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Liberalization of Environmental Services

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1. Introduction

The environment industry can be broadly classified under two sectors: (i) equipment and (ii) services.[1] This reflects the legal frameworks of the industry's global trade, in that the GATT covers all environmental goods and the GATS covers environmental services. Environmental services are today understood to include services that can reduce environmental risk, minimize pollution and enable efficient resource use, and market estimates of the sector include revenue from fees paid for services like waste treatment, waste management, remedial services, consulting, engineering, testing/ analytical services, etc.

The distinction between environmental goods and services though clean on the outset may not always be so. For instance, operating and maintenance of equipment fall under GATS services though equipment per se falls under the GATT. Also, the provision of environmental services can be embodied in another product: for example, computer programme for environment-related activities contained in a computer diskette or a video film containing instructions regarding environmental safety. Similarly, technology, designing and engineering of waste treatment system fall under environmental services, but the provision of these environmental services are often integrated with the provision of the associated equipment.[2] Thus the liberalization of environmental services and goods need to be undertaken together in view of the complementarities between the two sectors.

Activities in the environmental services sector overlaps with activities in several other economic sectors of the economy. For instance, under the Uruguay Round the environmental services is one of twelve service sectors (MTN.GNS/W/120), however, environmental activities overlap with like business services, construction and related engineering services, education services, health related and social services, transport services etc. This prompted a proposal from the OECD countries for a *cluster* approach to negotiations in environmental services sector (i.e. clubbing along with other service sectors that are closely connected with it). Similarly, trade in goods and equipment that lead to production of environmental services are also intricately connected with this sector.

An important characteristic of this sector is that the consumption of several environmental services has properties of public goods, and this makes pricing based on consumer use difficult. The provision of several environmental services typically requires large investment to ensure that collection and distribution networks reach the entire population (e.g. sewerage system network). This feature supports the emergence

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[1] The literature, however, sometimes distinguishes between three sectors in the environment market: *services*, *equipment* and *resources* (Environmental Business International Inc., based on the US Standard Industry Classification system). The OECD/Eurostat classification includes "resources" under the services sector.

[2] Of course there are environmental services that do not involve any complementary use of any other product, like advice on environmental standards/ environmental law, or environmental information and data analysis.

of natural monopoly for efficiency in the provision of environmental services requiring large capital investment (i.e. to minimize the cost of per unit provision of the service).

The public good nature of environmental services, coupled with its characteristic of natural monopoly made the public sector the primary provider (and also procurer) of these services. Thus several environmental services have been traditionally provided by the local government bodies including sewage and refuse disposal, collection of garbage, sanitation, provision of (tapped) drinking water, etc. These services are typically termed infrastructure environmental services, and are required to ensure the basic quality of life to the public.

In 2000, the global environment industry was worth US$522 billion approximately, of which the environmental services market was about US$280 billion.[3] . The US accounts for the largest share of this industry worldwide, comprising about 50% of the global market, followed by the EU and Japan (together the OECD countries account for 85% of the global environment market).

The environment industry (equipment and services) experienced rapid growth in the 1980s following increasing enforcement of environmental regulations and economic instruments in the industrialized countries. In the decade of the 1990s, however, the environment industry began to show signs of maturity and stagnation in these countries as the growth rates dropped sharply. For instance, in the US the annual growth rate of the industry that ranged from 10-15% during 1985-1990, dropped to 2-5% during 1991-1995 and further to a low of 1.2% in 1996. In the developing countries, on the other hand, double-digit annual growth rates were experienced in the 1990s.

The market for environmental services in developing countries like India has been growing due to increased environmental regulations, urbanization, and industrialization. Moreover, liberalization and increased private participation in municipal activities during the last decade have increased opportunities for trade in environmental services.

