

Committee on Trade and Environment

ENVIRONMENTAL BENEFITS OF REMOVING TRADE RESTRICTIONS AND DISTORTIONS

Note by the Secretariat

Addendum

IX. ENVIRONMENTAL SERVICES

A. Overview

1. The global market for environmental goods and services has been estimated by the OECD to be approximately US\$320 billion, with a rapid growth potential.¹ Private sector industry surveys estimate the environment industry will increase from US\$469 billion in 1997 to US\$600 billion by 2010, which represents an average annual rate of growth of 5 per cent.² Estimates of the value and growth potential vary widely based on the way in which the industry is defined. As the environment industry is not identified in standard industrial classification systems, emphasis has been placed on categorizing which goods and services should be included.

2. The OECD and the Statistical Office of the European Commission (Eurostat) have recently developed the following definition of the environment industry:

The environment industry consists of activities which produce goods and services to measure, prevent, limit, minimize or correct environmental damage to water, air, and soil, as well as problems related to waste, noise and eco-systems. These include cleaner technologies, products and services which reduce environmental risk and minimize pollution and resource use although there is currently no agreed methodology which allows their contribution to be measured in a satisfactory way.³

3. Activities of firms operating in the environment industry are equally distributed between the manufacturing and services sectors. In most cases, firms which produce environmental services also

¹OECD (1996), *The Global Environmental Goods and Services Industry*, Paris.

²ECOTECH Research and Consulting Ltd. (1997), *European Eco-industries database*, prepared for the EC Directorate-General for Environment, Nuclear Safety and Civil Protection (DGXI), Brussels; and Environmental Business International Inc. (1998), *Global Environmental Markets and Environmental Industry Exports*, San Diego.

³ OECD (forthcoming), *Environment Industry Manual: Proposed Guidelines for the Collection and Analysis of Data on the Environment Industry*, Paris: OECD Industry Division and Eurostat, p. 7. See Annex I for the classification system which has been developed.

provide the related environmental goods as part of an integrated package to address an environmental problem. This package provides comprehensive and specifically targeted project design and management through the provision of engineering, construction, equipment, and operation and maintenance of general utility facilities, such as water, pollution and waste management systems.

4. Although to date the principal producers and consumers of environmental goods and services are OECD countries, the market in developing countries is growing faster than that in developed countries.

5. Table 1 provides an indication of the current structure of the environment industry in OECD countries.

Table 1: Structure of the environment industry in OECD countries

Environment industry segments	Share of the total environment industry
Equipment manufacturing	25 - 35 per cent
Construction and installation of facilities	15 - 25 per cent
General services operation	40 - 50 per cent
Engineering services	5 - 10 per cent
Research and development	2 - 4 per cent

Source: OECD (forthcoming), *Environment Industry Manual: Proposed Guidelines for the Collection and Analysis of Data on the Environment Industry*, Paris: OECD Industry Division and Eurostat, p. 17. These estimates are derived from results of environment industry surveys and studies in OECD countries.

6. The industry is comprised of small and medium-sized domestic and regional suppliers (SMEs) and large multinational suppliers which tend to dominate a few market segments. It is estimated that a significant share of the industry's turnover is generated by SMEs, which provide specialized products or services for application to specific environment-related systems or subcontract on large projects.⁴ Integrated multinational firms provide the full range of goods and services required for environmental systems management.

7. Trade in environmental goods and services is estimated to be small, but increasing, ranging from approximately 5-20 per cent of total turnover in the industry depending on the country.

8. To a great extent, the market for environmental goods and services depends on environmental policies and regulations in individual countries and their enforcement, as well as increasing public environmental awareness, corporate liability and recognition of the financial and quality gains from environment-related investments.⁵

9. Changes in regulatory approaches have encouraged innovation in pollution and waste prevention strategies over conventional end-of-pipe pollution and waste control. For example, the use

⁴ITC (1997), *Implications of the Uruguay Round Agreements for International Trade in Environmentally-Sound Technology and Related Products: Overview*, Geneva.

