Bulgaria
Environmental Strategy Study Update and Follow-Up

December 30, 1994

Agriculture and Environment Operations Division
Country Department I
Europe and Central Asia Region

Document of the World Bank
CURRENCY AND EQUIVALENT UNITS
As of December 1994

Currency Unit = Lev (Plural: Leva), Abbr.: Lv
US$1.00 = 66 Leva

FISCAL YEAR

January 1 - December 31

ABBREVIATIONS AND ACRONYMS

BOD  Biochemical Oxygen Demand
BSCR  Black Sea Coastal Region
C and C  Command and Control
Cd  Cadmium
CHP  Combined Heat and Power
CMEA  Council for Mutual Economic Assistance
CO  Carbon Monoxide
COE  Committee of Energy
COF  Committee of Forests
CoM  Council of Ministers
CSM  Committee of Standardization and Metrology
CZM  Coastal Zone Management
EBFs  Extra-budgetary funds
EIA  Environmental Impact Assessment
EMTC  Environmental Management Training Center
EPFs  Environmental Protection Funds
EPA  Environment Protection Act
ERB  Europe Regional Bureau (of WHO)
ESS  Environmental Strategy Study
EU  European Union
ETP  Environmental Training Program
FAO  Food and Agricultural Organization
FGD  Flue Gas Desulfurization
GDP  Gross Domestic Product
GEF  Global Environment Facility
GIS  Geographic Information System
GNP  Gross National Product
GOB  Government of Bulgaria
HEI  Hygiene Epidemiology Inspectorate
H₂S  Hydrogen Sulfide
IBRD  The World Bank
<table>
<thead>
<tr>
<th>Acronym</th>
<th>Full Form</th>
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<tr>
<td>IDF</td>
<td>Institutional Development Fund</td>
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<tr>
<td>IPRTD</td>
<td>Information, Public Relations and Training Division</td>
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<tr>
<td>KWh</td>
<td>Kilowatt Hour</td>
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<td>LIC</td>
<td>Laboratory and Information Center</td>
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<td>MEPFs</td>
<td>Municipal Environmental Protection Funds</td>
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<td>MOA</td>
<td>Ministry of Agriculture</td>
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<td>MOE</td>
<td>Ministry of Environment</td>
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<td>MOH</td>
<td>Ministry of Health</td>
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<td>Ministry of Finance</td>
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<td>MOI</td>
<td>Ministry of Industry</td>
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<td>MRDC</td>
<td>Ministry of Regional Development and Construction</td>
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<td>MOT</td>
<td>Ministry of Transport</td>
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<td>NEAP</td>
<td>National Environmental Action Plan</td>
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<td>NEPF</td>
<td>National Environmental Protection Fund</td>
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<td>NGOs</td>
<td>Non-governmental Organizations</td>
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<td>NIMH</td>
<td>National Institute for Meteorology and Hydrology</td>
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<td>NNPS</td>
<td>National Nature Protection Service</td>
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<td>NOx</td>
<td>Nitrogen Oxides</td>
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<td>NSEMEI</td>
<td>National System for Ecological Monitoring and Environmental Information</td>
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<td>OECD</td>
<td>Organization for Economic Cooperation and Development</td>
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<td>O$_3$</td>
<td>Ozone</td>
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<td>PAFs</td>
<td>Pollution Abatement Funds</td>
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<td>Pb</td>
<td>Lead</td>
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<td>PHARE</td>
<td>European Union Assistance Program for Central and Eastern Europe</td>
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<td>PM</td>
<td>Particulate matter</td>
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<tr>
<td>REIs</td>
<td>Regional Environmental Inspectorates</td>
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<td>REPIs</td>
<td>Regional Environmental Protection Inspectorates</td>
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<td>SG</td>
<td>State Gazette</td>
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<td>SO$_2$</td>
<td>Sulfur Dioxide</td>
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<td>UN-ECE</td>
<td>United Nations--Economic Commission for Europe</td>
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<td>USG</td>
<td>United States Government</td>
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<td>USAID</td>
<td>United States Agency for International Development</td>
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<td>USEPA</td>
<td>United States Environmental Protection Agency</td>
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<td>USTDA</td>
<td>United States Trade and Development Agency</td>
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<tr>
<td>WCRM</td>
<td>Water Companies Restructuring and Modernization Project</td>
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<td>WHO</td>
<td>World Health Organization</td>
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Background

i. The Environmental Strategy Study, carried out in 1991-1992 with assistance from the World Bank and the United States Government, laid out the principles for environmental policy, reviewed the main environmental problems, identified the corresponding priorities, and provided a number of recommendations in response to these priorities. It concluded that past economic and management policies were a major cause of environmental degradation, so that market-oriented reforms would produce environmental improvements. It outlined the institutional, legislative and regulatory reforms required to implement its recommended policy and other measures, stressing the importance of a decentralized and participatory approach to environmental management and of establishing a balance between "command and control" and market mechanisms.

ii. The present Update and Follow-Up was undertaken at the request of the Government of Bulgaria and with a strong contribution from the country. In preparation for the update, the Ministry of Environment reviewed and assessed progress in the implementation of the original action plan. Staff from the Ministry contributed to the drafting of the report, and to formulating its conclusions and recommendations. A series of meetings were held with experts from the Ministry of Industry and the Committee of Energy, the Ministry of Regional Development and Construction, the Ministry of Agriculture, the Committee of Forestry, as well as with municipal authorities and NGOs. A workshop on the recommendations of the report for environmental experts from central and local Government agencies and NGOs was carried out jointly by the Ministry of Environment and the Bank's team.

iii. Considerable efforts have been made since 1991 to follow the action plan laid out in the Study. The main areas of progress have been: the development of important environmental legislation and regulations; the strengthening of environmental institutions including the Ministry of Environment and other agencies; the improvement in the system of environmental monitoring; and the establishment of mechanisms for funding environmental protection.

iv. As a result, environmental quality has improved in general. Pollution levels have been reduced in the "hot spots" identified by the Study (see Tables 4 and 5 plus the map for their location). In addition, the overall environmental management framework is better founded to accommodate the undertaking of further environmental measures in the future. Nevertheless, implementation of the Study recommendations was delayed by the slow pace of economic reforms on which it was based. Consequently, progress has been slower than anticipated, and
other transitory environmental improvements have mainly resulted from the economic and industrial slow-down.

Economic Restructuring and Environment

v. Bulgaria has faced considerable economic difficulties since 1991, marked by a sharp decline in total output and value-added and a dramatic rise in unemployment. There has been significant progress in market liberalization and macroeconomic stabilization. However, energy price reforms have been unbalanced and have tended to encourage the use of low quality domestic coal. The emergence of new enterprises, especially in the food sector, raises environmental policy issues which have yet to be addressed (e.g., emission control of small point sources of pollution, and development of incentives for pollution prevention/minimization in small and medium size enterprises).

vi. The decline in economic activity and industrial production from 1989 to 1993 was accompanied by a drop in energy consumption and was marked by a shift in the composition of industrial output from industries which are major sources of air pollution towards those which tend to discharge water pollutants -- see Tables 1 and 2. Estimates of the impact of economic restructuring on pollution loads since 1989 (Table 3) suggest that (i) air pollution has been reduced considerably more than water pollution, (ii) this trend is likely to continue through 2000, and (iii) the principal water pollution contributors are small and medium sources rather than large industrial plants.

vii. Analysis of monitoring data on environmental quality suggests that, despite a substantial improvement in its air quality, Asenovgrad remains a high priority "hot spot", along with Dimitrovgrad-Galabovo, Kurdjali, Pernik and Pirdop-Zlatitsa. There are significant, but less serious, problems of air quality in Burgas, Pleven, Sofia-Kremikovtsi, and Varna-Devnia. There was a significant overall improvement in water quality in most river basins. In particular, water pollution caused by agriculture appears to have fallen markedly. The industrial activity decline is reflected in the improvement in water quality for the Jantra, Maritsa and Tunja rivers. Nonetheless, there remain serious concerns about heavy metal levels in the Arda and upper Maritsa river basins associated with discharges from metallurgical plants. These sources have also caused substantial heavy metal contamination of soils in their vicinity or in more distant areas as a result of irrigation with polluted waters.

Toward Improved Environmental Management

viii. Bulgaria's environmental institutions are technically strong but analytically and managerially weak. The Ministry of Environment (MOE) has strengthened its capacity since 1991 through the creation of new departments, increases in staffing, and extensive training. Both internal coordination and collaboration with other relevant agencies have improved. An inter-ministerial committee for environmental projects has been established, chaired by the Prime Minister. At the local level, the capacity of Regional Environmental Inspectorates (REIs) has been enhanced by providing more staff, better monitoring equipment, and training. Most municipalities have also strengthened their environmental units. Nonetheless, technical
assistance is needed to enable the MOE to prepare and implement new standards, laws and regulations.

ix. A new Environmental Protection Law was passed in 1991 and subsequently amended in 1992. This was followed by regulations on Environmental Impact Assessment (EIA) promulgated in December 1992, which set out detailed requirements, process and criteria for EIAs. Currently, a regulation on Environmental Audits is being prepared. This would cover existing enterprises, especially those subject to privatization. A transitional screening procedure, overseen and assisted by the REIs, will be applied while the regulation is phased in. Detailed work is proceeding on drafting specific regulations that will fill out the broad framework laid down in the Environmental Protection Law, while other aspects should be further pursued. These would deal with standards, permits, monitoring and other issues in the areas of air quality, water quality, waste management and natural resources.

x. Ambient, emission, and performance standards are being revised and linked to an enforceable regulatory framework. Ambient standards for particulates should also be revised, and vehicle emission standards for hydrocarbons and NOx should be developed to complement the new ambient standards established for eight air pollutants in line with EU standards. Technical assistance and training in air quality dispersion modelling will be required if, as planned, industrial pollution permits are introduced and industrial emission limits are to be differentiated according to local air pollution levels. A similar approach is envisaged for liquid discharge limits (i.e. based on impact on the quality of the receiving media), since wastewater from many industries is discharged into municipal sewer systems without pretreatment. Five regulations covering water quality management and sewer discharge standards have been developed.

xi. In order to improve the enforcement of these regulations, particular emphasis has been given to the development of an efficient monitoring system combined with improvements in the collection and dissemination of environmental data. A National System for Ecological Monitoring and Environmental Information (NSEMEI) has been created and funded initially from the state budget. Constraints on future budgetary spending imply that NSEMEI must gradually become less dependent on the state budget over time. For this purpose, it is recommended that a stable mechanism for ensuring adequate finance for the monitoring and information system be established by progressively increasing NSEMEI's revenue from charges and service fees.

xii. The level of pollution fines does not reflect pollution abatement costs and has declined in real terms since 1989 as a consequence of inflation. Nonetheless, the system of fines and proposed pollution fees is a step towards implementation of the "polluter pays" principle. Enforcement of these penalties is hampered by the general economic decline, the grim financial situation of the worst polluters, and concerns about unemployment. Even though the present economic climate is not conducive to introducing new economic instruments for environmental protection, there is scope for testing alternative approaches on a pilot basis, with a view to gradually introducing them. These might include water pollution charges, differentiated fees for the management of municipal wastes, and special levies on materials which generate hazardous wastes.
xiii. Building upon progress in establishing an appropriate legislative and regulatory framework to address issues of soil pollution as well as solid and hazardous waste management will require a combination of institutional development and the implementation of detailed technical measures such as control of outdated pesticides, rehabilitation of surface mines and better operating procedures for landfill sites. Particular attention should be paid to the development of a system to monitor and track the use and disposal of hazardous wastes.

xiv. Bulgaria has made substantial progress in the areas of coastal zone management and nature protection. However, the prospect of new regional transport growth patterns, further tourist development and changing economic pressures on both protected and unprotected areas have revealed weaknesses in the coordination of policies across the relevant ministries and agencies. The newly-established National Nature Protection Service should forge closer links with the Regional Environmental Inspectorates to ensure effective cooperation. Further, the design and role of a 'nature tax' or of a more general set of fees for the use of biological resources in funding nature protection needs to be reconsidered.

xv. As in other transitional economies, budgetary funds for environmental protection are very limited. The MOE relies heavily on pollution fines, with revenue earmarked for the National and Municipal Environmental Protection Funds. While they are managed by elected Boards, with transparent operating procedures and expenditure accountability, their supervision could be improved through an advisory committee. They should also be audited annually by independent auditors and be allowed to charge interest on loans extended to enterprises or projects financed by the Funds.

xvi. Following a request from MOE, the Bank assisted in early 1994, in the development of a concept for a proposal for a debt-for-environment swap. Further work developing the scope and institutional mechanisms for such a swap with Bulgaria's main debt holders is expected.

xvii. The Information, Public Relations and Training Division -- created in 1993 -- is improving MOE's relations with NGOs, the media, the scientific community and the public. MOE should develop operating guidelines for its contacts with all sectors of the public.

Priorities and Next Steps

xviii. After reviewing the full range of environmental problems, it is recommended that priority attention in the formulation of policy and the design of projects should be given to the following five issues:

- reducing emissions of lead and other heavy metals from metallurgy plants;
- reducing exposure to air-borne lead from the use of leaded gasoline by promoting a shift from leaded to unleaded gasoline;
- v -

- reducing exposure to high levels of particulates and sulfur dioxide in Asenovgrad-Plovdiv, Dimitrovgrad-Galabovo, Kurdjali, Pernik and Pirdop-Zlatitsa;

- reducing exposure to high levels of specific air pollutants in Burgas, Pleven, Sofia-Kremikovtsi, and Varna-Devnia; and

- minimizing contamination of drinking water and food supplies by heavy metals and toxic organic compounds.

xix. These have been identified as environmental priorities by applying the criteria developed for the Environmental Action Programme for Central and Eastern Europe. In each case, pollution has been documented as posing a direct threat to the health and well-being of significant numbers of people. At the same time, the costs of greatly reducing the damage caused by such pollution are very low, and may even be negative, i.e. there are 'win-win' options which combine better environmental performance and greater economic efficiency. This combination implies that the benefit-cost ratios for measures that address these issues should be high.

xx. The key recommendations concerning policies, institutional developments and targeted interventions focusing on these environmental priorities are summarized in Tables 7-9. It is particularly important to establish an appropriate policy framework since this provides the foundation of incentives on which investments, technical assistance and other measures must rest. Immediate action is required to:

- penalize the use of leaded gasoline more heavily and relax constraints on the supply of unleaded gasoline;

- substitute gas or other fuels for low quality coal and lignite used by households, other small boilers and district heating plants by various measures including the introduction of "smokeless zones", tax penalties, and investments in gas distribution and conversion;

- promote good housekeeping and low cost control measures in metallurgical and chemical plants;

- increase and then maintain the real level of pollution fees and fines, especially for key pollutants such as heavy metals and particulates.

xxi. A number of project ideas which address the priorities identified here and which could be combined with appropriate policy interventions have been identified as warranting further consideration and development. It has been agreed that MOE would cooperate with other interested Ministries in this exercise. Some of the resulting proposals might be suitable for financing under various externally - supported operations. Others might form the basis for a Pollution Abatement Project that would combine support for key policy measures with finance for investments with both economic and environmental benefits.
While the overall strategy laid out in the original Environmental Strategy Study remains valid, more attention needs to be paid to phasing the implementation of policies and other actions to reflect constraints on institutional capacity as well as economic circumstances. Thus, the main new recommendations in this report are:

- environmental policies and projects should focus on a limited number of critical priorities, such as those outlined in para. xviii above;

- the switch from leaded to unleaded gasoline should be accelerated by tax measures and other price and policy incentives and deterrents, and investment to relax supply bottlenecks;

- financial mechanisms for mobilizing resources for environmental projects, especially those yielding economic and environmental gains, need to be developed in conjunction with the proposal to initiate a 'debt-for-environment swap'.
1. In early 1992 the Government of Bulgaria adopted a National Environmental Action Plan (NEAP) based on the Environmental Strategy Study (ESS) carried out with the assistance of the World Bank and the United States Government (the US Agency for International Development and the US Environmental Protection Agency). The NEAP started from the premise that much of the environmental degradation in Bulgaria was the result of inappropriate economic and other policies. Market liberalization, privatization and other reforms would penalize the excessive use of energy and other resources, reducing the associated environmental damage. These gains would be reinforced by the effects of market-driven industrial restructuring which would shift production from older, inefficient plants towards more efficient and less polluting plants.

1.2 The NEAP also emphasized the development of the institutional framework required to formulate policy, to translate policy into laws and regulations, and to implement and enforce those regulations. It stressed that such a framework should conform to the political and legal traditions of the country and should be consistent with its culture and norms. As far as possible, environmental management should be decentralized and should include a variety of mechanisms to encourage public participation in decision-making. Implementation of environmental policies should rely on a balance between "command and control" (C and C) methods and use of market mechanisms.

1.3 The ESS has been a useful tool for the Government of Bulgaria in developing its approach to environmental management. It has encouraged the exchange of ideas between the various branches of Government and alerted them to the magnitude of the task ahead. Progress has been made in developing the legal framework for environmental protection and natural resources management. Many draft laws and regulations are awaiting consideration by the Parliament or are nearing completion. Facilities for environmental monitoring have steadily improved with assistance from EC-PHARE and other donors. The Ministry of Environment has been restructured, clarifying departmental responsibilities and skills. National and municipal environmental protection funds have been established from the revenues generated from pollution fees and fines, to finance a range of environmental activities.

1.4 Implementation of the NEAP has been hampered by delays in launching the economic reforms on which it was based, especially those concerning privatization and the decentralization of responsibilities to local government. While commendable progress has been made in developing the legal and regulatory framework, much greater participation by industrial and other interested parties will be required to achieve an effective and workable system of environmental management. As a result, improvements in environmental quality since 1991 are
largely associated with the reduction in the level of economic and industrial activity and could easily be reversed once the economy starts to recover. Another factor that may have hindered the implementation of the EAP is that it was probably viewed as not a national but an MOE policy instrument. With this in mind, the present Update and Follow-up put a particular emphasis on providing for the participation and consultation of a wide variety of parties, including different ministries and other agencies, academic and research institutions, industries, NGOs, and the media.

1.5 The World Bank has been incorporating the recommendations of the ESS into its lending operations and sector work. The first energy loan to Bulgaria\(^1\) included both policy and investment measures to support energy conservation. In response to the strategy, the Bank has approved a water and sanitation loan\(^2\) which will finance the completion of a number of drinking water and waste water networks and treatment plants. The Bank is also providing support to the Bulgarian government on coastal zone management, irrigation development, local government reform (which will facilitate the decentralization of environmental management), and various issues of environmental policy and investment such as the system of water pollution charges.

1.6 The U.S. Government has given particular emphasis to support for institutional strengthening and for drafting a legal framework for environmental management. Technical assistance, policy advice and training have been provided in environmental economics, policy, and risk assessment both by expatriate consultants, the US Government, and the USG-supported Environment Management Training Center. The USG is also financing projects for sustainable development at the municipal level, and is providing funds, equipment and consulting staff. A biodiversity conservation project is currently in preparation ($4 million), with additional funds provided by the GEF ($150,000). Moreover, the US Government co-financed (together with the National Environmental Protection Fund, which provided over 8 million leva) a project designed to mitigate problems at Lake Srebarana\(^3\). If additional work proves to be necessary, it will be funded under the World Bank WCRM loan.

1.7 The present report, requested by the Government of Bulgaria in preparation for the 1995 Sofia Ministerial Conference on Environment for Europe, is intended to assist the Government to update and implement the NEAP by focusing on three main objectives:

- to identify a medium-term investment program to address the most pressing environmental issues;

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2/ Water Companies Restructuring and Modernization Project (WCRM); Loan 3739-BU, May 26, 1994, US $98 million.

3/ The lake is decreasing because of reduced water inflow, following the construction of dams upstream. The project will provide for water flow from the Danube into the lake through a diversion canal.
to address the financial and institutional constraints on implementation imposed by the transitional character of the Bulgarian economy, allowing flexibility for modifications as the pace of the economic restructuring accelerates; and

to encourage participatory methods to ensure ownership of the program and to facilitate dissemination of information and institution building.

1.8 The report is organized in the following parts: after this Background section, the second part provides a succinct description of the original ESS; the third part discusses the developments in Bulgaria since 1991 and their environmental impact; the fourth part provides an overview of the actions taken by the Government since 1991 in improving environmental management; the fifth part proposes a two-pronged course of action for the medium term based on (i) ameliorating the impact in the most damaging "hot spots" and (ii) improving the institutional and financial weaknesses of the present system at a pace that is consistent with the pace of overall economic restructuring in the country; finally, the sixth part outlines the recommended next steps and the envisaged role of external assistance in this respect. Annexes cover: the progress toward implementing the NEAP; a profile of the industrial sector; a description of environment management practices; and a proposal for a Debt-for-Environment swap with potential application in Bulgaria.

II. SUMMARY OF THE ORIGINAL FINDINGS AND CONCLUSIONS

A. Environmental Conditions

2.1 The original ESS (1991-1992) found that the most serious environmental problems were localized in specific areas (hot spots) where pollution (mostly from heavy industry) caused hazards to the health of local residents (about twelve percent of Bulgaria's population). High concentrations of particulates, heavy metals, volatile organic compounds, and SO₂ in the air were identified as a serious problem in many Bulgarian cities, caused by power and industrial plants as well as residential and commercial sources. NO₃ concentrations were not a serious problem in most urban areas, probably due to the relatively small number of motor vehicles in Bulgaria at that time.

2.2 Serious river pollution was primarily caused by industrial effluent, feedlot waste, and municipal sewage. While water quality was generally good, elevated nitrate levels in drinking water supplies were a widespread problem in three regions. The Bulgarian Black Sea coast met recreational use standards, except around Burgas and Varna, but there were concerns about the threat of Black Sea eutrophication with the increasing levels of BOD and nutrients.

4/ See Tables 4 and 5, plus the map for their locations.
2.3 Industry, mining, quarrying and construction have been major contributors to soil degradation and pollution. Many municipal landfills were operated as uncontrolled dumps with industrial wastes -- including toxic and hazardous materials -- mixed with domestic waste.

2.4 The older reactors at the Kozloduy nuclear plant, units 1-4, are Soviet designed VVER 440 model 230s and considered unsafe by many western experts. While there have not been major environmental problems with these units, the potential for problems exists and the Government of Bulgaria has agreed with the Nuclear Safety Account of the EBRD that these units will be closed when alternative conventional generating capacity is available. Several World Bank reports have been prepared dealing, inter alia, with this issue, including the Bulgaria Energy Strategy Study (Report 10143, April 30, 1992); Bulgaria Power Demand and Supply Options Study (Report 11610, June 22, 1993); and the paper prepared by the World Bank and the Bulgarian Government for the recent Consultative Group Meeting, Bulgaria: A Strategy for Electric Power and Nuclear Safety (May 30, 1994). The environmental safety in nuclear power production in Kozloduy and uranium mining have also been extensively investigated by other international institutions such as the International Atomic Energy Agency and the European Union. They have pledged assistance to the Bulgarian Government in these areas. Accordingly, the original ESS\(^5\) -- and by extension the present update -- did not include this sector in its scope.

2.5 Soil erosion, acidification, waterlogging, salinity, and heavy metal contamination have degraded about one fifth of the total forest area. While Bulgarian forests seemed less affected by pollution than those in Central Europe, better forest management was a major concern. The forest reserves were relatively young, and management for optimum growth was a priority. Timber cutting was prohibited, therefore the main threat to Bulgaria's 280,000 ha of protected areas were development activities and overuse by visitors.

B. Economic and Environmental Policy

2.6 The original ESS identified massive price distortions and state control over resource allocation as major causes of environmental degradation. Systematic under-pricing of resources and raw materials led to usage of per unit of output substantially higher than in market economies. The result was high levels of pollution per unit of output whose impact was exacerbated by the emphasis on heavy industry and by reliance on indigenous fuels, largely low quality lignite. Price distortions and subsidies created a bias against investments in pollution abatement, adequate maintenance of existing plants and recycling.

2.7 Economic and industrial reforms were thus expected to have a substantial and beneficial impact on the environment. It was concluded that market liberalization, privatization and other reforms would penalize the excessive use of energy and other resources, reducing the associated environmental damage. These gains would be reinforced by the effects of market-driven industrial restructuring which would shift production from older, inefficient plants

\(^5\)/ Except for a descriptive annex.
towards more efficient and less polluting plants. Therefore, the ESS argued that the adoption of economically rational industrial and energy policies were a critical first step in promoting sound environmental management.

2.8 The effects of economic restructuring on the environment might not, however, be entirely positive. The contraction of economic activity and the shift in the composition of final demand from investment and government consumption towards exports and private consumption would reduce emissions. On the other side, industrial restructuring combined with privatization and changing trade relations with the former Soviet Union and Western Europe might lead to a growth in output from sectors such as paper, chemicals and branches of metallurgy. On balance, it was expected that air pollution would be reduced but that progress might be slower in reducing industrial emissions of water pollutants.

2.9 To maximize the environmental benefits of economic reform, the ESS recommended that appropriate regulations and economic incentives for pollution control should be introduced. These would reinforce the impact of higher energy prices on emissions and ensure that resources were not transferred to industries that were considered internationally competitive only if no account were taken of the environmental damage that they cause. The ESS, thus, emphasized the need to combine C and C type of measures, including environmental impact assessments and emission permits enforced by legal sanctions for violations, with market-based instruments such as pollution fees and user charges for natural resources.

C. Institutional Framework

2.10 The ESS highlighted the substantial overlap between the functions of several government agencies with environmental responsibilities, pointing to the need to rationalize monitoring activities in order to avoid duplication, improve coordination, and strengthen quality control. One recommendation was that ambient standards be set by MOE after consultation with MOH. Few of the health and environmental inspectorates were relatively well equipped, so it was suggested that MOE and MOH should coordinate their work on environmental monitoring.

2.11 Centralization of day-to-day environmental control was seen as undesirable. It was suggested that the role of regional environment inspectorates should be enhanced and that Regional Environmental Protection Funds should be established to share the revenues accruing from pollution charges and fines. Local governments should be given the authority to regulate small-scale pollution sources as well as the duty of providing environmental services, which had been assigned to them by the Local Administration Law.

2.12 Since responsibility for protecting natural areas was highly fragmented, the ESS called for the creation of a Nature Protection Service, funded from the national budget and the Nature Protection Fund, with broad authority for protected area management but with functions entirely separate from natural resource exploitation. Targeted initiatives to increase public awareness of environmental issues were required. In view of the important role of NGOs in this respect, there was a need for better communication and coordination by the MOE.
D. Legislation and Standards

2.13 The ESS found that the legislation and regulatory framework for environmental protection was inadequate. Shortly before the completion of the ESS, the National Assembly passed the Basic Environmental Law in October 1991. The new Law introduced three basic principles: (i) the polluter pays principle, requiring internalization of environmental externalities; (ii) the prevention and precautionary principle; and (iii) the public right-to-know principle. The Law defined the enforcement powers of national and local government agencies. A new framework for environmental standards was established, allowing revision of the most stringent ones according to health safety requirements, application of best available technology, use of qualified expertise, and international practice. The Law did not attempt to define all of the elements necessary for developing an effective regulatory system. Thus, the ESS recommended that the most critical regulations should be prepared or revised in parallel as revision of the Basic Law and development of subsidiary legislation.

