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## Links and References

Status Report on Management of Hazardous Waste in India, 2006  
Compiled by T. Chakrabarti, M.P. Patil & Sukumar Devotta:

National Environmental Engineering Research Institute  
Nehru Marg, Nagpur 440 020, India <http://www.envis.neeri.res.in/testnew.php>

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## SOLID &amp; HAZARDOUS WASTE MANAGEMENT

## Market Overview

India is one of the most promising environmental markets in Asia and offers significant opportunities for B.C. companies. The total environmental technologies and services market in India is expected to grow to US\$9 billion by 2010. The hazardous waste technologies and services component – estimated at over US\$223 million in 2006 – is likely to grow by 7 per cent annually until 2010. Presently about 960 million tonnes of solid waste are being generated annually in India from industrial, mining, municipal, agricultural and other processes. Of this approximately 350 million tonnes are organic wastes from agricultural sources; 290 million tonnes are inorganic waste of industrial and mining sectors and 4.5 million tonnes are hazardous in nature.

**Industrial Solid Waste** – The industrial sector is the largest contributor of solid and hazardous waste in India, followed by bio-medical and healthcare facilities and waste recycling facilities. The main

source of industrial waste (and the cause of much of the adverse impact on the environment) is from the nation's chemical sector.

**Bio-medical Wastes** – Of special concern to many state and municipal officials is the fact that basic precautions are not being taken for the safe disposal of bio-medical wastes, which are treated as domestic garbage in the majority of the cases. Sources estimate the market size for bio-medical waste management equipment in India to be in the order of US\$200 million. India generates around three million tons of medical waste every year and the amount is expected to grow at eight percent annually.

**Municipal Wastes** – Solid waste generated in India's largest cities exceeds 100,000 MT/day (approximately 36.5 million tonnes annually), most of which is disposed of in land fills (94 per cent). In many centers the collection, transportation and disposal of municipal wastes are carried out in unhygienic ways that poses serious risks for carriers, people working or

scavenging in dumping areas, and to others living nearby. Ground water in dumping areas is highly contaminated. Deteriorating sanitary conditions and waste management problems are being exacerbated by the growing concentrations around waste sites of unskilled, unemployed and poorly educated people who have migrated from rural areas.

**Imported Wastes** – Private firms illegally imported an excess of US\$65 million worth of waste in 2006-07. This is only the tip of the iceberg, since the government does not completely track either the import or the dumping of hazardous waste. Incineration and secured hazardous waste landfills are the better-known waste management technologies in India. There are more than 120 hazardous waste incinerators and eleven hazardous waste landfills, the majority of which are located in western India. Several private companies in the pharmaceutical, petrochemicals, and chemical industry sectors have installed incinerators to process their own waste. (... next page)

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## Opportunities

Opportunities exist for B.C. companies in solid/hazardous waste management including consulting services and the supply of waste-to-energy technologies. Waste management systems for recycling and hazardous waste treatment are also in demand, especially for landfill gas-to-energy applications. The bio-medical waste sector is also an important market in India.

The demand for centralized waste treatment is growing for bio-medical wastes and the demand for new technologies is coming from centralized waste treatment providers and the large healthcare institutions that want to treat wastes on-site.

Some of the best prospects in the medical waste management sector are: incinerators, autoclaves, microwaves, hydroclaves, shredders, chemical treatment methods, encapsulation techniques, centralized treatment and disposal facility equipment, supplies and services.

While locally manufactured products are available to Indian companies, many prefer to fabricate equipment under license from international suppliers.

## Market Overview *Continued*

Of the twenty Indian companies manufacturing incinerators, Thermax India Limited and Paramount Pollution Control Limited are the two that stand out in the local incinerators manufacturing field. The Ramky Group, India's largest private solid waste management group, has expanded its operations and is developing municipal solid waste management projects throughout India.

There are more than 400 hazardous waste recycling facilities in India,

of which more than 300 process indigenous raw materials while 20 depend on imported recyclable wastes. Hazardous waste is imported for recycling and recovery of metallic constituents. The major types of hazardous waste imported include battery scrap, lead and zinc dross, ash, skimming residues and galvanized zinc.

## MARKET ENTRY STRATEGIES

Lower production and labour costs in India offer an incentive to B.C. companies to form joint ventures or licensing arrangements with Indian companies. These can involve technical agreements, project-related partnerships, or agent/distributor agreements. Such partnerships are preferred to selling directly to end-users because of the size and increasing sophistication of the environmental technologies, products and services market.

Direct sales of certain components and devices requiring very little after-sales service are possible, but establishing representational or partnership arrangements with Indian firms facilitates the delivery of

awareness programs in Indian cities with large concentrations of end-user industries. India has a tremendous local manufacturing capability for mechanical equipment and a large scientific and engineering community to draw upon.

The waste management industry in India is shifting toward privatization. Contractors will be expected to work on a 'Build, Own, Operate and Transfer' basis for the management of Industrial Solid Waste, Municipal Wastes, Bio-medical Wastes and Imported Wastes.

## COMPETITIVE ENVIRONMENT

The growth in municipal solid waste in India's urban centres has outpaced population growth in recent years.

Limited revenues earmarked for the municipalities makes them ill-equipped to provide for the high costs involved for collection, storage, treatment and proper disposal of municipal wastes. The average collection efficiency in Indian cities is about 72.5 per cent and

around 70 per cent of the cities lack adequate waste transport facilities.

The import market for pollution control equipment will continue to increase mainly due to increasing demand for improved and innovative technologies that cannot be met by domestic suppliers. The Government of India has relaxed import requirements and policies to further encourage this trend.

Canadian firms active in the environmental sector in India include Westland Incinerator, Hydroclave Systems, ADI International, R J Burnside, Eco-Tec, Process Research Ortech, Cubex, Turbotak, Turbomist, Bomem, Sci-Tec Instruments, Barringer, Aurora Instruments, R.V. Anderson Associates, Senes Consultants, RFI, Stantec, Acres, and Lavalin.

## REGULATORY ENVIRONMENT

India's industry driven economy makes hazardous waste problems difficult to manage. Non-enforcement of 'Polluter Pays' principles, the continued importation of hazardous wastes despite international bans, the absence of proper infrastructure or centralized disposal facilities, and the lack of technical and financial resources have led to the haphazard disposal of hazardous wastes which poses a serious threat to humans and the environment.

To monitor progress towards improving India's hazardous waste problem, the

Indian Supreme Court established the Supreme Court Monitoring Committee on Hazardous Wastes to ensure that states are enforcing the current rules for hazardous waste treatment and disposal. As a result of this Supreme Court order, many of India's state pollution control boards are sending notices to companies throughout India to create or improve safe waste disposal sites or risk closure. The sudden strong enforcement of the rules is driving the market for hazardous waste technologies and services.

Due to this increased enforcement, there may be opportunities to assist the industries that produce the majority of India's hazardous waste – primarily the producers of asbestos, caustic soda, paints and dyes, pesticides and fertilizers, petroleum and petrochemicals, pharmaceuticals and inorganic chemicals. B.C. firms may either supply these industries with technologies to treat existing hazardous sites and/or provide construction of new sites that safely treat and store hazardous wastes from their production processes.

## Key Companies

• Delhi Waste Management Limited, Consortium of SPML, Dooars Transport Ltd. and Tetrattech India Ltd.

F- 27 / 2, Okhla Industrial Area Phase – II,  
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• Ag Enviro Infra Projects (P) Ltd., Special Project Company for the consortium of Antony Waste Handling Cell (P) Ltd., Antony Garages Private Limited and Antony Motors Pvt Ltd.

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