⁵For example, the requirement that publicly traded companies must report contingent liabilities with respect to the environment on their future ability to generate stockholder value. See World Resources Institute (1995), *Green Ledgers: Case Studies in Corporate Environmental Accounting*, Washington, D.C.

of economic and market based instruments (such as environmental charges and taxes, marketable/tradable permits, and deposit refund schemes) aims to ensure that environmental targets are met using cost effective means and that users of goods and services with the potential to benefit the environment are rewarded.⁶

10. Several sources note that the market is expanding for environmental goods and services in developing countries. With the objective of providing assisting exporters in developing countries to develop this export potential, UNEP and UNIDO are establishing National Cleaner Production Centres in several countries. The International Trade Centre (ITC) has prepared a handbook on environmental engineering and support services from developing countries for which there are potential export markets.⁷ Of importance to the growth of the environment industry is the ability of potential producers and consumers, particularly developing country SMEs, to be aware of export opportunities for, and able to access information on environmental goods and services.⁸

11. For the most part, environmental goods and services are provided to general utilities projects, such as water and waste treatment, which are often large, public, infrastructure projects in which governments play direct roles in design, contracting and implementation. Public sector capital expenditures in both developed and developing countries on pollution control and water and waste management is increasing, with more than a third of such spending on water purification and wastewater treatment systems. At present, by far the majority of public spending is by local municipalities rather than central governments.

12. The trend towards privatization of state-owned and operated utilities and other public functions in many countries is facilitating greater private sector involvement in areas such as water supply and waste management.⁹ Privatization may allow for the capital and expertise required to update, maintain and restructure environment-related infrastructure. The impact of privatization has been particularly significant in developing countries, where basic infrastructure has benefitted from improvement, among other things, to cope with the pressures of increasing industrial activity and urbanization.

(a) Classification of the environment industry

13. The OECD and Eurostat have proposed a general classification of the environment industry which includes both environmental goods and services.¹⁰ This classification, contained in Annex I to this Note, is divided into three broad categories according to the kind of economic activity

⁶Ritu Kumar, et. al., (1997), *Incentives for Eco-efficiency: Market Based Instruments for Pollution Prevention: A Case Study of the Steel Sector in India*, London: International Institute for Environment and Development, Delhi: Confederation of Indian Industries, and Vienna: UNIDO.

⁷ITC (1997), *Environmental Engineering and Support Services: A handbook for exporters from developing countries*, Geneva.

⁸Examples of market information on environmental goods and services include ITC (1997), op.cit.; UNEP (1996), *Survey of Information Systems and Sources Related to Environmentally-Sound Technologies*, Nairobi; UNECE (1997), *The Compendium of Soil Clean-up Technologies and Soil Remediation Companies*, Geneva; and UNIDO (1996), *Study of Cleaner Production Techniques and Technologies, Covering Clusters of Small Scale Industries in Selected Areas*, Vienna.

⁹OECD (1996), *The Global Environmental Goods and Services Industry*, Paris.

¹⁰This classification draws on the implementation of existing classifications of industrial activities and products such as the North American Industry Classification System, the UN Central Product Classification (CPC) the International Standard Industrial Classification of all Economic Activities (ISIC) and the General Industrial Classification of Economic Activities within the European Communities (NACE).

undertaken: (a) pollution management group; (b) cleaner technologies and products group; and (c) resources management group. This classification aims to be as complete and flexible as possible to measure the industry as it currently is, and to allow for future structural changes such as shifts from end-of-pipe to cleaner technologies or the development of new types of services with environmental benefits.

14. The categories are set out in the following manner. The "Pollution management" group comprises activities that produce equipment, technology or services to treat or remove environmental effects. Generally, this includes end-of-pipe equipment, technology and related services that are clearly supplied for an environmental purpose only and that are statistically identifiable. In this category, waste water management is considered to be an important activity in many countries and regions identified by the OECD; solid waste management and air pollution abatement services and related equipment and technologies are expected to increase rapidly. The fields of activity in this category, which is the most developed of the categories, include:

- air pollution control;
- waste water management;
- solid waste management;
- remediation/clean-up of soil and water;
- noise/vibration abatement;
- environmental monitoring, analysis and assessment;
- environmental research and development; and
- environmental construction and engineering.

15. The "Cleaner technology and product" group comprises any activity which continuously improves, reduces or eliminates the environmental impact of technologies, processes or products, but which are often supplied for other than environmental purposes and for which methods for assessment remain under discussion. This includes cleaner or resource efficient technology or products such as those that reduce energy consumption, recover valuable by-products, reduce emissions, or minimize waste disposal problems.

16. The "Resource management" group comprises activities which prevent environmental damage to air, water and or soil. This includes any activity that produces equipment, technology or specific materials, designs, constructs or installs, manages or provides other services for recycling new materials or products; for the generation of renewable energy (such as biomass, solar, wind, tidal or geothermal sources); for reducing climate change; for sustainable agriculture and fisheries (such as biotechnology applied to agriculture and fisheries activities); for sustainable forest management; for natural disaster risk management; or related to eco-tourism.

