3 200 Gg)
Directive on mineral oil taxes and revised version (CO ₂)	Downward effect	Downward effect (up to 5 600)
Landfill directive (CH ₄)	Downward effect (up to 1 200–1 400 Gg)	Downward effect (up to 12–14 000 Gg)
CAP (CH ₄)	More likely upward effect	More likely upward effect (probably slight)
CAP and nitrate directive (N ₂ O)	Upward effect	Upward effect (up to 5 000 Gg)
Regulations on forestry measures (CO ₂)	Downward effect	Downward effect (unclear; up to 2 500 Gg)
IPCC Directive (CO ₂ , N ₂ O, CH ₄ , SF ₆)	Downward effect	Downward effect (up to 12 700 Gg)
Structural and Cohesion Fund (CO ₂)	Upward effect (non-quantifiable)	Upward effect (non-quantifiable)
Directive on renewable energy sources (CO ₂)	Downward effect (up to 1 600 Gg)	Downward effect (up to 7 000 Gg)
All areas of EU regulation	Downward effect (possibly up to 16 000 Gg)	Downward effect (possibly up to 100–110 000 Gg)

Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit 2001, pp. 102 *et seq.*

LIST OF ABBREVIATIONS

ACEA		European car makers
BAT		best available techniques
black triangle		industrial region around the common borders of the former GDR, Poland and Czech Republic
CAP		Common Agricultural Policy
CEES		Central and Eastern European States
CH ₄		methane
CO		carbon monoxide
CO ₂		carbon dioxide
CO ₂ eq		carbon dioxide equivalents
CR		Czech Republic
CSFR		Czechoslovak Federal Republic
CSSR		Czechoslovak Socialist Republic
C _x H _y		hydrocarbons
CZK		Czech crowns
EC		European Community
ECSC		European Coal and Steel Community
EIA		environmental impact audit
EU		European Union
GDP		gross domestic product
Gg		gigagram
GHG		Greenhouse gases
Gw		Gigawatt
hot spots		Areas severely affected by environmental pollution
IEA		International Energy Agency
IPPC		Integrated Pollution Prevention and Control Directive
JAMA		Japanese car makers
KAMA		Korean car makers
kg		Kilogram
Mw		Megawatt
N ₂ O		Nitrogen dioxide
NO _x		Nitrogen oxides
SF ₆		Sulphur hexafluoride
SO ₂		Sulphur dioxide
t		Tonne

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