

Project Notes

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Emerging Private Sector Participation Arrangements for Solid Waste Management in India

India produces approximately 48 million tons of urban solid waste annually. Current urban waste generation is estimated at 0.46 kilograms per capita per day, two to three times more than rural waste generation, and is increasing by 1.3 percent per year. This, when examined against the current urban growth rate, estimated at 3.5 percent per annum, has serious implications in terms of waste quantity. In addition, as GNP and urban population grow, paper and packaging waste will also increase, shifting waste composition. These changes will further stress already limited financial resources and inadequate waste management systems. This Project Note looks at municipal waste management in India and reviews emerging Private Sector Participation (PSP) arrangements as Urban Local Bodies (ULBs) strive to achieve improved service in response to tightening environmental rules.

Since the infamous bubonic plague epidemic in Surat (Gujarat) in 1994, India has seen a renewed focus on improving solid waste management (SWM). Various ministries have launched programs and high-powered committees have been formed. Increased public awareness and participation have been manifested in public interest litigations and non-government organization involvement. Supreme Court-issued guidelines and Ministry of Environment and Forest (MOEF) rules outline procedures for waste segregation, collection, storage, transportation, and disposal. The MOEF has also set deadlines for cities to establish suitable waste processing, disposal, and land fill facilities. These requirements have generated demand for technical expertise, equipment, material, and resources.

ULBs are responsible for SWM. A recent survey by the National Institute of Urban Affairs found that SWM staff constitutes 30 to 50 percent of total municipal staff and SWM expenditure constitutes 20 to 50 percent of municipal expenditure. Yet service remains poor: collection efficiency ranges from 60 to 70 percent of waste generated; equipment and fleets are inadequate and poorly maintained; and cities resort to open dumping. In the absence of operational revenues and given the poor fiscal condition of ULBs compared to

demands placed by rapid urbanization, resources available for SWM are inadequate.

Emerging PSP Arrangements in SWM

Indian cities are introducing PSP in SWM in order to attract funding and new technology and to achieve cost savings and improved efficiency and effectiveness in service delivery. ULBs in India have experimented with the following types of PSP arrangements.

Contracting for Maintenance, Equipment, and Vehicles

Vehicular Fleet Maintenance and Repair

Local bodies often contract with local garages for minor repairs and maintenance of their waste transportation fleet.

Leasing Vehicles

Leasing is a way to access equipment and vehicles when the opportunity to borrow for capital investment is limited. Typically the lessor provides vehicles as well as fuel and maintenance. Mumbai has leased vehicles

for waste transportation for all its 24 wards for more than 15 years.

Service Contracts for Waste Collection and Transportation

More than 50 ULBs have contracted with private firms for waste collection and transportation in selected zones. Typically these contracts are fee-based- the local body pays the private firm a monthly fee for provision of services. In cities using simpler technologies that require moderate investment, such as Hyderabad, local firms are increasingly entering the business of waste collection and transportation. Metro cities with larger budgets and greater management capacity, such as Chennai and Mumbai, have preferred mechanized solutions requiring larger investments that have attracted national and international firms.

Privatizing MSW Collection and Transportation

Chennai Municipal Corporation, Tamil Nadu

In order to mechanize and modernize its service delivery and management, the Chennai Corporation privatized waste collection and transportation in three zones, about 35 percent of its area. It hired consultants to assist it through the entire process. Following a competitive bidding process, the Corporation entered into a seven-year agreement in November 1999 with M/S C.G.E.A. Asia Holdings, Singapore. Operations began in March 2000.

The private operator is responsible for sweeping, collecting, storing, and transporting waste (garbage, construction, and garden waste), and for creating public awareness. It will deploy more than 1,800 employees, 30-35 compacter and hook lift trucks, 170 auto rickshaws, 800 modified bicycles, and 5,300 mobile garbage bins. It will also modernize two vehicle depots and two transfer stations. The waste to be removed is more than 1,000 tons per day (TPD). The rate for the first year is Rs. 648 per ton, which is to be escalated annually at five percent. This is much lower than the Corporation's own estimated cost of Rs. 1,050 per ton. Most Corporation workers were reassigned to other departments and no worker lost his or her job. The private firm recruited and trained its own workers and supplies them uniforms, gloves, caps, shoes, and safety gear.

Source: Chennai Municipal Commissioner.