17. "Cleaner technology and product" and "Resource management" are felt to be key areas as their importance is expected to increase. At present, there are identification or measurement problems with these two groups as there is little comparability between existing data and agreement has not yet been reached as to their definition.

18. As stated above, the OECD's classification of the environment industry covers environmental goods as well as services. In the WTO, environmental goods and services are subject to different legal frameworks; the GATT covers all environmental goods whilst the GATS covers environmental services.

(b) The General Agreement on Trade in Services

19. Commitments made by WTO Members under the General Agreement on Trade in Services (GATS) are in most cases based on the services sectoral classification list set out in Table 2 which

was developed during the Uruguay Round. In turn, this classification list largely follows the provisional United Nations Central Product Classification (CPC) system. Division 94 of the CPC classification, attached as Annex II to this Note, sets out a more detailed list of the environmental services which are included and excluded in this category.¹¹

Table 2: Services sectoral classification list

6. Environmental Services	CPC Code
A. Sewage services	9401
B. Refuse disposal services	9402
C. Sanitation and similar services	9403
D. Other	----

Source: MTN.GNS/W/120, July 1991, Group of Negotiations on Services.

20. During the Uruguay Round, 48 WTO Member countries (counting the EC Member States individually) made commitments in their schedules under one or more of the four sub-sectors of "environmental services". Annex III to this Note contains a list of countries and the environmental services for which countries made commitments. It should be kept in mind that these commitments may be qualified by limitations on market access and national treatment that countries may have included in their schedules with respect to any of the four modes of supply.¹² Although the GATS provides for commitments on the specific category of "environmental services", other services categories may also be relevant to the environment, e.g., engineering, construction, or research and development services.¹³

(c) Related environmental goods

21. A definition of the specific product coverage of environmental goods which tend to accompany environmental services has yet to be determined. For example, it is often the case that the accompanying guarantees on products, such as maintenance and repair, are important determining factors based on which services are selected. Other than by taking into account the end-use of goods which may accompany environmental services, such goods are difficult to isolate as they generally have multiple purposes. For example, the treatment and purification of water requires equipment components such as pumps, industrial valves, pipes, and storage tanks which are products that are used for many purposes. Multiple purpose goods are estimated to account for a considerable share of environmental equipment and goods sales.

22. Using the Harmonized Systems (HS) for international trade it would be possible to identify codes for the types of goods of particular relevance to the provision of environmental services, such as

¹¹An updated CPC classification system, Revision 1, features a more detailed breakdown of environmental services than contained in the provisional CPC.

¹²See WTO (1995), *Environment and Services* (WT/CTE/W/9) for a description of the complementarities between provision of a service with another product.

¹³As set out in MTN/GNS/W/120, 12 sectors of services have been identified: business, distribution, communication, educational, financial, consulting, environmental, health, tourism, engineering, transport, sporting services and others.

those activities set out in Division 94 of the CPC (sewage, refuge, sanitation, etc.). For example, equipment for filtering and purifying air or water (HS 8421.39 and 21); sewage pumps (HS 8413.81); instruments for environmental monitoring (HS 9026.80); and solar panels (HS 8422.20).

B. Trade Restrictions and Distortions

23. Identifying barriers to trade in environmental services will be facilitated when a more precise definition of the services and accompanying goods included in the environment industry is determined. In general terms, barriers to trade in both goods and services may arise from specific market access restrictions, e.g., tariffs, non-tariff barriers, or restrictions on commercial presence.

24. Work to identify barriers to trade in environmental goods and services is being undertaken in a manner that can serve as the basis for sector-specific trade liberalization in the Asia-Pacific Economic Cooperation (APEC) following the APEC Ministerial in November 1997. At this meeting, APEC Members agreed to pursue an ongoing voluntary programme of liberalization in 15 sectors, including environmental goods and services, and to build on APEC's early voluntary liberalization in these sectors as a basis for extending participation beyond the APEC region and, where appropriate, for incorporation into the WTO. APEC Ministers called for the development of appropriate agreements or arrangements for 9 of the 15 sectors, including environmental goods and services, by the first half of 1998, with a view to commencing implementation of liberalization in 1999.¹⁴

25. Barriers to trade in environmental services may result from restrictions imposed on commercial presence (Mode 3); examples include limits on foreign ownership, the number of foreign companies which can provide a service, the value of services foreigners can supply, or the eligibility of foreign-owned companies for grants and other subsidies. Certain professional environmental service providers such as environmental engineers, consultants and auditors may face barriers to cross border movement and temporary presence resulting from different qualifications or licensing requirements.