2.14 Although strict ambient air and water quality standards existed, the lack of an effective permit system meant that it was not possible to ensure that these standards were respected. The ESS proposed a phased approach under which interim standards for the major air pollutants would be adopted along with a program for achieving ambient air quality standards consistent with those of the EU over an appropriate transitional period. General emission standards should be replaced by plant and/or location specific emission limits which would be periodically revised to meet the revised ambient standards for the targeted pollutants. This approach would imply an important role for local and regional governments in determining such emission limits and compliance schedules after negotiation.

2.15 While water quality standards were more realistic than air quality standards, the use of ambient water standards in setting discharge limits led to unenforceable requirements. In their place, a similar phased approach based on interim effluent standards and sewer ordinances together with compliance schedules to meet stricter standards were required. The ESS also recommended that hazardous waste regulations should be issued. These should include reporting obligations which would permit the development of a tracking system.

E. Initial Results

2.16 The points of the Action Plan developed by the original ESS and the progress towards its implementation to date are summarized in Annex 1. As can be seen there, the Plan was largely process rather than product oriented. Accordingly, most of the actions taken were related to strengthening the institutional, legislative, and regulatory framework, and monitoring.

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6/ These principles are key for the establishment of an effective environmental policy framework. The polluter pays principle provides legislative ground for the introduction of policy instruments (emission and performance standards, pollution taxes, fees and charges) which directly or indirectly transfer the mitigation costs on the polluter. The prevention and precautionary principle advocates policy interventions that favor pollution prevention versus cure. The public right-to-know principle requires full disclosure of information on the state of the environment, and transparency of environmental policy decisions (on a national and on local levels).
capacity of the country except for certain specific mitigative measures in the hot spots identified by the ESS. Therefore, the corresponding impacts of these actions are two-fold: (i) a more solid environmental management system is being put in place, which should facilitate the implementation of additional measures in the medium- and long-run; and (ii) there has been a significant improvement in the environmental conditions of the hot spots (see Section III. C).

III. ENVIRONMENTAL IMPACT OF ECONOMIC RESTRUCTURING

A. General Economic Trends Since 1991

3.1 Bulgaria's economic situation at the outset of the reforms was more difficult than that in other transitional economies. Its high dependence on trade with the former Soviet Union and other CMEA countries -- 70 percent of foreign trade -- left it extremely vulnerable as CMEA trading arrangements broke down. There was a rapid decline in exports to traditional markets and the terms of trade deteriorated sharply as the prices of imported fuels moved to world market levels. Total output declined by over 25 percent from 1990 to 1992 while unemployment increased from less than 1 percent in 1990 to over 15 percent in 1993. Value added in the industrial sector fell by about 40 percent, while value added in the agriculture and service sectors fell by 7 and 20 percent respectively. Since 1992, however, the rate of output decline has slowed noticeably and the growth of unemployment has leveled off since the second part of 1992.

3.2 Despite this extremely harsh economic environment, the government made significant progress during 1991 and 1992 on two fronts: market liberalization and macroeconomic stabilization. Most prices were liberalized in February 1991, simultaneously with the creation of a floating foreign exchange regime for Leva in the newly established interbank market. The budget deficit was brought down from 8.5 percent of GDP in 1990 to less than 4 percent in 1991, mainly by severe expenditure cuts (i.e. subsidies, wages and salaries and capital expenditure), despite a larger than expected decline in Government revenues. However, since 1992, mounting budgetary pressures have reversed this progress with an increase in the budget deficit to 14 percent of GDP in 1993.

3.3 The privatization process, although very slow, led to the transfer of 147 enterprises from the state to the private sector, of which about 125 were small enterprises. Many small private enterprises have additionally emerged, mostly in the light industrial sectors and in the service sector. The emergence of new enterprises in the food processing sector has been particularly significant. This has been stimulated by land restitution and price liberalization.

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8/ CMEA: Council for Mutual Economic Assistance

9/ As of August, 1994.
of non-basic food products. This development has made the monitoring and enforcement of environmental regulations related to food processing more difficult. New regulatory approaches, such as self-monitoring and greater use of economic instruments, will be needed to address pollution problems in this and a number of other dispersed sectors.

3.4 It is envisaged that the privatization of many medium and larger enterprises via a voucher mechanism will get underway within the next few months. This raises the issue of environmental liability for past damage caused by these enterprises. In one form or another, the state will have to bear the cost of addressing this damage -- either by accepting a lower price for enterprises which are privatized with an obligation to clean-up past pollution or by undertaking to fund necessary remedial actions. While the government has enacted legislation which requires that privatized enterprises should have environmental audits before or soon after privatization, too little attention has been paid to this issue of environmental liability. The danger is that if there is no indication of the extent of damage when privatization occurs, enterprises will have less incentive to reduce current emissions because they will be able to claim that continuing damage is a consequence of past pollution rather than of current emissions. This will make it more difficult to enforce stricter environmental performance in future. The issues which should be addressed in dealing with environmental liability are discussed at length in the World Bank report "Environmental Liability and Privatization in Central and Eastern Europe" (Report No 11686-ECA, June 1994).

B. Sectoral Implications

Energy Production and Consumption

3.5 In Bulgaria, as elsewhere in Central and Eastern Europe, energy was heavily under-priced relative to other traded goods up until 1991. As a result, most Bulgarian industries used much larger inputs of energy per unit of output than their counterparts in other middle income countries. Overall, the Bulgarian economy used 5-6 times as much energy per $ of GDP in 1989 than comparable market economies. These high levels of energy use caused large amounts of pollution, which was especially associated with the use of low grade domestic coal and lignite.

3.6 The ESS emphasized that raising energy prices to world market levels would generate large environmental benefits. This assessment was based on two aspects of the adjustment that would occur:

(a) Increasing all energy prices would reduce the overall level of energy use per unit of output in industry and other sectors, so that the associated emissions of particulates, sulfur dioxide and other pollutants would fall.

(b) A move to world market prices would result in larger price increases for heavy fuel oil, domestic coal and lignite as well as for electricity and heat, much of which was produced from these fuels. This relative price adjustment would shift the composition of energy use away from heavily polluting energy sources to
cleaner fuels, especially gas and gas oil. Hence, the average level of pollution per unit of energy consumption would also fall.

It was expected that the immediate gain from raising fuel prices would come from lower levels of energy consumption, while the impact of relative price adjustments would be felt over a longer time period.

3.7 In practice, price liberalization for the energy sector has not progressed at the speed and in the manner anticipated 2-3 years ago. The prices of oil products have risen in real terms and are adjusted according to a formula which links these prices to the world market prices of oil products converted at the current exchange rate. Domestic gas prices are set relative to residual fuel oil prices and are significantly below the marginal cost of imported gas. Following large increases in the prices of coal, electricity and heat in the first half of 1991, the real prices of these fuels have tended to decline as the government has tried to reconcile concerns about the social and inflationary impact of higher energy prices with fiscal and other pressures to raise prices. As a result, the prices of these fuels remain well below their economic costs.

Table 1 - Indices of Energy Consumption 1990-93

<table>
<thead>
<tr>
<th>Year</th>
<th>Hard coal</th>
<th>Lignite &amp; brown coal</th>
<th>Gas</th>
<th>Oil products</th>
<th>Electricity</th>
<th>All primary energy</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>87</td>
<td>93</td>
<td>95</td>
<td>83</td>
<td>91</td>
<td>90</td>
</tr>
<tr>
<td>1991</td>
<td>60</td>
<td>84</td>
<td>79</td>
<td>51</td>
<td>81</td>
<td>71</td>
</tr>
<tr>
<td>1992</td>
<td>39</td>
<td>88</td>
<td>73</td>
<td>30</td>
<td>74</td>
<td>60</td>
</tr>
<tr>
<td>1993</td>
<td>31</td>
<td>83</td>
<td>67</td>
<td>25</td>
<td>73</td>
<td>56</td>
</tr>
</tbody>
</table>

Source: Mission estimates based on Planecon & IEA data.

3.8 Despite these declining trends in real energy prices, total consumption of all primary energy fell by 44 percent from 1989 to 1993, as shown in Table 1, rather more than the fall in national income and industrial output. However, as Table 1 shows, this fall has been concentrated on imported fuels and those used in the industrial sector -- especially oil products and hard coal -- whereas consumption of domestic coal and lignite has fallen by only 17 percent. In part, this is a response to changes in relative prices which favor substitution of coal, electricity and heat for oil products and gas. At the same time, administrative pressures and security of supply considerations have pushed the power sector towards greater reliance upon
nuclear power and domestic coal and lignite as primary fuels for electricity and heat generation. As a result, the decline of pollution from the fall in total energy consumption was partly offset by the increase of pollution from the shift from less polluting to more polluting fuels. The net result is that overall pollution from energy sources declined by less than the fall in energy consumption.

3.9 Overall, air pollution from energy use in manufacturing has fallen sharply, but there has been a much smaller improvement in emissions from heating plants, the residential sector and other low stack sources.

**Industrial Activity**

3.10 The sharp drop in the level of economic activity in the 1989-1993 period was accompanied by major shifts in the composition of industrial output since 1989. These are illustrated in Table 2 which provides output indices for 1991 and 1993 (with 1989=100) for a selection of heavily polluting and other industries. The largest falls in output have occurred in the iron and steel, machinery, electrical products, transport equipment and rubber industries. In a few sectors such as beverages, printing and publishing (whose output has increased), and glass the decline in output was less than one-third.

3.11 The overall composition of manufacturing output has tended to shift away from industries which tend to be significant sources of air pollution (iron & steel, machinery and cement) towards those which primarily discharge pollutants to water (paper & pulp, chemicals and textiles). There would also appear to have been a smaller shift towards industries which produce lower emissions per unit of output. It should be noted, however, that output indices are based on official statistics with different degrees of reliability. Particularly, *food industry indices do not reflect the substantial increase of private activity in the sector.* A more detailed sectoral profile is shown in Annex 2. Most of the growth in unmeasured manufacturing output appears to have occurred in industries which cause water pollution.

3.12 The model developed for the projections presented in the *Environmental Action Programme for Central and Eastern Europe*\(^\text{10}\) has been used to estimate the impact of changes in the level and composition of economic activity since 1989 on emissions of the main pollutants. The estimates assume that emissions per unit of output or per unit of energy consumption have remained constant. The main results for 1993 and for 2000 are shown in Table 3.

3.13 The overall decline in energy use is reflected in substantial reductions in emissions of air pollutants, despite the increased share of coal in power and heat generation. In the longer term the growth in traffic is likely to offset reductions in emissions of nitrogen oxides from stationary combustion sources either partially or totally. Since the model is not able to capture some of the supply constraints which have led to the large fall in consumption of oil products,

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\(^{10}/\) *The Environmental Action Programme for Central and Eastern Europe*, prepared with assistance from the World Bank, was endorsed by 50 countries and 25 international institutions at the environmental ministerial conference in Lucerne, in April 1993.
### Table 2 - Indices of Industrial Output

<table>
<thead>
<tr>
<th>Industry</th>
<th>Indices of Industrial Output (1989=100)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1991</td>
</tr>
<tr>
<td><strong>A. Heavily polluting Industries</strong></td>
<td></td>
</tr>
<tr>
<td>Oil refining</td>
<td>42.3</td>
</tr>
<tr>
<td>Paper and pulp</td>
<td>57.4</td>
</tr>
<tr>
<td>Basic chemicals</td>
<td>63.1</td>
</tr>
<tr>
<td>Cement</td>
<td>49.9</td>
</tr>
<tr>
<td>Iron and steel</td>
<td>33.4</td>
</tr>
<tr>
<td>Non-ferrous metallurgy</td>
<td>58.6</td>
</tr>
<tr>
<td><strong>B. Other Industries</strong></td>
<td></td>
</tr>
<tr>
<td>Food processing</td>
<td>62.3</td>
</tr>
<tr>
<td>Textiles</td>
<td>67.4</td>
</tr>
<tr>
<td>Wood products</td>
<td>65.0</td>
</tr>
<tr>
<td>Other chemicals</td>
<td>94.1</td>
</tr>
<tr>
<td>Metal products</td>
<td>75.4</td>
</tr>
<tr>
<td>Machinery and mechanical engineering</td>
<td>67.0</td>
</tr>
</tbody>
</table>

* The difference between the decline in consumption of oil products and the increase in oil refining is explained by: (i) a large decline in imports of petroleum products; (ii) the development of contract oil refining for exports; and (iii) a shift towards higher value products in total refining output.

Source: Mission estimates based on data supplied by the National Statistical Institute.

It does not capture the substantial shift from oil products to gas in the industrial sector and from oil products to coal briquettes in the household sector that has occurred in the last 4 years. As a result, the projected emissions of particulates, sulfur dioxide and nitrogen oxides for 1993 may be somewhat too high if emissions per unit of output had remained constant. However,
experience suggests that the intensity of emissions tends to increase when capacity is underutilized or maintenance is neglected for lack of finance. It is, therefore, probably reasonable to use the 1993 projections as a basis for examining changes in air quality since 1989.

Table 3 - Emission Projections for 1993 and 2000

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Indices of total emissions, 1989=100</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1993</td>
</tr>
<tr>
<td>Particulates</td>
<td>54</td>
</tr>
<tr>
<td>Sulfur dioxide</td>
<td>53</td>
</tr>
<tr>
<td>Nitrogen oxides</td>
<td>52</td>
</tr>
<tr>
<td>Lead dust</td>
<td>61</td>
</tr>
<tr>
<td>BOD</td>
<td>83</td>
</tr>
<tr>
<td>Suspended solids (to water)</td>
<td>82</td>
</tr>
</tbody>
</table>

Source: Mission estimates

3.14 The projections show that emissions of water pollutants will have fallen by much less than those of air pollutants. This is largely because the household and service sectors, whose emissions are primarily a function of population rather than economic activity, accounted for over 60 percent of total emissions of BOD and suspended solids in 1989 by comparison with less than 10 percent of particulates, sulfur dioxide and nitrogen oxides. Within the industrial sector, changes in the composition of output imply that industrial emissions of air pollutants should have fallen by more than discharges of water pollutants. One aspect of this shift is that large industrial plants should be responsible for a lower proportion of water pollution. The projections suggest that the share of emissions of BOD and suspended solids to water originating from large and highly polluting industrial sources may have halved since 1989. This is important because (a) there should have been substantial improvements in water quality for those stretches of rivers which were heavily polluted by large individual sources, and (b) the focus of measures to deal with industrial water pollution must turn to the management of effluent from many small or medium sources rather than from a small number of large plants.

C. Regional Environmental Quality Trends

3.15 An analysis of the reported results of air and water quality monitoring has been carried out in order to assess how far these aggregate trends in emissions have been reflected in ambient exposure levels. Close scrutiny of the monitoring data -- published in the MOE's
Annual and Quarterly Environmental Bulletins -- suggests that individual observations are subject to large margins of error. There are also concerns about the location and design of monitoring equipment since recorded average levels of pollutants such as particulates and BOD are extraordinarily high at some points given the general economic, social and environmental features of the general area. However, these factors are much less important in assessing trends in ambient conditions over the period 1990-93 for which monthly data were supplied.

3.16 Since many of the time series are incomplete and there are standard seasonal factors which affect environmental quality, the data were subjected to careful statistical analysis in order to identify those cases in which increasing or decreasing trends in environmental quality were statistically significant. The annual average values reported for 1990 and 1993 are either (a) the actual annual averages, whenever all of the monthly averages were available, or (b) interpolated averages where some of the observations in the year were missing.\footnote{As noted, there are obvious problems of data quality with much of the environmental monitoring data compiled by the Ministry of Environment from its own monitoring stations and those operated by San-Epid. This is compounded by apparent inconsistencies between data for the same urban areas reported by the two organizations. Over the past 3 years, with assistance from external donors, the Ministry has made serious efforts to improve its equipment and procedures for collecting air quality data. Nonetheless, this does not mean that all past data should be discounted because there are standard statistical techniques for analyzing such 'noisy' data in order to identify systematic trends over time. The trends noted in Tables 4 & 5 are described as statistically significant according to the criterion that the probability that they are purely random is 5% or less.}

### Air Quality

3.17 Trends in air quality in the main 'hot spots', shown in Table 4 and on the map at the end of this report, have mostly been favorable and correspond to the estimated fall in emissions discussed earlier. In particular, the exposure to lead dust in Asenovgrad, which was probably among the worst environmental problems in the country, has fallen substantially since 1990. This suggests that the control measures which have been implemented in the nearby lead smelter have been quite effective in reducing emissions. Levels of both particulates and sulfur dioxide have also fallen sharply in Asenovgrad, so that this must count as the most encouraging example of environmental improvement that has occurred over the last four years, though exposure levels still exceed recommended limits for both of these two pollutants.

3.18 The data suggest a worsening in exposure to particulates in Galabovo (close to Dimitrovgrad), Pernik and Rouse. For Galabovo and Pernik the worsening problems are associated with the power/heating plants which burn large quantities of low quality lignite and are major sources of both particulates and sulfur dioxide. Exposure to sulfur dioxide has fallen in Pernik, but this seems to have been a consequence of the decline in metallurgical production combined with favorable weather conditions since year to year fluctuations in the average concentration of sulfur dioxide in the city are very large -- the annual averages for the four years were 122 micrograms per cu.m in 1990, 406 in 1991, 138 in 1992 and 44 in 1993. The case of Rouse is puzzling because industries in the city and across the Danube in Romania have experienced a very large decline in output and energy consumption. New data from the
monitoring station recently installed in Rouse under the PHARE program should help to resolve this question within the near future.

Table 4 - Air Quality Trends by Urban Area

<table>
<thead>
<tr>
<th>Urban Area</th>
<th>Particulates</th>
<th>Sulfur dioxide</th>
<th>Lead</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asenovgrad</td>
<td>Down 344</td>
<td>Down 251</td>
<td>Down 2.33</td>
</tr>
<tr>
<td>Burgas</td>
<td>88 101</td>
<td>36 34</td>
<td>0.2</td>
</tr>
<tr>
<td>Dimitrovgrad</td>
<td>Down 380</td>
<td>71 86</td>
<td>0.90</td>
</tr>
<tr>
<td>Galabovo</td>
<td>Up 125</td>
<td>72 117</td>
<td>0.11</td>
</tr>
<tr>
<td>Kremikovtsi</td>
<td>Down 188</td>
<td>37 26</td>
<td>0.51</td>
</tr>
<tr>
<td>Kardjali</td>
<td>327 169</td>
<td>89 130</td>
<td>1.1</td>
</tr>
<tr>
<td>Pernik</td>
<td>Up 179</td>
<td>122 44</td>
<td>0.48</td>
</tr>
<tr>
<td>Pirdop</td>
<td>Down 453</td>
<td>330 206</td>
<td></td>
</tr>
<tr>
<td>Pleven</td>
<td>309 180</td>
<td>8 21</td>
<td>0.3</td>
</tr>
<tr>
<td>Plovdiv</td>
<td>485 360</td>
<td>35 88</td>
<td>1.5</td>
</tr>
<tr>
<td>Rouse</td>
<td>Up 157</td>
<td>28 19</td>
<td></td>
</tr>
<tr>
<td>Sofia-Drujba</td>
<td>Down 245</td>
<td>36 23</td>
<td>0.27</td>
</tr>
<tr>
<td>Svishtov</td>
<td>Down 509</td>
<td>Up 18</td>
<td>0.1</td>
</tr>
<tr>
<td>Varna</td>
<td>432 545</td>
<td>29 31</td>
<td>0.2</td>
</tr>
<tr>
<td>Veliko Turnovo</td>
<td>Down 491</td>
<td>33 27</td>
<td>0.47</td>
</tr>
<tr>
<td>Zlatitsa</td>
<td>Down 432</td>
<td>232 345</td>
<td></td>
</tr>
</tbody>
</table>

Source: Mission estimates based on data supplied by the National Center on Environment and Sustainable Development of the Ministry of Environment.

Notes: (a) Only trends which are statistically significant have been reported.
(b) The data contain two monitoring points in Burgas -- one the HEI station, the second at Meden roudnik. The latter has been used here because the data are more complete, though the equivalent HEI figures tend to be substantially higher for particulates.

3.19 On the basis of this and other evidence the list of critical 'hot spots' in terms of air quality can be revised. In setting priorities for immediate actions the following urban areas should receive most attention (listed in alphabetical order):
Data for Devnia were not available, so air quality in this town may be poor enough to include it in the highest priority group. There is also uncertainty about which are the more relevant set of monitoring results for Burgas. Next in the list of priorities would come the following urban areas with high levels of particulates (listed in alphabetically order with the major emission sources in square brackets):

- Burgas [oil refinery and petrochemical complex]
- Pleven [cement plant]
- Sofia - Kremikovtsi [iron & steel plant]
- Varna - Devnia [power and chemical plants]

For each of the second group air quality problems can be linked to a single major emission source, though traffic-related air pollution is an increasing problem in Sofia.

**Water Quality**

3.20 Summarizing trends in water quality, shown in Table 5, is more difficult because of the greater number of monitoring points and the wide variety of indicators of water quality. The analysis will focus on locations which failed in 1990 to meet the minimum standards laid down in the EU Directive on the quality of surface waters used for the abstraction of drinking waters. On the indicators measured this requires that:

- BOD5 < 7.0 mg/l
- Nitrates < 25 mg/l
- Suspended solids < 25 mg/l
- Lead < 0.05 mg/l

Only 3 of the 49 monitoring points for which data were available met the suspended solids criterion, which may reflect measurement practices. Two points -- Chepelarska river (average of 0.30 mg/l) and Vrana (0.21 mg/l) -- failed to meet the lead criterion, but the number of observations was small for all points and the large variance of the observations suggested that little reliance could be placed on the average values for these locations. Thus, the monitoring points recorded in the table are those which failed to meet either the BOD5 or the nitrate criterion in 1990.12

12/ To deal with random high values which skew the average upward, points with less than 6 observations in 1990 or for which the median level of BOD5 was less than 7.0 mg/l have been omitted from the table. The general conclusions are not affected by excluding them.
Table 5 - Water Quality Trends by River/Lake

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Bedechka River</td>
<td>Down</td>
<td>55.0</td>
<td>20.0</td>
<td>Down</td>
<td>16.8</td>
<td>5.9</td>
<td>Down</td>
<td>188</td>
<td>70</td>
</tr>
<tr>
<td>Beli Lom River</td>
<td>50.9</td>
<td>31.4</td>
<td>Down</td>
<td>53.7</td>
<td>2.4</td>
<td>131</td>
<td>65</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chepelarska River</td>
<td>8.7</td>
<td>6.2</td>
<td>5.5</td>
<td>1.6</td>
<td>33</td>
<td>47</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cherni Lom River</td>
<td>Up</td>
<td>25.8</td>
<td>45.9</td>
<td>Down</td>
<td>12.5</td>
<td>1.5</td>
<td>192</td>
<td>127</td>
<td></td>
</tr>
<tr>
<td>Iskar River 3</td>
<td>26.0</td>
<td>49.2</td>
<td>8.0</td>
<td>2.2</td>
<td>80</td>
<td>53</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jantra River 1</td>
<td>Down</td>
<td>19.4</td>
<td>9.7</td>
<td>4.1</td>
<td>0.6</td>
<td>52</td>
<td>60</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jantra River 2</td>
<td>Down</td>
<td>31.5</td>
<td>10.0</td>
<td>5.4</td>
<td>1.2</td>
<td>42</td>
<td>101</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kamchiya River</td>
<td>8.7</td>
<td>11.6</td>
<td>4.8</td>
<td>3.8</td>
<td>157</td>
<td>127</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mandrensko Lake</td>
<td>19.2</td>
<td>15.7</td>
<td>Down</td>
<td>3.4</td>
<td>0.3</td>
<td>67</td>
<td>49</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maritsa River 1</td>
<td>Down</td>
<td>19.9</td>
<td>7.5</td>
<td>4.7</td>
<td>0.6</td>
<td>Down</td>
<td>120</td>
<td>31</td>
<td></td>
</tr>
<tr>
<td>Maritsa River 2</td>
<td>Down</td>
<td>13.6</td>
<td>4.5</td>
<td>Down</td>
<td>2.8</td>
<td>1.0</td>
<td>Down</td>
<td>67</td>
<td>24</td>
</tr>
<tr>
<td>Maritsa River 3</td>
<td>10.5</td>
<td>3.5</td>
<td>8.0</td>
<td>5.6</td>
<td>29</td>
<td>24</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maritsa River 4</td>
<td>Down</td>
<td>19.3</td>
<td>8.8</td>
<td>2.3</td>
<td>1.4</td>
<td>79</td>
<td>61</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maritsa River 6</td>
<td>Down</td>
<td>21.6</td>
<td>7.9</td>
<td>7.6</td>
<td>2.1</td>
<td>Down</td>
<td>97</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>Osam River 1</td>
<td>Up</td>
<td>16.5</td>
<td>39.1</td>
<td>Down</td>
<td>4.1</td>
<td>0.9</td>
<td>55</td>
<td>67</td>
<td></td>
</tr>
<tr>
<td>Osam River 2</td>
<td>9.8</td>
<td>14.3</td>
<td>Down</td>
<td>1.6</td>
<td>0.8</td>
<td>50</td>
<td>49</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Provaliska River</td>
<td>34.7</td>
<td>36.1</td>
<td>Down</td>
<td>4.8</td>
<td>2.2</td>
<td>119</td>
<td>120</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sazlijka River</td>
<td>12.0</td>
<td>10.0</td>
<td>3.5</td>
<td>2.3</td>
<td>60</td>
<td>55</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ticha River</td>
<td>29.7</td>
<td>11.4</td>
<td>Down</td>
<td>17.2</td>
<td>1.3</td>
<td>120</td>
<td>40</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tundja River 3</td>
<td>Down</td>
<td>20.7</td>
<td>7.8</td>
<td>3.4</td>
<td>1.6</td>
<td>Down</td>
<td>112</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>Tundja River 4</td>
<td>9.8</td>
<td>6.2</td>
<td>2.5</td>
<td>1.7</td>
<td>29</td>
<td>22</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vit River</td>
<td>Down</td>
<td>64.4</td>
<td>8.5</td>
<td>1.7</td>
<td>5.3</td>
<td>Down</td>
<td>83</td>
<td>36</td>
<td></td>
</tr>
<tr>
<td>Vrana River</td>
<td>45.5</td>
<td>31.7</td>
<td>1.2</td>
<td>2.3</td>
<td>Down</td>
<td>201</td>
<td>82</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Mission estimates based on data supplied by the National Center on Environment and Sustainable Development of the Ministry of Environment.