As the domestic environment markets in OECD countries reach saturation, exports from the environmental firms in these countries, especially those providing environmental services, is becoming a significant growth factor. It is important to note here that the increasing export orientation of the global environment industry (especially in the last decade), and given the cross-cutting nature of the sector, environment services are set to become one of the fastest growing service sectors in the near future.[4]

2. Classification of Environmental Services

Under the Uruguay Round, environmental services were defined under four broad categories, namely (1) *sewage*, (2) *refuse disposal*, (3) *sanitation*, and (4) *other services*,

[3] Butkevicience et al (2002).
[4] During the last two decades, the growth in trade of commercial services outstripped that of merchandise trade. In 2001, the export value of commercial services stood at US$1460 billion. WTO *International Trade Statistics 2002.*

as outlined in the WTO Secretariat's *Services Sectoral Classification List* (MTN.GNS/W/120, July 1991). WTO members can base their scheduled commitments under these four environmental sub-sectors. The OECD countries, however, called for a broader definition of the environmental services sector and to refer to the UN Central Product Classification revised version 1 (CPC v.1). The basis of the finer classification by these members was that the GATS classification is broad-based and incomplete. The OECD and Statistical Office of European Commission (Eurostat) proposed a general classification of the environment industry, including both environmental goods and services that has three broad categories according to the kind of economic activity undertaken: (i) pollution management group; (ii) cleaner technologies and products group; and (iii) resources management group (*WTO 1998b*). Since the definition of environmental services had moved beyond the four broad categories drawn up in 1991. The OECD/Eurostat defined environmental services to include services that can measure, prevent, limit, minimize environmental damage to the natural resources by medium water, air and soil, as well as the ecosystem.

The classification under the Uruguay Round is considered to be rather limited since the primary focus is on pollution abatement, rather than pollution management (and prevention). It may be noted however, that the WTO Secretariat Note in 1998 further clarified and broadened the scope of environmental services to encompass some of the segments included under the OECD/Eurostat definition. The 1998 WTO Secretariat Note (WTO 1998a) expanded the *other environmental services* category to include cleaning services of exhaust gases (CPC 9404), noise abatement services (CPC 9405), nature and landscape protection services (CPC 9406), and other environmental protection services (CPC 9409). Some CPC activities were, however, excluded from these subsectors under the GATS.

Table 1 highlights the environmental services segments under the OECD/Eurostat classification that overlap with the GATS definition and those that are excluded under GATS, and the corresponding UNCPC version 1 classification. Under the OECD classification, *refuse disposal* includes two different classes: non-hazardous versus hazardous waste; and there is a separate class for other environmental protection services.

There is partial correspondence between the GATS classification and the OECD/Eurostat classification. The latter includes services water for human use (under water management services), recycling services (under solid and hazardous waste management services) and protection of biodiversity, as opposed to the GATS classification. The WTO Secretariat Note in 1998 (*Environmental Services* S/C/W/46) detailed these exclusions within each sub-sector.

The limits in the GATS classification involve environmental services that are sensitive in nature, including social equity issues and environmental risk. For instance, the GATS classification of environmental services categorically *excludes* the provision of water for human use, while this segment is included in the OECD classification. Privatization and liberalization of the water sector (treatment and purification) is partial across the globe, and only in certain West European countries, is the water sector privatized completely.

Table 1. OECD, CPC* ver. 1 & GATS Classification of Environmental Services

OECD/Eurostat	CPC version 1.0	GATS
A. Water and waste water management sector with sub-sectors: • Sewage services • *Water for human use*	941 Sewage services 94110 Sewage treatment services 94120 Tank emptying and cleaning services	1. Sewage services *Excludes collection, purification & distribution services of water, and construction repair and alteration of sewers.*
B. Solid and hazardous waste management sector with sub-sectors: • Refuse disposal and treatment services • Sanitation services • *Recycling services*	942 Refuse disposal services 94211 Non-hazardous waste collection services 94212 Non-hazardous waste treatment and disposal services 94221 Hazardous waste collection services 94222 Hazardous waste treatment and disposal services 943 Sanitation and similar services 94310 Sweeping and snow removal services 94390 Other sanitation service	2. Refuse disposal services *Excludes dealing and wholesale in waste and scrap, and R&D services on environmental issues*. 3. Sanitation and similar services
C. Protection of ambient air and climate	94900 Other environmental services	4. Other services
D. Noise and vibration abatement	94900 Other environmental services	4. Other services
E. Remediation and clean-up of soil, surface water and groundwater.	94900 Other environmental services	4. Other services
F. Protection of biodiversity and landscape services	94900 Other environmental protection services	4. Other services *Excludes forest and damage assessment and abatement services*
G. Other environmental/ ancillary services: • Design consulting and engineering. • Preparation of sites, construction, installation, assembly, repair and maintenance • Environmental research & development • Analytical services, data collection, testing, analysis, assessment • Environmental education, training and information	94900 Other environmental protection services	4. Other services