26. Potential restrictions to trade in specific goods which tend to accompany the provision of environmental services may take the form of tariffs, non-tariff barriers, and government procurement related issues.

27. As environmental regulations and standards and their enforcement differ between countries, this will affect market access for environmental goods and services.

28. Given the proportion of environmental goods and services which are procured by government entities, public procurement policies would be expected to affect market access for both environmental goods and services. There are three parallel activities in the WTO with respect to government procurement. First, there is the plurilateral Agreement on Government Procurement (GPA), which to date involves the participation of 26 WTO Members. The GPA includes commitments which are contained in annexes setting out the government departments, public entities and state-owned enterprises in each Party to the GPA which procure in accordance with the disciplines established in the GPA and the goods and services included. Second, the Working Group on Transparency in Government Procurement established at the 1996 Ministerial Conference, which involves all WTO Members, has a mandate to conduct a study on transparency in government

¹⁴See the Joint statement of the APEC Ninth Ministerial Meeting, 21-22 November 1997 (issued as WT/L/248). The statement sets out the following 9 sectors identified by APEC Members for voluntary liberalization commencing in 1999 wherever possible: environmental goods and services, energy sector, fish and fish products, toys, forest products, gems and jewellery, medical equipment and instruments, chemicals and telecommunications mutual recognition arrangement. Ministers called for further preparatory work on 6 more sectors: food, natural and synthetic rubber, fertilizers, automotive, oilseeds and oilseed products, and civil aircraft.

procurement practices taking into account national policies, and, based on this study, to develop elements for inclusion in an eventual agreement.

29. Third, Article XIII of the GATS provides for multilateral negotiations on government procurement in services; these negotiations are currently being conducted within the Working Party on GATS Rules. The purpose of these negotiations is to explore the possibility of applying multilateral disciplines to government procurement covering all sectors of services.

30. Another issue concerns specific patented know-how or technology which the supplier of an environmental good or service may be encouraged to disseminate if intellectual property (IP) protection is in place and enforced. To the extent that IP protection is a barrier to the dissemination of environmental goods and services, the TRIPS Agreement has put in place rules based on the concept that strong protection will foster the creation and transfer of technology. Where specific technical knowledge is adopted as a standard for an industry (by means of government regulations or standards, for example), IP owners may have to license their rights under reasonable conditions. Compulsory licensing is authorized under Article 31 provided its strictly specified conditions are met.¹⁵

31. Several intergovernmental organizations have commenced work on the environment industry, including the OECD, APEC, UNCTAD, and ITC. Work was initiated at the November 1997 meeting of the OECD Joint Session of Trade and Environment Experts to define the scope of the environment industry, to identify the nature and extent of barriers to trade in this sector, including market access barriers such as tariffs and non-tariff measures, as well as issues related to public procurement processes. In preparation for the UNCTAD Expert Group meeting on environmental services in July 1998, UNCTAD is preparing a document on "Strengthening capacities in developing countries to develop their environmental services sector", which will include information on how to categorize environmental services, the structure of the market and trade flows in environmental services. ITC is organizing International Business Round Tables on the implications for technology-based exporters of the Uruguay Round Agreements with a focus on emerging market niches for developing country exporters of environmental goods and services.

C. Environmental Benefits

32. By promoting the freer flow of environmental goods and services, the removal of trade restrictions and distortions in this sector has the potential to contribute to enhancing environmental quality, as well as expanding markets and new investment opportunities. Environmental goods and services contribute to cost effective, resource efficient and environmentally-sound approaches to resource use, and pollution and waste minimization with subsequent gains in productivity and improvements in the performance of many industries and sectors.¹⁶ Trade liberalization will also facilitate new market opportunities for the environment industry.

33. Demand for environmental goods and services results not only from compliance with environmental standards and regulations, but also in order to gain the economic benefits resulting from more efficient processes which reduce consumption of raw materials and energy, and reduce waste and pollution. Conventional command and control approaches ensure compliance with

¹⁵See WTO (1996), *Factors Affecting Transfer of Environmentally-Sound Technology* (WT/CTE/W/22).

¹⁶See the contribution by the United States on *Liberalization of Trade in Environmental Services and the Environment* (WT/CTE/W/70).

standards for pollutant discharge or ambient quality whilst market based instruments involve a more efficient and effective system based on, for example, pollution loads per tonne of finished product.¹⁷

34. Governments are establishing policies and programmes which encourage technological research and development, training and technology transfer of environmental equipment and services through, for example, joint ventures. OECD and ITC studies on the environment industry provide illustrative examples of the kinds of export enhancement initiatives for environmental goods and services through governments and multilateral institutions, including planning, financing and marketing of environmental goods and services, with concessional funding for exports to developing countries.¹⁸ Through the establishment of joint ventures whereby environmental expertise is imported and used with indigenous capacity, it is possible to increase the adoption and operation of new technologies and generate knowledge and skills which can contribute to improving the environment.

