GERMANY

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CONCLUSIONS AND RECOMMENDATIONS*

Germany's high population density, industrialisation level, location in central Europe and dependence on fossil fuels for its energy supply have contributed to making environmental protection a public concern and a policy priority. The decoupling of economic growth from the flow of several major pollutants over the past two decades is indicative of Germany's remarkable achievement in reconciling economic growth and environmental objectives.

Important challenges remain, however: waste disposal, pollution from the agriculture and transport sectors, to cite a few priorities at national level; and regional pollution and climate change at international level, where Germany has both a vital stake in ensuring progress and the will and capacity to help the international community. That it has accepted this international responsibility is a clear sign of its commitment to environmental protection.

Germany's environmental concerns have also increased substantially with unification. Keeping to its ambitious environmental restoration schedule during a period of economic slowdown will, very likely, take a special resolve, given the heavy investments required. However, the benefits of "staying the course" are substantial, not only for residents of Germany, but also for others, notably because such resolve and progress have a strong exemplary value.

The OECD report has set out the baseline for assessing environmental progress in the future, and has examined Germany's environmental performance in three major areas:

- reduction of the pollution burden, with separate analysis of western Germany and eastern Germany;
- integration of environmental and sectoral decision-making;
- international co-operation.

In each of these areas, the extent to which government policy objectives are being met has been assessed. This included both domestic objectives and international commitments, as well as environmental effectiveness and economic efficiency criteria.

1. Reducing the Pollution Burden in Western Germany

Achievements

Remarkable progress has been made in western Germany in dealing with a number of the pressing environmental problems identifies over the past two decades. This is particularly true for pollutants emitted from stationary sources, including sulphur oxides, particulate and certain heavy metal emissions from industrial and thermal power plants; waste water discharges from households and industry; and management of municipal waste. This progress is demonstrated both by the extent of achievement of environmental policy objectives and by absolute improvements in environmental quality.

The scale of these achievements becomes even clearer if they are seen against the deterioration that would have occurred had nothing been done. In fact, western Germany — like several other OECD countries — has achieved a decoupling of economic growth from the flow of several major pollutants. For example, over the 1980s, while GDP grew by 23 per cent, air emissions declined by 71 per cent for SO_2 and 35 per cent for particulates. This decoupling is a necessary steps towards sustainable economic growth for Germany.

Progress on air pollution was triggered initially be concerns in the late 1960s with health risks in certain industrialised areas, and then in the early 1980s with forest damage ("Waldsterben"). This progress is partly the result of energy efficiency gains and of the stability or decline of the shares of coal, lignite and oil in the energy supply. It also results from air m management programmes which address numerous substances from a variety of sources and which are uniformly implemented across the country. These programmes are mostly based on the use of "best-available technology" and a mix of emission, fuel-quality and product standards. Overall, the air management programmes have proven to be environmentally effective in achieving objectives adopted, as well as in reducing health risks and improving ambient air quality with respect to targeted air pollutants.

* Conclusions and Recommendations approved by the Group on Environmental Performance at its December 1992 meeting.

Water pollution abatement and control programmes have followed a somewhat similar pattern over the past two decades in western Germany. Considerable investment in the construction and renewal of sewers and of municipal and industrial waste water treatment plants has led to country-wide purification of waste water prior to discharge. With respect to targeted pollutants from point sources, such as suspended matter, oxygen-demanding organic substances and some heavy metals, investments have also contributed directly to improvements in the corresponding quality parameters of water bodies. Overall, the water management programmes have also proven to be environmentally effective in achieving objectives and improving the quality of surface waters with respect to targeted water pollutants.

Concerning waste management in western Germany, efforts have focused on achieving three major objectives: i) ensuring that wastes are sent to final disposal with minimum damage to the environment, ii) preventing or reducing waste generation, and iii) enhancing waste recovery, reuse and recycling. Available information suggests that these objectives have been generally achieved: i) the environment has been better protected by the introduction of rigorous disposal standards and stringent requirements for incinerators, ii) total quantities of municipal and industrial wastes have not increased over the past two decades, and iii) recovery rates for "industrial wastes" have steadily increased since 1977.

Direct expenditure for pollution abatement and control in Germany has grown slowly over time from 1.3 per cent of GDP in the mid-1979s to 1.65 per cent in 1990. Most of this expenditure has been devoted to water pollution abatement and has mainly been borne by the public sector. On the other hand, air pollution abatement has been funded principally by the private sector. As a percentage of GDP, Germany's environmental expenditure is one of the highest among the OECD countries. This effort has been accompanied by a share of government R&D expenditure devoted to environmental purposes which is also among the highest for OECD countries.

