



# Week 12

## Finance and PPP in MSWM Projects

### Financial Implementation Structure of SWM

ULB's should be aware of full costs and returns of the proposed MSWM service

- Fundings for ULB's to establish MSWM services

### Non Tax Revenues

- Very few ULB's take loans for establishing MSWM services in their areas.  
MSWM services are traditionally financed through a combination of government grants

### Full Cost Accounting (FCA)

- FCA provides a systematic framework for identifying and evaluating the costs associated with ISMW
- FCA provides accurate and complete information on the real costs of managing municipal solid waste.

- Front end cost**
- Land acquisition
  - Permits
  - Building construction
  - IEC Activities

- Capital costs**
- Fixed cost for plant and machinery
  - Cost of capital

- Operating costs**
- Debit service cost
  - Operation and maintenance costs involved in daily activities
  - Cost of refurbishment
  - IEC Activities

- Contingent costs**
- Remediation costs
  - Liability costs (e.g., property damage personal injury)

- Back end costs**
- Site closure
  - Building and equipment decommissioning
  - Retirement and health benefits for current employees

- Environmental cost**
- Costs involved in mitigating adverse effect on environment (costs for implementing Environmental Management Plan
  - Downstream impacts

- Social costs**
- Quality of life
  - Aesthetic impacts
  - Community image
  - Effects on property values

Elements of FCA

FCA covers the life cycle of MSW activities from “cradle (Front end cost) to grave (Back end cost)”

## Advantages of FCA

- ULBs can use FCA as a planning tool for preparing budgets and determining future direction.
- FCA helps the ULBs to examine various financial scenarios and their resulting impacts in the future.
- FCA can also be used while analyzing costs in the long term.
- FCA results can also be used for maintaining transparency between the ULBs and the general public.
- Results from FCA should be considered in conjunction with non-monetary costs to help ULBs to make better informed decisions for MSWM.

## Front End Cost

Front-end costs include pre-operative activities that are required before implementing any MSWM system (e.g., investigation costs such as topographical surveys; geotechnical, geological, hydrogeological investigations; environmental impact assessment; etc.).

Indicative Front-end Costs in a Typical Municipal Solid Waste Management System				
S. No	Description	Nos.	Unit Rate	Amount
1	Obtaining permit for land			
2	Topographical survey			
3	Geotechnical investigation			
4	Geological investigation			
5	Hydrogeological investigation			
6	Waste characterization			
7	Waste quantification			
8	Detailed design			
9	Environmental impact assessment			
10	Others			

## Capital Cost

Capital costs are one-time fixed costs associated with a project which may include the price of purchased assets such as land, vehicles, equipment, or other supplies.

- Collection and transportation costs: These include purchase of collection tools, storage bins, transportation vehicles, construction of transfer stations.
- Processing and disposal costs: These include cost of land buildings, plant machinery, process equipment, material handling equipment, pollution control equipment (electrostatic precipitators, bag filters, and other dust control equipment), transport vehicles, material recovery facilities, construction of sanitary landfill, laboratory facilities, rainwater drainage management, electrical equipment, backup of power, green belt, etc.

