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**ISSUES IN SUPPORT OF ECOLOGICALLY SUSTAINABLE
INDUSTRIAL DEVELOPMENT**

Submitted by the UNIDO Secretariat

CONTENTS

	<u>Paragraphs</u>	<u>Page</u>
INTRODUCTION	1-8	3
I. THE CONCEPT OF ECOLOGICALLY SUSTAINABLE INDUSTRIAL DEVELOPMENT	9-11	4
II. BARRIERS TO ECOLOGICALLY SUSTAINABLE INDUSTRIAL DEVELOPMENT	12-17	5
III. INDUSTRY INITIATIVES IN ACHIEVING ECOLOGICALLY SUSTAINABLE INDUSTRIAL DEVELOPMENT	18-24	6
IV. GOVERNMENT INITIATIVES IN ACHIEVING ECOLOGICALLY SUSTAINABLE INDUSTRIAL DEVELOPMENT	25-33	8
V. INTERNATIONAL COOPERATION IN ACHIEVING ECOLOGICALLY SUSTAINABLE INDUSTRIAL DEVELOPMENT	34-39	9
VI. FUTURE ACTIVITIES OF UNIDO RELATED TO ECOLOGICALLY SUSTAINABLE INDUSTRIAL DEVELOPMENT	40-43	11

INTRODUCTION

1. The General Assembly, in its resolution 44/228, section I, decided to convene a United Nations Conference on Environment and Development, to be held at Rio de Janeiro, Brazil, from 1 to 12 June 1992, to mark the twentieth anniversary of the United Nations Conference on the Human Environment, held at Stockholm from 5 to 16 June 1972. The United Nations Conference on Environment and Development will offer Governments an opportunity to seek consensus on measures relating to global, regional and national environmental and development issues.

2. The UNIDO environment programme (see IDB.6/3, paragraphs 3-28), approved by the Industrial Development Board in its decision IDB.6/Dec.7, focuses primarily on enhancing the Organization's capacities in rendering industry-related assistance with regard to the environment; assisting developing countries in formulating industry-related environmental policies and legislation; promoting clean, low-waste, energy-efficient and recycling or reuse technologies; and providing technical assistance in pollution abatement. The Industrial Development Board, also in its decision IDB.6/Dec.7 on the UNIDO environment programme, requested the Director-General to report to the General Conference at its fourth session on the implementation of that decision, including the UNIDO contribution to the United Nations Conference on Environment and Development.

3. As part of its contribution to preparations for the United Nations Conference on Environment and Development, UNIDO called for a Conference on Ecologically Sustainable Industrial Development (ESID), to be held at Copenhagen from 14 to 18 October 1991, to assist Governments, particularly those of developing countries, in understanding ESID-related requirements and in formulating appropriate policies and strategies. After reporting the results to the General Conference at its fourth session in November 1991, the conclusions and recommendations of the Conference on ESID will be presented to the United Nations Conference on Environment and Development.

4. The environmental dimension of industrialization plays an important role in UNIDO activities and will do so in the future. UNIDO has a long history of providing technical assistance to developing countries. Environmental aspects and impacts are increasingly being taken into account in the day-to-day project operations of UNIDO. The Organization's experience is quite extensive, covering most sectors of industry and the associated aspects of technology, management, design and training. The Conference on ESID, however, offers the first opportunity for member States to deal specifically with issues related to industry and environment at the ministerial level. UNIDO draws its mandate in this context from General Assembly resolutions 42/184, 42/186, 42/187, 43/53, 43/196 and 44/228; General Conference decision GC.2/Dec.11 and resolution GC.3/Res.16; and Industrial Development Board decisions IDB.4/Dec.19 and IDB.6/Dec.7, as well as documents IDB.4/16, IDB.6/3, GC.3/17 and GC.3/32.

5. Industry plays a critical role in economic development and in the enhancement of the economic welfare of populations. By transforming raw materials through processing, industry produces a wide range of consumer goods and, more importantly, intermediate and capital goods for all sectors of the economy. It generates substantial employment in producing consumer and investment goods, and it is the most dynamic sector of the economy in terms of inducing and disseminating technological change.

