## PART III. NATIONAL REPORTING GUIDELINES FOR CSD-14/15 THEMATIC AREAS

### A. ATMOSPHERE/AIR POLLUTION

Government focal point(s): Ms. Yvonna Hlínová, Air Protection Department, Ministry of the Environment (e-mail: yvonna_hlinova@env.cz)
Responding ministry/office(s): Ministry of the Environment, Ministry of Health

**Legislation framework**

Czech Republic has incorporated EC environmental legislation and commitments under multilateral environmental agreements into the Czech legislative framework. This task was successfully achieved by the time the country joined the EU in May 2004. The core for the air protection proceedings (measures) and the air protection management in the Czech Republic is constituted by the Clean Air Act No. 86/2002 Coll. with its amendments and associated regulations (in the forms of the Government Regulation and the Ministry Decree).

The main focus of the Czech air protection legislation (hereafter legislation) is:

- decrease emissions of air pollutants from all groups of stationary sources, included small stationary sources ;
- decrease emissions of SO2, NOx, VOC, NH3 and dust so as to comply with the emission national ceilings by 2010;
- improve collection of data and reporting on the air pollutants including heavy metals persistent organic pollutants and other hazardous substances;
- monitoring, managing and improving air quality, according to ÈSÚ standards;
- protection of the ozone layer, reduction and substitution the ozone depleting substances;
- protection of the climatic system; co-operation with the separate climate changes legislation.

**Air Pollution**

Emission limit values (hereafter ELV) for all pollutants are specified in the legislation as the specific ELV or general ELV and the operators of stationary sources (very large, large and medium – sized sources) must comply with them. As regards very large combustion sources (existing sources – their building permits have been issued by 1st July 1987), the operators are obliged to submit plans for emission reductions in order to comply with the emission ceiling and other targets resulting out of the national programme of emission reduction for very large combustion sources according to the implementation rules.

Emissions are measured continuously or discontinuously in the different intervals in dependence of the legislation requirements. The results of emission measurement are used for control and supervision of the sources (if they meet ELV) and for the creation and the calculation the inventories and emission factors.
We can present good progress in the air emission reductions for SO2 and VOC.

Emissions of SO2 decreased by 48% during 1998-2003, reaching 226 kilotonnes (kt) and hence already well below the 2010 emission ceilings stipulated by the CLRTAP Oslo Protocol (632 kt) and even the Gothenburg Protocol (283 kt) and the EU National Emissions Ceiling (265 kt), about 81% of total sulphur emissions came from large sources (predominantly the energy sector), while 14% came from small stationary sources.

VOC emissions decreased from an estimated 242 kt in 1998 to 198 kt in 2003, and the Czech Republic surpassed the CLRTAP Geneva Protocol objective of reducing VOC emissions by 30% during 1990-99. This achievement was due to several factors, including: a shift towards the use of environmentally sound coating materials and degreasing agents; installation and regular checking of vapour withdrawal facilities at most fuel storage terminals and gas stations; and a decline in VOC emissions from traffic due to the increasing penetration of catalytic converters in the vehicle fleet, which has outweighed the effect of traffic growth. Although current VOC emissions are below the 220 kt ceiling set for 2010 by the Gothenburg Protocol and the EU National Emissions Ceiling, likely increases in traffic will make this target difficult to achieve.

The Czech Republic is aware of some unfavourable trends in the case of NOx. The emissions of NOx dropped steadily from 551 to 313 kt over 1990-99, but have hovered around the same level since; they amounted to 330 kt in 2003.

The traffic presents considerable burden for NOx emission budget. The total NOx emissions from mobile sources increased by 9% in the 1998-2003 period and this trend is going on.

The further reductions required under the Gothenburg Protocol and the EU National Emissions Ceiling (which both have a ceiling of 286 kt by 2010) will be difficult to achieve.

Particulate matter emissions reached a low of 57 kt in the 2000, but then rose again to 76 kt, resulting in an overall reduction of 9% over 1998-2003, partly as a result of changes in measurement methods.