Notes:
(a) The numbers following some river names indicate different monitoring points in separate segments of the rivers concerned.
(b) Only trends which are statistically significant have been reported.

3.21 The results indicate that there was a significant overall improvement in water quality from 1990 to 1993. For 9 out of the 23 points in the table there was a statistically
The geographical distribution of the reductions in average levels of both BOD5 and nitrates suggest strongly that water pollution caused by agriculture has fallen markedly. Less fertilizer is being used in arable cultivation (as a result of higher prices for agricultural inputs) and total livestock numbers have declined by about 40 percent. It seems that the fall in livestock numbers has been particularly large in intensive livestock operations which tend to be responsible for a disproportionate share of agricultural pollution. The decline in industrial activity is reflected in the improvement in water quality in the Jantra, Maritsa and Tundja river basin. Nonetheless, there are still problems in the Rouvensky/Lom and Kamchija river basins, the Osam and Provadijska rivers, and Mandrensko lake. All of these have relatively high levels of both BOD5 and suspended solids. There must also be serious concerns about heavy metal levels in rivers which pass through the main centers of the metallurgical industry, though there were insufficient data to examine this issue in more detail.

### Soil Quality

3.22 Erosion continues to be one of the basic forms of soil degradation. About 29% of the total arable land of 4.7 million hectares is affected by water or wind erosion. In addition, gravity irrigation on 500 thousand hectares (or 38% of the 1.3 million hectares equipped for irrigation) is causing irrigational erosion. Acidification is a problem for about 1.5 million hectares, of which approximately 500 thousand are seriously affected by overuse of mineral fertilizers. Along the main rivers irrigation with heavily polluted water has also led to degradation of soils on the land terraces. On some 30 thousand hectares, incorrect irrigation with high salt content water and the lack of adequate drainage systems have caused soil salinization, requiring chemical treatment or improved drainage. About 22 thousand hectares distracted by mining and tailings require restoration.

3.23 An inventory of polluted agricultural lands, carried out in 1993, has identified 19,358 ha. polluted with heavy metals, 1,913 ha. with radionuclides, 25 ha. with oil products, and 403 ha. with very severe acidity. Heavy metal pollution is caused mainly by the aerosol emissions of metallurgical plants and by irrigation with waters polluted by the mining and metallurgical industries. Aerosol emissions of lead, zinc, cadmium, arsenic and copper from the metallurgical plants in Elisseina, Kurdjali, Plovdiv, Kremikovtsi, Pernik, and Pirdop have caused severe soil damage in the nearby areas. The use of polluted waters for irrigation is the main reason for soil degradation in the regions of Vidin, Pazardjik and Sofia. The main pollutants are arsenic, copper and lead, emitted by the copper smelter in Pirdop, the steel plant in Pernik, and specifically for the Vidin region - by mining in neighboring countries of the former Yugoslavia.
IV. IMPLEMENTATION OF AN ENVIRONMENTAL MANAGEMENT SYSTEM

A. Institutional Development

4.1 Bulgaria started developing environmental institutions (national Committee for Protection of the Natural Environment and regional Environmental Inspectorates) in the early 1970s. Three factors (bias to command and control regulation, irrational economic system, and historical emphasis on technical skills in human resources development) created highly distorted environmental institutions, combining strong technical expertise and weak analytical and managerial capacity. In addition, substantial overlap between the environmental monitoring activities of different agencies, as well as poorly defined managerial responsibilities contributed to institutional rivalry and insufficient collaboration with other government agencies. Concentration of decision making in the Government agencies weakened the local authorities.

4.2 Since 1991 a number of measures have been taken to strengthen the regulatory and enforcement capacity of the Ministry of Environment. The Ministry of Environment enhanced its functions and structure by creating three new Departments (an Urban Ecology Department, an Ecological Risk Department, and a Department for International Projects dealing with projects under the EC-PHARE Program), as well as an Information and Public Relations Division. In addition, the "Environment for Europe" Bureau was established in 1993 to (i) prepare and organize the forthcoming Ministerial Conference "Environment for Europe" to be held in Sofia in 1995 and (ii) prepare environmental projects for external financing. When the Ministerial Conference finishes, the Bureau will continue as a permanent project preparation facility within the Ministry of Environment. An Environmental Impact Assessment unit was created in the Economics Department for implementation of the Environmental Protection Law and the Environmental Impact Assessment regulation. In response to the legislative initiatives of the Ministry, the Legal Department was transformed into an Environmental Legislation Department. The staff of the Ministry was increased from 100 to 130\(^{13}\) and all experts went through various training programs.

4.3 The Ministry of Environment has initiated a dialogue with other Government agencies on their activities with significant environmental impact, and on steps to improve the division of responsibilities in order to eliminate the existing institutional overlap in environmental management. Memoranda of Understanding were signed with the Ministry of Regional Development and Construction, the Ministry of Health and the Committee on Forests. Agreements for collaboration on specific issues were achieved with the Ministry of Agriculture, the Ministry of Industry, the Ministry of Defense and the Metrology and Standardization Committee. Each of these agencies have discrete environmental responsibilities. For example, the Ministry of Regional Development and Construction is in charge of construction permits, water supply and sanitation (including municipal waste disposal), regional planning and coastal zone management, and ensuring enforcement of the Regional and Urban Planning Act through the State Inspectorate for Technical and Construction Control; the Ministry of Health establishes

\(^{13/}\) At the same time the staff at the Laboratory and Information Complex was decreased by 35.
hygiene regulations, participates in the development of environmental standards, and is responsible for environmental health; the Committee of Forestry is responsible for protection of forests and wildlife, and controls licensing hunting and fishing; the Ministry of Agriculture is in charge of land management, and oversees land recultivation and use of chemicals in agricultural practices; the Ministry of Industry is responsible for compliance with environmental standards in the sector; the Ministry of Defense is responsible for environmental cleanup during conversion and army reduction, and for compliance of military enterprises with environmental regulations and standards; and the Metrology and Standardization Committee are in charge of licensing all monitoring laboratories and of approval of standards.

4.4 While these agreements are an important step forward, it has proved difficult to establish and operate appropriate consultative mechanisms to ensure that all of the Ministries and agencies with an interest in a particular range of issues work together. Regular meetings and periodic evaluation reports on progress to the management of each institution should strengthen their cooperation.

4.5 Due to increasing economic difficulties and budget constraints, as well as low priority given to environmental concerns, some of the government institutions closed or significantly reduced their environmental protection units (the Ministry of Industry, the Ministry of Transport, the Committee of Tourism) over the last two years. Such units still exist in the Ministry of Agriculture (currently facing the issue of restitution of contaminated land) and in the Ministry of Health. The Ministry of Defence has recently created an environmental unit, in response to emerging environmental liability issues related to post Warsaw Pact defence adjustments.

4.6 In response to the endorsement of the Environmental Action Program for Central and Eastern Europe by the Ministerial Conference Environment for Europe in Lucerne, 1993, the MOE initiated a Ministerial Council decree for establishing an Inter-Ministerial Committee for Priority Projects in the field of environmental protection and rehabilitation. The Committee is chaired by the Prime Minister and includes Ministers and Committee Chairmen of government agencies, which are stakeholders in the above field. Further, the Ministry of Environment aims to enhance the objectives of the Committee in order to develop a high level Council for Sustainable Development.

4.7 At the regional and local level, efforts have been made to improve the enforcement capacity of the 16 Regional Environmental Inspectorates. Their staff was increased from 350 to 500 and supplied with new monitoring equipment (mostly as part of donor technical assistance). Training for operating the new equipment and in environmental policy and regulations was also provided. Most of the municipalities have strengthened their environmental units or positions in response to (i) declining state budget subsidies, (ii) the creation of Municipal

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14/ Soil recultivation is an obligation of the enterprise or individual responsible for the degradation. Ordinance No. 3 of February 23, 1994 authorizes the Ministry of Agriculture to oversee the preparation and implementation of projects in soil recultivation.
Environmental Protection Funds and (iii) the need to address locally persistent environmental problems.

4.8 Responsibility for many state functions is being decentralized to regional and local authorities. Until now regional administrations are an arm of the national government, but the draft Law on Local Self-Government envisages that they will become independent units of local government with real authority and financial autonomy. It will be important to allocate responsibilities for environmental management between national, regional and local bodies in order to avoid conflict and confusion. This offers the opportunity to decentralize the detailed implementation of environmental regulations and policies. There should also be a realignment of the number and coverage of the Regional Environmental Inspectorates to match the new governmental structure.

B. Environmental Legislation

4.9 Soft budget constraints and generous concessions for non-compliance in the past encouraged systematic violations of the strict environmental laws and regulations of the centrally planned, output driven economy. Since 1991 a legislative reform has been in progress in order to provide an implementable, market oriented legal framework for environmental improvements. Following the recommendations of the ESS and internal discussions on environmental fora, the Environmental Protection Law of 1991 was then amended by the Parliament in 1992.

4.10 A major contribution of the Law has been the introduction of procedures for environmental impact assessments, further specified in an Environmental Impact Assessment regulation of the Ministry of Environment, the Ministry of Regional Development and Construction, the Ministry of Health and the Ministry of Agriculture in December 1992. The objective of this regulation is to ensure that all development programs, urban plans, investment projects, production processes and activities with significant environmental impact are designed, operated or transferred to a previous or a new owner in an environmentally sound manner. All production processes and activities, requiring a mandatory EIA, are listed in an Annex to the Ministerial Ordinance.

4.11 The MOE is preparing an Environmental Audits regulation, to be applied to ongoing economic activities and existing enterprises, including those subject to privatization. According to the draft regulation, an independent expert should identify causes of environmental damage and propose mitigation measures. The most pressing cases for environmental audits result from the process of privatization. By law a full EIA should be carried out for all enterprises in a process of privatization. This, however, proved not to be feasible in most cases of small scale privatization, for which the MOE now intends to use the Environmental Audits

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15/ While the Ministry of Industry is also affected by the new regulation, it does not appear among the endorsing institutions.
regulation. The MOE is now applying a temporary environmental screening procedure\(^{16}\) with the assistance of the Regional Environmental Inspectorates. By early 1994, 170 reviews on proposed privatization deals had been carried out by experts from the environmental authorities. In addition, the Ministry of Regional Development and Construction in agreement with the Ministry of Environment adopted the Regulation for Construction on Agricultural Land, setting the procedure, conditions and types of activities which can be located in such lands with a view to encouraging private investment activities. A new law on territorial development has been drafted; a number of regulations on construction and development of urban areas will be updated in compliance with the sanitary and hygienic standards and requirements.

4.12 Concerning environmental liability for past pollution (for which the state, as the previous owner, will ultimately be responsible), the Ministry of Environment has urged that procedures for dealing with liability claims should be established along with mechanisms for raising and allocating the necessary finance. According to the new privatization regulations, 5 percent of the revenues from privatization sales should go to the National Environmental Protection Fund. Currently there is no specific requirement for earmarking these revenues for any particular purposes (the projected funds are not expected to be sufficient for rectifying the damage caused by past pollution). After the approval of the environmental audits regulation, all or part of the funds could be directed to promote environmental audits of privatized enterprises. In addition, it is recommended that the Ministry of Environment, the Ministry of Finance and the Privatization Agency should agree on scheme for dealing with the state’s liability for past pollution.

4.13 The Environmental Protection Law initiated the transition to a new regulatory system by defining its goals, policy framework, general regulatory requirements, and institutional responsibilities. Other aspects of the regulatory system, such as specific standards, pollution permits, compliance timetable for different categories of pollutants, monitoring of compliance and enforcement against violation, allocation of responsibility for the cost of remedial or prevention action, still need to be specified in other environmental laws and regulations.

4.14 A number of laws have been drafted by experts at the Ministry of Environment (MOE) and other institutions to address: (a) core pollution prevention and environmental management issues (substituting the 1963 Law on Prevention of Air, Water and Soil Pollution with three separate laws, a Clean Air Law, a Water Law and a Waste Management Law, as well as a Noise Management Law); and (b) nature conservation and nature resources management

\(^{16}\) This procedure includes the following steps: (i) institutions, authorized to carry out privatization, are required to announce forthcoming deals in a letter to the Ministry of Environment; (ii) the Ministry of Environment directs each privatization proposal, according to geographic allocation, to the Regional Environmental Inspectorate; (iii) the Regional Environmental Inspectorate reports back to the Ministry of Environment with a special information discharge card, providing data on actual and permitted pollution and mitigation recommendations; (iv) MOE authorizes the opinion of the Regional Inspectorate with or without internal screening by experts from the technical Departments (the latter is in case the proposed privatization unit raises serious environmental concerns); and (v) MOE provides a written review, signed by a senior official (normally a Deputy Minister) to the authorized privatization institution, which requested the review.
laws (a Marine Environment Protection Law, a Protected Areas Law, a framework Biodiversity Law, a Forestry Law, a Forestry Restitution Law, a Medicine Plants Law, a Game Law and an Underground Natural Resources Law). By mid-1994, these laws were at different stages of approval.\(^7\)

C. Standards and Enforcement

4.15 In the past all standards were set with little consideration for the costs of enforcement. As a result, they were massively violated, with or without consequences for the polluters (sanctions and fines imposed by the environmental authorities). Many of the enterprises used to incorporate the costs of non-compliance in their financial balances. Since 1990, the environmental and health authorities have taken steps to: (i) revise the standards (mainly in line with the EU standards, which in some cases are lower than the initial Bulgarian standards) and set realistic target dates for their implementation; and (ii) incorporate all three types of standards (ambient standards, emission standards and new source performance standards) in a coherent regulatory system, according to the regulatory objectives. Pressure from environmental NGOs and politicians to avoid softening the communist environmental regulations, as well as delays in passing the new environmental laws, create obstacles to the introduction of the new standards. As a result, the environmental authorities continue to tolerate cases of non-compliance when the polluter cannot possibly bear the compliance costs.

4.16 The question of enforcement of the environmental standards and regulations is a central one for the success of the Bulgarian environmental policy. So far two significant steps have been made: building an efficient monitoring system (with support from the PHARE program and other donors) and improving the collection and dissemination of information. An annual Green Book for the state of the environment has been published, starting from 1989. The National Center on Environment and Sustainable Development has started a new Quarterly Environmental Report, built upon the indicators in the Green Book. The MOE encourages self-monitoring and reporting, combined with sufficient random checks carried out by the Regional Environmental Inspectorates. Public access to information provides an additional incentive to the enterprises to comply with the environmental requirements.

4.17 A three-layer National System for Ecological Monitoring and Environmental Information (NSEMEI) has been created to provide day-to-day data on the state of the environment, to support the enforcement of the environmental standards, and to generate analysis and forecasts for the decision makers on national and local levels. The first layer of the system includes the MOE and the National Center on Environment and Sustainable Development, the

\(^7\) The legislative procedure in Bulgaria provides the right to a legislative initiative both to the Government and to the Parliament. In case a Governmental agency prepares a draft law, it first needs to be distributed to all relevant Government agencies for comments, after which the revised draft would be coordinated with the Ministry of Justice and proposed to the Ministerial Council for approval. Once accepted by the Ministerial Council, the draft law can be advanced to the Parliamentary commissions for parliamentary debates and revisions. After being approved by the relevant commissions, the draft law is directed to the Parliamentary Assembly and needs to pass two Parliamentary hearing. If voted by the majority, it becomes a State law.
second -- the 16 Regional Environmental Inspectorates, and the third -- the set of monitoring laboratories (for ambient and effluent air and water quality control, soil quality control, radiation control, noise control, waste control and control on the status of the protected territories). The NSEMEI is financed from the state budget and currently is experiencing shortages of funds to support the operation and maintenance of the existing monitoring equipment. Since the trend toward reduction of state subsidies is expected to continue, the funding for the NSEMEI should be shifted toward the National Environmental Fund and be given higher priority. Some of the services provided by the NSEMEI could be priced (e.g., monitoring requested by private enterprises and households).

4.18 A system of sanctions and fines was inherited from the centrally planned economy, and is still used as a key enforcement instrument. Enterprises, polluting above the emission standards, are subject to financial sanctions and their managers can also be fined. The sanctions are imposed on a monthly basis and are charged until pollution is decreased to the permitted level. In this sense they are regarded as a "price of pollution". In 1992 the sanctions were significantly increased, although they still did not match the inflation, and in real terms the revenues from sanctions and fines are below the 1989 level -- see Table 6.

<table>
<thead>
<tr>
<th>Charges/fines for:</th>
<th>'90/'89</th>
<th>'91/'90</th>
<th>'92/91</th>
<th>'93/'92</th>
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<tbody>
<tr>
<td>Water pollution</td>
<td>-15.5%</td>
<td>-30.5%</td>
<td>59.4%</td>
<td>126.4%</td>
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<tr>
<td>Air pollution</td>
<td>44.6</td>
<td>-50.5%</td>
<td>407.5</td>
<td>65.0</td>
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<td>Soil</td>
<td>-21.5%</td>
<td>11.3</td>
<td>259.0</td>
<td>-28.6</td>
</tr>
<tr>
<td>TOTAL</td>
<td>-10.5%</td>
<td>-27.7%</td>
<td>146.6</td>
<td>58.8</td>
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</tbody>
</table>

Inflation rate (%): .. ('89) 339 ('90) 91 ('91) 61 ('92)

Source: Ministry of Environment; World Bank.

4.19 Enforcement of existing environmental regulations and standards is also a problem due to the continuing economic decline and worsened financial situation of most of the main polluters. Many factories claimed exemptions from pollution control requirements on the grounds that they were operating with minimal capacity and hence did not contribute to pollution loads. In addition, monitoring and enforcement have been neglected for long time in the past, and this is still affecting the functioning of the enforcement system. Stricter implementation of
the pollution fines is needed. At the moment the threat of plant closure is a blunt instrument and lacks credibility in cases where closure will result in significant unemployment.

D. Economic Policy Instruments

4.20 While the economic decline and the need for fiscal discipline are not favorable for the introduction of new economic instruments for environmental protection, the MOE should take steps for developing such instruments for their introduction in parallel with the economic revival and return to growth. These instruments include pollution charges and taxes, pollution permits and certificates, and waste disposal fees. At this stage the pollution charges are not linked to the amount of damage caused by pollution or to the abatement costs, although MOE plans to move in this direction. Also, the phasing of stricter environmental control should be considered carefully and discussed within and outside of the Government with all major stakeholders.

4.21 The MOE intends to introduce a system of water pollution charges, as a revenue raising vehicle for funding waste water treatment facilities. The charges are consistent with the consumers' ability to pay and are designed in an easy to implement manner. They are calculated per cubic meter of fresh water used, and differentiated by water users in accordance with the quality of the discharged waste water. In such way, the water pollution charges encourage water conservation, recycling and water quality improvements. The revenues from charges would be accumulated in the Environmental Protection Fund and earmarked for completion and new construction of municipal waste water treatment plants. They would complement the increase in water tariffs, undertaken by the water companies throughout the country to cover their operation and maintenance costs, providing additional resources for investments in waste water treatment. However, due to concerns of the water companies about declining collection rates, there is resistance on the side of the Ministry of Regional Development (in charge of the water utilities) to the pollution charges. The MOE should initiate the charges on a pilot basis in order to assess applicability and tests their collection rate.

4.22 For control over industrial born air pollution the MOE plans to develop a system of pollution permits, to be applied both to existing and new sources of pollution. The permits would keep the industrial pollution loads in each region within the ceilings set by the ambient quality standards. Significantly improved air pollution monitoring would allow the environmental authorities to design emission permits for all major pollutants (particulates, SO₂, NOₓ, air-born lead and cadmium). Both environmental improvements and cost considerations should be taken into account in the process of setting the emission reduction targets. Since there is no in-country experience in application of air pollution permits, the MOE staff should be assisted in developing and implementing the permitting system.

4.23 Increase of motor vehicles and aging of the fleet are major causes of air pollution in the populated parts of cities. The MOE plans to develop a gasoline tax in order to (i) encourage reduced energy use and related air pollution emissions (especially from nitrogen oxides, carbon oxides, hydrocarbons and lead) and (ii) raise funds for environmental activities,
including monitoring and control of pollution from mobile sources. The tax would transfer earmarked funds from vehicle users to the Environmental Fund and thus may face resistance from the Ministry of Finance, which is advocating a consolidated state budget.

4.24 In many OECD countries, gasoline taxes are used to create a price differential between leaded and unleaded gasoline in the order of 5-15%. These taxes may be revenue neutral, with a higher tax on leaded gasoline being offset by a lower one for unleaded petrol. This price differential has encouraged a major switch to unleaded gasoline in most OECD countries. Such price differentiation should be introduced in Bulgaria as well, to create incentive for shift from leaded to unleaded gasoline. As soon as feasible, the MOE should seek support from the Government for the following (i) to require increased production of unleaded gasoline; (ii) to require all gasoline distributors to supply unleaded, as well as leaded, gasoline; and (iii) to introduce differential prices for leaded and unleaded gasoline. The Government has introduced a 10% differentiation in the excise for leaded and unleaded gasoline, which is not reflected in their price levels. The pricing formulae and tax levels for gasoline should be modified so that the pump price of unleaded gasoline is at least 10% below that of leaded gasoline. Consistent implementation of these measures should be broadly discussed with interested parties, notably the Ministry of Industry, the Ministry of Finance, the Ministry of Health, oil refiners and gasoline distributors. In addition, the MOE should propose phasing out the registration of cars using leaded gasoline (starting with new cars and moving toward second hand cars over time).

4.25 Other policy instruments to reduce vehicle emissions in the big cities should include reinforcement of emission certificates (renewable annually) stating the vehicle has met the required emission standards. Fees for the "clean car certificate" should pay for the full costs of the annual inspection at the big cities. In the medium term, steps should be taken to improve traffic management policies which facilitate traffic flow, such as better management of traffic signals and parking. In the long term, mass transit alternatives should be assessed and use of public transport promoted to slow down the current shift from mass transit to cars. MOE, together with the traffic police, should develop and regularly update a data base on the nature, extent and costs of air pollution. This would include an inventory of motor vehicles (type, age, etc.) and projections of associate lead or other emissions. This information should be distributed to policy makers, polluters, educational establishments, and other groups or individuals with an interest in air pollution. Since air pollution emission (and noise emission as well) depend to a large extent on vehicle maintenance and the drivers’ behavior, incentives to encourage regular testing of vehicles should be devised and information campaigns organized to emphasize that unleaded gasoline, low pollution, low fuel consumption and safe driving go hand in hand.

4.26 The municipalities are collecting a waste tax (as a percentage of the property tax value), which was recently increased without fully compensating for inflation. While there are no legal restrictions which prevent the introduction of full cost recovery fees for municipal services, municipal administrations are reluctant to increase their waste taxes and other service
fees, mostly due to electoral pressure. MRDC\textsuperscript{18} and the Regional Environmental Inspectorates should insist on appropriate improvements in waste collection and disposal, and urge the municipalities to adopt fees that cover the full costs of municipal waste management, including collection, transportation, and environmentally sound treatment. The fee should be based on real cost, which would differ between the cities and municipalities, depending on chosen treatment technology. Billing for waste disposal services should be similar to electricity billing, and done at regular intervals, to avoid inflationary losses.

4.27 Fee differentiation should be introduced for different types of waste (e.g. municipal and hazardous waste). The level of the fees should be high enough to encourage both reduction of waste and local treatment. A license for new waste sources should be imposed in new developments, to assure funding for extended waste collection and disposal. The level of the licensing fee should be related to the amount of waste generation to provide incentives for emerging new sources of waste (e.g., hotels, restaurants, small enterprises etc.) to use waste reduction technologies (composers, waste disposal etc.).

4.28 In the longer term, the possibility for introducing earmarked surcharges or taxes on specific products, which have a documented negative impact on the environment (alkaline and Ni-Cd batteries, products containing cadmium, paints containing mercury, motor oils, etc.) should also be discussed within and outside the Government. The revenues from such surcharge or tax would be gathered in the Environmental Protection Fund and earmarked for collection and treatment/destruction of these products. This action would provide an incentive for the general population to switch to environmentally less harmful products and influence industry and suppliers to provide substitutes. The reduced use of products such as those mentioned will improve the quality of municipal waste and/or sewage sludge, which can then be more easily used as compost or soil conditioner and contribute to a reduction in waste volume.

E. Environmental Financing

Sources and Mechanisms

4.29 Currently there are six sources of funds for environmental protection: (i) the state budget; (ii) the municipal budgets (funded from local taxes and from transfers from the state budget); (iii) the National Environmental Protection Funds; (iv) the Regional Environmental Protection Funds; (v) enterprise resources; and (vi) bank credits. In addition, there are donor funded activities (in monitoring, capacity building, abatement equipment and pilot conservation projects). All internal sources are severely restricted due to the economic recession, the considerable erosion of government revenues, the consequent sharp budgetary spending and investment decline, and reluctance of the state government, the municipalities and the state and private enterprises to borrow for environmental projects.

\textsuperscript{18} MRDC is responsible for drafting and updating regulations relating to the collection, transportation and disposal of solid wastes including the establishment of standards for the location, construction and operation of municipal landfills and other solid waste disposal sites.
4.30 Under these circumstances the Ministry of Environment relies heavily on revenues from pollution fines and has been working systematically on the development of a system of other market based enforcement instruments, i.e., charges and taxes. Such a system is potentially effective in protecting the environment and the natural resources without distorting economic efficiency.

4.31 There are various reasons however why it has so far not proven useful in the Bulgarian case. First of all, fines for water, air, and soil pollution are not related to the environmental damage or the costs of abatement. Damage value assessments of the various pollutants to health, agriculture, and recreation (tourism) are neither available nor accounted for. Secondly, the level of fines, although significantly increased with the new Environmental Protection Law, is well below the alternative abatement costs. Thirdly, the fines are not indexed for inflation, which encourages payment delays (since no interest is charged on the outstanding fines). The weak enforcement capacity of the environmental authorities also constrains the role of these instruments.

4.32 The proposed introduction of a pollution charges system does not eliminate the above reasons. For example, the water pollution charges would require industries and households to pay a charge per m$^3$ of fresh water, differentiated in accordance with the quality of discharged water. The charge levels are defined on the basis of an ad hoc assessment on the ability of enterprises and households to pay. There is no strict correlation between the charge level and the pollution level or between the charge level and pollution abatement costs. Due to collection constraints, the inflationary adjustment is expected to be at long intervals (i.e. annually) and lag behind the price increases. Nonetheless, the charge system would be a step ahead towards implementing the “polluter pays principle”.