6. Global trends in industrialization over the past 20 years reveal that significant progress has been achieved in some developing regions and countries. World industrial output has grown at an annual rate of 3.6 per cent, compared with an annual population growth rate of 1.8 per cent. Noteworthy gains have occurred in some regions, particularly East Asia and South-East Asia, whereas in others, particularly Africa and Latin America, industrial growth has been low compared with population growth. In the period 1970-1990, developing countries increased their share in world industrial output from 9.3 per cent to 13.2 per cent. Most of that increase, however, occurred in the period 1970-1980.

7. Since 1970, industry, in spite of intensive efforts to reduce pollution, has continued to contribute to deterioration in the environment. At the national level, problems related to air, water and land quality persist in many areas. At the regional level, acid deposition and the dispersal of toxic chemicals, largely due to industrial activity, are causing serious problems. At the global level, new environmental problems, including those arising from greenhouse gas emissions and ozone depletion, have emerged; industry, which accounts for about one third of the world's primary energy consumption, has contributed substantially to those problems.

8. A significant amount of pollution today can be traced back to the industrialization that has taken place over the past 150 years. The traditional pattern of social and economic development in industrialized countries accounts for a major share of today's global and regional problems of concern. Thus, industrialized countries bear a special responsibility for responding to those problems. No country, however, can afford to ignore the contribution of industrial activity to environmental deterioration, particularly in the light of the industrial growth that is expected in developing countries in the years to come. If developing countries are to identify, manage and implement environmental programmes, specifically those related to the industrial sector, while maintaining their development momentum, greater emphasis should be placed on cooperation between developed and developing countries. Integrating the concept of "sustainability" in the development process will only be possible if industry, labour, consumers, Governments and international organizations are willing to work together more closely at the national, regional and global levels.

I. THE CONCEPT OF ECOLOGICALLY SUSTAINABLE INDUSTRIAL DEVELOPMENT

9. A definition of ESID is essential to considering how best to achieve it and to identifying incentives that could contribute to its achievement. One potential definition is the one adopted by the Governing Council of the United Nations Environment Programme (UNEP) in 1989 - and based on the report of the World Commission on Environment and Development entitled "Our Common Future" (A/42/427, annex) - stating that sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs and does not imply in any way encroachment upon national sovereignty. Following from that definition, a definition of ESID is as follows: patterns of industrialization that enhance the contribution of industry to economic and social benefits for present and future generations without impairing basic ecological processes. These new patterns would increase economic development over time while efficiently utilizing non-renewable resources, conserving renewable resources and not exceeding the waste assimilative capacities of ecosystems; and they would differ depending on a country's resource endowments and stage of economic development.

10. Ecological processes at risk are those threatened by the pollution of air, water and soil, the destruction or alteration of habitat, the loss of wild species, and fundamental changes in geochemical, hydrological and climatic cycles. Furthermore, human health and safety are major concerns at all times.

11. To contribute to the achievement of ESID, the following objectives should be taken into account:

(a) Use of non-renewable resources at a rate guided by the availability of substitutes, use of renewable resources at a rate limited to their natural or managed regeneration rates, and the dispersion of industrial wastes at a rate limited to the assimilative capacities of ecosystems, thus preventing irreversible effects on basic life-support systems (eco-capacity);

(b) Adherence to the precautionary approach, which calls for environmental measures that prevent environmental degradation and attack its causes, thus anticipating threats of serious or irreversible damage (precaution);

(c) Development of procedures for accident prevention, thus reducing the risks of and potential losses associated with environmental emergencies (anticipation);

(d) Prevention of pollution at its source in products and manufacturing processes rather than removing it after it has been created (prevention);

(e) Minimization of resource consumption per unit of output and waste per unit of output, thus ensuring efficient use of man-made and natural capital (efficiency);

(f) Provision of opportunities for all countries to participate in the industrialization process, to benefit from the wealth generated by industrial activities and to apply the same principles of equity between genders and between present and future generations (equity).