Ammonia emissions reached a low point of 72 kt in 2002 but then rose. Nevertheless, the Czech Republic should have little difficulty in meeting the 2010 target of 101 kt under the Gothenburg Protocol as long as good agricultural practices are implemented. Meeting the EU emission ceiling of 80 kt for the same year will be much more challenging.

The downward trend in emissions of heavy metals (Cd, Hg, Pb) that began in 1990 continued during the next time, but appears to have been halted in the latter part. The reduction in Pb emissions was due mainly to the gradual phase-out of leaded petrol, completed in the end of 2000.

Emissions of POPs (e.g. PAH, PCB, PCDD/F) declined in emissions can be attributed to a shift from solid to gaseous fuels, the installation of new pollution separation equipment (e.g. desulphurisation at power plants) and dust removal from production and processing of metals and mineral raw materials. These measures may by now have exhausted their potential and further reductions will have to come from cleaner technologies.

As far as GHG emissions stayed broadly constant during most of the last years at a level of around 140 million tonnes CO2-equivalent. Net CO2 emissions amounted to 118.6 million tonnes in 2002, or 86% of the GHG total. Given that GDP grew by 12% during 1998-2003, CO2 emissions stayed decoupled from economic growth. Nevertheless, the carbon intensity of the Czech economy remains the highest among OECD countries. Methane and nitrous oxide contributed 10.4 and 8.2 million tonnes, respectively.

In an effort to decrease some kinds of emissions (including GHG), consumption of fossil fuels and to conform to EU policies on renewable energy, the State programme for the promotion of energy savings and the use of renewable energy sources has been passed. This programme aims to increase the share of renewable energy sources to at least 6% of total primary energy sources and 8% of gross power production by 2010.

The main national bodies the Czech Environmental Inspectorate is responsible for monitoring and controlling compliance with environmental laws and associated regulations.

**Monitoring**

The Environmental Monitoring System in the Czech Republic, approved by the Government Resolution in 1999, is a comprehensive system of collection, processing and evaluation of data on environmental contaminants and their effects on population health in the Czech Republic. Its particular subsystems have been run routinely since 1994. The Monitoring System is an open system and has developed continuously in terms of both the range of factors and pollutants monitored and methods of data processing and presentation. The Monitoring System has been implemented in 30 cities including the capital Prague, regional capitals and selected former district cities.

The major objectives of the Monitoring System are to study and to assess time series of the selected indicators of each environmental component quality and population health status, particularly to assess levels of population exposure to pollutants and subsequent health effects and risks.

On the air quality is focused Subsystem I, which is intended for the monitoring of selected indicators of population health and indoor and outdoor air quality. Information on population health status is obtained from general practitioners and pediatricians in outpatient facilities. Information on ambient air pollutant concentrations is obtained from the network of manual and automated units operated by the public health institutes in the cities monitored as well as from selected measuring facilities administrated by the Czech Hydrometeorological Institute, the location of which meets the requirements of the Monitoring System. Indoor air quality has been monitored in cooperation with selected public health institutes.

The effect of air pollution on health depends on the concentration of air pollutants, duration of exposure to pollutants and other factors such as inter- and intra-individual variability. The actual exposure of an individual varies widely over the year and her/his lifetime with job, lifestyle and outdoor/indoor pollutant concentrations depending on locality (city vs. countryside, low traffic vs. heavy traffic areas, industrial vs. non-industrial zones), time (seasonal trends, daily variability) and climatic conditions. The mean long-term exposure to pollutants can be expressed as potential exposure of the population of a given locality to the mean pollutant concentration level as “supply” stratified e.g. at limit concentration intervals.

The evaluation of the risk from outdoor air pollution included exposure to sulphur dioxide as an indicator of coal incineration, nitrogen dioxide indicative of incineration processes of other types, e.g. those associated with gas heating and traffic, and suspended $PM_{10}$ as the generally monitored indicator of highest health significance.