4.33 Even taking into consideration the affordability of the fines cannot assure high collection rate. Currently it is estimated to be approximately 50 percent of the fines imposed. Presumably, the low level of the fines should increase the collection rate for the financially inviable enterprises. However, this is rarely the case, since some of these enterprises are virtually bankrupt. On the other hand, they decrease pollution as a consequence of output decline. Some of these enterprises may not survive the economic restructuring, which makes them low priority for environmental regulation. Enterprises which can afford to pay the fines are also the ones with a better financial performance. Therefore, the charge level should target these enterprises, providing them with an incentive to invest in pollution abatement and mitigation measures. A combination of higher fines and fine holidays, if feasible plans for pollution reduction are proposed, should be put in place.

Environmental Protection Funds

4.34 As in other former socialist countries, extra-budgetary funds (EBFs) are well established in Bulgaria. These funds are financial accounts held outside of the framework of the state or municipal budgets, funded from assigned revenues (taxes or other sources, e.g. fines and charges), and earmarked for particular programs or activities. Currently a total of 14 such funds exist, some of which were inherited from the centrally planned system (including an
Environmental Protection Fund); others were created to facilitate the transition to a market economy or to cushion the social impact of restrictive budgetary policy. An earmarked Environmental Protection Fund is established at a national level, and 185 out of 270 municipalities have also created such funds.

4.35 Earmarking usually distorts public financial management and undermines the budgetary discipline. In the case of environmental protection, however, three factors warrant the EBFs’ existence: (i) the lower priority assigned to environmental protection during the transition to a market economy; consequently, (ii) the sharp decline in environmental spending and share of environmental expenditures in GDP; and (iii) the need for a financial vehicle capable of on-lending money to small-scale environmental activities. The lax application of environmental regulations and failure to recover full costs for environmental services (such as sewerage, waste water treatment and waste disposal) create the need for subsidies or soft loans to encourage pollution prevention and finance critical environmental investments.

4.36 According to the new Environmental Protection Act of 1991 (amended in 1992), earmarked revenues from pollution fines and charges are directed to the National and Municipal Environmental Protection Funds. Seventy percent of the revenues from fines go to the National Funds, and 30 percent to the Fund in the violator’s municipality. Revenues from charges and taxes (which are included within various environmental laws and Ministerial Council’s regulations, but are yet to be approved) will also be shared, with 60 percent going to the National Fund and 40 percent to the Municipal Funds. The charges and taxes currently proposed include water pollution charges, product charges (for leaded gasoline), tariffs for visiting protected areas, and fees for collection of medicinal plants.

4.37 Both the National and the Municipal Environmental Protection Funds are managed by elected Boards, with transparent operating procedures for the allocation of expenditures. The Managing Board of the National Environmental Fund is chaired by the Minister of Environment, and includes Deputy Ministers and other high level officials from relevant Ministries and institutions.

4.38 The main objective of the National Environmental Protection Fund is to support the implementation of the national environmental policy, by providing financial assistance (grants or interest free loans) to municipalities, companies and research institutions. During 1993, the first year of operation of the Fund, the total revenues were Leva 105,786,000, and the total

19/ The lessons from the Bank’s experience show that revolving pollution abatement funds (PAFs) could be very useful in financing low-cost environmental improvements. A PAF is currently being established as part of the proposed environmental project in Russia, and EU PHARE is providing financial support to similar national funds in Hungary and Poland. In order for PAFs to be successful, however, it is essential to provide sound managerial practices and assure strong capacity to appraise proposals, and supervise the disbursement of funds.

20/ Currently tariffs and fees for medicinal plants go to the Forestry Fund.

21/ The National Environmental Protection Fund was established by the Ministerial Council Ordinance No. 278, December 30, 1992.
expenditures -- Leva 60,858,000. The spending priorities of the Fund included: monitoring and control (40.5 percent)\textsuperscript{22}, municipal and industrial waste water treatment (32.3 percent); reduction of air pollution (14.4 percent); research and development (5.5 percent); construction of solid waste disposal sites (3.9 percent) and support for conferences and publications (2.2 percent). Support for environmental NGOs accounts for 0.5 percent. Most of the expenditures (77 percent) are on grant basis and only 23 percent -- in the form of interest-free loans to enterprises, which allows multiple use of funds (revolving funding). The Fund is prohibited from charging interest on loans to enterprises.

4.39 Until 1993 the National Environmental Protection Fund relied primarily upon fines as its major revenue source. This created a conflict between the revenue-raising and the penalty functions of environmental fines. As a result, the Ministry was inclined to set the level of fines well below any reasonable value of the damage caused by pollution in order to facilitate and maximize the revenue collected from fines. With the introduction of new economic instruments, the share of fines in the overall revenues of the NEPF dropped from 55.5 percent in 1993 to 29.1 percent for the first 9 months of 1994.

4.40 Since the financing of environmental improvements currently depends heavily on the earmarked national and municipal Environmental Protection Funds, further improvements in their objectives, revenue raising instruments and spending priorities are of critical importance. The NEPF should provide assistance to such priority areas as: (a) the design and pilot implementation of environmental policy instruments; (b) collecting and disseminating environmental information; (c) identifying and preparing investment projects which yield economic and environmental benefits; and (d) promoting environmental awareness. Currently, the MOE is in charge of both fine collection and the disbursement of subsidies. Staff time and expertise are diverted from improving the regulatory framework and enforcement mechanisms to the management of funds for pollution reduction.

Debt-for-Environment Swap

4.41 Since they were first introduced in an agreement between an American non-governmental organization and Bolivia in 1987, DEBT-FOR-ENVIRONMENT (or Debt-for-Nature) SWAPS have been used by many indebted countries to combine a reduction of their external debt with a mobilization of resources for environmental protection. In addition to their economic and environmental benefits, debt-for-environment swaps can also provide image gains among creditor banks and the international community. By the end of 1993, at least 16 countries were reported to have undertaken debt-for-environment transactions and the total size of the funds generated was close to US $1 billion. The largest debt-for-environment swap undertaken so far is the Polish Ecofund, which currently has a volume of US $466 million.

4.42 The MOE requested assistance from the Bank in developing a proposal for a debt-for-environment swap in order to establish a new financial vehicle for environmental projects.

\textsuperscript{22}/ Including the construction of two buildings in Sofia (Laboratory and Information Center) and Pleven (Regional Environmental Inspectorate).
Three factors are in favor of such proposal: (i) expected debt service renewal; (ii) the magnitude of the environmental problems; and (iii) continuing decline in the country's environmental expenditures. In addition, the debt-for-environment swap is expected to facilitate the inter-ministerial dialogue on environmental project proposals, as well as to assist in the development of a transparent financial intermediary (a Trust Fund for the debt-for-environment transaction). Further development of this proposal is strongly encouraged. Details on the swap are included in Annex 4.

F. Sectoral Environmental Management

Soil

4.43 Soil quality standards were established by the Council of Ministers in 1979. The MOE, in cooperation with the Ministry of Agriculture, also developed a set of standards for maximum allowable concentration of four heavy metals and are completing the standards for nine other metals and oils. While the establishment of standards is a step in the right direction, much remains to be done to control soil pollution. In particular, there is a need to: (i) prepare a draft Soil Protection Law which would regulate clean up and land uses; (ii) develop a system for polluted soil classification and monitoring; (iii) carry out an evaluation of the options for financing neutralization and/or incineration of contaminating outdated pesticides stored in 1400 different locations in 274 municipalities; (iv) prepare a study for designing the methodologies for risk assessment and cost-effectiveness analysis of rehabilitation of land subjected to the Restitution Law and provide training to local experts for the implementation of said methodologies; (v) mobilize funding for projects dealing with rehabilitation or alternative use of land contaminated with heavy metals and radionuclides; and (vi) develop strategies for the safe closure of the ore and uranium mines and for the reclamation of abandoned areas. (For more details see Annex 3)

Air

4.44 The NEAP recommended the development of air management strategies on a regional basis. It was expected that local and regional governments and regional units of MOE would play important roles in developing these air management strategies and determining plant specific emission limits and compliance schedules. In order to find the least cost solutions to meet national ambient standards, a process of legally enforceable negotiations with the affected enterprises was expected to be established. Compliance agreements with the affected enterprises would be negotiated on a case-by-case basis.

4.45 The MOE and the MOH have established an overall trend toward harmonization of the Bulgarian standards with those of the EU and the World Health Organization, as well as toward setting specific emission limitations contingent upon the severity of the air quality problems in the area. Upon enactment of the draft Air Quality Law, MOE together with MOH, would be able to set more stringent emissions limitations for industries that correspond to the more seriously polluted areas. An effective implementation of this strategy will require
substantial technical assistance and training in ambient air quality dispersion modeling. With
the results of this modeling, revised emission limits for the sources which are shown to
contribute in a significant way to the violation of the standards should be established. Ambient
air quality modeling should also be used to establish emission limits for major new sources of
air pollution. (For more details see Annex 3).

4.46 In November 1990, the Government ratified by accession the Montreal Protocol on Substances that Deplete the Ozone Layer. As a signatory to the Montreal Protocol, Bulgaria is committed to the phaseout of CFC consumption by January 1996. To date, the Government has nominated an Ozone Coordinator within the MOE and prepared a Country Program which describes its ODS Phaseout Strategy, a profile of the ODS-consuming industrial sector, and proposed alternative technologies which could be introduced. In Bulgaria, the main ODS-consuming sectors are: refrigeration, foams, solvents, aerosols and fire protection. In some sectors, namely flexible foam and aerosols, Bulgaria has already taken steps to introduce environmentally acceptable replacement substances. In these situations, the technology was relatively straightforward and not costly. There still remains about 783 tons per year of ODS to phaseout, primarily in the refrigeration and solvents sectors, requiring more complex technology and financial assistance. The MOE, in cooperation with enterprises, has also started preparing many sub-projects and pre-investment studies to address the remaining ODS consumption in Bulgaria. The World Bank is assisting them in these efforts.

4.47 Although Bulgaria has stringent ambient air quality standards, they apply to many more pollutants than what could be monitored. Following the recommendations of the ESS, new 24 hour and annual average standards for eight air pollutants (dust, SO₂, NOₓ, CO, O₃, Pb, H₂S, and Cd) were drawn up and endorsed by an Ordinance of the Ministries of Environment and Health, published in the State Gazette No. 43, 1994. The next step will be the development of ambient standards for small particles, which are most damaging to human health, and the determination of critical loads for acidifying depositions of sulfur and nitrogen. Also, MOE, in collaboration with the Ministry of Transport and the Committee for Standardization, Metrology and Certification, should establish vehicle emission standards for hydrocarbons and nitrogen oxides to complement the existing standards for CO and PM, and evaluate all of the standards for harmonization with EU Regulations. In addition, MOE, together with the Ministry of Industry and the Ministry of Transport, should carry out a study to develop a strategy for the reduction of lead emissions from motor vehicles. (For more details see Annex 3).

23/ The Montreal Protocol is an international agreement whereby signatory countries have committed themselves to the phaseout of ozone depleting substances (ODS) in a global effort to protect the stratospheric ozone layer. The MP addresses CFCs and halons, which are two important ozone depleting substances. Bulgaria's 1993 estimated consumption of ODS was about 783 tons per year, of which CFCs account for about 91% of that total.

24/ Deposition standards for particulate matter, lead, cadmium, thallium, hydrogen fluoride, and zinc were established in 1991.
4.48 In 1976 the Government of Bulgaria established effluent limits as "water quality measures" which required that all discharges to surface water bodies meet Class II\(^{25}\) ambient standards. This policy was based on the Government's objective to achieve Class II water quality in all surface and coastal waters (with the exception of the Danube, since the quality of that river - Class III - was already determined by the pollution load carried by countries upstream). The use of ambient standards as directly enforceable limitations on discharges, resulted in unrealistic requirements that did not take into account water treatment costs and technologies. As a result, enforcement was largely ineffective.

4.49 The adoption of nationwide effluent standards based on best available technologies may imply considerable cost and limit the choices of polluters to find the most suitable measures to reduce effluent levels. An approach similar to that described above for air emission limits was adopted by MOE: regulation of a discharge would be based on its impact on water quality in a particular river, i.e., individual discharge limitations should be developed with a view towards meeting medium and long term ambient water quality targets. The polluters themselves are in the best position to develop least cost strategies for the elimination of sub-standard discharges, assuming that adequate technical assistance will be provided. Therefore, through a process of negotiations with the polluters, interim effluent ceilings and compliance schedules would be established for each major river basin.

4.50 Many industries do not have proper industrial pre-treatment facilities and directly discharge their wastewater to municipal sewer systems. None of the municipalities have specific ordinances controlling these discharges. Sewer use ordinances are necessary to prevent the discharge of contaminants to sewer systems that are untreatable in municipal sewage treatment plants. The ESS recommended that the MOE assist the municipalities by drafting a sample ordinance that could be adopted by the municipalities.

4.51 Since the adoption of the NEAP, five draft regulations for water quality management and admissible limits of pollution have been developed. The draft regulations are:

(a) **Requirements for the quality of water for main uses**, which addressed the different use classes (i.e. drinking water, recreation, irrigation, and industrial).

(b) **Ambient water quality standards**, which address five classifications for any inland surface water (i.e. very pure, pure, slightly polluted, polluted and heavily polluted).

(c) **Hazardous substances or industrial wastewater discharges to municipal systems**.

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\(^{25}\) Class I: Drinking water quality  
Class II: Recreation use and fish farming  
Class III: Irrigation and industrial use  
Beyond Class III: Unsuitable for any use
(d) **Effluent standards for wastewater from certain industrial servers and municipal wastewater treatment plants** (i.e., pre-treatment and categorical standards).

(e) **Ambient water quality standards for coastal waters of the Black Sea.**

The Ministries of Regional Development and Construction and of Health are also preparing a new standard for drinking water -- State Standard no 2883.

4.52 The MOE had originally anticipated that industry would be able to meet the new proposed limits within a matter of several years. However, international experts are proposing a much longer period of time to meet the limits. During the intervening period, the Regional Inspectorates will be negotiating interim effluent limits and compliance schedules into the industrial as well as municipal permits. The system of permits will afford both industries and municipalities the time needed to procure and install the necessary pollution equipment in order to achieve the new proposed effluent limits. This gradual approach will alleviate some of the economic impact facing these entities. Also, there is an Interact Program (part of the PHARE program) that issues grants to certain industrial plants in the areas that discharge to rivers of the European Union. However, this program has yet to be implemented. More details are shown in Annex 3.

**Solid and Hazardous Waste**

4.53 Substantial progress has been achieved in creating the necessary legislation to govern the management of solid and hazardous waste. A comprehensive Waste Management Law has been drafted, covering household, construction and industrial (including toxic) waste. The Draft Law does not deal with: radioactive waste; debris from mining and geological excavations (when sites are developed according to an approved plan); slaughterhouse waste; animal carcasses; waste from agriculture and forestry; air pollutants; waste water discharge in sewers and waste collectors; and waste from arm explosives. It fully deals with permits for all wastes, covered by the Draft Law, including generation, transport, export/import, and disposal. It also provides for planning at the national, municipal and industrial levels. It establishes a national hierarchy of waste treatment which favors first, waste minimization, then recycling, and finally appropriate treatment and disposal. In addition, via Decree 153 adopted in August 1993 by the Council of Ministries, the government is regulating hazardous waste. The decree includes a list of substances, their characteristic, provisions for collection, treatment and disposal, guidance for transportation, etc. Full enforcement of these regulations, however, will require the passage of the Waste Management Law currently awaiting Parliamentary action. MOE has also recently prepared a package of regulations designed to harmonize domestic standards with EU Directives.

4.54 In addition to the necessary legal and regulatory framework, the establishment of a fully effective national industrial waste management system will require substantial efforts in institutional strengthening and the development of coordinating mechanisms involving the Ministries of Health, Agriculture, Regional Development and Construction. An Urban Ecology department was established in MOE in 1992. As the work load of the waste program expands,
particularly upon the passage of the Waste Management Law, it will be necessary to continuously evaluate staffing levels and capabilities at both the Ministry and the REIs. Also, it is essential that MOE develop: (i) a hazardous waste classification and identification system, (ii) capabilities for analyzing waste, (iii) a reporting system for hazardous waste, and (iv) a data management system for tracking information on generation, transport and disposal of wastes. Finally, an inventory of hazardous wastes with a risk-based ranking, one of the most essential tasks, will commence shortly with financing from the US Trade and Development Agency (USTDA). This exercise is needed not only as a way of identifying high priority sites in need of cleaning up, but also to provide the necessary information for the privatization process. (For more details, see Annex 3). Additional regulations are still needed to govern the handling and use of hazardous materials that are not wastes. An assessment of the potential for involving the private sector in the provision of solid waste collection services should also be conducted.

4.55 An obstacle in the satisfactory management of household waste is the absence of explicit and comprehensive legislation fully governing their generation, storage, collection, transport and disposal. While there are several laws covering solid waste management they all have certain gaps. This obstacle is expected to be removed with the enactment of the Waste Management Law. Two major issues stand out in the management of municipal waste. The first one concerns the lack of an appropriate cost-recovery policy, an aspect that is closely related to the implementation of the Law on Local Self-Government which awaits Parliament’s decision. The proposed Law would widen the right of the municipalities to influence user charges and reduce the present reliance on central Government budgets and the Environmental Fund. The process of decentralization, however, will tax the limited capabilities of the municipalities, and it is advisable to identify those areas, such as waste management, in which the private sector can play an important role. In addition, MOE and MRDC support a regional approach to avoid the excessive fragmentation of responsibilities and achieve an optimal unit of waste management. To this end, they have developed a strategy for resolving waste disposal problems at a regional level by decreasing the number of small, uncontrolled dumps. Thus, the next step should be the preparation of a national plan for regional solid waste disposal facilities, with the goal of increasing regional cooperation. The other major issue is the inadequate construction and operation of municipal landfills. Standards on the location, construction and operation of municipal landfills were adopted by MRDC in 1993. However, their enforcement is hindered by the lack of an effective Waste Management Law. (For more details see Annex 3)

Coastal Zone Management and Spatial Planning

4.56 Fully cognizant of the potential implications of land reforms and market economy on the development pressures of the coastal zone, the government has undertaken decisive steps in line with the recommendations of the Environmental Strategy Study. With financial assistance from an IDF grant, the development of a coastal zone management (CZM) program has been initiated to ensure the sustainable development of the Black Sea Coastal Region (BSCR). Interim Rules and Standards for the "Arrangement and Management " of the BSCR were adopted by the Council of Ministers in June 1993 to be tested for a pilot period in 1993/94. A new CZM Office was created in the MRDC to implement these Rules and Standards. In addition, CZM regional offices have been established in Varna and Burgas. All three offices (national and
regional) are now staffed and equipped. Mapping and delineation of the coastal zones identified in the Interim Rules and Standards is underway by the National Center. An Expert Council, co-chaired by MRDC and MOE, has been established to assist the Council of Ministers with coastal issues.

4.57 The process includes the preparation of a new coastal law which will codify the experience gained during the pilot period with the Interim Rules and Standards and the new institutional structure. Technical assistance in the preparation of the law, design of an effective permitting and monitoring system, development of a GIS system, preparation of an Operational Manual for the CZM Office, and provision of training for CZM staff is being provided by international consultants. A number of institutional problems and conflicts need to be resolved, however, before a properly functioning Integrated Coastal Zone Management Program is in place. Such problems include: inter-ministerial coordination, central-local administrative conflicts, deficiencies in municipal authority and capacity, uncorrelated sectoral laws and regulations, slow and difficult process of privatization/restitution, and distorted economic development perceptions.

4.58 New factors which have emerged since the original ESS are the: (i) planned development of two new major transport axes with a N-S direction, and (ii) on-going and future tourism which is expected to grow rapidly in areas beyond the coastal zone, generating accompanying infrastructure and cultural concerns. Accordingly, an interministerial committee to develop a strategy for territorial development has been established. The creation of the Urban Ecology Department in the MOE is an important positive development for dealing with environmental issues associated with regional and urban development. In addition, the Ministry of Transport has requested MOE's assistance in developing an environmentally friendly national transport strategy. A draft law on physical planning and urban development has been prepared by MRDC and reviewed by other ministries.

4.59 While preparation of the CZM program is actively underway by the CZM office and consultants, coordination with MOE is weak at present. The Urban Ecology Department is uncertain about its expected role in the development of the program and the implementation of the resulting plan. Moreover, review of the environmental considerations of regional, urban and transport planning by the Urban Ecology Department is being done without basic environmental criteria. More generally, the EIA process is being used as a retrospective review tool after land use and development plans have already been prepared.

4.60 Accordingly, development of the CZM program will be facilitated by the following recommended steps: (i) issue regulations on the implementation of the physical planning and urban development law; (ii) start the EIA process at the time of the conceptual design phase of spatial and transport development using the process as a preventive and planning tool in addition to its corrective use; (iii) develop environmental criteria for land and transport development projects for use in the EIA process, in the development of the strategy of territorial development and in the national transport strategy; (iv) establish a formal coordination mechanism between the MOE and MRDC on a comprehensive and systematic basis, which should eventually lead to amendments to the Regional and Urban Planning Act; and (v)
institutionalize the participation of the Urban Ecology Department in territorial planning by the MRDC and include it in the development of the CZM.

**Forestry**

4.61 Following a request from the Government, a team from the World Bank and FAO carried out a review of the forestry subsector in May 1994. A report will be discussed with the Government early in 1995. The focus will be on financial and environmental sustainability. Forestry accounts for 30% of land use in Bulgaria and play an important role in watershed protection and biodiversity conservation as well as providing raw material for the wood processing industry. The forests are self-financing; revenues from harvesting timber finance reforestation, forest management and erosion control programs. Declining revenues from harvesting have reduced available revenues for environmental protection programs. Privatization of at least 20% if forest land is envisaged. This will require that new policies and regulations concerning forest management be developed.

**Nature Conservation, Protected Areas Management and Biodiversity**

4.62 Issues in this area are related to: pricing and resource mobilization, institutional arrangements and training. With respect to pricing, the NEAP called for the introduction of a "nature tax" on revenues from facilities in or adjacent to protected areas and earmarking the proceeds for a Nature Protection Fund. Current constraints to collection and control over the use of funds limited progress in the creation of a "nature tax". The principle of such tax was briefly introduced in the draft Protected Areas Law, which states that owners of buildings or other properties that are located within the protected areas must pay a tax of 0.5% of the property value. This tax would be primarily levied on chalets and huts within park boundaries and the proceeds would go to general revenues. While the current proposal has been a subject of intensive discussions, significant differences in opinions still exist, resulting in three major drawbacks: (i) it does not specifically introduce in the proposed legislation the principle of levying "nature taxes" as fees internalizing benefits (which require expenditures for their protection, and justifies earmarking for a Protection Fund at the national or municipal level); (ii) it does not include taxes on revenue generating facilities profiting from the protected areas; and (iii) the tax rate is too low. A biodiversity project, prepared by GEF and being implemented with USAID funding, is planning to address these issues.

4.63 Fees related to the use of biological resources are also inadequate as they are set too low or are not collected at all. Whatever fees are collected, such as for game and medical plants, are not allocated to protect or maintain those resources. The MOE is revising the relevant legislation. However, in order to effectively design and implement a system of fees and taxes, with the right incentives and corresponding species-specific funds, the GOB should undertake an objective, independent analysis and evaluation of Bulgaria's natural resources (e.g. medicinal plants, game, mushrooms, snails, fish species, etc.). In addition to relevant fees and taxes, there appear to be opportunities for increasing resource mobilization in the short run through debt-nature-swaps. The Government is actively exploring this possibility, as a part of
a broader debt-for-environment swap initiative. Annex 4 provides details for the design and implementation of such scheme.

4.64 The foundation of Bulgaria's efforts to conserve biological diversity is its network of protected areas. Bulgaria has currently designated 3.5% of its land base as protected areas. The MOE's goal is to designate 7.5% by the year 2000. High-priority regions for new or expanded protected areas are the Rhodope Mountains, the Black Sea coast, Strandzha Mountain; areas surrounding and connecting the existing national parks in Rila, Pirin, Vitosha, and Stara Planina Mountains; and the valley of Strouma River. Steps should be immediately taken to delineate new protected areas and to review the goals and methods of the network as a whole. In addition, measures should be taken to strengthen administrative capabilities of the network. These measures should emphasize improvements in land management, law enforcement, biodiversity monitoring, education and interpretation, training of personnel, information services, and research capabilities.

4.65 The NEAP recognized the need to strengthen the institutional framework for the management of protected areas. In particular, it recommended the establishment of a National Nature Protection Service (NNPS) for the design, management and monitoring of all protected areas, including wetlands. Efforts have been made in this direction, although differences between MOE and COF had precluded the creation of the NNPS until now. The NNPS was established in March 1994 and negotiations are currently underway to iron out those differences for its smooth operation. It appears that a workable solution will be reached in the near future.

4.66 The establishment of an adequate organization for the implementation of a comprehensive conservation program for Bulgaria, will require close coordination with the Regional Environmental Inspectorates (REIs). At present, REIs do not have the capability and are not sufficiently involved in the development of the regional system of protected areas, eco-tourism strategies, sustainable forestry and agricultural management practices, or community outreach programs. Until now, no efforts were made to develop the regional set of the NNPS. The REIs need to increase their nature protection staff at least three times and improve their mobility through sufficient transport means in order to assure an adequate regional service of the protected areas. Training on nature protection should be provided both to the REIs and to the local authorities, involved in natural resources management. (For more details, see Annex 3).

G. Public Participation, Education, and Training

4.67 In 1993, the MOE formally established the Information, Public Relations and Training Division in order to develop and implement public outreach programs. This division has been working on developing activities and improving relations with: NGOs, the media and journalists, the scientific community, and the general public. In addition, they have begun to develop an environmental education program. As part of this overall effort, too, the MOE has established an office responsible for reporting on and responding to emergency incidents. (For more details see Annex 3).
4.68 The MOE has made progress in improving its relationship with these entities, but more remains to be done. Certainly, the notion of public outreach and communications is new for Bulgaria as a whole, but is complicated by the complexity of environmental issues. The MOE has received some formal training, which has had a positive effect, but there needs to be a longer term, sustained effort to help the MOE come to terms with the various intricacies of communicating with the public. (For more details see Annex 3).

4.69 While the functions of the Division have been clarified, as a next step, the MOE needs to develop operating guidelines for themselves and for all sectors of the public. The Ministry should also consider increasing its staffing in this division and dedicating a public information person to each of its Regional Inspectorates, in order to provide a presence in the regions. (For more details see Annex 3).

4.70 As part of this overall effort, the MOE, in conjunction with its National Center on Environment and Sustainable Development (formerly the Laboratory and Information Complex), monitors and provides data on the quality of the environment at any given time. This information is provided to the public and applied in a variety of analyses and forecasts for environmental policy design. This new Center's activities are an important component of the Ministry's attempts to disseminate information.

4.71 The issue of training in environmental issues for civil servants and specialists from central and local government, other state bodies, enterprises and non-governmental organizations needs to be addressed. A broad menu of training programs covering specific industries and issues as well as general environmental awareness will be required. The Ministry should not involve itself directly in providing such training, but it has an important role as a catalyst to encourage the development of suitable courses at institutions of higher education and more specialized training centers.