II. BARRIERS TO ECOLOGICALLY SUSTAINABLE INDUSTRIAL DEVELOPMENT

12. Common to both developed and developing countries are barriers to the achievement of ESID. These encompass information gaps and deficiencies, scientific, technological, professional and related institutional capacities to support the process of transition to ESID, as well as political and economic obstacles to its implementation.

13. Information deficiencies include limitations of data on the nature and extent of environmental degradation (physical indicators of resource depletion, as well as air, water and land pollution); limited understanding of the proximate and underlying causes of, and hence feasible remedies for, environmental degradation; and insufficient measurement of economic losses resulting from environmental degradation.

14. Most of the problems cited above may be more acute in some developing countries where government activity is constrained by urgent, short-term financial needs. The gathering and dissemination of information and applied research do not receive sufficient attention. Consequently, Governments have inadequate information on the nature, magnitude, causes and consequences of environmental degradation; furthermore, because of low economic and

technological capacities of their countries, they often lack access to non-commercial and non-profit technical information to deal adequately with pollution-related problems.

15. Obstacles to ESID-related measures are numerous. Heading the list of such obstacles are conflicts between short-term economic costs and long-term economic benefits of environmental protection. Regulatory and monitoring capacity and skilled personnel may not be sufficient for dealing with new problems. Small- and medium-scale industries have limited information and lack the skills and capital needed to implement cleaner production processes. Political and social constraints often limit the setting of economically appropriate prices for water, energy and raw materials. States may ignore the consequences of industrial activity that result in damage being done outside of their borders. Finally, the poor, disadvantaged and vulnerable tend to suffer most from environmental degradation, but lack the political influence required to bring about the introduction of remedial measures.

16. Obstacles to the implementation of ESID-related measures are intensified in developing countries. Weak institutional capacity, particularly the ability to implement and coordinate programmes, and shortages of skilled personnel are major problems in developing countries. Even if existing industry wanted to invest in more environmentally sound technologies, it would often be faced with financial constraints. The scarcity and high cost of capital may preclude importing those technologies, even if the investments are economically justified. Lastly, a sizeable portion of the population lacks the awareness, education and experience needed to deal with environmental problems, and the few non-governmental organizations (NGOs) that are involved in such matters lack political influence.

17. More importantly, developing countries are faced with particular difficulties in achieving ESID. One barrier can be in part traced to their indebtedness, which results in shortages of capital needed to finance cleaner production processes. Another is their limited capacity to absorb cleaner production practices, which is attributable in part to their lack of technical and scientific capacity. A third is the potential risk of new non-tariff barriers emerging as a side-effect of new environmental measures that, in effect, close markets to exports from developing countries. Keeping markets open to manufactured products from developing countries will provide such countries with better conditions for the repayment of debts to developed countries.

III. INDUSTRY INITIATIVES IN ACHIEVING ECOLOGICALLY SUSTAINABLE INDUSTRIAL DEVELOPMENT

18. Through the International Chamber of Commerce and its international and national associations, industry has declared its support for principles of sustainable development. Industry regards sustainable development as a goal that requires real economic growth, since only such growth can create the economic and technical capacity to solve environmental problems. On several occasions, most recently at the Second World Industry Conference on Environmental Management, held at Rotterdam from 10 to 12 April 1991, industry declared its willingness to work towards a continuous improvement of environmental performance.

19. It is in industry's own interest to adopt a course of action leading to ESID. Industry can maximize profits by increasing efficiency while at the same time maintaining environmental concerns. Pollution prevention is more environmentally effective, technically sound and economical than conventional controls. Industry can develop and utilize clean production processes and produce "green" products. The full cooperation of all concerned is needed to avoid irreversible adverse effects on humans or development.