The demand for pollution-abatement technologies, clean production technologies, environmental consulting services and environment-related R&D have generated an "eco-industry" in Germany which is estimated to generate employment of 320 000 people, to have a turnover exceeding DM 40 billion and to export 40 per cent of its production volume. Available studies assessing the economic value of environmental protection in western Germany show that most environmental policy measures investigated produce benefits, in terms of avoided environmental damage, which clearly exceed costs.

Enhancing environmental performance in western Germany

Some pollution problems have proven difficult to solve in a number of countries including Germany, and strategies are being developed or tested to address them. This is the case with some air pollution problems which may require the development of ambient quality standards or objectives by the relevant fora in the following cases: carcinogens; ground-level ozone; acidified soils and fresh waters; and if possible for particularly sensitives ecosystems, such as forests. Further measures in the transport sector need to be taken to achieve acceptable quality levels. This is also the case with water pollution from diffuse agricultural sources, which is now one of the most difficult environmental challenges facing Germany: widespread use of pesticides and fertilizers in agriculture causes ground water contamination; nitrate pollution in particular adversely affects public water supplies, streams and coastal waters in some areas. Water quality standards for nitrogen compounds in fresh and ground water should be developed by the relevant fora in order to protect sensitive marine waters. Policy measures to avoid further nitrate contamination of ground water and marine waters also need to be taken.

Germany is facing severe capacity limits for waste disposal, and public opposition to the installation of new landfill or incinerator sites. Consequently, efforts to increase waste recovery and to reduce waste generation have been stepped up, including the use of charges and subsidies to foster waste prevention and recycling, as well as the use of "eco-labels" such as the Blue Angel. Also, the recent and innovative Packaging Ordinance further supports Germany's waste objectives. These actions, however, need time to have an effect on the environment and it is too early to evaluate their cost-effectiveness. Among areas deserving more attention are the economic aspects and overall costs of current waste management policy, especially with regard to the costs of achieving high recovery rates, and the effect on industrial competitiveness and international trade of certain high-cost waste management measures. Further problems such as contaminated soil sites are still subject to ongoing research in Germany on remedial technologies and costs.

It is further not certain that achievements described in the previous section have been reached at the lowest cost. Current approaches, primarily based on country-wide uniform regulations and technological progress, may have to be supplemented to obtain further results for environmental problems that are already well under control, and

to address the more intractable remaining problems. Among the compelling reasons for modifications suggested below are rising marginal costs of pollution abatement as environmental quality improves, and current financial constraints. Improved priority setting and more cost-effective choices of actions are required.

First, the wider use of differentiated measure linked to ecosystems characteristics might be considered. For instance, varying delays could be adopted when introducing best-available technology into existing installations. This would offer the advantage of achieving environmental goals or targets more cost-effectively by targeting expenditure towards certain areas, processes or industries. This approach has already been used successfully in Germany to solve selected environmental problems, and may imply further use of financial transfers.

Secondly, the use of economic instruments (e.g. fees, charges and deposit-refund systems) could be expanded in Germany in combination with regulatory instruments to achieve environmental objectives more cost-effectively. Experience with waste water charges provides a precedent concerning water management. Other areas, such as air and waste management, could also benefit from a wider use of economic instruments to address, for instance, the challenges posed by CO_2 emission targets. A review of the various subsidies used to stimulate environmental protection may also be needed, particularly with regard to their environmental and economic effectiveness.

Thirdly, close-co-operation between government and industry has resulted in more scientifically-based and timely decisions. Voluntary environmental agreements in industrial sectors, such as the chemical industry, have also led to more rapid, flexible and cost-effective implementation of a number of environmental objectives; The use of voluntary agreements could be extended while ensuring that their terms and level of compliance are properly monitored. Streamlining regulations and increasing the attention paid to small and medium-sized enterprises could also yield both environmental and economic benefits.

Fourthly, Germany has responded to the need to increase public information on the environment, for instance by making available general environmental data and environmental reports as well as specific data on individual facilities or projects. This is a necessary step towards more effective public participation in decision-making concerning the environment, and more influential environmental impact assessments of projects. Implementation of federal laws and regulations at the Länder level should, however, be strengthened in order to implement principles adopted at both international and national levels in relation to informing foreign populations and authorities. Länder should ensure that the data on the state of the environment which they gather are made available at federal level for national and international use.

2. Environmental Restoration in the New Länder

The unification Treaty of October 1990 established the immediate validity of the entire legal and administrative system of the Federal Republic of Germany for the new Länder, including for environmental matters. The goal is to close the disparity in ecological conditions between eastern and western Germany as soon as possible. It is too early to evaluate environmental performance in eastern Germany since environmental requirements have been defined only recently.