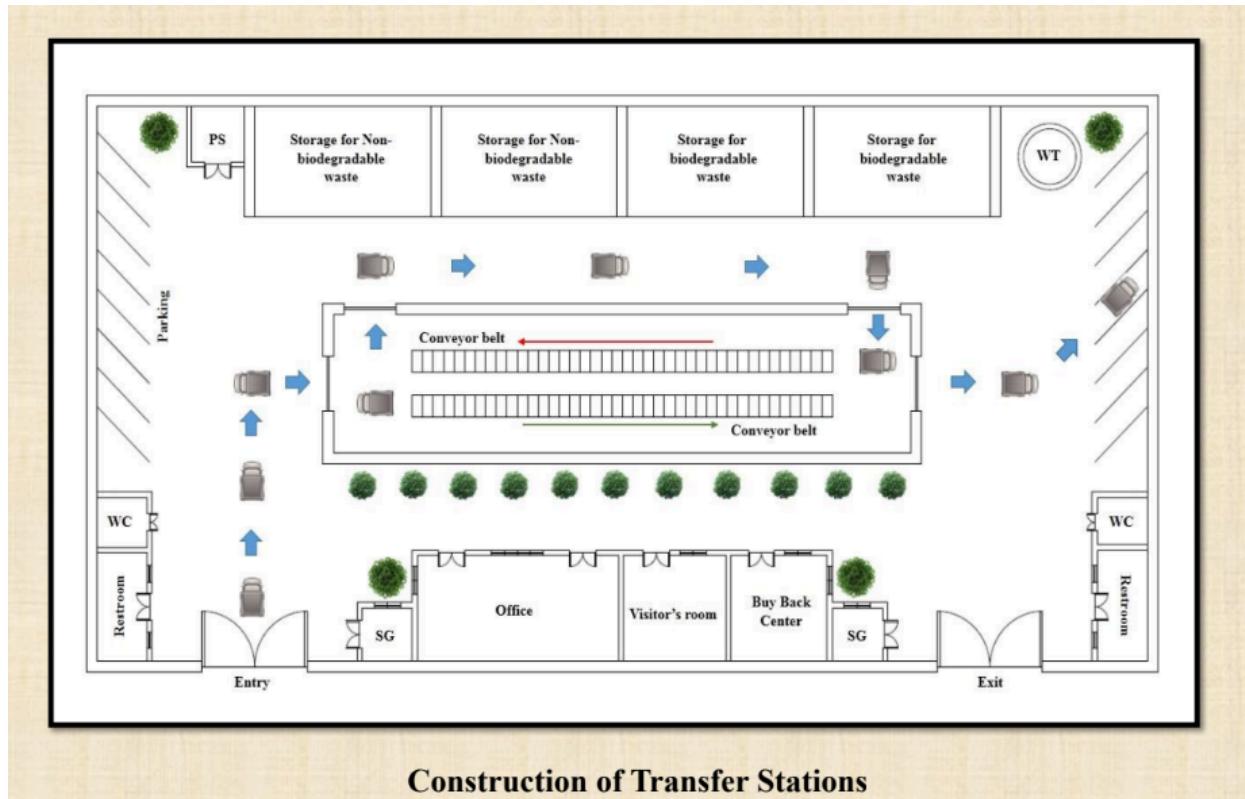
#### **Collection and transportation costs:**



**Storage Bins**



**Transportation**



## Operation & Maintenance Cost

- Operations and maintenance (O&M) cost is an ongoing cost and shall include all costs incurred in daily operation of the facility.
- It shall include labour and salaries; administrative and management cost; maintenance of vehicles and equipment; fuel or tyres; etc.

## Contingent Costs

- Contingent costs include costs that might or might not be incurred at some point in the future, e.g., remediating future release of pollutants.
- These costs can best be described in probabilistic terms: their expected value, their range, or the probability of their exceeding some dollar amount.
- Examples include the costs of remediating unknown or future releases of pollutants, such as leaks from currently operating municipal landfills.
- Contingent costs also include the liability costs of compensating for as yet

undiscovered or future damage to property or persons adversely affected by MSW services.

## Environmental Costs

- Environmental costs: These are the implications on the environment that might occur due to MSW transportation, treatment, and disposal activities (e.g., costs for mitigating contaminated soil, polluted surface and groundwater bodies, and poor air quality due to indiscriminate burning of MSW).
- Environmental costs are the costs of environmental degradation that cannot be easily measured or remedied, are difficult to value, and are not subject to legal liability. Such environmental costs often are termed "externalities" by economists. To truly capture all of the important lifecycle cost elements, some people advocate assessing the upstream (and downstream) environmental costs of resource use, pollution, and waste entailed in providing goods and services.
- For example, manufacturing and transporting MSW management equipment and vehicles can entail environmental impacts prior to their use, such as depletion of nonrenewable mineral resources, air and water pollution, and waste generation.