20. The trend towards using greater transparency as a means of securing public confidence in and support for operations has been observed in several sectors. Industry's strategy for ESID might include the following elements:

(a) Adoption of pollution prevention, an approach that prevents pollution at its source in products and manufacturing processes rather than removing it after it has been created;

(b) Integration of environmental responsibility in decision-making at all management levels; introduction of waste minimization and environmental compliance auditing; establishment of emergency, risk and safety management systems; and establishment of training programmes;

(c) Adherence to voluntary environmental codes of conduct for industrial investment and production;

(d) Increase of research and development activities with emphasis on cleaner production technologies, giving priority to technologies that offer potential for improved efficiency and reduced pollution; and provision of training facilities to developing countries for that purpose;

(e) Consideration, where feasible, of the use of substitute materials and product reformulation, process modification and redesigning of equipment, renewable sources of energy and raw materials, recycling and reuse of waste materials;

(f) Assumption of a "cradle-to-grave" approach to industrial products;

(g) Application of cleaner industrial production processes and more rational use of natural resources;

(h) Transfer and adaptation of environmentally sound technologies, know-how and skills to meet the needs of developing countries and mobilization of financial resources for this purpose;

(i) Encouragement of large-scale industry to provide information on environmentally sound management and energy conservation.

21. Principles for achieving ESID have been embodied in the Criteria for Sustainable Development Management prepared by the United Nations Centre on Transnational Corporations. The following elements of the criteria are also embodied in the Business Charter for Sustainable Development, adopted by the Executive Board of the International Chamber of Commerce at its sixty-fourth session on 27 November 1990: corporate priority, integrated management, process of improvement, employee education, prior assessment, products and services, customer advice, facilities and operations, research, precautionary approach, contractors and suppliers, emergency preparedness, transfer of technology, contributing to the common effort, openness to concerns, compliance and reporting.

22. Industrial associations and chambers of commerce could promote environmental practices that go beyond the minimum legal requirements and regulations. They could also organize training programmes, advise public authorities and facilitate the sharing of non-proprietary information and technology. Similarly, the environmental issues pursued by trade unions, consumer associations, women's groups and community groups working with industry and other organizations could have a major effect on how industry develops its strategy.

23. The general arguments on why industry would follow a course leading to ESID also apply to transnational corporations (TNCs), which have a particular role to play. TNCs that have been establishing operations in developing countries should apply standards of environmental responsibility to their foreign operations and should at least apply standards consistent with those used in their home countries and in compliance with the laws and regulations of host countries. Furthermore, open operations and rapid communication put the global image of a corporation at risk if an environmental incident occurs.

24. Important issues to be considered include the following:

(a) How can industry be assisted and encouraged to follow a course of action leading to ESID using a system of incentives and measures?

(b) How should such incentives and measures to assist and encourage industry be international in scope?

(c) How can voluntary action by industry to achieve ESID be assessed and communicated?

(d) How can small- and medium-scale enterprises best be assisted in achieving ESID?

IV. GOVERNMENT INITIATIVES IN ACHIEVING ECOLOGICALLY SUSTAINABLE INDUSTRIAL DEVELOPMENT

25. If, through imperfections, the market fails to deal adequately with the environment, government initiatives and intervention may be required to achieve ESID. Such failures of the market to deal with the environment arise when the interests of industry are not consistent with those of society. The achievement of ESID thus requires the assertion of environmental concerns through industrial policies and strategies adopted by Governments.

26. Governments need an industrial policy that supports the development, promotion and diffusion of pollution prevention and cleaner production processes. Governments should develop a transparent public information policy concerning the environment and should support education, training and research programmes to raise public capabilities and awareness.

27. Government intervention may be divided into two types: regulations and market-oriented incentives. Regulations involve a complex mixture of standards, permits, monitoring and enforcement that, taken together, are frequently termed a "command-and-control" approach. In developed countries, noteworthy successes have been achieved using this approach. But regulations alone will not be efficient in achieving ESID. In recent years this approach has been augmented with market measures and voluntary measures, such as the use of economic incentives, pollution prevention, waste minimization and cleaner production technologies.