* United Nations Central Product Classification.
Compiled from Table 4 of OECD (2000), GATS 2000 EC Submission S/CSS/W/38 and Table 1 of WTO (1998a).

Similarly, the GATS definition excludes dealings/ wholesale in waste and scrap, while recycling services are included under the OECD definition (under solid and hazardous waste management). The international trade in hazardous waste is currently regulated under the Basel Convention on the Control of Transboundary Movements of Hazardous

Wastes and their Disposal (adopted in 1989, entered into force in 1992). The guiding principle of the Basel Convention is to minimize the threat to human health and environment by encouraging the treatment and disposal of hazardous wastes close to where they are produced. The Basel Convention aims to control the transboundary movement of hazardous wastes, monitor and prevent illegal traffic, provide assistance for the environmentally sound management of hazardous wastes, promote cooperation between Parties in this field, and develop Technical Guidelines for the management of hazardous wastes. There is an export ban from OECD to non-OECD countries of hazardous wastes intended for final disposal, effective 1994. An amendment to the Basel Convention in 1997 also prohibits export of hazardous wastes intended for recovery and recycling from Annex VII countries (including EU, OECD, Liechtenstein) to non-Annex VII countries (all other parties to the Convention).[5] Notably the US, one of the largest exporters of scraps, has not yet ratified the 1989 Basel Convention nor the amendment to the Basel Convention on the ban of hazardous wastes for recycling services.

In ending this section, it may be observed that the broader definition of environmental services encompasses two significant characteristics: first, efficient resource management, emphasizing resource productivity; and second clean technology, i.e. pollution prevention as opposed to just pollution abatement and cleaning-up operations. The broader definition today fits well with the concept of sustainable development, which is one of India's primary goals. For a developing country like India, where the focus so far has been on the end-of-pipe pollution management, it would be beneficial to embrace a wider definition of environmental services if only to emphasize the importance of efficient and optimal resource utilization.[6] However, reservations need to be made in certain segments like drinking water since it involves thorny issues of equity and political acceptability (as the majority of the Indian population does not have the economic means of purchasing essential consumption goods in the market).

3. Environmental Services and Developing Countries

The environment market in developing countries of Africa, Asia and Latin America, together account for less than 10% of the worldwide market (7% in 1996), but are expected to register double-digit annual growth (10-15% p.a.). Among the factors supporting this trend are increasing stringency of domestic environmental regulations in these countries, enforcement of international environmental standards and pressure from consumers/ communities.

The expected growth of environment market in developing countries, coupled with the saturation of environment markets in the developed countries prompted mature environmental firms (of the latter) towards seeking export opportunities in the developing countries. The developing countries are net importers of environmental services (as also

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[5] The Amendment to the Basel Convention has not yet entered into force since it needs ratification by two-thirds of the parties to become effective.

[6] The intent of optimal resource utilization is reflected in some of the domestic environmental policies, although instruments to ensure efficiency are still lacking in India.

equipment). In particular, privatization and deregulation of utilities adopted in developing countries is expected to increase the opportunities for foreign participation.

Several Asian countries, including India, have been the focus of the US environment industry, given the growth prospects of their domestic environment sector, under the United States-Asia Environmental Partnership (US-AEP). In the environmental exports to Asian countries Japan is the leader.[7] In 1999, Japan had a share of about 40% of the total environmental imports of 11 Asian countries, followed by the US with a share of 29%, Germany with a share close to 8%, and Taiwan with a share of 5.5% (US-AEP 2001: 13).

