



# Environment *in the* **CZECH REPUBLIC:** **A Positive** *and* **Rapid Change**

**The former communist country witnessed remarkable improvements in environmental quality in the 1990s, and they have had a lasting effect.**

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**T**he Czech Republic ranks 4th among 133 countries (after New Zealand, Sweden, and Finland) in terms of its environmental performance, according to a 2006 report from the Yale Center for Environmental Law and Policy (1). The report, which was presented at the World Economic Forum in Davos (Switzerland) last February, establishes a new Environmental Performance Index (EPI) and has triggered a serious discussion of environmental quality in the Czech Republic. When people think about the Czech Republic, they often remember previous environmental reports, which revealed air and water pollution, uncontrolled waste disposal, and devastation of the countryside. These bleak environmental conditions were associated with human-health effects and serious forest damage.

In terms of pollution, the former Czechoslovakia was perhaps the most adversely affected country in Europe. The Black Triangle, the heavily industrialized 12,000-square-mile area where Poland, Germany, and the Czech Republic meet, was packed with chemical plants, refineries, steam-heating and power plants, and lignite strip mines (2–4). Improvement has been visible, and breathable, since the transi-

tion from the communist past began with the Velvet Revolution in November 1989.

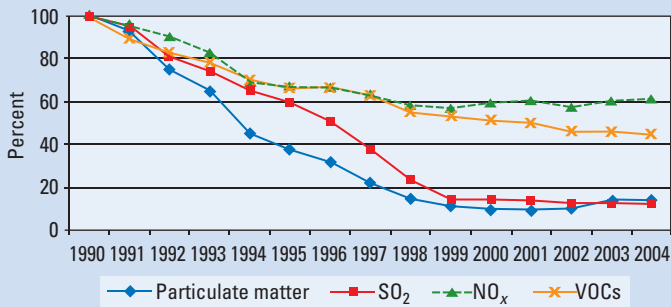
The evidence of substantial improvement of environmental conditions in the Czech Republic should not come as a shock to those who have paid attention to news regarding environmental and socioeconomic conditions. Indeed, the change did not happen overnight. Environmental improvements were recorded early on, in large part because of industrial decline. Budgetary allocations, foreign credits, and political pressure from environmentalists had little impact compared with the effects of the recession.

Many central and eastern European countries reported reductions in emissions of 20–25% from 1990 to the end of 1991. Lower economic output had the largest impact on water and air emissions and the volume of solid waste that was dumped (5, 6). This sharp recessionary drop was also observed in the Czech Republic. From 1990 to 1991, the gross domestic product (GDP) decreased by nearly 12%, industrial output by 22%, and gross agricultural output by 9%. As a result, the consumption of fertilizers per hectare decreased by 28%; emissions of CO<sub>2</sub>—the main greenhouse gas—by 15%; emissions of the air pollutants SO<sub>2</sub> and particulate matter (PM) by 7% and 5%, respectively; and biodegradable organic pollution discharged from point sources by 11% (7).

Later on, restructuring and privatization were remarkable forces for environmental change in the Czech Republic. An increase in much-needed capital brought about modernization and made it easier to comply with pollution regulations. However, despite dramatic positive changes, the condition of the environment was still serious in the mid-1990s (6). Hundreds of unsecured landfills were in operation until 1996, when they were forbidden by law. In addition, ~5000 municipalities did not have sewer systems and wastewater treatment facilities, and soil and groundwater at thousands of localities were contaminated, a consequence of previous industrial, military, and agricultural activities (8).