35. A recent OECD report assesses the economic benefits to be gained through the application of cleaner production and waste minimization strategies in a range of sectors and regions.¹⁹ Examples in this report illustrate that while stringent regulations, if they are unenforceable, often fail to achieve environmental objectives such as reducing pollution, cleaner technologies achieve this goal while creating substantial economic efficiencies. Worth noting are references in the report which outline that a wide range of some of the fastest growing industrial sectors in developing countries would benefit from enhanced access to environmental goods and services. Examples of sectors and the contribution of environmental goods and services include pulp and paper processing (chlorine minimization); steel smelting and refining (energy-efficient processes); energy (cleaner burning and fuel-efficient); coal (cleaner combustion equipment); automobile manufacturing (fuel-efficient motors); textiles (water-based dyes); and footwear (chrome-free leather tanning).

36. Incentive to adopt cleaner technologies have also been stimulated by voluntary industry standards. These standards have the potential to contribute to more environmentally and economically efficient processes and products through an evaluation of incremental environmental performance, auditing and management systems. Standards, norms and conformity assessment are currently being developed, not only by governments but importantly through multilateral processes to develop environmental management systems, such as ISO 14001 and the Environmental Management and Auditing Systems (EMAS). Such voluntary standards have the potential to move beyond compliance with environmental laws and regulations in that they create incentives for industry to make continuous improvements in environmental quality. Environmental management standards are cited by some sources as having a positive impact on firms making the transition to cleaner production and waste reduction strategies.²⁰

¹⁷OECD (1994), *Managing the Environment: The Role of Economic Instruments*, Paris; and D. O'Connor (1996), *Applying Economic Instruments in Developing Countries: From Theory to Implementation*, Paris: OECD.

¹⁸OECD (1994), *Export Promotion and Environmental Technologies*, Environment Monographs No. 87, Paris; and ITC (1997), *op.cit.*; US International Trade Commission (ITC) (1996), *Global Competitiveness of US Environmental Technology Industries: Air Pollution Prevention and Control*, Washington, D.C.; and USITC (1995), *Global Competitiveness of US Environmental Technology Industries: Municipal and Industrial Water and Wastewater Treatment*, Washington, D.C.

¹⁹OECD (1998), *Cleaner Production and Waste Minimization in OECD and Dynamic Non-Member Countries*, Paris.

²⁰OECD (1998), *Ibid.*; and "Companies going beyond compliance, investing in energy-efficient technology", *International Environment Reporter*, 12 November 1997.

37. The argument that adopting less polluting and more resource efficient products, processes and services will permit economic gains as well as contributing to improving environmental quality was a message that emerged from the UNCED, particularly as set out in Chapter 34 of *Agenda 21* on "Transfer of environmentally-sound technology, cooperation and capacity building". As follow-up, the Commission on Sustainable Development's meeting in April 1998 will address several issues related to environmental management tools for sustainable development, including: (a) the interrelationship of water, industry and cleaner production, including the management of water and its supply by private entities; and (b) the environment and other impacts of environmentally-sound technologies.²¹

38. Incentives to develop environment goods and services are also being stimulated by multilateral environmental agreements, such as the Montreal Protocol on Substances that Deplete the Ozone Layer and the United Nations Framework Convention on Climate Change (FCCC), in order for Parties to meet multilaterally-agreed environmental targets. The objectives of these agreements would tend to increase demand for substitute technologies and stimulate investment and research and development in environmental goods and services related to, for example, air pollution abatement. An example is the result of the phase out of CFCs and other ozone depleting substances (ODS) under the Montreal Protocol which has stimulated research and development into alternative substances and technologies which do not involve the use of ODS. Since 1991, financial resources have been made available for the transfer of ozone-friendly technologies through the Multilateral Fund for the Implementation of the Montreal Protocol.²²

39. To help achieve the commitments to reduce greenhouse gas emissions, the Kyoto Protocol to the FCCC will stimulate the development and use of energy efficient and cleaner technology. Investment will occur through Joint Implementation or the Clean Development Mechanism (provisions on securing credits for joint projects with development countries) either directly through project financing or transfer of technology and know-how, or indirectly through funds set up by, for example, the interim financial mechanism of the FCCC, the Global Environment Facility.