In terms of environmental segments significant for Asian country imports, solid /hazardous waste and other recycling systems/ remediation constituted the largest share during 1995-99, followed by monitoring and analysis equipment, and potable water treatment/wastewater management.

3.1 Issues in Liberalization of Basic Infrastructure Environmental Services

Privatization and liberalization in environmental services has great significance since basic infrastructure environmental services have traditionally being in the public sector. Local government bodies have typically provided services like water, sanitation, sewage and refuse disposal, cleaning of roads, parks, and lakes. However, private participation in the provision of these basic services have been increasing globally, driven by the need for cost reduction as well as private sector capital.

The trend in privatization of public utilities has included most significantly that of water supply and wastewater management. This is because, among the public infrastructure services, water purification and wastewater treatment systems require the largest investment, and more than a third of the public sector capital expenditures in developed and developing countries is spent on the latter (*WTO 1998b*). Wastewater treatment is completely privatized in United Kingdom, and in France more than two-thirds of the market is in the private sector (*WTO 1998a: 5*). Privatization has also been extensive in the US, though not uniform across all environmental service sub-sectors.

The developing countries have also encouraged private participation in environmental service provision, including water, sewage, and sanitation services. It is estimated that between 1990-97 the cumulative private sector capital expenditure on water and sanitation projects in developing countries was about $25 billion (compared to $297

7 In terms of worldwide environmental exports, however, the US is the largest exporter. In 1999 of the total global exports of US$122 billion, the US had a share of about 26% (export value of $32 billion), followed by Germany with a share of 19%, and Japan with 15% share. Other European nations including Italy, U.K., and France had much smaller shares of 8%, 7% and 6% of the global environmental exports. The sectors covered include air pollution control equipment, heat/energy management and renewable energy plants, monitoring and analysis equipment, solid/hazardous waste, other recycling systems and remediation and cleanup, and wastewater management equipment. The estimate was based on OECD trade statistics (actual sales by HS codes). (US-AEP 2001:10).

million during 1984-90).[8] Among the Asian developing countries, in particular Malaysia, Indonesia, Thailand, Philippines have encouraged private participation in these infrastructure environmental services. In Philippines, contracts for water and sewerage services for the city of Manila were awarded to two private consortia, and in Indonesia a 25-year build and operate contract for drinking water treatment plant in the city of Medan, Sumatra, was awarded to a French company.[9]

In India the financial constraints of urban local bodies (ULBs) have been a major problem towards the adequate provision of services, and the 74th Amendment of the Indian Constitution in 1992 provided the framework for decentralisation of governance and local participation. It also provided for ULBs to tap financial resources through Central Finance Commission as well as the State Finance Commissions. In 1996, the Central Government also sent guidelines to all state governments on innovative approaches for resource mobilization and suggesting urban development plans/ projects be placed on commercial format by designing commercially viable urban infrastructure services and area development projects. A state is supposed to assign ULBs with specific taxes, duties, tolls and levies, and authorize them to impose collect and appropriate the same. All state governments of India have either enacted new municipal law or amended the existing laws to conform to the changes under the 74th Amendment. However along with privatization and liberalization it is important to have reforms/ policies to protect consumers in the provision of basic environmental services including water and sanitation.

In general, while privatization and liberalization of infrastructure environmental segments like water utilities does seem to increase efficiency, and provide the capital for building network to extend services to millions of new customers, (considering government agencies are strapped for finances and can also be bureaucratic, inefficient, and corrupt), there are other concerns. One serious concern is that private entities operating in public services sector with profit-seeking behaviour in the market may not take care of the public interest, especially as some of the environmental services support the emergence of monopolies.[10] This raises the argument for public intervention to restrict monopolistic practices in the market, while the desirability of private participation remains on the grounds of efficiency gains.