V. REVISITING PRIORITIES

5.1 The general thrust of the NEAP rested on the premises of aggressive privatization and decentralization policies. While these premises continue to underpin Bulgaria's restructuring efforts, it is now evident that there is a need to adjust the NEAP to a longer than originally anticipated transition period. The question then is: given the uncertainties surrounding the pace of economic restructuring in Bulgaria, what would be a realistic five-year environmental program which not only tackles the most pressing issues but also sets the stage for the time when market based incentives and C and C measures can function in an economy with an appropriate public-private sector mix? Such a program should be realistic enough to encourage, but not mandate, actions that transcend the decision capabilities of MOE and/or that requires further consensus building and political definitions that go beyond environmental concerns.
5.2 In accordance with the Lucerne Declaration, the Government attaches priority to minimizing damage to human health in setting its priorities for the Environmental Action Plan\(^2\). On the other hand, arresting environmental degradation which reduces the productivity of natural resources and physical capital or causes considerable amenity loss, while no less important, is not as urgent as addressing health concerns. Moreover, efforts are already underway to tackle biodiversity and coastal management issues in a comprehensive manner, with the assistance of the US Government and the World Bank.\(^2\) Consequently, the recommended short term strategy has two main objectives: (i) to address the most health threatening environmental "hot spots"; and (ii) to continue advancing in the design and implementation of an institutional, legal and regulatory framework consistent with the evolving character of the economy.

5.3 The remainder of this chapter describes the elements of the strategy and explains the basis on which it has been constructed. The key recommendations and proposed actions -- covering policy measures, institutional developments and targeted interventions that will be required to implement the strategy -- are summarized in Tables 7, 8 and 9, at the end of the chapter.

A. Hot Spots and Their Implications for Future Priorities

Prospects and Guiding Principles

5.4 While the macroeconomic situation is beginning to stabilize and economic recovery may be expected to get underway in 1995, the environmental projections for 2000 show that a further decline in emissions of air pollutants should be possible. The scrapping or replacement of old capital equipment combined with shifts in the composition of energy consumption will reduce the intensity of emissions per unit of output. A large fall in emissions of lead dust is projected as a result of specific policy measures to tighten emission standards on lead-zinc smelters and to increase the use of unleaded gasoline. For water pollution, however, the gains from better technology are likely to be entirely offset by the projected increase in industrial output. Progress with respect to emissions of water pollutants will largely depend upon stricter emissions controls and longer term investment in municipal wastewater treatment.

5.5 As a result, this focuses attention on the following forms of pollution:

- Lead in air and soils from metallurgical plants and the use of leaded gasoline;
- Particulates in the air from household heating, small scale enterprises, power and heating plants, metallurgical and other large plants;


\(27/\) USAID is financing a Biodiversity Project which includes, among others, the implementation of a management plan for Bulgaria's two largest national parks. The World Bank, through the Institutional Development Fund, is financing the development of a Coastal Zone Management Program.
Sulfur dioxide and other irritant gases, especially in combination with high exposure to particulates;

Nitrates in water, especially shallow wells, from agricultural run-off and rural septic tanks; and

Contaminants, particularly heavy metals and toxic organic compounds, in drinking water and food supplies.

5.6 All of these have been a problem in Bulgaria as was documented in the Environmental Strategy Study and in the Environmental Action Plan for Central and Eastern Europe. The assessment of recent trends in emissions and environmental quality shows that considerable progress has been made over the past 4 years, either as a consequence of specific environmental measures or linked to the economic transition that is occurring. Thus:

- Emissions of lead from the biggest sources have been substantially reduced so that exposure to lead in the worst affected towns is now much lower, though further reductions are required;

- Levels of particulates in 'hot spots' and elsewhere have declined in most places, especially in those urban areas which had the highest levels in 1990;

- Excessive exposure to sulfur dioxide and similar gases has not been a widespread problem in Bulgaria, but there has been some reduction in average exposures in the urban areas with the worst records;

- Nitrate levels in rivers and lakes have fallen significantly and it is reasonable to infer that the same will have occurred in shallow groundwater supplies;

- Declining economic activity in the metallurgical and chemical industries should have reduced emissions of heavy metals other than lead and toxic organic compounds to both water and air, though there is no adequate monitoring data to document this and it is difficult to assess exposure to residues left from past emissions.

5.7 Despite this progress, the populations of some urban areas are still being exposed to excessive levels of pollutants which threaten their health:

- Emissions of lead, arsenic and other heavy metals from the smelters at Asenovgrad, Kurdjali and Pirdop-Zlatitsa may cause excessive exposure to heavy metals in the air as well as in drinking water and food supplies;

- The continued use of leaded gasoline combined with the anticipated growth in urban traffic will worsen the exposure of children to air-borne lead;
High levels of exposure to particulates and sulfur dioxide in combination remain a major problem in Asenovgrad-Plovdiv, Dimitrovgrad-Galabovo, Kurdjali, Pernik, and Pirdop-Zlatitsa;

Despite recent improvements in air quality the combination of the total population exposed and levels of exposure also mean that exposure to various air pollutants is a cause for concern in Burgas (particulates & organic compounds), Pleven (particulates), Sofia-Kremikovtsi (particulates), and Varna-Devnia (particulates & organic compounds);

Possible contamination of drinking water and food supplies in the vicinity of metallurgical plants and in the upper sections and tributaries of the Maritsa and Arda rivers.

**Recommended Actions**

5.8 **Addressing the above five issues should form the primary agenda for current environmental policies and investments.** This is likely to require a concentrated effort for a period of 4-5 years, especially because it will not be possible to count on further reductions in emissions as a result of changes in the level and composition of industrial output. The crucial measures in a strategy to deal with these issues will be:

- Strong economic and regulatory incentives to discourage the use of leaded gasoline combined with measures to relax supply constraints on unleaded gasoline;

- Replacing low quality coals and lignite in household and other small scale boilers and heating units and in district heating or CHP plants by higher quality coal or by gas, buttressed by changes in relative prices to encourage this shift;

- Establishing a framework which would promote the adoption of good housekeeping and low cost control measures in metallurgical and chemical plants.

5.9 The proposed actions integrate both environmental and economic concerns. The steps that need to be taken are likely to be essential for protecting the competitiveness of the existing industries, especially in light of the evolving European Union standards. Although in

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28/ There is considerable uncertainty about the threat to drinking water supplies posed by heavy metal pollution in the Arda and Maritsa River basins. MOE considers that the state of the Arda does not pose a significant hazard, but that the whole of the Maritsa River deserves special attention because of the accumulation of arsenic and heavy metals in the lake formed by the Topolnitsa dam and the hazard posed by high levels of manganese in the river near Dimitrovgrad. However, this view is not supported by the analysis of the water quality data discussed earlier and raises questions about whether the observed levels of heavy metals in these two rivers are the result of current discharges or are a legacy of past damage. More detailed investigation will be required to agree on the immediate priorities in addressing these problems.
some cases the proposed measures may impose hardship on highly polluting enterprises, the overall effect of these recommendations will be to strengthen the economic efficiency of industries. The overall objective is to minimize damage to public health and productivity losses, as well as minimize waste and improve the performance of key industries.

5.10 As a first step, the MOE should carry out Environmental Audits of the most polluting sources, including power generation plants. These Audits should include schedules for compliance with agreed standards or for closing plants which cannot meet reasonable standards. Simultaneously, the MOE should carry out studies of the different options to gradually phase out leaded gasoline and to encourage the shift from low quality coal and lignite to higher quality coal and gas.

5.11 The draft Environmental Audits Regulation responds to urgent needs to assist the privatization process and the restructuring of the economy. In order to be effective, more attention should be given in the draft to improving current environmental performance (including environmental performance plans for activities causing significant environmental damages). The audits should also include estimates of the costs of remedying the effects of past damage to reasonable (but not excessive) standards and define who should bear these costs. Audits to establish environmental liabilities should also be mandatory for plants or sites which are being closed down. In all cases, the audits should also include a section on identification of potential environmental benefits. Different auditing procedures should be developed for different types of activities. More detailed information should be requested in the audits for description of the environmental facilities (for pollution reduction, waste water treatment and waste disposal).

5.12 The implementation of the Environmental Impact Assessment and of the proposed new Environmental Audits regulations requires (i) enhanced screening capacity of the MOE and the Regional Environmental Inspectorates, as well as in the sectoral Ministries, and (ii) improved quality of EIAs. For the latter, the MOE should organize training of the experts providing environmental impact assessment and auditing, at least for a transitional period, until appropriate consulting services and associations emerge in the country. For the on-going privatization process, the MOE should consider licensing of the auditors.

5.13 Both the Environmental Assessment Regulation and the draft Environmental Audits regulation should be reviewed at 3 - 5 years intervals (specified in advance). This would allow to correct technical deficiencies and adjustments to be made in accordance with the implementation experience. In addition to EIA and audits, other decision making techniques (such as cost effectiveness and cost benefit analysis) should be used in prioritizing environmental activities.

B. Institutional, Legal and Regulatory Reform

Institutions

5.14 The evolution of MOE into a true normative, monitoring and enforcement agency will require a strong commitment for reform and a clear vision of the steps leading to a modern
and effective institution. Although endowed with a cadre of highly competent professionals, MOE's efforts are undermined by an unclear definition of its main objectives, problems of coordination with other relevant agencies in the government, and a rather weak mandate partly explained by the overwhelming demand on the government to concentrate on crisis management. Inter and intra-institutional "turf fighting" are one of the results of this institutional weaknesses. In addition, uncoordinated donors efforts encourage a supply-driven piece-meal approach that atomizes scarce resources among a myriad of issues, problems and objectives.

5.15 A necessary pre-condition for MOE's success is to carry out a comprehensive institutional analysis to define objectives, assess their human and financial resources to carry out those objectives and prepare a technical assistance and training program for institutional strengthening based on needs and absorptive capabilities. A key by-product of this exercise should be the design of a workable system of inter-institutional relations allowing MOE to carry out its mandate. This proposal should serve as the basis for discussions within the government in order to reach consensus on a workable and clear definition of the role of MOE in the decision making process. Meanwhile, MOE should contract external consultants and advisors for specific tasks (design of policy instruments, project development etc) and should increase the technical assistance from the Ministry and various donor programs to the Regional Environmental Inspectorates and municipal councils both in C and C and in market based instruments.

5.16 Technical assistance will be needed to: (i) institutionalize the new Policy Coordination and Formulation Department and incorporate it in the Ministerial structure; (ii) provide training in economic analysis and enforcement; and (iii) develop an advisory unit, which will contract consultants for specific policy, economic and legal tasks. The unit should afford access to highly qualified economists, financial analysts, environmental policy and legal experts, which are currently not available for permanent employment in the Ministry of Environment (due to the limited salary budget and the scarcity of this expertise nationwide). Consultancy services are particularly needed during preparation and implementation of new standards, laws and regulations. The advisory unit should be supervised by the high level management in the Ministry (Minister and Deputy Ministers). For each assignment Terms of Reference should be prepared and approved by the Expert Council of the Ministry. On critical policy initiatives the Terms of Reference should be endorsed by the Ministerial Council.

Legislation and Regulations

5.17 Although substantial progress was achieved in creating an appropriate legal and regulatory framework for environmental management, there is a need to improve legislative coordination. The Ministry of Environment is required to review all draft laws, presented by other institutions, before their submission to the Ministerial Council. This coordination procedure provides the opportunity to integrate environmental considerations in the legal framework for the economic transition. However, due to time shortage for assessment and recommendations on the proposed drafts the coordination is a mere formality. Another shortcoming of the legislative coordination is lack of procedure for response to comments, which
allows the initiating institution to either ignore or modify MOE proposals. Dialogue among the institutions should be encouraged to provide better communication within the national Government. The coordination procedure should include a follow up stage. Also, greater emphasis is needed on integrating economic incentives in the core economic legislation that would encourage minimizing waste, emissions and discharges (currently the only incentive for improved environmental performance is free of duty import of environmental equipment).

5.18 There is a tendency to delay the adoption of environmental legislation, regarded as a lower priority by the politicians. The environmental lobby in the Parliament decreased significantly (the share of the "green" organizations dropped from 9% in the first Parliament to less than 4% in the current one, and is continuing to decrease as a result of position shifts). As a result, the Environmental Commission of the Parliament is almost paralyzed. Under the circumstances, the Ministry of Environment should focus on further consultations on the draft laws, in particular on the issues of enforcement and implementation. On-going work on rules and regulations that will be needed for the implementation of the new laws should be intensified, and if necessary these rules and regulations should be adopted before the approval of laws. For all new laws the timing and the implementation costs should be assessed and cost bearing arrangements specified in advance. Technical assistance will be needed to design and in some cases apply on a trial basis the enforcement instruments (e.g. pollution permits, charges and taxes). In addition, a broad public information campaign through the media and through the educational system, should be promoted to encourage public support for the environmental authorities.

C. Environmental Funding

Funding Arrangements

5.19 Since 1989, the level of environmental expenditures has decreased significantly and their share in the GDP dropped significantly (from 0.93 percent in 1989 to 0.29 percent in 1993). The restrictive state budget, adopted in 1994, is expected to contribute to further fall, which increases the pressure on the Government to apply the polluter-pays-principle and to implement revenue raising instruments for non-budgetary environmental funding. New financial sources (external and internal) need to be identified in order to reverse the nominal and slow down the real term decline in environmental spending. While the Ministry of Environment has been proactive in the above areas, lack of general consensus in the Government is hindering the enforcement of the environmental laws and regulations both for existing and newly emerging

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29/ For example, in the case of the Law on Property and Use of Agricultural Land, MOE suggested that all plots of heavily polluted land be excluded from restitution. The Ministry of Agriculture applied the exemption only to land polluted with radioactive and hazardous waste. In all other cases the contaminated land should be restored and the owners should receive compensations for direct and indirect losses from the extrabudgetary fund of the Ministry of Agriculture. There are a number of unresolved issues concerning both the compensation procedure and the availability of funds. Rehabilitation of the land then becomes a responsibility of the owner, who often might either ignore the problem or undertake inappropriate actions.
sources of pollution and is blocking progress in shifting the environmental expenditures from the state budget to the polluters.

5.20 The deficiencies of the existing sources, mechanisms and vehicles of environmental funding have been presented in paragraphs 4.38-4.40. In order to address these deficiencies, the following measures are recommended:

- **On the revenue side**, efforts should continue the shift from non-compliance sanctions to economic incentives, focusing on fees, taxes and charges, rather than fines. All fiscal instruments should be adjusted for inflation. For the effectiveness of these instruments (charges and fines) it is critical to improve their collection rate. Better collection rates would provide a stable cash flow, and the ability to plan the replenishment of funds and on-lending to enterprises through soft loans. The EPFs should be permitted to charge appropriate interest rates on their loans. If necessary, the rates could be differentiated according to the financial status of the recipients.

- **On the expenditure side**, priorities should be redirected from subsidies to regulatory development and to increasing monitoring and enforcement capabilities. This would include support for research efforts and advisory assistance. Minimum disbursement targets should be set for the revolving funds, and matching grants actively promoted. The Ministry of Environment should gradually withdraw from investments and subsidies, as appropriate incentives are put in place for private sector investment. In the long term, as economic reform advances, good pricing and taxation policies are put in place, and enforcement capabilities are strengthened, the Environmental Funds should cease to be needed in their current form.

- **On the management side**, the NEPF should be completely separated from MOE. Furthermore, supervision of environmental expenditures could be further improved through an advisory committee employing broader expertise (technical, financial and managerial) and representing various interest groups, which would work in tandem with the elected Boards. In this way, the influence of existing institutional biases on the management of funds will be lessened. In addition, the national and municipal funds should be subjected to yearly review by independent financial auditors.
**Investment Priorities**

5.21 Actions to address these priority issues identified above should focus initially on low cost or no cost measures -- i.e., taxation of the leaded gasoline; improving the quality of solid fuels burned by households and in small boilers; improvements in operating practices and the introduction of low cost control measures in metallurgical and chemical plants. Investments may be required in order to implement these measures effectively -- for example, to ensure adequate supplies of unleaded gasoline, for low pressure distribution of gas in polluted urban areas or to produce higher quality lignite or coal briquettes.

5.22 In the past, the bulk of environmental spending has been allocated to municipal wastewater treatment plants. The environmental problems addressed by these expenditures do not appear on the list of priorities identified earlier, though there are longer term concerns about water pollution from both industrial and municipal sources. The improvements in river quality that have been observed over the past 4 years suggest that a more focused strategy should be adopted. The MOE should implement and enforce a set of economic and regulatory incentives to ensure that discharges of water pollutants from industrial sources continue to decline in future.

5.23 Expenditures on completing or extending wastewater treatment plants should be carefully reviewed and allocated to those projects which will have a significant impact on the quality of the receiving waters. Such projects will receive high priority in their implementation through the Water Companies Restructuring and Modernization Project.

5.24 In almost all cases the strategy should be one of phasing the implementation of wastewater treatment with an initial stage of either mechanical or basic biological treatment (perhaps with chemical enhancement), followed in future by advanced biological or even tertiary treatment as funds can be generated by water or municipal authorities. Further, the MOE should rely in future less on the allocation of state subsidies for the construction of wastewater treatment plants as its main policy instrument. Municipal authorities and water companies must gradually be required to generate the resources required to extend or replace treatment facilities from water charges and/or discharge fees.

5.25 The one exception to the general recommendation that wastewater treatment should receive lower priority than in the past concerns the protection of tourism on the Black Sea coast and in the mountains. Bulgaria relies heavily upon earnings from tourism, but this is a very competitive international market in which foreign tourists are influenced by the quality of bathing and recreational waters. Expenditures to protect and upgrade water quality in critical tourist areas can clearly be justified on economic grounds. However, it is also the case that such expenditures should be financed by the tourist industry and the municipalities which will directly benefit from the resulting improvements in environmental quality.
## Table 7 - Key Recommendations on Environmental Policies

<table>
<thead>
<tr>
<th>RECOMMENDATION</th>
<th>OBJECTIVE OR OUTCOME</th>
<th>ACTION TO BE TAKEN</th>
<th>LEAD AGENCY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clarify pollution standards and develop a system of pollution permits.</td>
<td>To reduce air and water pollution loads to within accepted standards.</td>
<td>(i) Set enforceable standards for critical pollutants; (ii) contract external assistance to aid in the design and implementation of a pollution permit system.</td>
<td>MOE, MOI, MRDC, MOT, COE</td>
</tr>
<tr>
<td>Restructure pollution and waste disposal fees and permits, creating a differentiated system of charges, fees and recycling requirements.</td>
<td>To reduce excessive use of resources, waste, and pollution through clearer regulation and better targeted financial incentives.</td>
<td>(i) Raise the level of charges, taxes and permits to reflect actual pollution damage and abatement costs; (ii) test the feasibility of pollution charges as an ear-marked revenue-raising vehicle; (iii) provide support to municipalities in drafting regulations.</td>
<td>MOE, MOI, MOF</td>
</tr>
<tr>
<td>Develop a national strategy for the efficient management of solid wastes at the regional level.</td>
<td>To promote effective decentralization of waste management.</td>
<td>(i) Prepare an inventory of solid waste facilities; (ii) develop a structure for regional cooperation among waste management authorities.</td>
<td>MOE, MORDC</td>
</tr>
<tr>
<td>Conduct environmental audits of major pollution sources and industries.</td>
<td>To reduce pollution loads to established standards.</td>
<td>Through audits (i) introduce &quot;good housekeeping&quot; practices; (ii) recommend low-cost improved technologies; (iii) negotiate and enforce schedules for standard compliance and/or closure of non-complying sites.</td>
<td>MOE, MOI, COE</td>
</tr>
<tr>
<td>RECOMMENDATION</td>
<td>OBJECTIVE OR OUTCOME</td>
<td>ACTION TO BE TAKEN</td>
<td>LEAD AGENCY</td>
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<tr>
<td>Develop a comprehensive system of laws, analytical methodologies, and clean-up and prevention strategies for polluted lands.</td>
<td>To reduce long-term hazards/risks for public health, and increase the productive potential of lands.</td>
<td>(i) Draft a Soil Protection Law regulating land clean-up and use; (ii) develop a system for classification and monitoring of polluted soils, including those currently exposed to industrial pollution; (iii) evaluate options for removing and disposing of agricultural contaminants and mining wastes; (iv) develop risk-assessment and cost-effectiveness analysis methodologies.</td>
<td>MOE MOA MOH</td>
</tr>
<tr>
<td>Develop a program for broad public participation in the implementation of the Environmental Strategy.</td>
<td>To assure priority setting that incorporates local concerns and promotes local ownership.</td>
<td>(i) Involve local authorities and NGOs in the development of specific actions; (ii) design monitoring procedures for the implementation of the Strategy with public participation.</td>
<td>MOE NGOs</td>
</tr>
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</table>
### Table 8 - Key Recommendations on Strengthening Environmental Institutions

<table>
<thead>
<tr>
<th>RECOMMENDATION</th>
<th>OBJECTIVE OR OUTCOME</th>
<th>ACTION TO BE TAKEN</th>
<th>LEAD AGENCY</th>
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<tbody>
<tr>
<td>Strengthen policy coordination and analysis, and enhance available technical and analytical expertise.</td>
<td>To promote economy-wide coordination of environmental policy.</td>
<td>(i) Form an interministerial coordinating committee to discuss policy and guide phasing-in of stricter controls; (ii) appoint a Deputy Ministry of Policy Coordination to supervise inter- and intra-ministerial coordination; (iii) form a Policy Coordination and Formulation Department, including an Advisory Unit for consultancy services, to work under the Deputy Minister.</td>
<td>MOE, MOI, MOF, MORDC</td>
</tr>
<tr>
<td>Stabilize funding for the National System for Ecological Monitoring and Environmental Information (NSEMEI).</td>
<td>To provide a high quality environmental monitoring system, improve enforcement, and strengthen environmental analysis.</td>
<td>Develop an adequate and stable mechanism for funding the NSEMEI from the National Environment Fund and other sources; gradually reduce dependence on the state budget; increase provision of services on a fee-paying basis.</td>
<td>MOE, MOF</td>
</tr>
<tr>
<td>Strengthen the staff of the Regional Environmental Inspectorates (REIs) and local counterparts.</td>
<td>To develop a coordinated and comprehensive nature conservation program at the regional level.</td>
<td>(i) Increase the staff of the REIs by three-fold; (ii) provide training on nature protection to REI staff and local authorities.</td>
<td>MOE</td>
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<tr>
<td>RECOMMENDATION</td>
<td>OBJECTIVE OR OUTCOME</td>
<td>ACTION TO BE TAKEN</td>
<td>LEAD AGENCY</td>
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<tr>
<td>Provide technical, financial and managerial support to the staff and Boards of</td>
<td>To promote informed and unbiased management of Environmental Protection Funds.</td>
<td>Establish advisory committees with broad technical, financial and managerial expertise to work with</td>
<td>MOE</td>
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<tr>
<td>the Environmental Protection Funds.</td>
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<td>the national and municipal Funds.</td>
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</tbody>
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Table 9 - Key Recommendations on Targeted Interventions

<table>
<thead>
<tr>
<th>PROBLEM</th>
<th>LOCATION</th>
<th>SOURCE</th>
<th>POSSIBLE ACTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exposure to heavy metals in air</td>
<td>Asenovgrad-Plovdiv</td>
<td>Non-ferrous metal smelters</td>
<td>Improve ore storage and handling, rehabilitate furnaces, improve dust collection</td>
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<td></td>
<td>Elisseina</td>
<td></td>
<td>and controls</td>
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<tr>
<td></td>
<td>Kurdjali</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Pirdop-Zlatitsa</td>
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<tr>
<td>Exposure to air-borne lead from vehicles</td>
<td>Sofia (worst)</td>
<td>Leaded gasoline combined with increased urban traffic</td>
<td>Increase tax differential between leaded and unleaded gasoline, establish price</td>
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<td></td>
<td>Plovdiv (second worst)</td>
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<td>and policy incentives and deterrents on gasoline and vehicle use, expand capacity</td>
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<tr>
<td></td>
<td>all major urban centers</td>
<td></td>
<td>to produce unleaded gasoline, devise and implement a public information campaign</td>
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<tr>
<td>Exposure to high levels of particulates and SO₂ in combination</td>
<td>Asenovgrad-Plovdiv</td>
<td>Household and small scale use of low quality coal and lignite, power/heating plants; metallurgical plants</td>
<td>Increase prices of coal/lignite to domestic users, improve quality of coal/lignite briquettes, introduce smokeless zones, shift from coal to gas, increase pollution fees for particulate emissions, upgrade dust controls on medium and large boilers and industrial plants</td>
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<td></td>
<td>Dimitrovgrad-Galabovo</td>
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<td></td>
<td>Kurdjali</td>
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<td></td>
<td>Pernik</td>
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<tr>
<td></td>
<td>Pirdop-Zlatitsa</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exposure to particulates and organic compounds</td>
<td>Burgas</td>
<td>Industrial sources: oil refinery and</td>
<td>Implement 'good housekeeping' measures, introduce and/or increase pollution</td>
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<td></td>
<td>Pleven</td>
<td>petrochemical complex, cement,</td>
<td>charges, upgrade dust controls</td>
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<tr>
<td></td>
<td>Sofia-Kremikovtsi</td>
<td>metallurgical, chemical and power plants.</td>
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<td></td>
<td>Varna-Devnia</td>
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</tbody>
</table>
| Exposure to water and food supplies contaminated with heavy metals | Arda River  
Maritsa River  
Topolnitsa River | Mining operations and metallurgical plants | Improve water management and control within mines and plants; upgrade operation of wastewater treatment facilities; ensure land close to smelters is not used for growing food |
VI. NEXT STEPS AND ROLE OF EXTERNAL ASSISTANCE

6.1 To achieve a significant improvement in the state of the environment, it will be necessary to focus efforts on a limited number of key environmental concerns. The Environmental Strategy Update has identified five priorities on grounds of the threat posed to human health: (i) pollution with heavy metals in Asenovgrad-Plovdiv, Kurdjali and Pirdop-Zlatitsa, caused by non-ferrous mining and metallurgy; (ii) air pollution with lead in dense urban areas, due to the use of leaded gasoline; (iii) high levels of particulates and sulfur dioxide in Asenovgrad-Plovdiv, Dimitrovgrad-Galabovo, Kurdjali, Pernik and Pirdop-Zlatitsa; (iv) various cases of acute air pollution in Burgas, Pleven, Sofia-Kremikovtsi, Varna-Devnia; and (v) heavy metal contamination of water in the upper sections of the Maritsa and Arda rivers.