28. One of the conditions for maximum efficiency (both traditional economic efficiency and environmental efficiency) is that prices for products and services must reflect their full social and economic costs. It is not always possible to accurately determine those costs. Market-based economic instruments, such as taxes, fees and tradeable permits, however, give industry a direct financial incentive to reduce pollutant discharges in the most cost-effective manner. Combining a mixture of market-based incentives with a regulatory or pollution prevention approach has cost-saving potential. Flexibility on the part of Governments in allowing industry to choose the timing of pollutant reductions and the methods to be used to achieve such reductions may result in industry adopting cleaner production processes that go beyond meeting traditional environmental standards.

29. An important factor to be considered is the relationship between environmental policies and economic and social policies. Governments need to be aware of, for example, the repercussions of tax and subsidy policies in general on the use of resources and on the environment. They need to ensure that such policies, aimed perhaps at export promotion, do not encourage behaviour that would have an adverse effect on the environment.

30. In addition to strict environmental considerations, industry is subject to complex considerations in areas such as occupational safety, health, planning and economic zoning, wildlife and marine life protection and conservation.

31. Environmental intervention requires institutional capability, which is often lacking, particularly in developing countries. Consequently, simpler policy instruments, such as tax policy, resource-pricing and withdrawal of subsidies, may be needed in order to achieve economic and environmental objectives simultaneously.

32. Community associations, women's organizations and NGOs have in many instances played an important role in increasing public awareness and behaviour with respect to environmental questions. A Government designing an ESID-oriented policy should consider proposals and ideas relevant to manufacturing industry that have been suggested by such associations and organizations.

33. The following issues need to be considered in this context:

(a) How can environmental considerations be integrated in the formulation of industrial policies and strategies from the very outset instead of being taken up later when the planning or implementation process is already at an advanced stage?

(b) What is the appropriate mixture of policy, regulatory and economic incentives, given the dual objectives of maximizing the productive performance of the industrial sector and protecting the environment?

V. INTERNATIONAL COOPERATION IN ACHIEVING ECOLOGICALLY SUSTAINABLE INDUSTRIAL DEVELOPMENT

34. Since the convening of the United Nations Conference on the Human Environment in 1972, the international community has undertaken several initiatives, particularly in the 1980s, that constitute important steps towards achieving ESID. The World Commission on Environment and Development, in its report entitled "Our Common Future" (A/42/427, annex), emphasized the

need for all countries to cooperate in pursuing economic, social and environmental objectives with a view to achieving sustainable development. The Environmental Perspective to the Year 2000 and Beyond, prepared by UNEP for its Governing Council and contained in General Assembly resolution 42/186, annex, offers a broad framework for guiding national action on and international cooperation in policies and programmes aimed at achieving ESID. Other organizations such as the Organisation for Economic Co-operation and Development have also taken steps to address those issues.

35. The international community has made efforts to resolve global and regional environmental problems resulting from industrial activities. Noteworthy global efforts include the Vienna Convention for the Protection of the Ozone Layer, adopted on 22 March 1985; the Montreal Protocol on Substances that Deplete the Ozone Layer, adopted in September 1987 and amended in June 1991; the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (UNEP/JG.80/3); the Voluntary Code of Conduct for the Release of Organisms into the Environment, prepared by the UNIDO Secretariat for the Informal UNIDO/UNEP/WHO/FAO Working Group on Biosafety; and the efforts of the Intergovernmental Panel on Climate Change. Among numerous regional efforts are marine environment protection programmes; guidelines on trade in chemicals; and conventions on dumping and on the transboundary movement of air pollutants. By supporting new initiatives, the Interim Multilateral Ozone Fund and the Global Environment Facility, developed countries have recognized that developing countries need additional financial resources to mitigate specific environmental problems.

36. Issues related to international cooperation fall into three areas of critical importance to the achievement of ESID, each of which entails regional and global cooperation of both a North-South and a South-South nature, as given in the paragraphs below.

37. Financial resources. The mobilization of financial resources is vital to ESID, as well as to alleviating environmental problems in general, and international sources of financing, particularly the development assistance programmes of developed countries, play a key role. Public and private sources also contribute to investment in environmental protection, particularly as progress is made on debt relief and establishment of meaningful societal priorities.