²¹CSD (1998), *Report of the Secretary-General on Industry and Sustainable Development*, (E/CN.17/1998/4).

²²See the communications to the Committee on Trade and Environment by the Multilateral Fund for the Implementation of the Montreal Protocol (WT/CTE/W/60), the Montreal Protocol (WT/CTE/W/56) and the Global Environment Facility (WT/CTE/W/58).

ANNEX I

Explanatory Notes on the OECD/Eurostat Classification of the Environment Industry

The OECD and Eurostat have categorized environmental goods and services as follows²³:

"THE 'POLLUTION MANAGEMENT' GROUP

A. Environmental Goods

Air pollution control

This class includes any activity that produces equipment, technology or specific materials for the treatment and/or removal of exhaust gases and particulate matter from both stationary and mobile sources. It includes air-handling equipment, dust collectors, precipitators, filters, catalytic converters, chemical treatment and recovery systems, specialized stacks incinerators, scrubbers, odour control equipment, environmentally less-damaging specialized fuels.

Waste water management

This class includes any activity that produces equipment, technology or specific materials for collection, treatment and transport of waste water and cooling water. It includes pipes, pumps, valves, aeration equipment; gravity sedimentation equipment, chemical treatment and recovery equipment; biological recovery systems, oil/water separation systems, screens/strainers, sewage treatment equipment, waste water reuse equipment; water purification equipment and other water handling systems.

Solid waste management

This class includes any activity that produces equipment, technology or specific materials for collection, treatment, transport, disposal and recovery of hazardous and non-hazardous solid waste. It includes waste storage and treatment equipment (thermal, biological, chemical), waste collection equipment, waste disposal equipment, waste handling equipment, waste separation and sorting equipment, recovery equipment. It also includes equipment for outdoor sweeping and watering of streets, paths, parking lots, etc. It includes equipment, technology or specific materials for treatment of low level nuclear waste. It excludes high level nuclear waste. Recycling activities excludes manufacture or production of new materials or products from recovered waste or scrap and subsequent use of these materials or products.

Remediation and cleanup of soil, surface water and groundwater

This class includes any activity that produces equipment, technology or specific materials to reduce the quantity of polluting materials in soil and water, including surface water, groundwater and sea water. It includes absorbents, chemicals and bioremediators for cleaning-up, as well as cleaning-up systems either *in situ* or in appropriate installations.

²³OECD (forthcoming), *Environment Industry Manual: Proposed Guidelines for the Collection and Analysis of Data on the Environment Industry*, Paris: OECD Industry Division and EUROSTAT, pp. 37-42.

Noise and vibration abatement

This class includes any activity that produces equipment, technology or specific materials to reduce or eliminate the emission and propagation of noise and vibration both at source and dispersed. It includes mufflers/silencers, noise deadening material, noise control equipment and systems vibration control equipment and systems.

Environmental monitoring, analysis and assessment

This class includes any activity that produces equipment, technology or specific materials for sampling, measurement, and subsequent recording, analysis and assessment of various characteristic of environmental media. It includes measuring and monitoring equipment, sampling systems, data acquisition equipment, other instruments or machines for measurement. Environmental information systems, analytical software, specific safety and personal protection are included.

B. Environmental Services

Air pollution control

This class includes any activity that designs, manages systems or provides other services for treatment and/or removal of exhaust gases and particulate matter from both stationary and mobile sources.

Waste water management

This class includes any activity that designs, operates systems or provides other services for collection, treatment and transport of waste water and cooling water. It includes design, management or other services for sewage treatment systems, waste water reuse systems, water handling systems.

Solid waste management

This class includes any activity that designs, operates systems or provides other services for the collection, treatment, management, transport, storage and recovery of hazardous and non-hazardous solid waste. It includes design, management or other services for waste handling (collection, transports separation, sorting and disposal), operation of sites, recycling (including collection of waste and scrap), operation of recycling plants. It includes services for outdoor sweeping and watering of streets, paths, parking lots, etc. Services for treatment of low level nuclear waste are included. It excludes high level nuclear waste. It excludes services for manufacture of new materials or products from recovered waste or scrap and subsequent use of these materials or products.

Remediation and cleanup of soil, surface water and groundwater

This class includes any activity that designs, manages systems or provides other services to reduce the quantity of polluting materials in soil and water, including surface water, groundwater and sea water. It includes cleaning-up systems either *in situ* or in appropriate installations, emergency response and spills cleanup systems. Treatment of water and dredging residues are included.