**FIGURE 1**

## Emissions of the main air pollutants in the Czech Republic, 1990–2004

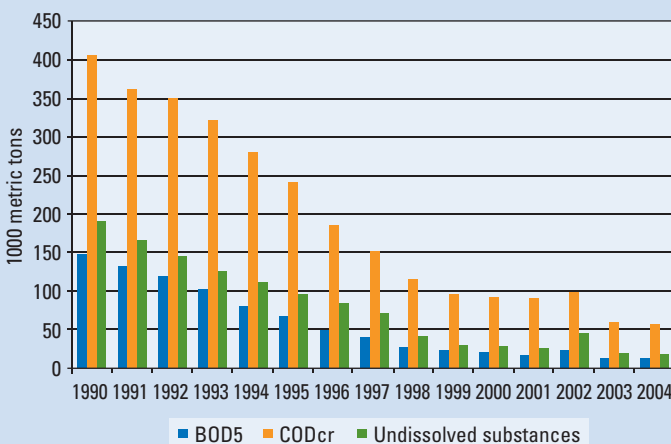


### Changes in environmental conditions

Under communism, little environmental research was performed in Czechoslovakia and even less was published (9, 10). However, in the 1970s, the government did designate the eight most affected areas as “emergency” regions. The first comprehensive, albeit half-illegal, summary of the Czechoslovak environment was made available by Radio Free Europe and Voice of America in 1984. Since 1990, environment-related data have been collected regularly, published, and made easily accessible as yearbooks, state-of-the-environment reports, indicator-based publications, and so on.

**FIGURE 2**

## Pollution discharged from point sources—biochemical oxygen demand (BOD<sub>5</sub>), chemical oxygen demand (COD<sub>cr</sub>), and undissolved substances—in the Czech Republic, 1990–2004



In the early 1990s, the state of the environment was dismal. The Fifth Environmental Action Programme, which in 1993 established the EU environmental agenda for a decade, referred to central and northern Bohemia as “hot spots” (11). Air pollution, hazardous solid waste, and water quality were identified as priorities for remedy. SO<sub>2</sub>, NO<sub>x</sub>,

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PM, and heavy metals were considered the worst pollutants (12, 13). As shown in Figure 1, a combination of strict legislation and huge investments resulted in a substantial decrease in emissions of all the main pollutants, ranging from 38% (NO<sub>x</sub>) to 88% (SO<sub>2</sub>). Although air emissions dropped during the 1990s in most European countries, the rate of improvement in the Czech Republic was unmatched (5). Huge investments in desulfurization scrubbers by energy utilities were the primary reason for the reduction in SO<sub>2</sub> emissions. Nevertheless, compared with the average values in the EU-15 (the 15 countries that formed the EU until the end of April 2004), the Czech Republic still produces quite high emissions of some pollutants (e.g., 22.5 kg SO<sub>2</sub> per capita compared with 15 kg per capita in the EU-15, and 33.3 kg NO<sub>x</sub> per capita compared with 24.7 kg per capita in the EU-15 in 2004) (14).

At the beginning of the 1990s, water pollution was among the most pressing issues of the Czech environment. The major waterways were polluted, and groundwater was highly contaminated (15). Attention was focused on reducing the amount of pollution discharged into surface water via construction, rebuilding, and intensification of wastewater treatment plants as well as construction of sewer systems. As a result, all of the main indicators of pollution discharged into surface water dropped substantially between 1990 and 2004. As shown in Figure 2, BOD<sub>5</sub> (biochemical oxygen demand) decreased by 93%, COD<sub>cr</sub> (chemical oxygen demand) by 86%, and insoluble substances by 89%.

In the mid-1990s, new and rebuilt wastewater plants began to influence the quality of water; their numbers increased by >800, and total capacity increased 50% (16). Almost all communities with >10,000 people had wastewater treatment plants by 2000. Currently, surface-water pollution remains an issue in places with 2000–5000 inhabitants, many of which still lack sewer systems and wastewater treatment plants.

The Czech Republic is relatively densely populated (130 people/km<sup>2</sup>), with an extensive linear infrastructure (both railways and roads). Even so, 15.9% of the country’s area is protected—slightly above the EU-15 and Organisation for Economic Co-operation and Development (OECD) averages of 12.1% and 12.4%, respectively. Protected areas have increased 30% since 1990. If the NATURA 2000 system (a set of localities mostly protecting endangered species of plants, animals, and natural habitats within the EU) is included, protected areas amount to 18.6% (16).