The concerns in full privatization of environmental infrastructure services arise from the disparity in information between the government and private firms, the opportunities for regulatory capture or corruption and the inadequacy of regulatory capacity. *It is important to note that full privatization has been experienced only in select environmental service segments in a handful of industrialized countries which have the most mature institutional and regulatory structures.* In the United States, where

[8] Johnstone et al (1999): 2.
[9] UNCTAD 1998: 17.
[10] A World Bank survey of water projects indicates that the water supply is subsidized and the price charged for in developing countries is only a fraction of the cost of providing the utility. Optimal resource utilization and conservation of water would require raising this price, which is likely to take place with privatization. On the other hand, a hike in water price would adversely affect basic cleaning habits of the poor, leading to increased risk of diseases. (UNCTAD 1998: 17)

privatization of utilities has been the most extensive in the overall environment services sector, the extent of privatization is different in different segments. For instance, in 1994 the wastewater treatment segment was virtually controlled by the government with 95% ownership (WTO 1998a: Table 4). In other words, even in a country like the US, generally regarded as a country with large-scale privatization of utilities, most of the revenue in wastewater is generated by the public sector. Privatization, however, is still progressing in this segment. In other segments, including solid waste management, hazardous waste management and environmental testing/ analytical services, the US government has a more limited role with an ownership of 33%, 10% and 8% respectively. Full privatization exists in the two segments of remediation/ industrial environmental services and environmental consulting/ engineering![11]

Thus, despite privatization in environmental infrastructure services around the world, on the whole the public sector continues to play an important role as the provider of these environmental services. The public sector capital expenditures is increasing on pollution control and water and waste management in both developed and developing countries. Government procurement and government provisions of environmental services continue to play a large role despite large-scale privatization in utilities. Developing countries have so far encouraged more of service and managerial contracts, and also joint ventures in this sector. Public intervention is bound to remain significant to ensure that provision of the essential services like water and sanitation are socially equitable. Ensuring environmental sustainability of operations in the sector is also important[12], say to regulate that the private service provider does not indulge in unsustainable withdrawal of underground water.

3.2 Segments Important for Developing Countries

As noted earlier, some of the most significant environmental services include wastewater treatment, refuse disposal, sanitation and drinking water, and the public sector continues to play an important role (as provider and sometimes procurer) in these services. Most of these environmental infrastructure services are in the realm of local government bodies in the developing countries.

A conservative estimate of Indian environment market in 1996 (excluding segments of sanitation and industrial non-hazardous solid waste treatment) indicated that the segments requiring the largest investment is wastewater treatment, followed by industrial air pollution (see Table 2).[13] Thus India could do well to encourage private investment in these segments to improve environmental quality of air and water. There is also an

[11] Considering the entire environment market, however, the stake of the public sector in the US has reduced over the years, and constituted only 34% of the industry revenues at the end of the 1990s (Ferrier 2000).

[12] Some of the multinational environmental service providers do not have a proven environmental track record either! For example, some of UK multinational water corporations have been hauled up by UK's Environment Agency as the country's most polluting companies as evident from the number of appearances in court and prosecutions during 2000!

[13] CII (1996). The estimates were based on secondary data collected from government agencies, industry suppliers and multilateral and bilateral assistance agencies.

urgent need for remediation and clean-up services of contaminated surface and ground water that have been polluted through indiscriminate dumping of untreated municipal wastes and wastewater, as well as industrial effluents over the years.

Table 2. Investment Potential in Indian Environment Sector, 1994 (in US$ million)

Environment Segment	*Net Capital Investment Potential**
A. Waste Water Treatment	
Industrial	700.2
Municipal	660.0
B. Solid Waste Management	
Municipal (composting)	90.0
Industrial Hazardous	46.0
Industrial Non-Hazardous	n.a.
D. Other services	
• Air Pollution	
Industrial	313.9
Mobile	40.0
• Environmental Consultancy	38.0
• Water and Air monitoring/ testing equipment & services	17.7
Total	*1905.8*

* Total estimated capital investment required in 1994 less of the capital investment incurred.
n.a. => no information was available.
Source: Data from Table 4.1.1 in CII (1996)

In India there are severe deficiencies in the provision of basic environmental services to the growing population, particularly in the urban areas where the population has been growing at a faster pace than in the villages. The demand for some of the essential environmental services from the urban population is evident from the increase in defensive expenditure of consumers, and the growth of markets for bottled water, household water purification kits and air purification equipment during the last decade. This clearly indicates that communities, especially in urban India (except for the urban poor) are willing and do pay for improvement in environmental quality of the basic consumption goods and services.