The mean long-term exposure to sulphur dioxide is low and did not exceed 20 $\mu g/m^3$, i.e. 40 % of the exposure (concentration) limit, for 99 % of the monitored population in 2003. Since 1999, this exposure can be considered as stable and close to the natural background exposure.

Levels of exposure to nitrogen oxides, represented by nitrogen dioxide, remain higher and more significant. Exposure levels are rather stable in a long-term run, 55,9 % of the population monitored are long-term exposed to concentrations under 27 $\mu g/m^3$ and 39,4 % of the population are exposed to concentrations between 27–40 $\mu g/m^3$ and 1,5 % of the population is exposed to the levels exceeded the limit.

The population exposure to suspended $PM_{10}$ continues to be of concern. The criteria established by Government Decree No. 350/2002 Coll. were exceeded for 72,2 % of the population monitored in 2004. Exposure may be characterized as long-term, with slowly increasing mean values. The share of the

population living in the localities where the concentration limit was exceeded decreased in comparison with the year 2003.

Acute respiratory diseases (ARD) account for the highest percentage of morbidity in children (peaking in pre-school children), and therefore the ARD incidence is used as an important indicator of population health. The major factors involved in the ARD incidence are the epidemiological situation, climatic conditions, air pollution, individual susceptibility and physician's subjective evaluation. The information source is medical records on the first treatment given to patients presenting with acute respiratory disease. The basic outputs are absolute numbers of new cases of selected diagnoses in the population monitored and their incidence rates per 1,000 population of different age groups. The data are entered in the system database of treated ARD with the acronym MONARO. The database is an integrated system that allows continual collection, processing and evaluation of the data on ARD morbidity from general practitioners and pediatricians. The central database is being regularly validated to clear possible redundant or incorrect records.

In 2004, 77 pediatricians and 41 general practitioners providing care to a total of 178,785 patients in 25 cities took part in ARD data collection.

The data of 2004 do not markedly differ from those of previous years with the monthly incidence rates ranging from tens to hundreds of cases per 1,000 population of a given age group depending on season and epidemiological situation. In 2004, the monthly ARD incidence (excluding influenza) in children under 18 years of age varied widely from 2 (Havlíckuv Brod) to 826 (Hradec Králové) per 1,000 children. As in previous years, the highest morbidity was recorded in the age group 1 to 5 years. In most cities, the ARD morbidity shows seasonal trend with a typical downward tendency in summer. The seasonal trend was found in all age groups of urban population, being most marked in the age group 1–5 years, less marked in children aged from 6 to 14 years and least marked in adults.

The results are provided in detail in the Technical Reports of the individual subsystems (in Czech) available through the Internet at the address of the National Institute of Public Health www.szu.cz/chzp/index.htm together with the Summary Report (in English) (www.szu.cz/chzpa/sumrep.htm).

**Ambient air quality**

Air quality policy in the Czech Republic during the last years was predominantly driven by international imperatives in the form of the CLRTAP - Gothenburg Protocol and the EC Air Quality legislation including the National Emissions Ceiling Directive. In 2002, these international commitments were transposed to the Czech legislation (Clean Air Act No. 86/2002 Coll. and Government Regulation No. 350/2002 Coll.), which are now the main legal instruments for improving air quality.

The Czech Republic is also bound to reduce its greenhouse gas (GHG) emissions by 8% below the 1990 level by 2008-12 under the Kyoto Protocol.

Czech ambient air quality standards have become somewhat more stringent since the adoption of EU ambient air limit values. The Government Regulation No. 350/2002 Coll. already incorporates the limit values in addition to basic pollutants ($SO_2$, $NO_x$, $PM_{10}$) even for arsenic, cadmium, mercury, lead, nickel, benzene, PAH, ozone.

The Integrated National Programme of Emission Reduction, under which the central government provides funds to help municipalities draw up their management plans, will contribute to compliance with international commitments.