A preliminary assessment of the state of the environment in the New Länder can, however, be made. It suggest that environmental damage is serious, but concentrated in certain areas. For certain media (e.g. water, air), the situation in eastern Germany is comparable to that in western Germany two or three decades ago. Other issues such as damage from poor lignite mining practices and on former military sites are specific to eastern Germany. A number of environmental pressures have already been dramatically reduced since unification, such as SO_2 and particulate emissions. This is mainly due to the massive decline in economic activity (of the order of 50 per cent over two years). The risk from nuclear plants has been curtailed with their closure. It is worth noting that most of eastern Germany is in relatively good environmental condition, and data show that concentrations of pollutants in ambient air such as NO_2 and ground level ozone are generally lower than in the western part of the country.

The overall cost of environmental restoration is still uncertain, as it includes liability for possible decontamination of polluted sites such as those encountered by the Treuhandanstalt during the privatisation process. Estimates of the total expenditure for environmental reconstruction vary between DM 80 and 320 billion. A large part of this expenditure (e.g. waste water treatment) is the responsibility of municipalities and authorities of the new Länder.

The New Länder remain in a transitional phase, and are only starting to build up new administrative structures and in-depth knowledge of the large body of western German legislation and regulations. Timetables for environmental restoration in the eastern part of the country may therefore prove overly ambitious in certain areas. As in western Germany, priority-setting for environmental action, ensuring the cost-effectiveness of environmental protection measures, and integrating economic and environmental goals, are essential to the future environmental performance of the new Länder.

3. Integration of Environmental and Sectoral Decision-Making

Economic forces and structural changes in major economic sectors strongly influence environmental conditions and trends in Germany, and can enhance or counteract the benefits of environmental regulations and technical progress. The integration of environmental concerns into sectoral decision-making is therefore a key to environmental performance and sustainable development as well as to cost-effectiveness in the responses to environmental challenges. It should in Germany, as in other OECD countries, receive increased attention.

Energy

Development in the energy sector have contributed, as in a number of OECD countries, to improved environmental performance in western Germany: the economy's energy intensity has improved significantly despite energy price decreases in the 1980s; and the energy supply structure has evolved towards a diversification of environmental impacts, though Germany still relies on fossil fuels for 84 per cent of its requirements, including coal for 27 per cent. In eastern Germany, energy intensity is much higher than in the western part of the country, and the energy mix is very different, with a high share of lignite (69 per cent in 1989); however, there have already been major changes in supply and demand patterns in the east with the closure of all nuclear power plants and a fall in energy demand corresponding to the decline in industrial activity. More recently, the German government's ambitious target of a 25-30 per cent reduction of CO_2 emissions by the year 2005 has moved the energy sector to centre-stage in environmental policy considerations.

Taking into account energy price trends and international economic interdependence, further attention and efforts need to be directed to the integration of environmental concerns into energy policies dealing with:

- the restructuring of eastern Germany's energy supply;
- energy efficiency and conservation, particularly for dwelling and motor vehicles;
- the shares of different fuels in the energy supply;
- technological progress and related upgrading of regulations; and
- the extension of the use of market-oriented instruments, and particularly sets of taxes and charges.

Transport

Several measures taken in the transport sector have helped to contain its environmentally adverse effects in western Germany: the adoption of motor vehicle standards and incentives to accelerate the replacement of older vehicles by cleaner and quieter ones; improved fuel quality including tax differential incentives to increase sales of unleaded gasoline; effective inspection and maintenance programmes for vehicles in use; transport system management and urban public transport improvements. However, the benefits of these measures have been more than offset by traffic growth, and particularly the growth of road transport.

Consequently, transport's share in total emissions of traditional air pollutants has grown and ozone air pollution remains of concern. Transport-related CO_2 emissions have nearly doubled over the past two decades; transport energy consumption and energy intensity have increased, partly reflecting a decline in the relative price of gasoline over the 1980s. This expansion of traffic in Germany is likely to be reinforced by the creation of the single market in the European Community, the consequences of unification including the expansion of the fleet in eastern Germany, and the growing traffic flows with central and eastern European countries.

Environmental pressures from transport, combined with land scarcity, congestion costs, accidents and constraints on public funding, suggest that the sustainable development of this sector will depend critically on improved integration of transport and environmental policies. Among the areas requiring further attention are:

- the restructuring of eastern Germany's transport systems, with a view to preventing environmental pressures;

- the incorporation of environmental concerns into transport policy definition and implementation, and into transport planning, notably to eliminate obstacles to the development of more environmentally friendly modes (e.g. rail transport and waterways);
- technological progress towards highly energy-efficient, clean and quiet vehicles as well as limitations on the weight, engine power and speed of cars and lorries;
- traffic management, including speed limits on motorways, road pricing as well as other measures to limit the use of vehicles when and where necessary;
- the extended use of economic instruments so that prices better reflect environmental damage related to transport (e.g. the currently proposed vehicle tax incorporating an environmental rationale); the review of economic and environmental effects of fiscal instruments such as tax deductions for commuting by car.