Long-Term Concessions for Resource Recovery Projects

Long-term concessions, such as Build-Own-Operate-Transfer (BOOT) or Build-Own-Operate (BOO) contracts, are a form of agreement being used for revenue generating

components of SWM, such as resource recovery projects. In these arrangements, the private firm finances and owns the solid waste facilities for a period sufficient to depreciate investments and provide reasonable return to equity investors. The ULB typically grants and enables access to a specified quantity of solid waste. It may also provide land for the facility at a nominal lease. The most popular resource recovery projects are composting and waste-to-energy.

Waste Composting Projects

Composting involves bacterial decomposition of the organic portion of solid waste. Approximately 35 composting projects have been set up in India with PSP in the past five years, most in the states of Maharashtra, Tamil Nadu, Andhra Pradesh, and Kerala. Typically the arrangement has been on a BOO or BOOT structure. The treatment capacity of these facilities ranges from 80 to 700 TPD and their combined capacity is about three million tons per year. Some 17 more projects are being finalized. Capital investment required for such facilities (capacity 100 to 700 TPD) typically ranges from Rs. 30 to 75 million, and project financing has predominantly been driven by promoter equity. The private firm recoups its investment by selling compost derived from waste processing.

A BOOT Solid Waste Composting Project

Kolhapur Municipal Corporation (KMC), Maharashtra

The composting project was conceptualized in late 1996, with the assistance of the FIRE project. The Corporation first enlisted consultants to conduct field measurements and base studies, prepare procurement documents, and support the bidding process. In April 1999, the KMC selected Zoom Developers Ltd. to implement the project, in association with Larsen Engineers.

The KMC and Zoom Developers (concessionaire) signed a 30-year, Build-Own-Operate-Transfer (BOOT) contract in September 2000. The Corporation will provide four hectares of land on a long-term lease to the concessionaire, who will design, build, operate, and maintain the waste treatment facility for this period, and mobilize its financing. The facility will handle 160 TPD in the initial year, increasing to 270 TPD in the final year. The KMC will deliver solid waste to the treatment site (a weekly average of 770 tons), for which the concessionaire will compensate it with a fixed annual payment of Rs. 0.48 million (escalated annually at eight percent). The concessionaire will pay the city one rupee per square meter per year for the land lease. The city estimates it will receive Rs. 0.65 million in the first year of the facility's operation. The concessionaire, who is responsible for marketing organic fertilizer produced from composting of waste, will retain income from sales.

Source: Kolhapur Municipal Commissioner and FIRE Project.

Key risks associated with such projects include demand for compost and sustainability of operations. The quality of compost produced must be closely monitored, since, without waste segregation at the source, compost may become contaminated.

Waste-to-Energy (WTE) Projects

WTE project technologies include incineration, pelletization, and bio-methanation. The viability of these technology options is still being established in India. The incineration plant at Timarpur (Delhi), set up in 1987 using Danish technology, failed to operate properly because the waste fed into the plant did not have sufficient calorific value.

In the past, Vijayawada, Baroda, Bangalore, Mumbai, and Kalyan tried to set up pelletization facilities. The pellets, produced by segregating and drying combustibles from waste, would be burned for industrial fuel initially and for power generation ultimately. These projects either stalled in development or were eventually shut down due to poor pellet quality. Last year, the city of Hyderabad set up, on a trial basis, a pelletization plant with a waste handling capacity of 200 TPD.

In recent years, as a result of Ministry of Non-Conventional Energy Sources (MNES) programs, there has been much interest in generating power through bio-methanation of municipal solid waste. Bio-methanation involves bioconversion of organic matter to biogas and humus. This methane rich biogas is then used to generate power. WTE projects require larger investments and are more complex than composting projects, so ULBs must have the capacity to handle complex PSP arrangements and documentation. Nagpur, Lucknow, Chennai,

Mumbai, Bhopal, and Delhi plan to set up such facilities. These jurisdictions generate sufficient waste; typically the minimum required for such facilities is 300 TPD. Project financing, Rs. 400-800 million, is arranged using a mix of promoter equity, loans from financial institutions, suppliers' credit, and government subsidies. Two projects that have reached an advanced stage of development, in Nagpur and Lucknow, are structured on a BOO basis. Construction of the Nagpur (Maharashtra) facility, designed to generate approximately 5.4 megawatts (MW) per day, began in December 1999.

Key risks associated with WTE projects relate to technology. The quantity and quality of available waste is also critical. Financing risks must be suitably addressed with back-to-back agreements (e.g., for energy offtake) in place. Financial institutions also attach great importance to the promoter's qualifications.

Community Contracting

Cities are increasingly accepting the role of non-government and community-based organizations in urban waste management. Some cities are experimenting with community contracting to complement service provision by the ULB.