The Czech Republic further improved its air quality monitoring and reporting. The present legislation requires regular monitoring of selected harmful substances. Data on emissions of several heavy metals (Hg, Pb and Cd) and POPs (PCB, PCDD/F and PAH) were reported for the first time in 2000. Emissions of other monitored heavy metals (As, Cr, Cu, Ni, Se and Zn) were added in 2003, and emissions of HCB were included in 2004. The Czech Hydrometeorological Institute has published the comprehensive annual air quality report since 1993.

The significant effort has been spend for meeting ambient air quality standards in all parts of the country. In general, the three areas of the Czech Republic with the worst air quality problems are:

- the triangle extending northwest from Prague towards the German border,
- north Moravia and Silesia,
- Prague region.

A marked decrease in SO2 concentrations across the country occurred after 1997 as a result of the more stringent emission limits imposed and enforced from that year under the then Clean Air Act No. 309/1991 Coll. In 2003, however, a slight increase in SO2 pollution occurred in several areas.

Concerning concentrations of NO2 the annual average was exceeded at a few stations only, mainly in Prague. However, after generally decreasing until 2001, NO2 concentrations began to edge upward in many localities. Expected growth in traffic is likely to increase the frequency of episodes of high NO2 and ozone levels, especially in and near large cities.

Suspended particulate matter is of major concern. Annual amount of both total suspended matter and PM 10 rose during last period. Both the annual average limit (40 µg/m3) and the 24-hour limit (50 µg/m3) were exceeded at about one-fourth of measuring stations.

Ground-level ozone is an extensive problem throughout the country, for both human health and vegetation. In 2002, more than 64% of the population were exposed to concentrations above the health limits, and vegetation protection standards were exceeded at 20 out of 32 stations and in more than two-thirds of protected areas. As elsewhere in Europe, the trend has been for maximum 8-hour concentrations to decrease at rural measuring stations but to increase at urban stations.

PAH originating from the imperfect combustion of fossil fuels in both stationary and mobile sources are also of widespread concern. In 2003, the limit value for concentration of benzo(a)pyrene was exceeded at 8 out of 12 monitoring stations. Limit value for benzene concentration were also exceeded in Ostrava, mainly as a result of emissions from coking plants.

**Transport**

The transport sector is playing an increasingly important role in the Czech economy and is also an important and growing source of environmental concern. In particular, road freight and car traffic are growing faster than GDP and are likely to continue to rise, being a growing source of air pollution. A reduction of air pollution from transport is one of the main policy goals of both the State Transport Policy and the State Environmental Policy of the Czech Republic.

Concerning vehicles, Euro 3 emission standards for new vehicles were introduced in 2000 and an inspection programme has been implemented, requiring inspections every two years for vehicles old four years and more. Since 2004, imported used vehicles that do not meet the Euro 3 standard have been penalized. The import of cars more than eight years old has been banned.

Concerning fuels, quality standards were introduced in 2001 in accordance with EC regulations.

In 2003, the sulphur content of both gasoline and diesel fuels were reduced from 500 mg/kg to 150 mg/kg for gasoline and 350 mg/kg for diesel. Leaded gasoline was phased out in 2001.

The number of vehicles equipped with catalytic converters has increased extensively; 47.5% of motor vehicles had them in 2003. However, 56% of passenger cars are still more than ten years old.

Despite the availability of an LPG refuelling infrastructure, the number of cars using LPG is negligible.

**Transboundary air pollution**

Since the 1970s, the Czech Republic has been affected by transboundary air pollution as well as domestic one. The resulting acidification of the atmosphere has contributed to damage to the country's forests, lakes, watercourses, soil, as well as to human health. The Czech Republic has ratified the 1979 CLRTAP and its protocols covering emissions of SO2, NOx, VOC, heavy metals and persistent organic pollutants (POPs). Although it has not yet ratified the protocol on acidification, eutrophication and ground-level ozone, it has introduced the necessary legislation and programmes to fulfil its obligations under the convention and its protocols. The most recent integrated programme gives a timetable for activities until 2010.