Industry

Structural adjustments in industry over the past two decades have tended to be beneficial for the environment: a relative decline of some of the most polluting sectors such as iron and steel; turnover of obsolete equipment accompanied by plant and equipment modernisation, leading to higher productivity and cleaner processes; and the emergence of an eco-industry on domestic and international markets.

The one industry reviewed in the OECD report, the chemical industry, has taken a leading role in German industry's overall contribution to improving the environment. Very large investments have been made and important reductions in releases of pollutants have rapidly been obtained. The principle of preventive action has been implemented through various notification and assessment programmes in which the German chemical industry has been very active. Voluntary agreements have been made to reduce the production of certain substances. In the future, public disclosure of information on pollution from individual firms would help achieve even greater protection of the environment and induce firms which are lagging behind to behave more like the leaders of the sector. Greater use of risk analysis and of the life-cycle concept in the chemical sector should also contribute to more cost-effective management of environmental problems caused by chemicals.

4. International co-operation

In view of its economic and ecological links with neighboring countries and the world in general, Germany faces a number of significant international environmental challenges.

Bilateral co-operation

Germany has concluded and implemented numerous agreements to deal with environmental problems arising in frontier areas with its nine neighboring countries, covering water quality, treatment of waste water, treatment of waste, land-use planning, protection of the landscape and nature reserves, and information and consultation on hazardous facilities. As a result concrete progress has been achieved, for instance in reducing pressures on shared ecosystems (e.g. the Wadden Sea) or in protecting local populations from risks arising in industrialised frontier areas (e.g. the Basel area).

Regional co-operation

Germany has succeeded in abating atmospheric emissions of sulphur oxides much sooner than the deadlines specified in international agreements, and expects to achieve a very significant decrease in emissions of nitrogen oxides by 1997. However, difficulties will arise if further reductions of nitrogen oxides have to be achieved, for instance to reduce the contribution of airborne pollutants to nitrification of the seas.

Over the last 20 years, the quality of international water bodies such as the Rhine and Lake Constance has improved remarkably in western Germany and steps are planned to reintroduce aquatic life into streams where it has disappeared. By and large, transfrontier pollution along the country's western borders is now less severe, and steps are being taken to achieve similar results on all eastern borders.

Emissions from diffuse sources such as traffic and agriculture have, however, not yet been adequately reduced. These include emissions of nitrates and ammonia, which contribute to the pollution of the North Sea and Baltic Sea. Germany, like other European countries, will need to develop and implement new measures to address

these problems. This may require the use of policy objectives concerning both emissions and ecological quality, as was done successfully in the case of the Rhine.

Emissions from central and eastern Europe result in considerable transfrontier pollution. Economic development and environmental efforts in these countries should both be taken into account when setting up international co-operation. This could include stepping up efforts to provide assistance in the environment field to eastern neighbors.

Worldwide co-operation

Germany has been very successful in reducing its emissions of CFCs to prevent ozone depletion and will stop all production and consumption of CFCs at the latest in 1994. Activities aimed at stabilising and even reducing CO_2 emissions within the country have already been initiated. Progress concerning related global problems will be influenced by the position taken by Germany within the European context. In particular, greater emphasis should be given to the use of the economic and financial instruments to solve international problems efficiently while seeking an equitable distribution of the financial burden.

As a highly industrialised country, Germany plays a leading role in creating and exporting modern technologies and new substances, some of which create risks to man or the environment. Controls on the export of hazardous substances and wastes have been implemented in Germany. The social responsibilities of Germany and other industrialised countries in solving global environmental problems and avoiding hazardous exports require strict application of guidelines and regulations adopted to protect the environment of less-industrialised countries. Controls on exports of certain substances or technologies would be justified in this context. For instance, and within the framework of the Basel Convention, more work will be needed to ensure that residual material or wastes which Germany knows to be hazardous wastes in the importing country do not leave Germany without the consent of public authorities and of the importing country, even if such substances are not considered to be hazardous wastes in Germany.

Germany's decision, announced in Rio, to increase its international financial assistance from 0.4 to 0.7 per cent of GNP as soon as possible should help provide the financial means to support sustainable development in developing countries including German initiatives to protect the environment worldwide, for instance concerning tropical forests. While aiming at that target, German support for central and eastern Europe must also be taken into account.

Overall, Germany has played a leading role in solving international problems at bilateral, regional and world levels and has achieved considerable results. However, international environmental challenges are such that in the future Germany will have to sustain its efforts in seeking and promoting international responses, in both its own interest and in that of the rest of the world. This will entain taking into account both the environmental and economic aspects of development and ensuring the competitiveness of German industry, as well as contributing to environmental effectiveness and to global sustainable development.