6.2 A combination of policy measures, institutional development and investments will be required in order to address these priority issues. The critical policy steps include:

- introducing, where necessary, increasing and then maintaining the real value of pollution charges (encompassing both fees and fines) -- especially for the key pollutants such as heavy metals and particulates -- so that enterprises (including the National Electric Company and municipal district heating plants) face a substantial incentive to implement low cost measures to reduce their emissions;

- introducing a much larger differential between the taxes on unleaded and leaded gasoline\(^30\);

- large increases in the prices of domestic coal and lignite, especially to household and other small consumers;

- adopting legislation which can be used to establish "smokeless zones" in heavily-polluted urban areas; and

- creating the institutional and financial framework to enable municipal governments, cooperatives and enterprises to convert apartment blocks from the use of coal in residential heating to gas or another fuel.

6.3 Institutional development should focus on the capacity to set reasonable ambient and emission targets for the most polluted areas, to negotiate compliance agreements with the main sources of pollution and to monitor the implementation of these agreements. It will be important to strengthen the regional environmental inspectorates which will be responsible for much of the detailed work involved in negotiating and enforcing compliance agreements.

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\(^{30}\) This might be accompanied by a general increase in the taxation of gasoline to encourage a shift towards newer, more fuel-efficient, vehicles which use less fuel and emit less pollution per unit of fuel consumed.
6.4 An Inter-Ministerial Committee on Priority Environmental Projects has been established to develop an investment program which takes account of economic constraints and environmental priorities. This Committee should focus on identifying projects which yield both economic and environmental benefits. In many cases, the major responsibility for developing and implementing such projects will fall to Ministries and government agencies other than the MOE -- for example, the Ministry of Industry or the Committee on Energy. Close collaboration between all of the relevant bodies will be required in order to ensure that the maximum economic and environmental returns are obtained from the program.

6.5 The World Bank has provided some assistance to the MOE in reviewing the project ideas submitted to the Inter-Ministerial Committee in order to draw up a short list of potential investment and technical assistance proposals which meet the criteria described in this report. A workshop was held in June 1994 with participants from a wide variety of Ministries and other agencies to discuss the priorities outlined in the previous section and the identification of investment projects that would address these priorities. Another workshop focusing on project preparation was also held in October 1994.

6.6 In the course of these discussions the following project proposals warrant further consideration and development:

- Measures to reduce emissions of heavy metals and sulfur dioxide from lead and copper smelters at Eliseina, Kurdjali, Plovdiv, and Pirdop including rehabilitation of electric furnaces and sulfuric acid plants;
- Expansion of capacity to produce unleaded gasoline at the oil refinery in Burgas;
- Construction of a facility to produce high quality lignite briquettes at Maritsa East;
- Measures to reduce air pollution -- especially particulates -- from industrial and small sources in the Dimitrovgrad-Galabovo area;
- Substitution of gas for coal in households, small boilers and district heating plants in Plovdiv, Vratsa and/or other areas with acute air pollution problems.

6.7 It was agreed that the MOE in cooperation with other interested Ministries would collect additional information concerning (a) the potential impact of these project proposals on environmental quality, (b) the technical feasibility of alternative project options, (c) the economic

31/ The "Environment for Europe" Bureau, within the Committee, is responsible for the evaluation and reformulation of project proposals in collaboration with the relevant authorities.

32/ One major source of pollution in Dimitrovgrad is the cement plant. A recent assessment suggests that this plant is quite uneconomical and has no prospect of surviving without large government subsidies. This is a clear case of a plant that ought to be closed on both economic and environmental grounds.
and financial status of the enterprises including their capacity to repay loans, and (d) the economic benefits of the projects to the enterprises and/or the country. This information would provide the basis for further discussions between the Government, the World Bank, and other donors on ways in which viable projects could be funded.

6.8 A number of World Bank lending operations which have already been approved or are under preparation might form appropriate vehicles for financing some of these and other projects. These include the recently-approved Water Companies Restructuring and Modernization Project as well as the proposed Energy II and Municipal Development Projects. In addition, it would be useful to explore the possibility of a Pollution Abatement Project which might finance investments in reducing pollution from industrial and small scale sources that produce economic and environmental benefits.

6.9 Such a project might follow the example of loans to other countries which combine technical assistance to strengthen environmental management with the establishment of a revolving Pollution Abatement Fund that provides loans (at normal commercial interest rates) to fund a part of the cost of investments which generate significant environmental benefits. This Fund could operate jointly with the institutional arrangements for the Debt-for-Environment Swap that was requested by the Minister of Environment at the Consultative Group meeting in Paris in mid-1994. The World Bank could provide additional technical support for the Debt-for-Environment Swap concept.

6.10 In order to comply with its international obligation to the phaseout of CFCs by 1996 (see paragraph 4.46), Bulgaria has requested assistance from the World Bank with the preparation of a Project (of about US$ 14 million) to be submitted to the GEF for the financing of eligible phaseout activities. The World Bank carried out an identification mission in late October 1994 and has been working with the MOE in order to assist with the preparation of subprojects. It is expected that certain projects would be identified for accelerated processing so that the phaseout of CFC consumption may be realized by the end of December 1995. The project design is expected to include a flexible financing plan so that implementation of these activities could commence in February 1995, while other less urgent activities would be initiated following Project effectiveness planned for September 1995.

6.11 Bulgaria has signed the "Framework Convention on Climate Change" at the UN Environment Conference in Rio, which would be necessary for consideration of the ODS Phaseout Project by GEF. The text of the Convention was approved by the CoM decision of August 29, 1994 and submitted for ratification to the Parliament before the latter was dissolved. The next step is the ratification of the Convention by the new Parliament once it assumes its duties.

6.12 In addition, there were a number of proposals for investments, studies and other activities which might be suitable for technical assistance and smaller scale projects that could be supported by bilateral donors with specific interest and expertise in the areas concerned. It was suggested that these proposals should be developed into a form that could be presented to
potential donors either via the Project Preparation Committee established following the Lucerne Conference or at other suitable opportunities.

6.13 In June 1994, the Government signed the Second Sulfur Protocol under the UN-ECE Convention on Long Range Transport of Air Pollution. Implementation of this Protocol will oblige the Government to take steps to reduce emissions of sulfur dioxide progressively over the next 15 years. The cost of these steps may be substantial and could involve large investments in controlling sulfur emissions from thermal power plants and other large sources. Before ratifying the Protocol the Government intends to formulate a strategy for meeting its obligations under the Protocol. The World Bank has agreed that, with the assistance of funds provided by The Netherlands, it will help the Government to identify the least cost options for meeting the sulfur reduction targets and other requirements of the Protocol as a basis for exploring potential assistance under the burden-sharing and joint implementation provisions of the Protocol. Other donors would also be invited to play an active role in supporting this effort.

6.14 A key element in the success of any action aimed at environmental protection and/or improvement is the degree to which such an action enjoys the support of the public. Therefore, it is crucial to inform the public and seek its active involvement through wide dissemination of environmental information and public participation campaigns (see Table 7, last item).
<table>
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<tr>
<th>No:</th>
<th>ESS/NEAP RECOMMENDATION</th>
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<tbody>
<tr>
<td>1.</td>
<td><strong>ECONOMIC POLICY/RESTRUCTURING</strong></td>
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<tr>
<td>1.1</td>
<td>Complete the energy price reform.</td>
<td>Reform started in 1991. There were six corrections of the electricity and heat prices. The sixth started in April 1994. Petroleum prices have been regularly corrected since 1992 (every two weeks) according to international levels.</td>
</tr>
<tr>
<td>1.2</td>
<td>Conduct the environmental audits as part of the industrial restructuring process.</td>
<td>Partially done as an element of the privatization process. A regulation for environmental audits of operating industrial sites is being prepared and will be completed and adopted in 1994. A procedure for environmental reviews of the sites under privatization, was adopted in 1993, has already been implemented.</td>
</tr>
<tr>
<td>1.3</td>
<td>Environmental law to spell out principle that state will take over liability for past environmental damages from newly privatized companies.</td>
<td>This is a basic principle of the Environment Protection Law (para 9) and of the COM's Act No. 50/1992 on the soils damaged by industrial pollution.</td>
</tr>
<tr>
<td>2.</td>
<td><strong>ENVIRONMENTAL LEGISLATION</strong></td>
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<tr>
<td>2.2</td>
<td>Develop a Nature Conservation Strategy.</td>
<td>Completed in early-1994. An action plan for its implementation is now required.</td>
</tr>
<tr>
<td>2.3</td>
<td>Prepare new regulation for EIAs.</td>
<td>Done in 1992. Regulation No. 1 issued in SG No. 10/1993. A total of 18 decisions for national and 110 for regional/local level projects were issued in 1993.</td>
</tr>
<tr>
<td>2.4</td>
<td>Sign and implement the proposed Convention on the Protection of the Black Sea.</td>
<td>Bulgaria signed and ratified the Convention in 1993. The Rio Convention on Biodiversity has been signed, but not yet ratified.</td>
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<tr>
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<tr>
<td>3</td>
<td><strong>STANDARDS AND REGULATIONS</strong></td>
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<tr>
<td>3.</td>
<td>Reduce number of standards, set realistic annual standards and establish a schedule to achieve EU ambient standards.</td>
<td>Emission standards for 9 air pollutants (dust, SO₂, NOₓ, CO, O₃, heavy metals) have been updated in collaboration with MOH (issued in SG No 43/1994).</td>
</tr>
<tr>
<td>3.1</td>
<td>Establish deposition standards for informational purposes and international negotiations</td>
<td>Deposition standards for dust and heavy metals from air pollution established (issued in SG No. 81/1991).</td>
</tr>
<tr>
<td>3.2</td>
<td>Develop regional air management strategies, set local specific emission limits on the basis of the requirement that ambient air quality meets national standards.</td>
<td>Development will be possible after adoption of the Air Quality Law and of a number of regulations and standards.</td>
</tr>
<tr>
<td>3.3</td>
<td>Adopt a revised system of vehicle emission limits.</td>
<td>Special chapter in the draft Air Quality Law. Technical requirements prepared for the development of standards by the CSM in 1994.</td>
</tr>
<tr>
<td>3.4</td>
<td>Develop set of standards with corresponding measures.</td>
<td>The whole system of the air quality control does not operate in real time. It will be possible to develop a set of standards and a warning system after completing the equipment by PHARE Program in 1994.</td>
</tr>
<tr>
<td>3.5</td>
<td>Review ambient water quality standards and adjust as necessary.</td>
<td>Four draft regulations for water quality management and admissible limits of pollution in fresh and marine water are being developed. A revision procedure by the MTDC is pending.</td>
</tr>
<tr>
<td>3.6</td>
<td>Establish through a process of negotiations individual permits with interim emissions limits and compliance municipal enterprises.</td>
<td>The solution depends on the adoption of the Water Law. There is a temporary instruction to REPIs schedules for each discharger, including for individual permits depending on each particular case.</td>
</tr>
<tr>
<td>3.7</td>
<td>Draft sample sewer use ordinance. Adopt sewer use ordinances</td>
<td>A regulation for permitted contents of hazardous industrial waste water in sewer systems is being prepared. A revision procedure by the MTDC is pending. MTDC is developing a new regulation for sewer use.</td>
</tr>
<tr>
<td>3.8</td>
<td>Develop complete set of soil quality standards.</td>
<td>A set of standard levels of the 4 heavy metals in soils adopted in 1992. Standards for 9 other metals and oils are being prepared; to be completed in 1994.</td>
</tr>
<tr>
<td>3.9</td>
<td>Issue regulation on collection, transportation and disposal of hazardous wastes.</td>
<td>While wastes are completely regulated in the draft Wastes Management Law, regulation cannot be issued before enactment of the Law. CM's Act No. 153/1993 provides a temporary solution.</td>
</tr>
<tr>
<td>3.10</td>
<td>Revise the regulation on the location, construction, and operation of the municipal landfills to meet current international standards.</td>
<td>The draft Waste Management Law completely solves the problem of meeting current international standards. In 1992 MRDC adopted standards for the design of solid and municipal waste depots. MKE prepares technical specifications for the location, design, construction and operation of landfills; to be completed in 1994 and transformed into a Regulation after the adoption of the Waste Management Law and the Law on Local Taxes and Fees.</td>
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<td>4.</td>
<td>ENFORCEMENT</td>
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<tr>
<td>4.1</td>
<td>Establish a system of pre-construction design review and permits</td>
<td>EIA Regulation (see SG No. 10/1993) solves the problem in principle. Permits need a harmonization of the several effective or draft laws and regulations.</td>
</tr>
<tr>
<td>4.2</td>
<td>Increase fines so that the fines are truly punitive and reflect the seriousness of the violation</td>
<td>Fines corrected in the reviewed Environment Protection Law in 1992 (a monthly fine can be up to 30 mln lv)). Fines are increased in all draft laws as well. A new regulation for fines was adopted by COM (issued in SG No. 15/1993).</td>
</tr>
<tr>
<td>4.3</td>
<td>Set up interministerial expert group to analyze pollution charges and propose procedures for the operation of environmental protection funds, then adopt the system of pollution charges.</td>
<td>An Act for Management of the NEPF and NEPFs was adopted by COM (issued in SG No. 5/1993). A system of taxes for waste water discharges and for air pollution by transport is being prepared.</td>
</tr>
<tr>
<td>4.4</td>
<td>Increase piped water tariffs, introduce raw water charges and groundwater fees, increase irrigation water charges.</td>
<td>Taxes for irrigation water and piped water tariffs were increased.</td>
</tr>
<tr>
<td>4.5</td>
<td>Introduce &quot;nature tax&quot; on revenues from facilities in or adjacent to protected areas.</td>
<td>The principle of the &quot;nature tax&quot; is introduced in the draft Protected Areas Law.</td>
</tr>
<tr>
<td>4.6</td>
<td>Develop and introduce a system of royalties for economic mineral resources.</td>
<td>No developed system of royalties for mineral resources, except for oil-drilling procedures in the sea-shelf. Taxes for inert materials were increased 10 times. The draft Local Rates and Taxes Law solves the problem partially.</td>
</tr>
<tr>
<td>4.7</td>
<td>Develop properly functioning land markets.</td>
<td>The land reform is not completed. A methodology for economic assessment of the soil damages from environmental pollution is being prepared.</td>
</tr>
<tr>
<td>4.8</td>
<td>Increase charges for solid waste collection services.</td>
<td>Implemented by some municipalities. Laws on Local Taxes and Fees and on Waste Management will define the principles to be followed by all municipalities in setting charges.</td>
</tr>
<tr>
<td>4.9</td>
<td>Develop a coastal zone management program for the Black Sea coast.</td>
<td>Done in 1993. Two regional offices in Varna and Burgas were established as part of the implementation of the Coastal Zone Management Plan. Developed programs and plans will be updated in 1994.</td>
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<td>5.</td>
<td>MONITORING AND INFORMATION</td>
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<tr>
<td>5.1</td>
<td>After a period of transition, only MOE will carry out regular monitoring of air quality in relation to ambient air quality standards. NHWH will carry out monitoring related to transboundary and global problems. MOH will carry out measurements only in relation to specific health impact studies.</td>
<td>Air quality monitoring network revised and coordinated in 1993. Now, MOE supports and maintains 60, and MOH 36 of the existing 105 sites. Lack of funds for supporting the whole air quality monitoring network.</td>
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<tr>
<td>5.2</td>
<td>Update air quality monitoring methods, purchase air and water monitoring equipment, provide assurance program and training.</td>
<td>Both air and water monitoring equipment is being completed by the PHARE Program. A total of 14 automatic stations (of which 5 mobile) have already been delivered, 4 (1) are expected.</td>
</tr>
<tr>
<td>5.3</td>
<td>Establish air pollution and radiation alert and warning systems.</td>
<td>Radiation control network is being established and will be completed in 1994. Completing depends on the equipment delivered by PHARE Program. Coordinated radiation alert and warning systems established in 1993. For air pollution see 3.5.</td>
</tr>
<tr>
<td>5.4</td>
<td>With the exception of the drinking water quality, MOE to overtake gradually all regular ambient water quality monitoring activities.</td>
<td>Done in 1992. The total surface and underground water quality monitoring is carried out by MOE, except for portable water sources (MON).</td>
</tr>
<tr>
<td>5.5</td>
<td>Develop: (i) hazardous waste classification and identification system; (ii) capabilities for analyzing waste; (iii) reporting system for hazardous waste; (iv) data management system for tracking information on generation, transport and disposal of waste.</td>
<td>(i) Completed in 1993 and adopted as an annex to CON's Act No. 153/1993: (ii) A Laboratory for Hazardous and Municipal Waste will be set up at LIC/MOE in 1994; (iii) An information and reporting system is being introduced; (iv) The system is not designed yet.</td>
</tr>
<tr>
<td>5.6</td>
<td>Set up a simple food control network with adequate quality control arrangements.</td>
<td>A food control network has been established and is run by MON and MOA.</td>
</tr>
<tr>
<td>5.7</td>
<td>Establish comprehensive environmental data information system including capability to collect and present information on a geographic basis.</td>
<td>The framework of a National Automated System for Environmental Monitoring is being prepared and will be adopted in 1994. GIS (ARC/INFO) technologies are introduced in LIC/MOE.</td>
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<tr>
<td>5.8</td>
<td>Design and implement program for information dissemination and public education.</td>
<td>No designed and implemented program for information dissemination and public education.</td>
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<tr>
<td>6.</td>
<td>INSTITUTIONS</td>
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<tr>
<td>6.1</td>
<td>Strengthen legal capabilities in MOE in order to assist the law enforcement activities of regional environment inspectorates.</td>
<td>Provided by the Environment Protection Law and a number of regulations.</td>
</tr>
<tr>
<td>6.2</td>
<td>Strengthen waste management capability of MOE. Establish comprehensive responsibility for waste management within the context of a visible, high priority program, staffed accordingly.</td>
<td>An Urban Ecology Department was established in MOE in 1992 to tackle the whole range of waste management problems among other things.</td>
</tr>
<tr>
<td>6.3</td>
<td>Set up Project Preparation and Management Unit with the responsibility to attract and coordinate all external assistance activities.</td>
<td>Such a unit was set up in 1993 only for the PHARE Projects management. The rest of the externally-assisted projects are managed by MOE's respective departments/divisions with the assistance of the &quot;Environment for Europe&quot; Bureau.</td>
</tr>
<tr>
<td>6.4</td>
<td>Strengthen capability to implement public information and education programs.</td>
<td>MOE's Information and Public Relations Division was set up in 1993 to develop and implement public information and education programs.</td>
</tr>
<tr>
<td>6.5</td>
<td>Ambient standards to be set by MOE in cooperation with MON. Drinking water standards continue to be set by MON.</td>
<td>The main part of ambient standards is still being set by MON in collaboration with MOE, including those for drinking water.</td>
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<tr>
<td>6.6</td>
<td>Set up an agency responsible for design, management and monitoring of all protected areas, including wetlands.</td>
<td>No agency set up. The National Ramsar Convention Committee was established in 1993 to implement the National Plan (1993) for priority actions in wetlands.</td>
</tr>
<tr>
<td>6.7</td>
<td>Develop a curriculum for the training of park rangers and protected area administrators.</td>
<td>A GEF project (see 6.8) includes a curriculum for the training of park rangers and administrators.</td>
</tr>
<tr>
<td>6.8</td>
<td>Introduce training program for development of management plans for protected areas.</td>
<td>A GEF project for the development of a management plan for the Central Balkan National Park will start in 1994.</td>
</tr>
<tr>
<td>6.9</td>
<td>Set up a Nature Protection Fund and earmark from the &quot;nature tax&quot; to the fund.</td>
<td>No Nature Protection Fund set up.</td>
</tr>
<tr>
<td>6.10</td>
<td>Develop, and after a transition period, implement a coordinated structure for the regional environment and sanitary inspectorates consistent with the structure of governance.</td>
<td>A WHO/ERB Project for Integrated Environmental Health Program is underway.</td>
</tr>
<tr>
<td>6.11</td>
<td>Set up Regional Environmental Councils advising regional level government bodies. The councils will be formed from representatives of local, regional and central government agencies, major industries and NGOs.</td>
<td>Done in 1992/1993 in most of the municipalities. 16 Regional Environment Councils of Experts were established in 1993 at the REPI/MOE to implement the EIA procedures.</td>
</tr>
<tr>
<td>6.12</td>
<td>Enhance the role of the regional environment inspectorates to include the preparation of regional environmental action plans, negotiations and issue of pollution permits, review of environmental assessments, environmental monitoring, detection and fining of violations, and coordination with other regional and local level government agencies.</td>
<td>Completely achieved with the rights given to the REPIs by the provisions of the basic Environment Protection Law.</td>
</tr>
<tr>
<td>6.15</td>
<td>Assign responsibility for regular small-scale pollution sources to local governments.</td>
<td>Article 27, para 1 of the basic Environment Protection Law solves the problem. REPIs are authorized to impose fines of up to 50,000 lv. on the offenders.</td>
</tr>
<tr>
<td>6.16</td>
<td>Establish formal coordination mechanism (between MOE and NGOs).</td>
<td>No developed formal mechanism for coordination between MOE and NGOs. The EIA procedure gives wide opportunities for involving the public and its NGOs in the decision making process.</td>
</tr>
<tr>
<td>7.</td>
<td>INVESTMENTS, TECHNICAL ASSISTANCE AND RELATED ACTIONS</td>
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</tr>
<tr>
<td>7.1</td>
<td>Base investments supported by the government on risk assessment and cost-effectiveness analyses.</td>
<td>No developed/implemented methodology for identifying the priorities for investments in environment protection.</td>
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<tr>
<td>7.2</td>
<td>Prepare feasibility study for the expansion of natural gas distribution network.</td>
<td>World Bank and EC-PHARE studies on this topic underway.</td>
</tr>
<tr>
<td>7.3</td>
<td>Stop distribution of high sulphur content coal in affected areas, replace with low sulphur content (imported) coal.</td>
<td>No program for stopping the distribution of high sulphur content coal. Lack of funds for supporting the import of low sulphur content coal.</td>
</tr>
<tr>
<td>7.4</td>
<td>Prepare full inventory of sites and carry out risk based ranking to assess need for cleanup.</td>
<td>No methodology developed and implemented for risk-based/assessments.</td>
</tr>
<tr>
<td>7.5</td>
<td>Prepare feasibility study for regional hazardous waste disposal facilities. Explore the option of hazardous waste incineration in cement kilns.</td>
<td>Preliminary studies were carried out in 1992 for incineration in cement kilns. No feasibility study has been carried out due to the pending privatization of the cement plants but one is being planned.</td>
</tr>
<tr>
<td>7.6</td>
<td>Explore the possibility of debt for nature swap operation.</td>
<td>Possibilities being explored. A proposal for &quot;Debt-for-Environment&quot; swap is under consideration. Discussions between MOE and MDF are planned on the subject.</td>
</tr>
<tr>
<td>7.7</td>
<td>Ensure that technical assistance provided by donors covers high priority areas.</td>
<td>The Interministerial Committee for Priority Environmental Projects and Development of the Republic of Bulgaria was established in November 1993 to attract foreign investments for top priority environmental projects.</td>
</tr>
</tbody>
</table>
INDUSTRIAL SECTOR PROFILE

This Annex provides details on the following seven industrial sectors examined in the update. The sectors are presented alphabetically.

1. Cement Industry
2. Ferrous Metallurgy
3. Food Processing
4. Non-ferrous Metallurgy
5. Petrochemical Industry
6. Textiles and related industries (excluding clothing)
7. Thermal Power
CEMENT INDUSTRY

DESCRIPTION:
6 plants: 3 wet (more energy-intensive, less economically viable); 3 dry. Wet plants in Dimitrovgrad, near Pernik, and near Varna; dry plants in Pleven, near Vratsa, and near Zlatna Panega. Output consumed primarily domestically.

MAJOR POLLUTANTS:
Air pollution is principal concern: mainly particulates, but also SO₂, NOₓ, and CO.

MACROECONOMIC CONTRACTION:
Physical output of cement fell by half in 1991 and continued to decline in 1992 and 1993, though at much lower rates (5-10%/yr). Increased exports (to Greece and Turkey), which were negligible before 1992, partially offset declining domestic demand. Decline in output led to reduced emissions.

PRIVATIZATION:
A corporate structure has been established but the state remains the sole shareholder. Environmental audits for all plants nearly complete. Privatization could lead to closure of many plants. Plant near Pernik recognized as being not economically viable; conversion to incinerator has been discussed.

RESTRUCTURING:
Structure of industry same as in 1991.

PRICE LIBERALIZATION:
Energy consumption per unit of output high by European standards. Increases in energy prices have had small impact on energy efficiency, at best. No substantial investments related to energy efficiency since 1991.

TRADE LIBERALIZATION:
Impact of reforms on rise in exports since 1991 not clear.

INVESTMENT LIBERALIZATION:
Modernization--Old technology and poor maintenance are major reasons why plants are so polluting. No substantial investments since 1991.

Pollution control--ESP and bag filters (for reducing particulate emissions) installed at all plants between 1976 and 1986. Most pollution-control equipment old and should be replaced. Economic difficulties since 1989 have led to reduced maintenance and lack of financial resources for repairing/ replacing equipment. But in 1991, one plant installed improved (German) technology. Some plants have switched from burning coal to gas, thus reducing
pollution considerably. However, in the long run gas will be a more expensive fuel, so that improvements in energy efficiency will be required if the plants are to remain economically viable.
FERROUS METALLURGY

DESCRIPTION: 2 big steel mills at Kremikovtsi and Pernik (2 units), and several steel-processing plants. More of iron ore is imported, as local ore has low ferrous content and high manganese and lead content. Quality of steel low and unattractive to many foreign buyers, but exports have risen from 40% to 80% of output since 1989.

MAJOR POLLUTANTS: Air pollution is principal concern, from coke ovens, milling, and power generation (plants have own power plants, using various fuels): particulates, phenolic compounds, hydrogen sulfide, ammonia, NOx, lead aerosols (from use of local iron ore).

MACROECONOMIC CONTRACTION: Output of pig iron, steel, and rolled metals fell 15-40% in 1991, declined much less in 1992, and increased sharply (20-25%) in 1993 due to development of export markets and recovery of local construction industry. Kremikovtsi mill operating at half capacity but output has stabilized; Pernik mill worse off; steel-processing plants nearly shut down. Large reductions in emissions of air and water pollutants compared to 1991.

PRIVATEIZATION: None yet. Much lower interest compared to nonferrous metallurgy.

RESTRUCTURING: Structure of industry same as in 1991. Some particularly polluting facilities closed in late 1980s (e.g., ferro-manganate plant in Kremikovtsi).

PRICE LIBERALIZATION: Industry is energy-intensive. Mill at Kremikovtsi generates 30-35% of electricity from own power plant (switched from coal to natural gas by mid-1980s); mill at Pernik gets 100% from national grid. Industry has reportedly recouped higher electricity prices by raising domestic prices (little competition) and raising export share: formerly, mills were required to sell at subsidized prices to machine-building plants that exported to Russia; export price is higher, even though steel is low quality. Mills have reportedly developed energy-efficiency programs, but not initiated.