The environmental improvements could not have happened without massive investments. In the past 15 years, >350 billion Czech koruna (CZK) (\$15 billion) was invested in environmental protection in the Czech Republic (~CZK150 billion came from government sources). As shown in Figure 3, investment in environmental protection reached the highest percentage of GDP ever (2.0–2.5%) in 1992–1997, dropping to 0.7% in 2002.

In the 1990s, most of the investments were aimed at air protection (the largest amounts were invested in 1995–1997 because of the massive desulfuriza-

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tion projects). After 1998, investment was focused on water protection. Such a high level of investment, concentrated within a few years, is unlikely to be repeated. According to recent calculations, CZK180 billion will need to be invested in 2005–2010 to meet the regulatory requirements of the European Communities (16).

### The realistic view

The preceding considerations appear to justify the EPI findings cited at the beginning of this article. It should be kept in mind, of course, that EPI is not an index that captures the overall environmental situation; it is an index of performance. (EPI uses a proximity-to-target methodology focused on a core set of environmental outcomes linked to policy goals; 1.) We believe that, regarding environmental performance, the Czech Republic is indeed among the advanced countries. The positive changes were achieved because of the coexistence of several key factors: the new approaches in governance and legislation, the economic transition, and the impact of the EU and its environmental policies.

Since the beginning of the transition of the country from a communist underdog to its current memberships in OECD and the EU, a relatively strong environmental ministry has existed. As the first Minister for the Environment, one of the authors of this article (Moldan) was responsible for shaping a ministry that had never existed before. In the new ministry, enthusiastic officials introduced all of the necessary measures extremely quickly. These included the State Environmental Fund (with a relatively large budget), a powerful Environmental Inspectorate, an avalanche of legislation, scientific institutions, providers of data and information, public education, and a support system for nongovernmental organizations.

Strong, knowledgeable, and focused leadership was supported by a public fed up with communist negligence and incompetence and, at the same time, concerned about their health. Perhaps most importantly, the political climate was conducive to quick passage of efficient laws and mobilization of large sums of money for environmental protection. Obviously, restriction or shutdown of many energy-intensive and heavily polluting industries caused instant improvement of many environmental parameters, particularly in 1989–1992.

After 1992, several factors contributed to environmental improvements, including structural changes in the economy, stricter environmental regulations, and technological change. Sporadic analyses of their relative importance were performed, both in the Czech Republic and in other countries with transition economies. One study, which analyzed the relationship between economic performance and the main air emissions in the Czech Republic in 1993–2002, identified three areas of change: the level of overall economic performance, the economic structure, and environmental intensity (emissions per GDP). Results revealed that the reduction of emissions, except for greenhouse gases, was caused by changes in economic structure and environmental intensity. Environmental investments in manufacturing industries had

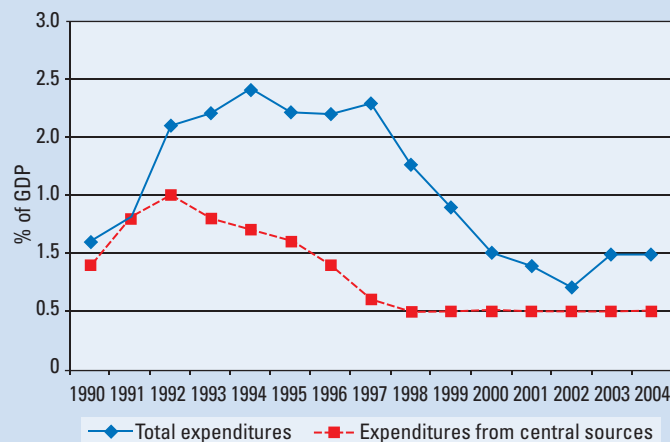
a significant impact in reduction of PM emissions and some effect on SO<sub>2</sub> emissions. However, the impact was insignificant for NO<sub>x</sub> and C<sub>x</sub>H<sub>y</sub> emissions. The fall in emission intensities was associated with an increase in capital or labor productivity or both. The influence of technological change steadily diminished as the transition economy replaced old, inefficient capital structures (17). Other studies showed that for the industrial sector throughout Europe, virtually no relationship can be found between the change in SO<sub>2</sub> emissions and the growth in industrial output. This lack of association suggests that the situation is country-specific (18).