38. Technology cooperation. The adaptation and absorption of pollution prevention techniques and cleaner production processes by industrial firms are key ESID issues. Many of those techniques and processes and the information, skills and know-how associated with their use are in developed countries, particularly in corporations. Ways must be found to ensure their efficient transfer to developing countries on concessional terms.

39. Trade and environment. Policies on trade in manufactured goods may have an adverse impact on environmental concerns and environmental policies may alter such trade patterns. Issues relating to protectionist policies, product and process standards and specifications, intellectual property rights, foreign direct investment flows, and structural change affect technology cooperation and need to be dealt with at the international level.

VI. FUTURE ACTIVITIES OF UNIDO RELATED TO ECOLOGICALLY SUSTAINABLE INDUSTRIAL DEVELOPMENT

40. UNIDO needs to develop a comprehensive programme for the promotion of ESID that will build on its strengths and will constitute a logical extension of the capabilities and experience it has acquired during the implementation of its environment programme. The relationship of UNIDO with Governments, its years of experience in industrial development in developing countries, its network of experts and field offices, and its role within the United Nations system in promoting industrial development provide the foundation for its approach to and involvement in ESID. In developing such a programme, recommendations and guidelines from the United Nations Conference on Environment and Development should also be taken into account.

41. The UNIDO environment programme provides broad guidelines and a basis that will enable the Organization to assist developing countries in making the transition to ESID. It requires UNIDO to improve its capacity to render ESID-focused technical cooperation, to assist developing countries in formulating ESID-related industrial policy and to increase its efforts in promoting both cleaner production and pollution abatement. These programme components are being implemented by providing internal training, following modified project design guidelines and integrating ESID-related components into technical cooperation projects. The latter contribute to ESID at the enterprise, sectoral and national policy levels. For example, UNIDO has acquired a wealth of experience in advising managers and others at the plant level on improving operating procedures, thereby helping them not only to achieve greater operational efficiency and product yields, but also to reduce waste that might otherwise be discharged directly into the environment.

42. The concept of ESID comprises many elements. An important issue is how UNIDO can modify and expand its environment programme to further the objectives of ESID and its efforts to assist developing countries in achieving it.

43. The following suggestions for possible UNIDO action deserve closer consideration:

(a) Assisting developing countries in building the technical and scientific capacity to develop, absorb and diffuse pollution prevention techniques and cleaner production processes essential to making the transition to ESID. This could be done:

- (i) By adapting ESID to special needs of developing countries within their means;
- (ii) By demonstrating the financial and economic advantages and environmental benefits of ESID to present and future generations;
- (iii) By providing technical support on designing, establishing, operating, evaluating and monitoring pollution prevention techniques and cleaner production processes and technologies;
- (iv) By establishing demonstration and training centres at new or existing industrial facilities, and providing support to centres of excellence;

(b) Assisting in the implementation of international environmental conventions and protocols:

- (i) By providing technical assistance to developing countries to identify and implement needed actions;
- (ii) By helping developing countries to locate expertise and funding for projects that contribute to implementation;

(c) Assisting developing countries in determining the environmental soundness of industrial technologies:

- (i) By preparing guidelines on environmentally sound industrial practice for selected sectors;
- (ii) By promoting, in selected sectors, technical procedures to evaluate and to test processes, products and services;

(d) Assisting developing countries in integrating environmental considerations into their industrial strategies and policies:

- (i) By identifying sectoral and subsectoral priorities for environmentally sound industrial activities;
- (ii) By specifying the measures needed to rehabilitate existing industries so that they could operate in a manner that is more "friendly" to the environment, as well as by giving an assessment of the costs of such a transition and the time-frame for achieving it;
- (iii) By examining their current policies on such topics as industrial taxes and subsidies and resource-pricing in order to identify and remove factors that encourage inefficient and environmentally damaging activities;

(e) Strengthening its existing database and capacity to coordinate the dissemination of technical and policy information on ESID by cooperating with UNEP on building up and operating the International Cleaner Production Information Clearinghouse and through other means.