The industrial demand for environmental services is also important, particularly for industrial wastewater treatment and disposal; hazardous waste management, environmental analysis, consulting, testing and certification. There is also significant need to encourage investment in remedial environmental services (for soil and water) to clean up the present degraded state of the environment in the country. The indiscriminate disposal of untreated wastes and effluents into waterways and land has led to severe surface and ground water pollution.

3.3 Implications of Foreign Service Suppliers in Environmental Services

The mature environmental service firms from the industrialized countries have a comparative advantage in the export of resource-saving and clean technologies, and in technical expertise in the design and engineering of treatment and purification facilities. Thus liberalization of the environmental services sector in developing countries can encourage the import of much needed capital and technological expertise in environmental management in these countries since typically investment in clean R&D by domestic firms is poor.

New investment and expansion in the environmental services sector in the developing countries can provide employment opportunities to unskilled as well as skilled labour, as some of the environmental segments are labour intensive (e.g. waste management, sanitation, consulting, training, etc). Moreover, since environmental services are typically provided in conjunction with other products or services, as the environmental services sector expands so would other sectors, following new demand generated in the other sectors including, engineering and design, construction, research and development, training, consulting.

At the same time, one must note that the global environmental services industry consists of several large corporations. While on efficiency grounds such large corporations need to exist, their operations need to be monitored closely. The environmental services that require large scale investment for economies of scale (and support the emergence of natural monopoly) is dominated by a few large multinational firms.[14] For instance, sewage services that need collection and distribution network investment is economical only for a single large operator. Municipalities have also been seen to use few large environmental service suppliers due to the ease in monitoring and tracing liability (WTO 1998a: page 5).

The large multinational corporations, dominating a few market segments (say, water and wastewater treatment), typically offer integrated products and services required for environmental systems management. These large integrated multinationals account for about 50% of the total environment market, while the other half is accounted by the smaller firms (UNCTAD 1998: 8), with American and French firms being in the lead. For instance, Vivendi, which is considered to be leading in environmental services worldwide, has four business divisions: water, waste, energy services and transportation. Vivendi Environment[15] operates in more than 100 countries and provides multi-service global offers.

Mature environmental firms with deep pockets (or with cross-subsidization across affiliated markets) could indulge in anti-competitive practices.[16] This is important for the group of Indian environmental service providers, which is still to develop into a full-fledged industry. While it is important that the domestic environmental service providers in developing countries are exposed to global competitive forces with access to state-of-the-art technology to grow into an efficient industry, it is equally important to ensure that restrictive business practices of large incumbent firms do not stifle their growth. (In this regards, the GATS article VIII and IX on *Monopoly Practices* and *Other Restrictive*

[14] Specialized environmental services including analytical services and consulting, however, include small/medium scale operators.
[15] Vivendi Environment, ranked Number 1 worldwide in environmental services, has four arms: Vivendi Water, Dalkia (in energy), Onyx (in waste management) and Connex (in transportation business).
[16] I.e. short-term lowering of prices to out-bid newer firms in competitive environmental projects, where the lower price quote is not based on cost efficiency but predatory pricing strategy.

Business Practices, respectively provide a framework for gaining information on foreign environmental service firms, and ensuring that large firms do not engage in any anti-competitive practices or abuse their market positions).