TRADE LIBERALIZATION: Floating of leva has had unclear impact on output, given foreign sourcing of much of iron ore but rising export share.

INVESTMENT LIBERALIZATION: Modernization—Existing technology far out of date. Upgrading of all aspects necessary; would improve processing efficiency and reduce pollution. E.g., only 2 of 4 coke ovens at Kremikovtsi mill
operating as should. Modernization reportedly underway at Kremikovtsi and Pernik mills, including expansion of capacity in latter case. Some new equipment and structures reportedly purchased but never installed, as resources diverted to repairs and maintenance. In 1992, 480 million leva spent on repairs and maintenance and 226 million leva on upgrading (excluding pollution control); in 1993, 362 million leva and 130 million leva, respectively.

Pollution control--Since 1990, strict enforcement of regulation limiting domestic iron ore to 10% (according to Ministry of Environment) and 20% (according to Ministry of Industry) of input, to reduce lead emissions. Modernization at Pernik mill includes upgrading of pollution-control equipment. At Kremikovtsi mill, existing equipment operating poorly; old ESP, no bag filters. But some new monitoring equipment installed, new ESP on one line started operating in 1992, and Bulgarian-financed improvements to wastewater treatment facilities completed. Facility to capture and biodegrade phenolic compounds generated by coke processing under discussion. Comprehensive action plan prepared for mill, but similar plans have been prepared in past and not acted upon. Some skepticism that mill truly lacks financial resources for necessary investments. Expenditure on pollution control by both mills: 80 million leva in 1992, 65 million leva in 1993.
### FOOD PROCESSING

**DESCRIPTION:** More than 1,000 state enterprises, and an unknown number of private ones, producing a great variety of food and beverage products. Enterprises are distributed throughout the country. Private ones are of recent origin and tend to be smaller.

**MAJOR POLLUTANTS:** Great variation within industry. Water pollution, mainly due to organic wastes, is particular concern. Air pollution and solid waste sometimes locally significant.

**MACROECONOMIC CONTRACTION:** Perhaps less impact than in other sectors, given that food is an essential consumption item. But for state enterprises, huge declines during 1991 and 1992 (25-60%/yr for meat and canned fruits and vegetables), which continued in 1993 for some subsectors (meat).

**PRIVATIZATION:** One maize processing plant. More important is land restitution, which broke up state farms that formerly supplied state food processors. This has created openings for private processors, particularly in the dairy, meat, and edible fat industries.

**RESTRUCTURING:** Composition of the industry has changed dramatically since 1989. Many state enterprises have shut down. Emergence of numerous private enterprises makes monitoring and enforcement of environmental regulations more difficult.

**PRICE LIBERALIZATION:** Government still controls important food prices, including those for milk, bread, meat, and eggs. But increases in these prices and freeing of others provided important inducement for private-sector expansion. Water rates and charges for wastewater treatment too low to provide incentives for conservation and recycling.

**TRADE LIBERALIZATION:** No identifiable effects.

**INVESTMENT LIBERALIZATION:** Modernization--No significant investments since 1991 in the state sector. Whether technology of private sector is more or less polluting than that of state sector is not clear.

Pollution control--No significant investments since 1991. Wastewater is discharged into streams or municipal sewers. Municipal treatment plants apparently provide most cost-effective means of controlling pollution.
NON-FERROUS METALLURGY

**DESCRIPTION:**
Lead and zinc smelters in Kurdjali and Plovdiv; copper smelters in Pirdop (near Srednogorie) and Eliseina. Plant in Kurdjali also produces cadmium. Bulgaria is major world producer and exporter of zinc and lead. Products traded on international commodity exchanges and recognized as top quality. Cadmium exported to U.S.

**MAJOR POLLUTANTS:**
Air pollution is principal concern: particulates containing high concentrations of heavy metals; also, SO$_2$.

**MACROECONOMIC CONTRACTION:**
Export-orientation, to markets other than just those in former Eastern Bloc, insulated industry from decline in domestic aggregate demand. Physical output of zinc and copper reportedly more or less constant since 1989; output of lead reportedly fell by about 20% but is expected to return to former levels in near future. Value of output (in real terms) fell 27% in 1991 and 8% in 1992, but rose 7% in 1993.

** PRIVATIZATION:**
Reportedly underway for smelter at Kurdjali.

**RESTRUCTURING:**
Structure of industry same as in 1991.

**PRICE LIBERALIZATION:**
Smelting generates energy, so sector requires only supplemental energy, mainly electricity from national grid. Sector's own power-generating capacity is limited and coal-fired. Hence, largely insulated from energy price rises.

**TRADE LIBERALIZATION:**
Floating of leva has helped industry maintain output, given local sourcing of energy and much of raw materials and exporting of most of output. Dismantling of controls on foreign exchange reportedly made it easier for smelter in Kurdjali to obtain foreign currency needed to purchase pollution-control equipment.

**INVESTMENT LIBERALIZATION:**
Modernization--Some investments completed since 1991, e.g. more efficient combusters at Plovdiv lead smelter. Reconstruction of Kurdjali zinc smelter under discussion with Canadian interests. Upgrading of Plovdiv zinc smelter under discussion with Marubeni Corp. (Japan). Actual investments small relative to those in pollution control, but necessary ones much larger: e.g., US$200 million and US$100 for lead smelters in Kurdjali and Plovdiv, respectively.
Pollution control--Many investments completed or initiated since 1991, driven by public pressure. Most made in 1992-93: 209 million leva in 1992, 170 million leva in 1993, paid in cash. Much larger than investments in modernization during same period. At Kurdjali lead smelter, German technology for capturing and treating (to post-1995 standard) both production and outlet gases installed. Paid by plant and done in response to pressure from Ministry of Environment. At Plovdiv lead smelter, 4 new filters and 3 additional bag-houses (fabric filters) installed, local closed cycles for water pollution installed (reducing wastewater discharge from 860 l/s to 190 l/s), and construction of new wastewater treatment facility begun. At Plovdiv zinc smelter, 2 new bag-houses installed and reconstruction of sulfuric acid plant (which captures and uses SO₂) begun. At Pirdop copper smelter, discussions initiated with German firm (Lurgi) to construct sulfuric acid plant, Canadian firm (Hatch) to install equipment to capture residual hydrogen sulfide gases emitted by this plant, and unidentified foreign firm to upgrade wastewater treatment facilities. New monitoring station installed between Pirdop and Zlatitsa. At Eliseina copper smelter, government applied for Japanese financing for Mitsubishi to conduct feasibility study for facilities to reduce SO₂ emissions and wastewater discharge.
PETROCHEMICAL INDUSTRY

DESCRIPTION: 3 large plants, in Burgas, Pleven, and Ruse, which process crude oil into various products. Most output consumed domestically, but 30% is exported. Plant at Ruse includes country's only recycling facility for spent oil; closed by Ministry of Environment at end of 1991.

MAJOR POLLUTANTS: Air pollution is principal concern: particulates, SO$_2$, and NO$_x$ from power plants; hydrocarbons and hydrogen sulfide from processing. Contamination of water supplies and disposal of processing sludge also problems.

MACROECONOMIC CONTRACTION: Output reportedly fell by about half between 1989 and 1992, but it increased during 1993 (physical production of light crude oil products rose nearly 40%). Pollution emissions declined with output, but by a smaller proportion: start-up and shut-down of plants generates a disproportionate amount of emissions.

PRIVATIZATION: None yet.

RESTRUCTURING: Structure of industry same as in 1991.

PRICE LIBERALIZATION: Energy-intensive industry. No evidence that higher energy prices have had impact.

TRADE LIBERALIZATION: 4 years ago, plants processed cheap petroleum from Russia. Now, must pay world price for oil. No evidence that higher price has led to more efficient processing. "Soft" budget constraint may be explanation.

INVESTMENT LIBERALIZATION: Modernization--Investments in modernization could increase processing efficiency and reduce emissions. E.g., hydrogen sulfide problems reflect poor combustion. Some improvements reportedly underway. Closure of recycling facility at Ruse improved local environment but increased burning of spent oil elsewhere.

Pollution control--Investments since 1991 minor, except at plant in Pleven. Cheaper to pay fines than invest in pollution-control equipment. E.g., in 1993, plant in Bourgas paid 16 million leva in fines, while facility to desulfurize heavy oil would cost US$200 million.
### TEXTILES AND RELATED INDUSTRIES

**DESCRIPTION:**
Large number of plants producing thread, wool, yarn, cloth, leather, and related inputs for the clothing and apparel industries. Textiles and leather are export-oriented industries.

**MAJOR POLLUTANTS:**
Great variation within industry. Water pollution related to pigments (in the case of textiles) and animal remains (in the case of leather) is particular concern.

**MACROECONOMIC CONTRACTION:**
Fall in export demand--in particular, collapse of Soviet market--more important than fall in domestic demand, especially for textiles. Output of cotton fabrics declined by more than half in 1991 and continued to decline rapidly during 1992 and 1993 (20-30%/yr). Aggregate wastewater discharge by textile mills fell by about half during 1989-93. Output of leather declined much less, due to more diversified export markets.

**PRIVATIZATION:**
None yet. Keen interest by potential buyers; privatization documents are reportedly complete for 45 enterprises. Land restitution has had important spill-over effect: break-up of state animal farms eliminated market for livestock feed made from leather industry's animal wastes, resulting in increased discharge of these wastes. Delivery to small, dispersed private animal farms is reportedly not economic.

**RESTRUCTURING:**
Structure of industry same as in 1991. But much of output now sold to small, private clothing makers who have emerged since 1991.

**PRICE LIBERALIZATION:**
Water rates and charges for wastewater treatment too low to provide incentives for conservation and recycling.

**TRADE LIBERALIZATION:**
Output of export-oriented industries might have fallen more without floating of leva.

**INVESTMENT LIBERALIZATION:**
Modernization--No significant investments since 1991.

Pollution control--Minor investments since 1991, e.g. new treatment facility at Kazanluk, replacement of iron sulfate by aluminum sulfate as coagulant, introduction of microorganisms as indicators. Wastewater is discharged into streams or municipal...
sewers. Existing treatment neutralizes but does not degrade pigments. "Hot spot" problems related to leather industry in Yantra watershed and in Romanian cities downstream of Ruse.
THERMAL POWER

DESCRIPTION: Plants under control of National Electric Company. Additional plants controlled by industry, district stations. Local lignite with low energy value, high sulfur and ash content is source of 35% of electricity generation in country. Nuclear accounts for a substantial 35%. Remainder is imported (Ukrainian coal), gas, hydro.

MAJOR POLLUTANTS: Air pollution is principal concern: particulates, SO₂ (due to high-sulfur fuels), NOₓ, and hydrocarbons. Tall stacks reduce local problems. Nuclear safety also a concern.

MACROECONOMIC CONTRACTION: Output of electricity from all sources (not just thermal) declined by 5-10% in 1991 and 1992. Air quality benefitted because: (i) output was reduced mainly at plants with higher marginal costs, which tend to be more polluting, and (ii) output share for nuclear, the lowest marginal cost source, rose. Output increased slightly in 1993.

PRIVATEIZATION: None yet. Difficult to privatize while prices held below costs.


PRICE LIBERALIZATION: Impact of higher fuel prices on efficiency of generation is limited, due to inadequate instrumentation for controlling combustion.

TRADE LIBERALIZATION: Higher prices for imported fuel oil have shifted fuel consumption toward more-polluting domestic coal and less-polluting nuclear power. Subsidies to buy local coal (to maintain employment in coal mining) have discriminated against greater imports of low-sulfur coal from Indonesia.


Pollution control--No investments since 1991. No NOₓ controls or FGD. FGD underway at Unit 8 of Maritsa East. Need for FGD not clear: briquettes burned by households are main cause of exposure to SO₂. Access to pollution-control technology has improved, but financing is obstacle.
BULGARIA

ENVIRONMENTAL STRATEGY STUDY
UPDATE AND FOLLOW-UP

SECTORAL ENVIRONMENTAL MANAGEMENT

INDUSTRIAL AND HAZARDOUS WASTE

Laws and Regulations

1. Decree 153/93 of the Council of Ministers (COM) adopted a regulation which includes a list of hazardous wastes and their characteristics, provisions for disposal, plus ten appendices setting forth forms and guidance for monitoring, reporting, transportation, etc (including a Catalogue of Hazardous Waste, and uniformed forms for monitoring hazardous waste). It also includes a requirement for permits for hazardous waste collection, transportation and disposal. The Department of Urban Ecology is now working on the form of a permit application required by Article 8 of the Regulation, which will cover collection, transportation and disposal of hazardous waste. Complete regulation awaits passage of the Wastes Management Law, which has been drafted and awaits action by Parliament. Moreover, enforcement is difficult due to lack of Waste Management Law; it is carried out through the general sanctions of the Environmental Protection Act (EPA).

2. As drafted, the Waste Management Law is a comprehensive document that includes all manner of solid wastes, with the exception of: radioactive waste; debris from mining and geological excavations (when sites are developed according to an approved plan); slaughterhouse waste; animal carcasses; waste from agriculture and forestry; air pollutants; waste water discharge in sewers and waste collectors; and waste from arm explosives. It deals fully with permits for all wastes, including generation, transport, export/import, and disposal. It also provides for planning at the national, municipal and industrial levels. It establishes a national hierarchy of waste treatment which favors first, waste minimization, then, recycling, and finally, appropriate treatment and disposal. Implementation of this Act will involve such other ministries as Health, Agriculture and Territorial Development and Construction. Care will be needed to coordinate activities and avoid overlapping or conflicting permit requirements.

Reporting, Analysis and Monitoring

3. The reporting system existed even before the COM decree 153/93 decree, and data have been collected for 1992 and 1993 for industrial hazardous wastes. Plans are to extend the survey to non-hazardous industrial waste, household wastes and construction wastes this year. The reporting system has been implemented via the MOE Regional Environmental
Inspectorates (REI). Data from about 1200 industrial reporters have been compiled by the Laboratory and Information Center (LIC) and are now available in the 1992 MOE report. Now that the reporting system is underway, the REIs will turn to Article 8 of the COM decree 153/93, which requires permits for hazardous waste management. MOE is still working on the permit application form, which is modelled on the European Union practice.

4. It has been necessary to enhance the capabilities of the REIs in the hazardous waste area. Two seminars have been conducted for the inspectors and a training program is planned. Today, MOE estimates that 14 of the 16 REIs have achieved the needed capability. It seems clear that additional resources will be needed by the REIs for the future of this program, which will also include involvement in urban development and land use plans, as well as a range of new permitting responsibilities defined by the Draft Waste Management Law.

5. A dedicated hazardous waste/substance laboratory is not available to MOE. The LIC has not listed this need in its short-term planning, only in the long term. There are several laboratories in the country as a whole, capable of analyzing isolated parameters of different types of wastes, but there is no single specialized laboratory at the MOE, capable of a comprehensive overall waste analysis.

6. A classification/code system for industrial wastes has not yet been established. The Ministry is using the European code system for its '93 waste survey, but it remains to be seen whether it is fully applicable to Bulgaria. The transportation manifest system has not yet been put in place, although the form is included in the COM decree. Implementation is planned once the permit system is in place.

7. The preparation of a full inventory of hazardous waste sites and the risk-based financing required to assess the need for clean-up have not been carried out yet.

8. Bulgaria, like many countries, has not yet ratified the Basel Convention on the transboundary movement of hazardous wastes. It is planning to do so, but must establish the supporting lab and training programs and reporting system.

Institutional Capacity

9. An urban ecology department was established in MOE in 1992 to tackle the whole range of waste management problems, among other things. It included, in addition to its director, experts in waste management, hazardous wastes, and household wastes. In 1993, an expert in hazardous substances was added. The director hopes to add in 1994 a technical assistant for such administrative needs as the permit application process. The Department relies heavily on the REIs for support of its reporting and permitting programs and on the LIC for the data management system.

10. In addition to waste management, the Department of Urban Ecology also has the responsibility to coordinate the review of environmental assessments in urbanized areas. It
includes experts in regional planning, transportation networks and urban ecology. The department coordinates the work of technical experts from other MOE departments, and performs actual technical evaluation on only the waste aspects of the EIAs. Formal responsibility for the EIA application process and the compilation of MOE’s comments rests with two experts in the Environmental Economics Department.

Disposal Options

11. Preliminary studies were carried out in 1992 to explore the use of cement kilns for hazardous waste incineration. It was concluded that it would be feasible to convert two cement plants (in Batanovtzy and Beli Izvor) at a cost of $1 to $1.5 million each. No feasibility study was carried out since the plants were in the process of being privatized so this option has not been pursued. Plans are now underway to build a mobile incinerator to dispose of several thousand tons of obsolete pesticides at various locations. Consideration is also being given to building an incinerator for pharmaceutical wastes at a cost of $2 million, plus 4 million leva. No studies have been done on the need for or the location of a hazardous waste landfill(s) that could also be used for disposal of materials from spills.

AIR QUALITY

Environmental Audits

12. The EIA process adopted in 1993 is currently being used to evaluate new sources or modified/reconstructed operations. These sources are evaluated for environmental impacts prior to construction of the facility and must meet specific multi-media requirements in order to get approval. Although the MOE performs some environmental assessments of firms, no formal environmental auditing process exists pertaining to operating sources.

13. Various offices, both technical and economics/financial, are collectively developing regulations/procedures for conducting environmental audits. The Air Protection Department is currently providing input to this process. The audit procedures will incorporate requirements for environmental auditing found in the European Union (Green Book), PHARE, experienced consultants and specialists from Britain, etc. Training on environmental auditing is planned for the MOE by US EPA this year.

Standards

14. Ambient standards are currently being proposed for revision for eight air pollutants which are dust, SO₂, NOₓ, CO, O₃, Pb (lead aerosols), H₂S (hydrogen sulfide) and Cd (Cadmium). As recommended in the original ESS, the levels of the 24 hour standards (which were unrealistically stringent), were relaxed to more reasonable (achievable) standards.
15. MOE and MOH have agreed on the revised standards, and they have jointly issued the standards in regulatory form. The MOE and MOH are in the process of considering additional pollutants for which ambient standards will be revised. Most of these compounds will include many pollutants classified as "transboundary" in nature (such as sulfates, ammonia, nitrates, etc.) which approximate 15 in number. In addition, heavy metals which include nickel, magnesium, copper, etc. will also be considered for revision.

16. Deposition standards for particular matter, lead, cadmium, thallium, hydrogen fluoride, and zinc were established in 1991. However, none currently exists for sulfates and ammonia on a dry basis, which are the primary precursors of transboundary pollution. Establishment of appropriate standards for dry sulfates and ammonia is currently underway.

17. MOE is in the process of developing the Air Quality Law in order to submit to COM for consideration. Articles 9 and 10 of the Air Quality Law, currently under development, address the setting of specific emission limitations contingent upon the severity of the air quality in the area. Upon enactment of the Law, the MOE, in conjunction with the MOH, will be able to set emission limitations for industries that correspond to the pollution level of the area. Polluted areas will require correspondingly more stringent standards to be set on industry to achieve ambient standards in the area.

18. MOE's Air Quality Law, as currently drafted, gives MOE the authority to set standards depending upon the air quality conditions of the area. However, MOE presently has no air quality dispersion modeling expertise needed to model source impacts which are used to determine the necessity of prescribing more stringent standards and the degree of stringency needed. MOE will need training in this area of air dispersing modeling in order to effectively and competently apply this provision.

**Mobile Sources**

19. There are vehicle emissions limitations established for Carbon Monoxide (CO) and Particulate matter (PM). Article 8 of the proposed Air Quality Law contains some provisions governing requirements for limiting the lead content of locally produced and imported gasoline and the sulfur content of diesel fuels for use in motor vehicles.

20. Currently, the emissions of CO and PM from mobile sources are being measured at approximately 30 inspection stations operated by the Ministry of Interior. The limitation of lead in gasoline (0.15 g/liter), which was promulgated by the Committee for Standardization and Metrology three years ago, and the limitation for Sulfur in diesel fuel (0.2 - 0.3% S) established by the Ministry of Industry, effective over 5 years ago, are currently being enforced by the MOE. The new Air Quality Law, if enacted as written, will further limit the allowable sulfur concentrations.
Monitoring and Warning Systems

21. Air Quality Index standards for warning the public of elevated levels of air pollution have been established. Under the PHARE program, 10 automated monitoring stations (stationary) and 6 automated mobile stations were purchased and installed in many "hot spots" (large urban areas). Additionally, three new stationary and one new mobile automated systems are expected in the near future. In total, counting the existing stations which operate using wet chemistry (bubblers) for measuring gases and physical techniques for measuring dust and the new systems forthcoming, there will be 115 stations altogether. The air monitoring network currently measures particulates, SO₂, NO₂, H₂S, lead, NH₃, sulfur aerosols, phenols, heavy metal aerosols, CS₂, Cl, HCl, HF. The automated stations measure particulates, SO₂, NO₂, H₂S, NH₃, O₃, CO, and HC. With the exception of the automated stations, the remaining stations (using wet chemistry methods (bubblers)) operate with fairly outdated technology.

22. Radiation alert and warning systems were established in 1993. However, no alert and warning systems have been established for any other pollutant.

WATER QUALITY

Water Quality Standards

23. There are five draft regulations for water quality management and admissible limits of pollution in fresh and marine waters that have been developed. The draft regulations are:

(a) Requirements for the quality of water for main uses, which addressed the different use classes (i.e., drinking water, recreation, irrigation and fish farming).

(b) Ambient water quality standards which address five classifications for any inland surface water (i.e., very pure, pure, slightly polluted, polluted and heavily polluted).

(c) Hazardous substances of industrial wastewater discharged to municipal systems.

(d) Effluent standards for wastewater from certain industrial servers and municipal wastewater treatment plants (i.e., pre-treatment and categorical standards).

(e) Ambient water quality standards for coastal waters of the Black Sea.

24. All five of these regulations will be signed by the MOE, Ministry of Health and MRDC.
25. While the MOE is attempting to set new water quality objectives based on new water quality classifications, the National Institute for Metrology and Hydrology is developing a pilot project for two rivers -- Mesta and Osam -- to assist in the endeavor to determine the water quality of main river basins.

26. The MOE had originally anticipated that industry would be able to meet the new proposed limits within a matter of several years. However, recommendations by PHARE program experts (Holland) insisted that industry would need a much longer period of time to meet the limits.

27. In the meantime, the REIs will be negotiating interim effluent limits and compliance schedule into the industrial as well as municipal permits. There will also be fines or penalties should the interim limits and/or schedules not be met.

28. This type of permitting system will afford both industries and municipalities the time needed to procure and install the pollution control equipment in order to achieve the new proposed effluent limits. This will alleviate some of the economic impacts facing these entities.

29. There is also an interact Program (part of the PHARE program) that issues grants to certain industrial areas. This program is specifically for plants within areas that discharge to rivers flowing through European Union countries (i.e. Greece). However, this program has not been implemented to date.

30. In addition, for certain large industries that are still State-owned, there is still the possibility of funds from the State budget. For municipal systems funding may be acquired from: the State budget, the National Environmental Fund, loans (e.g., the World Bank) and investments from other countries.

Sewer Use Ordinances

31. The MOE has had regulations in effect since 1987 that only are applicable to industries that discharge into municipal systems. The MOE has now prepared a new regulation (Hazardous Substances of Industrial Wastewater Discharged to Municipal Systems) which will apply to industries as well as municipalities. These proposed regulations will be implemented through the permitting process.

32. The MTDC also has regulations (Regulation No. 9) in effect which determines the general requirements for all sewer systems and establishes relations between the owner of the system and the user. These regulations have recently been updated -- SG No. 77/1994. According to the MTDC regulations, there must be a signed agreement/contract between the user and owner.
Monitoring and Inspection

33. The PHARE program has provided a total of 4 million leva for the purchase of monitoring equipment to improve compliance monitoring, as well as to assess the quality of wastewater. Some of this equipment is on-line and operating. The Western firms supplying the equipment are required to train the REI staff in the proper operation of the equipment. In addition, the EPA Region 2 has provided several training seminars regarding standard methods, calibration of equipment, etc.

34. The REIs have assumed the responsibilities of preparing regional action plans, negotiating and issuing permits, reviewing assessments, monitoring, detecting and fining of violations and coordinating with other regional and local government agencies. However, the capability of Inspectors to establish a relationship with all permittees as well as to conduct unannounced plant visits are an integral part of effective compliance and enforcement programs. The reliance on self-monitoring reports alone is not sufficient. During discussions with the MOE regarding the capabilities of their inspectors, it was noted that only three vehicles are available for a total of 40 Inspectors. Due to technical and financial reasons, difficulties exist also in the communication links among the REIs, and between them and the MOE.

NATURE CONSERVATION, PROTECTED AREAS MANAGEMENT AND BIODIVERSITY

Pricing and Resource Mobilization

35. The principle of a nature tax is briefly introduced in the draft Protected Areas Law. The draft law states that owners of buildings or other properties that are located within the protected areas must pay a tax of 0.5% of the property value. This tax would be primarily levied on chalets and huts within park boundaries. The draft law also directs that these funds would be earmarked for the state budget.

36. The language currently written into the draft Protected Areas Law does not adequately provide for levying nature taxes on revenue generating facilities in or adjacent to protected areas and the proposed percentages are too low. Options should be explored for revising the draft municipal tax law or the profit tax law to provide for nature taxes. In addition, the MOE should ensure that the taxes collected should be earmarked for a special Nature Protection Fund(s), either at the national or regional level. (This issue will be addressed as part of the Biodiversity Project, which is financed by USAID and has been prepared by the Global Environment Facility (GEF).

37. A Nature Protection Fund is a crucial foundation to sustain Bulgaria’s nature protection management system. According to the Ministry of Finance, such a fund can only be established under the National Nature Protection Service (NNPS). Consequently, the Fund has not yet been established as it awaited the creation of NNPS. Now that NNPS has been created,
the establishment of the fund may proceed. The special fund could also be set up as part of the Environment Protection Fund already established and operational. Funds could also be established at the regional or municipal levels.

38. The current system of fee collection and use of biological resources is inadequate. Fees are set too low, or not collected at all. In addition, when fees are collected, such as for game or medical plants, the revenue generated is not used to maintain or protect those resources. The MOE is in the process of revising these practices by drafting or amending legislation. However, this process is difficult due to the lack of information regarding the value of Bulgaria's biological resources.

39. The effective design and implementation of a system of appropriate fees and taxes requires a neutral, independent analysis of the value of Bulgaria's natural resources (e.g., medicinal plants, game, mushrooms, snails, fish species, etc). This would provide the necessary basis for the MOE to establish appropriate fee and tax systems, incentive programs, and corresponding species-specific funds.