Forests in the Czech Republic are continuously monitored in both an EU and a pan-European framework. The health of mountain forest ecosystems has not been satisfactory sufficiently yet, despite the measures taken under the CLRTAP and its protocols requirements

**Protection of the ozone layer (Montreal Protocol)**

The Czech Republic became a party to the Montreal Protocol on January 1st 1993, and the Beijing amendment on control of production of HCFCs and bromochloromethane came into force in the country in 2002. At that time, production and imports of CFCs amounted to 1 430 tonnes per year, compared with 5 510 tonnes per year in 1986. Both halons imports and methyl bromide consumption dropped to zero or nearly zero by 2003.

In 2002, the Czech Republic introduced measures to control substances that deplete the ozone layer in a new Clean Air Act No. 86/2002 Coll.

The measures included: introducing a system for recovering used ozone-depleting substances, especially from discarded refrigerators, increasing the amount of substances destroyed, reducing leaks of the substances from plants in use and increasing the recovery of halons. Industry has invested in this programme and is now exporting its know-how, including in the framework of regional co-operation on public funds.

Implementation of the Montreal Protocol in the Czech Republic has been a definite success; with a positive the alliance between action to protect a common good (the ozone layer) and the promotion of advanced technologies in industry.

**MEAs ratified or accepted by the Czech Republic**

The multilateral environmental agreements, which have been ratified or accepted since the year 1999 for the air protection area:

- Montreal Protocol on Substances that Deplete the Ozone Layer,
- Convention on Long-range Transboundary Air Pollution (CLRTAP),
- Protocol to CLRTAP Long-term Financing of the Co-operative Programme for Monitoring and Evaluation of the Long-range Transmission of Air Pollutant in Europe (EMEP),
- Protocol to CLRTAP on the Reduction of Sulphur Emission or their Transboundary Fluxes by at lest 30 percent,
- Protocol to CLRTAP on further Reduction of Sulphur Emission,
- Protocol to CLRTAP Concerning the Control of Emission of Nitrogen Oxides or their Trasboundary Fluxes,
- Protocol to CLRTAP Concerning the Control of Volatile Organic Compounds - VOC - or their Trasboundary Fluxes,
- Protocol to the Convention on Long-range Transboundary Air Pollution on Heavy Metals,
- Protocol to the Convention on Long-range Transboundary Air Pollution on Persistent Organic Pollutants,
- Protocol to the Convention on Long-range Transboundary Air Pollution to abate Acidification, Eutrophication, and Ground-Level Ozone,
- Protocol on Substances that deplete the Ozone Layer (Montreal Protocol),
- Amendment to the Montreal Protocol (London Amendment),
- Amendment to the Montreal Protocol (Copenhagen Amendment),
- Convention for the Protection of Ozone Layer (Vienna Convention),
- Kyoto Protocol to the Framework Convention on Climate Change
- Stockholm Convention on Persistent Organic Pollutants
- Rotterdam Conv. on Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade
- Convention on Access to Information and Public Participation in Environmental Decision-Making and Access to Justice in Environmental Matters (Aarhus Convention).

**NGOs**

Non-governmental organisations (NGOs) play an active role in developing environmental policy and programmes in the Czech Republic. NGOs are now represented on each of the monitoring committees of the Structural Funds and Cohesion Fund in the Czech Republic. Representatives on some of the committees are selected through an open competition drawn up by the EU Committee of the Government Council for Non-State, Non-Profit Organizations. The Regional Environmental Centre for Central and Eastern Europe, an international non-profit organisation, was involved in the strategic environmental assessment of the National Development Plan of the Czech Republic.

Co-operation between the Ministry of the Environment and environmental NGOs has improved in terms of access to information and public involvement in decision-making.

NGOs and their specialised facilities, a network of more than 100 Environmental Education Centres, also play an important role in promoting environmental education and awareness at schools. Programmes are being introduced for civil servants at all levels of public administration and for teachers at all school levels, but progress is slow due to financial constraints and the large number of targeted individuals.