There have been suggestions that developing countries could set conditions under which foreign private companies are to operate, possibly in the form of qualifications to market-access commitments under GATS. These qualifications could focus on measures to ensure equity (e.g. maximum prices for consumers, percentage of profits that should be reinvested in the infrastructure) or capacity building (e.g. technology and managerial know-how transfer, training of personnel), in conformity with articles IV and XIX of GATS. (UNCTAD 1998: 5).

The departure from complete liberalization of the environmental services sector may be deemed necessary given the nature of the services provided. To ensure equity in the provision of basic environmental services in developing countries like India, the government needs to establish a strong institutional and regulatory mechanism while promoting efficiency. Some degree of government monopoly in provision of environmental services like water for human use, and regulations on pricing and business practices are required to ensure affordability, access, and quality of services.

4. Trade Barriers and Export Potential of Developing Countries

4.1 External Trade Barriers in Environmental Services

The most significant barriers to trade in environmental services pertain to restrictions in the establishment of commercial presence and movement or employment of nationals of the operating company (GATS supply Mode 3 and 4 respectively). The provision of environmental services like sewage services, sanitation, and refuse disposal are capital intensive, thus conditions on commercial presence and foreign investment are crucial in these cases. Restrictions under mode 3 can take various forms: limits on foreign ownership of specific assets (e.g. landfill, sewage system), the number and location of foreign companies, type of legal entity (e.g. requirement to incorporate locally), application of economic needs test. Restrictions on movement of natural persons (Mode 4) can be in the form of domestic regulations on business operations by foreign companies, or employment of nationals. For instance, qualifications or licensing requirements for professionals, including environmental engineers, consultants and auditors. Although commitments under Mode 3 for commercial presence is important, the commitments in Mode 4 has by far the greatest significance for India, since environmental consulting services has been the most robust segment in India.

The cross-border mode of supply (Mode 2) can also be used for the some environmental support services that can be delivered as IT-enabled services. The scope, however, is limited, since the significant segments of sewage treatment, waste management and sanitation services require physical presence of the service providers.

Trade in environmental services is affected by barriers in other sectors also, including environmental equipment, and services sectors like engineering, consulting, and analytical services. The lack of market access in these sectors become barriers to trade in environmental services, even though this sector per se seems to be relatively free of restrictions in comparison to other service sectors (UNCTAD 1998).

Finally, since a large part of the environmental service sector is still in the realm of the public sector, public procurement policies affect market access for environmental services in these countries.[17]

In developing countries like China, which has a rapidly growing environmental services market, there is also an effort to encourage the growth of the domestic enterprises. Traditionally China's service sector has been one of the most heavily regulated parts of the national economy - and one of the most protected, where foreign service providers are largely restricted with licensed operations that have limits on entry, and restrictions on the geographic scope of activities.[18] Similarly Korea and Thailand, who have good growth prospects in the environment sector, have not committed to full liberalization since they want to encourage domestic entrepreneurs.

4.2 Export Potential of A Developing Country Like India

As the environment markets in the OECD countries are quite mature and saturated, India's export potential in this sector lie primarily in the developing countries, where the demand for environmental services is growing. India has the scope of specializing in labour-intensive environmental services, including skilled segments like environmental consulting, auditing, analysis and training.

The Indian environmental service providers have emerged most significantly in two areas: first, environmental services in turnkey projects (e.g. integrated engineering services in energy equipment); and second, environmental support services like consulting, environmental impact assessment, auditing and training (including ISO 14001). There are a few companies, which have been specializing in composting of solid waste and waste to energy services.

As the investment in the environmental services sector has been autonomously open with 100% FDI in India, domestic firms have engaged in both joint ventures and long-term strategic partnerships. Joint ventures have been prominent in the Indian environment industry, and over 100 companies have associations with international companies in the form of joint ventures and technology transfer agreements for various types of pollution control equipment. While there are many joint venture and collaborative arrangements in

[17] In this regard, the GATS multilateral negotiations on government procurement in services will have an impact on market access of environmental services. The purpose of these negotiations is to explore the possibility of applying multilateral disciplines to government procurement covering all sectors of services. (WTO 1998b)
[18] *US Country Commercial Guide FY 2003: China.*

the environmental goods sector (between 100 to 150) there are fewer such arrangements in the environmental consultancy services sector.