Noise and vibration abatement

This class includes any activity that designs, manages systems or provides other services to reduce or eliminate the emission of noise and vibration both at source and dispersed. It includes designing, management or other services for acoustic and sound-proof screens and street covering.

Environmental R&D

This class includes any systematic and creative activity which is concerned with the generation, advancement, dissemination and application of scientific and technological knowledge to reduce or eliminate emissions in all environmental media and to improve environmental quality. It includes creative scientific and technological activities for the development of cleaner products, processes and technologies. It includes non-technological research to improve knowledge on ecosystems and the impact of human activities on the environment.

Environmental contracting and engineering

This class includes any activity that investigates feasibility, designs and manages environmental projects which are not included elsewhere. It includes multidisciplinary environmental contracting and engineering. Environmental management consulting, and auditors are included.

Analytical services, data collection, analysis and assessment

This class includes any activity that designs, manages systems or provides other services to sample, measure, and record various characteristics of environmental media. It includes monitoring sites, both operating singly and in networks, and covering one or more environmental medium. Health, safety, toxicology studies, and analytical laboratory services are included. Weather stations are excluded.

Education, training, information

This class includes any activity that provides environmental education or training or disseminates environmental information and which is executed by specialized institutions or other specialized suppliers. It includes education, training, and information management for the general public, and specific environmental work-place education and training. The activities of the general educational system are excluded.

C. Construction

This class includes any activity for the construction and installation of facilities for: air pollution control; waste water management; solid waste management; remediation and cleanup of soil, water and groundwater; noise and vibration abatement; environmental monitoring, analysis and assessment; other environmental facilities.

THE 'CLEANER TECHNOLOGY AND PRODUCT' GROUP

This group includes any activity which continuously improves, reduces or eliminates the environmental impact of technologies, processes or products.

Cleaner/resource efficient technology

Cleaner and resource efficient technologies decrease material inputs, reduce energy consumption, recover valuable by-products, reduce emissions, minimize waste disposal problems, or some combination of these.

Cleaner/resource efficient product

Cleaner or resource efficient products decrease material inputs, improve product quality, reduce energy consumption, minimize waste disposal problems, reduce emission during use, or some combination of these.

THE 'RESOURCES MANAGEMENT' GROUP

NOTE: In the case of the 'Resources management' group, activities aimed at the production of environmental goods and services and connected construction are gathered together for convenience. However, it is suggested that wherever possible information on these items be separately collected and presented.

Indoor air pollution control

This class includes any activity that produces equipment, technology or specific materials, designs, constructs or installs, manages or provides other services for the treatment and renewal of indoor air to remove pollutants. It excludes air-conditioning.

Potable water treatment and distribution

This class includes any activity that produces equipment, technology or specific materials, designs, constructs or installs, manages or provides other services for water supply and delivery systems, both publicly and privately owned. It includes any activities aiming to collect, purify and distribute potable water to household, industrial, commercial or other users.

Recycled materials

This class includes any activity that produces equipment, technology or specific materials, designs, constructs or installs, manages or provides other services for manufacturing new materials or products, separately identified as recycled, from recovered waste or scrap, or preparation of such materials or products for subsequent use.

Renewable energy plant

This class includes any activity that produces equipment, technology or specific materials, designs, constructs or installs, manages or provides other services for the generation, collection or transmission of energy from renewable sources, including biomass, solar, wind, tidal, or geothermal sources.

Heat/energy saving and management

This class includes any activity that produces equipment, technology or specific materials, designs, constructs or installs, manages or provides other services to reduce heat and energy use or minimize heat and energy loss (e.g. co-generation). It includes equipment, technology or specific materials to reduce climate change.

Sustainable agriculture and fisheries

This class includes any activity that produces equipment, technology or specific materials, designs, constructs or installs, manages or provides other services for systems which reduce the

environmental impact of agriculture and fishery activities. It includes biotechnology applied to agriculture and fishery activities.

Sustainable forestry

This class includes any activity that produces equipment, technology, or specific materials, designs, constructs or installs, manages or provides other services for programmes and projects for reforestation and forest management on a long term sustainable basis.

Natural risk management

This class includes any activity that produces equipment, technology, or specific materials, designs, constructs or installs, manages or provides other services for systems to prevent or reduce the impact of natural disasters (storms, floods, volcanic eruptions, etc.).

Eco-tourism

This class includes any activity that designs, constructs, installs, manages or provides other services for tourism that involves protection and management of natural and cultural heritage, or education and interpretation of the natural environment, and that do not damage or degrade the natural environment.