PSP in SWM – Key Considerations

To attract PSP, local bodies must start by putting their financial house in order. In the absence of user charges, the contract fees come from general revenues. This requires that cities designate income from operating revenues and strengthen their overall resource base.

Financing a Waste-to-Energy Bio-Methanation Project

Lucknow Nagar Nigam (municipal corporation), Uttar Pradesh

The Lucknow Nagar Nigam partnered with Enkem India Ltd. to execute a bio-methanation project on a BOO basis. The facility is designed to handle a minimum of 300 TPD of municipal waste. The project cost is estimated to be Rs. 760 million (US\$16.5 million). Enkem India Ltd. floated a Special Purpose Vehicle (SPV) called Asia Bio Energy for the project. ENTEC, an Austria-based firm, will provide the project technology and digester to produce methane. M/S C.G.E.A. Asia Holdings, Singapore, will be responsible for operations and maintenance.

The proposed financing plan for the project is as follows.

Rs. in Million (US\$1 = Rs. 46)

	Funding Type	Source	Amount	Status
1.	Promoter equity	SPV-Asia Bio Energy	200	Tied
2.	Government subsidy	MNES (30 million pr MW)	150	Tied (in principle)
3.	Equipment supplier (gas engine, 6 units of 1MW each)	Gas engine is being supplied on an operating lease basis.	110	Tied
4.	Debt	Contract-based lending by IDFC.	200	Advanced discussion
5.	Credit	Deferred credit being provided by the equipment supplier.	100	Being arranged
	Total		760	

Source: Discussions with Infrastructure Development Finance Company (IDFC).

Contracting Community Groups

Vijayawada Municipal Corporation, Andhra Pradesh

The Vijayawada Municipal Corporation facilitates the formation of area-based community groups of women and children that are put in charge of sweeping, cleaning, collecting, and transporting garbage, and de-silting drains in their area.

The Corporation supports these groups by arranging financing of sanitation vehicles and implements. Each garbage vehicle unit, consisting of a tractor and a trailer and costing approximately Rs. 0.26 million, is financed by a Corporation subsidy of 50 percent, a bank loan of 45 percent, and the remaining 5 percent by the group. The loan is further secured against guaranteed future income from the rental fee of Rs. 350 per day that the groups pay for each vehicle unit. The Corporation deducts Rs. 150 per day of this amount and repays the bank on behalf of these groups.

Each group member is paid Rs. 55 per day. Of this, Rs. 5 goes to a group fund used for uniform jackets, shoes, and implements. As of August 2000, 12 of these groups, including three night sanitation groups, covered about 20 percent of the town area.

Source: Vijayawada Municipal Commissioner

The next critical issue is linked to labor. Since such a large portion of municipal staff is engaged in SWM, it is imperative to devise a staffing plan that adequately addresses the apprehensions of these workers. Issues linked with the Contract Labour (Regulation and Abolition) Act of 1970 must also be carefully examined.¹

ULBs must develop in-house financial and managerial capacity to arrange private sector contracts. Monitoring private sector operations is important, since the responsibility of ensuring proper service delivery and standard compliance remains with the municipality. Finally, PSP must be introduced within the framework of an overall waste management plan for the city.

This *Project Note* was written by Kirti Devi, Project Development Specialist of the FIRE Project. She is a member of the core group on PSP and Financing of the Ministry of Urban Development Technical Advisory Group set up in 1999 to improve SWM in India. The report on Financing and PSP issues in SWM is available from the FIRE project office. All *Project Notes* are available online at www.dec.org.

¹ In accord with provisions in Section 10 (1) of this Act, state governments may prohibit employment of contract labor in any process, operation or work in any establishment (defined to include any office or department of a local authority). Any state that chooses to exercise this provision must review the implications on delivery of SWM service and staff strength and related expenditure of a local body. Such a ban would preclude introduction of PSP. The Government of India is currently reviewing this Act.

The mission of the Indo-US FIRE(D) Project is to institutionalize the delivery of commercially viable urban environmental infrastructure and services at the local, state and national levels. Since 1994, the Project has been working to support the development of demonstration projects and of a sustainable urban infrastructure finance system. Now, the Project is also pursuing this mission through:

- Expansion of the roles of the private sector, NGOs and CBOs in the development, delivery, operation and maintenance of urban environmental infrastructure;
- Increased efficiency in the operation and maintenance of existing water supply and sewerage systems;
- Strengthened financial management systems at the local level;
- Development of legal and regulatory frameworks at the state level;
- Continued implementation of the 74th Constitutional Amendment; and
- Capacity-building through the development of an Urban Management Training Network.

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