An additional, important long-term motivation for making positive environmental changes occurred in 1993, when the Czech Republic became a candidate for EU accession. In May 2004, the country officially became an EU member state. The EU impact may be distinguished as both direct and indirect (informal). The direct effects—transfer of knowledge and financial support from the EU—were powerful driving forces for environmental improvement in the region during the pre-accession period (19). However, informal effects were of even greater importance; from the beginning, politicians, state officials, and business leaders were aware that EU accession was near and planned their actions accordingly.

FIGURE 3

### Investments in environmental protection (% of GDP) in the Czech Republic, 1990–2004

The 2004 data are estimates.



When we examine the Rainbow Programme, the first environmental recovery program for the Czech Republic (12), we can see that basically all the envisaged tasks were completed. We consider it remarkable that, although the programme was only a framework document that defined strategic goals and related tasks but did not quantify objectives and deadlines, almost all its measures were implemented.

Still, the luster of this optimistic picture faded in 1999–2000, as stated in a recent OECD report (20). The report notes that despite some recent progress, the Czech Republic is still a big polluter (in per capita

terms) and one of the least efficient users of energy and materials within OECD. Since 1998, public and private spending on environmental problems has been drastically reduced, and much progress is still needed to achieve the economic and health benefits of a clean environment. These weaknesses were also identified by the Czech Ministry of the Environment (21).

Several reasons exist for the slowdown of environmental improvement in the Czech Republic. First, people were generally happy with the rapid improvement achieved during the first years of the transformation and became more than a little complacent. Second, they observed that the government was capable of doing the job—not impeccably, but in sharp contrast to the communists—so they didn't see a need to remain personally engaged. Thus, public interest decreased substantially (22). Third, people found the economic efforts very rewarding; they were much better off than before. The environmental issues were not only put on the back burner but also increasingly seen as an obstacle to even more rapid development. The concept of sustainable development—trying to reconcile conservation with development by finding synergies and removing conflicts—has not yet been fully understood by the Czech people (23).

The Czech Republic has witnessed less progress in recent years. The most important environmental problems are greenhouse-gas emissions (high per capita and per GDP values that, nonetheless, meet the Kyoto Protocol target to keep emissions 8% below the 1990 level); rather large concentrations of the fine fractions of PM (<10 µm and <2.5 µm in diam) and PAHs; unsatisfactory surface-water quality; noise exposure; and poor health of forests (20). Damaged forests, the best-known symptom of acid rain, are a notable example of long-term effects. Even after 15 years of positive changes (e.g., decreased pollution, liming, fertilization, and changes in forest composition), forest health has not improved—the rate of defoliation has actually gone up (15, 24).

However, the situation is definitely not bad: many environmental parameters are being maintained at acceptable levels or are even improving, albeit slowly. But things have changed. In 1990, although the tasks were huge, the battle was against a limited number of sources (mostly big ones, like power plants or other large polluters). These were perhaps easier to fight than a myriad of small offenders, like cars, or households with their ever-increasing consumption. Fortunately, the well-built framework of institutions, laws, information, and other measures laid down at the beginning is still working. In addition, it was boosted recently by the strong EU environmental policy. All indicators show that the Czech Republic has become a more typical European country (25, 26) and that the current improved environment may be considered representative. The remarkable progress during the 1990s is viewed as an exception—truly, an impressive and positive exception with a lasting impact.

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