While developing countries like India do not have any opportunity in the upper-end technology environmental services sector in OECD countries, there is scope for some niche segments in the mature environment market of the latter. There are also opportunities for export in the environmental services market of the developing countries.

The large Indian environmental equipment firms offering accompanying environmental services have been exporting equipment in Asian, Middle Eastern and African markets. They have also begun to explore niche markets in the environment sector within industrialized countries, to boost exports as also to nurture future partnership and alliances for technology solutions. For instance, Thermax Ltd, a multinational energy equipment, chemicals and services company opened its second overseas subsidiary, Thermax Inc., in Detroit, US in 2001 (the first one being ME Engineering based in the UK). The overseas subsidiary offers resins for water treatment and specialty applications, process cooling, cogeneration solutions, bio-mass fired boilers for niche markets, heat recovery units and engineering/ consultancy services. The new export strategy being to target major global players by offering quality solutions in energy and environment projects worldwide: in its first year of operation, Thermax's UK subsidiary ME Engineering obtained orders worth $ 7.5 million.

On the other hand, the segment of environmental support services constitutes a relatively small share in the global environmental services industry, has increasing demand in the developing countries in South Asia, Africa and Middle East (although declining in developed countries). The Indian environmental service providers could specialize in services in regions where there are similarities in ecological and economic conditions. Indeed, India has exported environmental consulting services, including training in ISO 14000 and auditing, to countries, including Nepal, Sri Lanka, Nigeria, Egypt and Qatar.[19]

However, much like India, most developing countries (where the environmental service sector is expected to grow rapidly) require establishment of infrastructure facilities including sewage treatment facilities, water purification and distribution, waste treatment facilities which are technology driven and where countries like the US, France, UK, Germany, Japan etc have been exporting.

5. Concluding Remarks

Privatization and liberalization of environmental services promise gains for developing countries like India in terms of access to capital, technology and competition from global firms that emphasize resource efficiency. The growth of the environmental services sector needs to be encouraged particularly since there exists severe deficiencies in the provision of basic services in these countries. The growth of the environmental services sector with privatization and liberalization has other direct benefits, namely the

[19] Seema Arora, Environment Management Division, Confederation of Indian Industries.

improvement of the environmental quality and encouraging resource efficiency in general for other economic sectors.

Liberalization in environmental services, however, needs accompanying institutional and regulatory mechanism given the special characteristics of some of the services to ensure equity along with efficiency. Attention also needs to be paid to the fact that the environmental services industry is still rudimentary in most developing countries, and monitoring of anti-competitive practices on the part of mature service providers is important.

Considering the sensitivity issues of the environmental services sector, the WTO members have made various qualifications, conditions or exclusions in their initial commitments in this sector. For example, Korea has opened only the industrial sewage and industrial solid waste (refuse) disposal services, i.e. the commitment does not infringe into public sector operations. Korea has also imposed an economic needs test under Mode 3 for market access, and refuse collection and transport services are to operate within the jurisdiction and with approval of the Regional Environment Office. Such a strategy is aimed at giving impetus to the domestic environment industry, while opening the sector for foreign technology imports, capital and management skills. Similarly, Thailand has committed to restricted market access under Mode 3 with a 49% equity limitation.

As basic environmental services remain largely in the realm of the public sector, several WTO members (including industrialized countries like the US) have excluded environmental services not open to private participation. In particular, the US has excluded "water for human use" in the sector specific commitments and opened only those environmental services contracted by private industry (i.e. without infringing on the public sector operations) in the initial offer in 2003.

Thus while embracing the broader definition of the environmental services, India needs to make appropriate qualifications. The sensitive segments of water for human use (under A. Waster and waste water management) could be excluded. The commitment strategy taken needs to match offers from the other member nations, and also ensure Indian's own interests based on both political and social acceptability of these commitments in the country.

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