Other

This class includes any activity that measures, prevents, limits or corrects environmental damage to air, water, and soil, as well as problems related to waste, noise and eco-systems, which is not included in any other class. These activities should be separately specified and listed."

ANNEX II

The UN Central Product Classification

940 SEWAGE AND REFUSE DISPOSAL, SANITATION AND OTHER ENVIRONMENTAL PROTECTION SERVICES

9401 94010 Sewage services

Sewage removal, treatment and disposal services. Equipment used are waste pipes, sewers or drains, cesspools or septic tanks and processes utilized may be dilution, screening and filtering, sedimentation, chemical precipitation, etc.

Exclusions: Collection, purification and distribution services of water are classified in subclass 18000 (Natural water).

Construction, repair and alteration work of sewers are classified in subclass 51330 (Construction work for waterways, harbours, dams and other waterworks).

9402 94020 Refuse disposal services

Refuse collection and disposal services. Collection services of garbage, trash, rubbish and waste, whether from households or from industrial and commercial establishments, transport services and disposal services by incineration or by other means. Waste reduction services are also included.

Exclusions: Dealing services in wastes or scraps are classified in subclass 62118 (Sales on a fee or contract basis of goods n.e.c.) and 62278 (Wholesale trade services of waste and scrap and materials for recycling).

Research and experimental development services on environmental issues are classified in division 85.

Regulatory administrative services by the government related to environmental issues are classified in subclass 91123 (Administrative housing and community amenity services), 91131 (Administrative agriculture, forestry, fishing and hunting related services) and 91132 (Administrative fuel and energy related services).

9403 94030 Sanitation and similar services

Other sanitation and similar services including outdoor sweeping services and snow- and ice-clearing services.

Exclusion: Disinfecting and exterminating services for buildings and other non-agricultural structures are classified in subclass 87401.

Pest control services in connection with agriculture are classified in subclass 88110 (Services incidental to agriculture).

9404 94040 Cleaning services of exhaust gases

Emission monitoring and control services of pollutants into the air, whether from mobile or stationary sources, mostly caused by the burning of fossil fuels. Concentration monitoring, control and reduction services of pollutants in ambient air, especially in urban areas.

9405 94050 Noise abatement services

Noise pollution monitoring, control and abatement services, e.g. traffic-related noise abatement services in urban areas.

9406 94060 Nature and landscape protection services

Ecological system protection services, e.g. of lakes, coastlines and coastal waters, dryland, etc., including their respective fauna, flora and habitats. Services consisting in studies on the interrelationship between environment and climate (e.g. greenhouse effect), including natural disaster assessment and abatement services. Landscape protection services not elsewhere classified.

Exclusion: Forest and damage assessment and abatement services are classified in group 881 (Services incidental to agriculture, hunting and forestry).

9409 94090 Other environmental protection services n.e.c.

Other environmental protection services not elsewhere classified, e.g. acidifying deposition ("acid rain") monitoring, controlling and damage assessment services.

ANNEX III: GATS Commitments on Environmental Services

Countries	Sewage Services (6.A)	Refuse Disposal Services (6.B)	Sanitation and Similar Services (6.C)	Other (6.D)	Total
Australia	1	1	1		3
Bulgaria	1	1	1	1	4
Canada	1	1	1	1	4
Central African Rep.				1	1
Colombia				1	1
Czech Republic	1	1	1		3
Ecuador	1	1	1	1	4
El Salvador				1	1
European Community (15)	1	1	1	1	4
Gambia	1		1		2
Guinea	1		1		2
Hungary		1	1		2
Iceland	1	1	1	1	4
Israel	1	1	1	1	4
Japan	1	1	1	1	4
Korea RP	1	1		1	3
Kuwait	1	1	1		3
Lesotho	1	1	1	1	4
Liechtenstein	1	1	1	1	4
Morocco	1	1	1	1	4
Norway	1	1	1	1	4
Panama				1	1
Poland				1	1
Qatar	1	1	1	1	4
Romania				1	1
Rwanda			1		1
Sierra Leone	1	1	1	1	4
Slovak Republic	1	1	1		3
Slovenia	1	1	1	1	4
South Africa	1	1	1	1	4
Switzerland	1	1	1	1	4
Thailand	1	1	1	1	4
Turkey	1	1	1		3
United Arab Emirates	1	1	1	1	4
USA	1	1	1	1	4
Total	29	29	30	29	117

Source: Overview of services schedules carried out by the WTO Trade in Services Division. The commitments normally cover all four Modes of supply set out under the GATS.