40. Many opportunities exist for debt-for-nature agreements in Bulgaria. Bulgaria faces a combined foreign debt of $12.3 billion, more than half of which is owed to banks in Germany, Japan, and Austria. It is currently negotiating with its commercial creditors in an effort to restructure its debt load and to design a realistic repayment schedule in light of its weak domestic economy and foreign exchange situation. As part of this general restructuring, debt-for-nature swaps could be included to the advantage of all parties. The Government of Bulgaria, through the MOE, has already expressed interest in the potential of debt-for-nature swaps, and has taken initial steps in consideration of such agreements.

Institutional and Training Issues

41. The formulation of effective conservation policies and the execution of laws affecting biological diversity require a solid administrative structure. The MOE has been trying to establish such a structure under its administrative framework. The MOE has received wide ministerial support within the Council of Ministers and from the Prime Minister. Finally, the MOE signed an ordinance to create NNPS on March 2, 1994 and the ordinance was published in the State Gazette on March 25, 1994. The Council of Ministers has directed the MOE and the Committee of Forests (COF) to set up a working group to resolve their differences regarding the operation, role and responsibility of NNPS. Negotiations are currently underway and preliminary discussions indicate a workable solution can be reached.

42. The original ESS recommendation to train park personnel in nature protection and nature interpretation is still valid. However, training programs have not yet been initiated due to the continuing lack of park directorates and necessary staff (i.e., park rangers). The required comprehensive training programs should include such topics as law enforcement, nature protection, interpretation, and public awareness, with participants from Bulgaria's national parks, as well as nature protection specialists from the REIs and the local forestry units.
43. While no regulations and/or guidance exist for the development of management plans, training has been initiated. A draft statement of the Central Balkans Management Plan has been prepared with USAID assistance. This statement will be further developed under the GEF Project. A management plan for Rila National Park will be also be undertaken as part of the GEF project. Regulations should now be drafted for the development of comprehensive management plans in Bulgaria, including components such as training, eco-tourism, public awareness, infrastructural requirements, and forestry policies. These regulations should include clear distinction of roles and responsibilities of various agencies, including the MOE, COF, MOA, REIs, and park staff. (Such a model will be developed as part of the GEF project preparation.) Activities being undertaken by other donors need to be incorporated into the management plans being developed (e.g., the British Know-How Fund project in Pirin/Rila, the EU PHARE project in Rila, and the Swiss project in the Central Balkans).

MUNICIPAL SOLID WASTE

44. Standards on the location, construction and operation of the municipal landfills were adopted by MRDC in 1993. Enforcement is carried out through the Environmental Protection Act with difficulties due to the lack of the Waste Management Law. The draft Waste Management Law that was submitted to Parliament, deals with the issues of meeting current international standards, permits for generation, transport and disposal and defines the priorities of waste treatment.

45. Technical requirements for the location, design, construction and operation of municipal landfills is under preparation by MOE as described under its objectives. The instruction will be in use as soon as the technical requirements are completed. Passage of the draft Waste Management Law will regulate roles of the Ministries of Environment, Health, Agriculture and Regional Development in waste management.

46. Some municipalities have increased charges for the solid waste services but they do not cover capital costs for development of solid waste management systems. The draft Law on Local Self-Government, which has been submitted to Parliament, proposes to widen the rights of the municipalities to influence user charges. Currently, however, municipalities continue to rely on central government subsidies and existing environmental protection funds to meet their financial needs. Passage of the Law on Local Self-Government will regulate application of realistic charges for the municipal solid waste collection.

SOIL DAMAGE

47. Soil quality standards were established by the Council of Ministers in 1979. The MOE in cooperation with the Ministry of Agriculture developed a set of standards for maximum allowable concentration of four heavy metals in soils. These standards were adopted in 1992.
Standards for maximum allowable concentration of nine other metals and oils are under preparation. They are expected to be completed within 1994.

48. Effective regulation of land use and of the rehabilitation of damaged lands would require the preparation of a draft Soil Protection Law. Moreover, in view of the partial monitoring and reporting of soil contamination, polluted soil classification (including pollution by aerosols and irrigation waters) and monitoring systems need to be developed by MOA, MOE and MOH.

49. Outdated pesticides are stored in 1400 different locations in 274 municipalities. The risk of contamination requires an evaluation of various options for financing the neutralization and/or incineration of these pesticides.

50. In order to effectively apply the Restitution Law, the condition of the land to be returned to its original owners, should be established and the hazard risks from its possible contamination should be assessed. This would allow the analysis of the cost effectiveness of land rehabilitation vs. compensation of its owners. In addition, in order to properly enforce Decrees Nos. 140 and 56, the ore and uranium mines should be closed and the abandoned areas should be reclaimed.

**MONITORING, INFORMATION, AND EDUCATION**

51. The framework for a National Automated System for Environmental Monitoring is being prepared and will be adopted during 1994. A Geographic Information System (GIS) in ARC-INFO, has been developed and provided by USEPA and is being utilized in the National Center on Environment and Sustainable Development (NCESD) of the MOE. It has the capability to develop and display information on a geographic basis, and prepare relevant maps and other visual information.

52. The MOE/NCESD now provides weekly updates on air quality which are provided to a wide subscriber base, including the mass media. Emissions data are broadcast to the public by radio every Tuesday. In addition, the NCESD prepares monthly, quarterly, and annual reports on environmental conditions which are distributed to relevant technical institutions and other government agencies. The NCESD technical library and publishing arm is also connected to the newly established Information Center at the MOE.

53. In 1993, the Ministry formally created the Information, Public Relations and Training Division (IPRTD) to increase the dissemination of information to the public. The purpose of IPRTD is as follows: coordinate, organize and control the information flow in the Ministry; maintain relations with the public, media and environmental NGOs; assure the inclusion of ecological issues in educational and training programs, and the exchange of information with the other State Institutions, the REIs, and the Laboratory and Information Center. IPRTD develops programs for environmental education, including computer programs,
instructions and documents for operational and control activities, and specialized information such as statistical data.

54. With a staff of eight, IPRTD is well on its way to fulfilling its mandate. It is organized with contacts with NGOs, the mass media, the regional inspectorate, the scientific community, and environmental educators. With each of these groups, IPRTD has made great strides and is developing programs and initiatives to interact effectively with, and support, these sectors.

55. Most notable among these new initiatives is the MOE Information Center funded by the EU/PHARE program, which is designed to serve as a walk-in resource for the public. The Center, which is also connected to the LIC and its large collection of technical and scientific information, is scheduled to open officially in March 1994. In addition, the MOE plans to launch a series of "National Campaigns" to educate the public on environmental issues and increase overall public awareness. The first campaign scheduled for 1994 will advocate environmentally conscious household practices.

56. The IPRTD has formally designated one of its staff to interface with NGOs and develop programs to enhance their relationship with the MOE. NGOs generally feel that communication efforts on behalf of the Ministry have improved, but there is still room for improvement. It is important to realize, however, that there are approximately 160 NGOs -- and one MOE person to provide outreach to this sector. The NGOs cannot depend on the Ministry as their sole source of information.

57. Several donors have launched environmental training initiatives in Bulgaria. The Environmental Training Program (ETP), supported by USAID, and the Environmental Management Training Center (EMTC), supported by USEPA, are running successful programs, providing a wide variety of courses to broad audiences throughout the country. The British Know-How Fund and the EU/PHARE program have also conducted successful environmental training efforts. The MOE is developing a teacher training program to promote environmental education in Bulgarian schools. With the assistance of PHARE, the MOE is expanding its training efforts (including language and computer classes). Also through PHARE, the University of Sofia and the MOE are developing an environmental studies program (the TEMPUS program).
DEBT-FOR ENVIRONMENT SWAP: A POTENTIAL APPLICATION IN BULGARIA

DRAFT PROPOSAL

1. Since they were first introduced in an agreement between an American non-governmental organization and Bolivia in 1987, DEBT-FOR-ENVIRONMENT (or Debt-for-Nature) SWAPS have been used by many indebted countries to combine a reduction of their external debt with a mobilization of resources for environmental protection. In addition to their economic and environmental benefits, debt-for-environment swaps can also provide image gains among creditor banks and the international community. By the end of 1993, at least 16 countries were reported to have undertaken debt-for-environment transactions and the total size of the funds generated was close to US-$1 billion. The largest debt-for-environment swap undertaken so far is the Polish Ecofund, which currently has a volume of US-$466 million. The Ecofund is described in more detail in Appendix I.

2. In every debt-for-environment transaction, the debtor country trades a reduction of its debt burden against a commitment to provide resources for environmental protection. While many versions have been tried, current swaps are mostly based on two generic forms, the bilateral and the trilateral. The **bilateral form** involves only debtor and creditor country and is used mainly for swapping official debt. The creditor country agrees to forgive a portion of the **foreign currency** debt it holds while the debtor country provides resources in **domestic currency** for environmental protection.

3. The alternative model of a debt-environment swap is the **trilateral form**, which can be used for both private and official debt. In contrast to the first form, it involves at least one additional party, mostly a non-governmental organization (NGO) with a particular interest in environmental protection across the world. Typically, the debtor government negotiates with the NGO, taking the role that the creditor government has in the first form. The debtor government agrees to exchange foreign debt into domestic currency at a specified rate.

I. A MODEL SWAP FOR BULGARIA

4. What follows from these considerations for the Bulgarian government? The most important factor for its decision which type of swap to choose should be its **environmental policy priorities**.

5. This choice is the government's, but some reasons suggest that a bilateral swap may be preferable for the country:
(a) Bulgaria's environmental problems are concentrated in the areas of water and air pollution caused by heavy industry rather than nature conservation, in which NGOs specialize.

(b) Environmental spending as a share of GNP has deteriorated in the last few years due to permanent budgetary crisis. Only bilateral swaps could be large enough to reverse this trend.

(c) A specific opportunity for projects that only a bilateral swap could fund is presented by the scheduled closure of uranium mines as prescribed by Ordinance No. 163. Swaps could help redressing severe environmental damages in these regions. Such projects would also help to mitigate unemployment caused by layoff of uranium mine workers.

6. The following paragraphs try to provide an outline of how a swap arrangement for Bulgaria could look like, based on the bilateral swap model as presented above.

**Trust Fund**

7. The government will then have to provide resources in domestic currency according to the agreement with the creditors. As an example, the Ecofund proposes an amount equivalent to the same value in domestic currency. This could be accomplished either as a capital endowment at the inception of the contract or in annual installments, where the leva amount is adjusted according to the exchange rate at each installment date. Given the budgetary problems the country is facing, the second alternative seems preferable. The same structure was chosen by the Polish proposal.

**Fund Management**

8. The Trust Fund itself would comprise of two bodies, the Fund Management and the Supervisory Board. The *Fund Management* would be responsible, among other things, for project pre-selection and evaluation, for post-grant monitoring and for negotiations with recipients and potential co-financing institutions. These tasks require a variety of professional skills ranging from sciences over engineering to finance and management. Given these sets of skills, the Fund Management can be an important source of know-how transfer for other domestic institutions.

9. The Fund would be governed by a *Supervisory Board* on which the Bulgarian government and its creditors have to agree. It is essential that creditors are either represented directly on the board - the approach taken by the Ecofund - or find their interests represented by independent experts from NGOs or research institutes familiar with the country's ecological problems. The second alternative seems in many ways preferable since it avoids the high administrative costs and the complexities of governance of a large board.
Disbursement of funds

10. A simple way to arrange disbursements is to take the repayment schedule of the debt. Instead of paying to the creditor in foreign currency, the government now pays an equivalent amount in leva to the Trust Fund. The Fund would have an annual budget based on the scheduled government remittances. These remittances would be deposited in interest-bearing accounts and the Trust Fund would be able to make disbursements according to the cash-flow requirements of its projects. The Supervisory Board would oversee disbursement decisions.

II. PROGRESS UP-TO-DATE AND NEXT STEPS

11. Debt-for-Environment Swaps are generally initiated by the debtor country, which then approaches either an international NGO or its creditors directly. Following are the steps already taken by the Bulgarian Government.

(a) **Consensus on a debt-for-environment swap proposal within the Government.**
   Before other actors are approached, it is important to achieve a consensus between the different branches of government involved. In Bulgaria the swap was discussed with all relevant Government agencies, and a decision was made to authorize the Ministry of Environment and the Ministry of Finance to initiate contacts with the creditors for a potential earmarked for environment debt reduction.

(b) **Develop a swap proposal and seek support in the donor community.**
   A swap concept was prepared with assistance from the World Bank, identifying the objectives of the swap, the types of projects it should support and the need to develop a Trust Fund for managing resources from the swap. This concept was presented at a Consultative Group meeting on June 6, 1994 in Paris, and received a general support from the meeting.

12. Next, the swap operation require turning the proposal to the Paris Club (since debt reduction negotiations with official creditors are centralized in the Paris Club, bilateral swaps need the approval of this forum). In case of a positive response, the next steps are to:

(a) **Establish contacts with international NGOs and law firms to set up legal structure for trust fund.**
   As indicated, the participation of both national and international NGOs is important for the governance of the Fund. The already existing contacts to the WWF would be an ideal starting point. International NGOs have experience in the operation and the establishment of trust funds. They can also provide access to international law firms with essential legal expertise in the field, should this prove to be necessary. While legal services can be prohibitively
expensive, some firms have in the past been willing to give free advice for the establishment of debt-for-environment swaps.

(b) **Develop showcase project portfolio.**
A set of projects should be prepared by Environment Ministry, in collaboration with national and international NGOs, that could be "marketed" to prospective donor governments. Project proposals could come from different areas, covering cross-national issues as well as regional ones.

(c) **Approach official creditors.**
With the preliminary approval of the Paris Club and the institutional groundwork in place, individual countries should be approached. Among the first candidates are those debt-holding countries with existing economic assistance programs in Bulgaria. Some countries have already participated in the Polish Ecofund and have shown a willingness to use debt-for-environment swaps, namely USA, France and Switzerland. In addition, the following countries have expressed interest or already prepare their participation in the Ecofund: Italy, Netherlands, Sweden, Canada.

### III. CONCLUSIONS

13. A debt-for-environment swap creates a unique opportunity for Bulgaria. It offers four types of benefits:

(a) **First,** a debt-for-environment swap generates substantial financial and economic benefits for Bulgaria. It exchanges its debt obligations in foreign currency into payments in domestic currency. This advantage is of particular salience in a period when foreign exchange earnings are still scarce.

(b) **Second,** a debt-for-environment swap creates environmental benefits. It can be used directly to finance projects with high priority for both debtor and creditor governments. Indirectly, it generally also allows Bulgaria to concentrate domestic environmental expenditures on those local and regional tasks that may not be suitable for a swap.

(c) **Third,** the use of innovative instruments such as debt-for-environment swaps conveys image gains for Bulgaria in the international political and banking community. Politically, those gains are particularly important in the light of the upcoming Environment for Europe ministerial conference in Sofia 1995. In addition, banks generally regard debt-for-environment swaps as a sign of commitment to political reform.

(d) **Fourth,** debt-for-environment swap facilities such as the Trust Fund are important vehicles for know-how and technology transfer. Some observers
suggest that as centers of environmental expertise swap facilities may also attract scientists and economists who would otherwise be tempted to leave the country.

14. Given so many advantages, what are the risks for Bulgaria from a debt-for-environment swap?

(a) First, there is an inflationary risk if the swap is too large and disbursements are not stretched out enough. As indicated, this risk can be minimized by appropriate design of disbursements.

(b) Second and more important, the government has to commit to spending more money on environmental protection than it otherwise would. Note, however, that these environmental expenditures protect the health of the population and the integrity of its ecosystems. Viewed from this perspective, they are investments in the future of the country.

(c) Third, setting up the debt-for-environment swap may require political will and perseverance. The innovativeness of the instrument also means that many creditor governments are not always used to it and may have to be won over slowly. In this sense, debt-for-environment swaps are a political investment whose returns are not guaranteed.

15. On balance, however, debt-for-environment swaps offer an opportunity for Bulgaria that should not be missed. Debt-for-environment swaps combine economic and financial benefits with environmental improvements and image gains. They are flexible enough to support a wide range of political goals.
SOME ADDITIONAL NOTES ON DEBT-FOR ENVIRONMENT SWAPS

I. WHAT IS A DEBT-FOR-ENVIRONMENT SWAP?

1. In every debt-for-environment transaction, the debtor country trades a reduction of its debt burden against a commitment to provide resources for environmental protection. While many versions have been tried, current swaps are mostly based on two generic forms, the bilateral and the trilateral.

The Bilateral Form

2. The bilateral form involves only debtor and creditor country and is used mainly for swapping official debt. The creditor country agrees to forgive a portion of the foreign currency debt it holds while the debtor country provides resources in domestic currency for environmental protection. In most cases, this money is administered by a trust fund, which is governed by a committee on which both parties agree. Assume, for example, that country D owes country C $25 million. A debt-for-environment swap occurs when country C forgives some of that debt, say 50%, if country D agrees to provide an agreed-upon amount, say $X million, in domestic currency equivalent to the trust fund. The trust fund can then spend the money for purposes specified by both parties. As a result:

- Country D saves precious foreign currency by exchanging an obligation of $12.5 million in foreign currency into $X million in domestic currency. In addition to this financial benefit, it also receives the environmental benefits from the trust fund projects.
- Country C gives up its rights to debt payments, but it saves on the financing of environmental protection through official development assistance.

The Trilateral Form

3. The alternative model of a debt-environment swap is the trilateral form, which can be used for both private and official debt. In contrast to the first form, it involves at least one additional party, mostly a non-governmental organization (NGO) with a particular interest in environmental protection across the world.

4. Typically, the debtor government negotiates with the NGO, taking the role that the creditor government has in the first form. The debtor government agrees to exchange foreign debt into domestic currency at a specified rate. The NGO acquires the debt from a creditor bank and then transfers it to a partner organization or a trust fund in the debtor country, which can use it for the purposes specified.
5. To take another example, assume country D owes $25 million to a bank B. The secondary market value of the debt is $5 million. This means that the non-governmental organization can buy the debt from the bank for $5 million and exchange it into the specified amount, say $10 million, in domestic currency. The NGO then transfers the money to its partner or the trust fund in the debtor country.

6. In sum:

- The NGO obtains $10 million in domestic currency for $5 million in foreign currency. Had the NGO planned to donate $5 million anyway, it would have received only $5 million in domestic currency, while it now gets $10 million.

- Country D benefits because it reduces its debt burden by $25 million, but it now has to pay $10 million in domestic currency to the NGO, which in turn grants it to its partner organization. In addition, the country derives environmental benefits from the protection of its own natural resource base.

- By contrast, bank B loses $25 - $5 = $20 million. This loss is already reflected in the secondary market value of the debt, however, and is independent of the contract.

II. SEVEN IMPORTANT CONSIDERATIONS

7. A debtor country interested in debt-for-environment swaps has to decide which swap model is best suited for its situation. There are a couple of points to note:

(a) NGOs often concentrate on the protection of biodiversity in various forms, but are less interested in other fields of environmental policy. The environmental priorities of the debtor country are thus an important input for the decision which type of swap the country should seek.

(b) Swaps involving NGOs are generally much smaller since they can command only limited resources from their donors. These swaps are typically in the range from $1 million to $15 million. By contrast, bilateral swaps can be much larger. Appendix II lists official bilateral swaps in chronological order. It shows that their size varies from $3.1 million to as much as $360 million in the case of the US donation to the Polish Ecofund.

(c) Debt-for-environment swaps can have significant inflationary impacts if their size is large enough and the funds are disbursed too quickly. In order to mitigate these effects, long-term bonds are issued, which spread out the disbursement. By implication, therefore, swaps can only be of limited use as immediate macroeconomic instruments. Current disbursements from the swap will generally be small compared to overall debt reduction.
(d) While creditor governments may be less sensitive to secondary market values than NGOs, they generally require a country to commit to comprehensive political and economic reform and the repayment of the remainder of the debt. Very often creditor governments use debt-for-environment swaps as a part of a larger debt-reduction and political reform package. Political will is thus an important prerequisite for creditor government interest in debt-for-environment swap transactions. It should not be forgotten that a debt-for-environment swap has to strike a balance between the priorities of debtor and target donors. Therefore, when the debtor country proposes a project portfolio and the institutional structure of the swap, it is essential to anticipate donors' concerns and priorities.

(e) Donors will require that the resources generated by the swap be "additional" to the country's environmental expenditures. This implies that the country does not reduce its environmental protection budget because of the swap. However, it generally does allow the debtor country to concentrate more of its environmental expenditures on areas for which swaps would be less likely to be available, say, for waste disposal or municipal infrastructure investments.

(f) Donors will insist in a transparent governance structure that ensures that annual disbursement used for the correct purposes. They will also want to see their interests represented in the selection of projects. For a successful debt-for-environment swap, the debtor country will thus have to give up at least some measure of control over the selection of projects. Note that the Polish Ecofund confined use of its funds to international environmental issues, which it expected to be in the donors interest.

(g) Official donors may also want to restrict procurement contracts that follow from the implementation of projects to contributing countries.
THE POLISH ECOFUND

Genesis:

1. After the scale of possible debt-reduction with Paris Club countries had become clear in late February 1991, the Polish government presented a preliminary debt-for-environment swap proposal to the Paris Club creditors that would link additional debt reduction to investments in environmental protection in international priority areas.

2. On April 4, 1991, then Prime Minister Krzysztof Bielecki appointed an Interministerial Committee in charge of the preparation of the swap, which was chaired by the Deputy Minister of Finance. Bielecki also approached Prime Minister Gro Harlem Brundtland from Norway, who responded positively to this initiative.

3. On April 21, 1991, Paris Club creditors allowed in principle additional reductions of official debt up to a maximum of 10% of the original amount to be achieved by bilateral agreements with creditor countries.

4. In the following months, the Committee developed a concept paper with the assistance of Coopers & Lybrand, a British consulting firm, and representatives of the Norwegian government. On June 11, 1991, Prime Minister Bielecki presented the concept paper to the ambassadors of Paris Club countries in a special conference in Warsaw. On the same day, Prime Minister Brundtland announced a meeting of Paris Club countries in Oslo on July 1, 1991 to discuss the Polish proposal.

5. The Oslo conference showed broad support for the three core elements of the Polish proposal, i.e.

   (a) The Ecofund selects projects eligible for funding through Debt-for-Environment swaps.

   (b) The choice of projects has to be approved in some form by creditor countries.

   (c) The actual expenditures are subtracted from a special escrow account of the Polish government with the Bank of International Settlements. The amount invoiced is credited to the Ecofund.
Governance:

6. The Ecofund essentially consists of two bodies, a management team responsible for day-to-day operations and a supervisory council. The Management Team is chaired by Professor Maciej Nowicki, the former environment minister. It is responsible for project selection and evaluation, as well as for negotiations with co-financing institutions. The Supervisory Council comprises seven Polish members and five representatives from creditor countries. Council decisions require a 2/3 majority so that creditors have collective veto rights. The Council

- reviews financial and operational performance;
- approves projects;
- sets up the budget;
- appoints the Chief Executive and other key staff; and
- receives audit reports and writes annual report on the Ecofund’s performance to the Polish government and creditor governments.

Allocation of Funds:

7. The funds are used for projects in the following areas:

- reduction of Baltic Sea pollution;
- global warming and phasing out CFCs;
- protection of biodiversity; and
- reduction of transboundary air pollution.

8. The Fund is in operation since November 1992. Total disbursements in 1994 will be $10.5 million\(^1\). In 1993 the Fund had funded 25 projects with a total volume of 327 billion zloty. Of this, 18 investments are still being carried out, and one of them has been abandoned. Completed projects include, among others, an installation for desulfuring the exhaust of the Skawina power plant, a sewage treatment plant, a pumping station and a sewage system in Rewal district, sewage treatment plants in Raigrod and Grudziadz, and a heating-system modernization in the Zakopane region (a move from coal to gas).

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1/ The current exchange rate is around 22000 ZL/$ (Economist 3/19/94). It was 16000 in March 1993. At the current rate, $10.5 million is equivalent to 231 billion ZL.
9. In response to creditor demands, the Ecofund uses a geographical distribution criterion for its procurement policies. After a competitive bidding process for each project, contracts are reviewed with regard to the geographical distribution of the companies which obtain procurement contracts. In effect, this implies that companies from non-creditor countries will not get procurement contracts from the fund.

**Donors:**

10. The maximum size of the Ecofund is around $3 billion (in 1991 US- $), which was determined by the original agreement with the Paris Club. So far, the Polish government has managed to capture only a fraction of that amount, as Table 1 shows. Still, the total size of the Ecofund makes it by far the largest Debt-for-Environment swap undertaken so far.

**Contributions to the Ecofund (as of March 1994)**

<table>
<thead>
<tr>
<th>Creditor Country</th>
<th>Contribution (US$ Million)</th>
<th>Contribution (In % of Original Debt)</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA</td>
<td>360</td>
<td>10</td>
</tr>
<tr>
<td>France</td>
<td>52</td>
<td>1</td>
</tr>
<tr>
<td>Switzerland</td>
<td>43</td>
<td>10</td>
</tr>
<tr>
<td>Total</td>
<td>466</td>
<td>n.a.</td>
</tr>
</tbody>
</table>

There are negotiations underway with Italy over a contribution of $170 million. In addition, the governments of Netherlands, Sweden and Canada have expressed interests in joining the Ecofund.

### SUMMARY OF OFFICIAL BILATERAL DEBT-FOR-ENVIRONMENT TRANSACTIONS
(April 1994)

<table>
<thead>
<tr>
<th>Year</th>
<th>Debtor Country</th>
<th>Donor Country</th>
<th>Funds Generated (US-$ million)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1991/1992</td>
<td>Chile</td>
<td>USA (EAI)</td>
<td>18.7</td>
</tr>
<tr>
<td>1991</td>
<td>Bolivia</td>
<td>USA (EAI)</td>
<td>21.8</td>
</tr>
<tr>
<td>1992</td>
<td>Colombia</td>
<td>USA (EAI)</td>
<td>41.6</td>
</tr>
<tr>
<td>1992</td>
<td>Uruguay</td>
<td>USA (EAI)</td>
<td>6.2</td>
</tr>
<tr>
<td>1992</td>
<td>El Salvador</td>
<td>USA (EAI)</td>
<td>41.6</td>
</tr>
<tr>
<td>1992</td>
<td>Poland</td>
<td>USA</td>
<td>360.0</td>
</tr>
<tr>
<td>1993</td>
<td>Argentina</td>
<td>USA (EAI)</td>
<td>3.1</td>
</tr>
<tr>
<td>1993</td>
<td>Poland</td>
<td>France</td>
<td>54.0</td>
</tr>
<tr>
<td>1993</td>
<td>Poland</td>
<td>Switzerland</td>
<td>48.0</td>
</tr>
<tr>
<td>(in preparation)</td>
<td>Poland</td>
<td>Italy</td>
<td>170.0</td>
</tr>
</tbody>
</table>

**Note:** EAI stands for Enterprise of the Americas Initiative, a US government initiative that tied a partial forgiveness of official debt to certain macroeconomic performance conditions.

**Sources:** WWF, Nexis/Lexis