## Social Costs

- Social costs: These are costs incurred to mitigate adverse impacts on health and well-being of local community, on account of improper MSWM. In India, such impacts are generally not compensated. Impacts of MSW storage depots, as well as MSW treatment and disposal facilities on the health, quality of life, and value of property in the neighbourhood are considered. An assessment and consideration of these impacts is required before selecting waste management options, even though they are not easily quantifiable.
- While FCA focuses on costs that can be valued readily in the marketplace, understanding social costs is important for planning efforts. Social costs include the impacts of MSW transport on neighborhoods along the routes taken, as well as the impacts of MSW facilities themselves.
- Issues of "environmental justice" can arise for planners when any of the following fall disproportionately on certain social groups: (1) adverse effects on

property values, community image, and aesthetics; (2) opportunity costs of alternative and future land uses; and (3) noise, odor, and traffic.

## **Financial Viability of Municipal Solid Waste Management System (MSWM)**

The MSWM system will be done on the basis of several cost recovery mechanisms: -

- User fees
- Sale of the end products
- Municipal funds and grants from state and central governments
- Loans and funding from private sectors through PPPs

## **Identification of Sources for Finance**

The traditional sources of financing MSWM activities include:

- Local tax e.g., property tax, water tax, conservancy tax, development fee, etc.
- User charges Rents from properties, license fees, and other non-tax revenues
- Grants from state and central government, e.g., Swachh Bharat Mission, state finance commission grants
- Loans from capital market, government, and financial institutions
- Loans from international agencies, e.g., Asian Development Bank (ADB), Japan Bank for International Cooperation (JBIC), German Development Bank and the World Bank
- PPPs
- Municipal bonds or debentures
- Revenue from sale of products from waste processing plants (if owned by the ULB)
- Tipping fees from the private operator

## **Property Tax**

- Traditionally, property tax in India is the single largest internal source of revenue to the ULBs, contributing as much as 25%–30% to their total revenue.
- Government grants are another major source of revenue, mainly utilized for

paying wages to employees and for undertaking specific projects.

- Most of the ULBs use a sizable part of the property tax to support MSWM activities. However, since the assessment and collection of property tax is poor, ULBs are unable to allocate adequate funds for MSWM services.
- Further, the lump sum approach of the property tax does not impose any incentive for at-source waste minimization. Rationalization of the property tax is required to ensure financial sustainability of these services.

## User Charges

□ The following basic principles may be considered by ULBs for levying user or service fee for MSWM services

- Polluter pays principle: Those responsible for waste generation should pay for its collection and safe disposal.
- Proportionality: The user fees should be in proportion to the quantity of waste generated and level of service provided to waste generators.
- Capacity to pay: Affordability of the taxpayer may be kept in mind while fixing user charges.
  - The following criteria may be considered for enhancing the tax base in an ULB:
    - Subsidy for the poor
    - Higher rates from nonresidential establishments
    - Willingness to pay
    - Introducing higher service fees

## Grants from Central or State Government

□ It has been widely recognized that ULBs are unable to meet the expenditure for their activities solely by internal resources.

□ ULBs require substantial financial support from the central and state government in the form of grants and funds.

□ Some of the grants and funds available to ULBs are:

- ✓ Finance commission grants.

- ✓ Central government grants (e.g., JnNURM, Swachh Bharat Abhiyan).
- ✓ State finance commission grants allocated by the state to local authorities once every 5 years to support administrative, governance, and municipal service delivery.

## **Loans from Capital Market or from Government or Financial Institutions**

❖ULBs can also approach capital markets either directly or through an intermediary and they can also take advantage of funding for SWM from financial institutions which charge relatively lower rates of interest. Some of the financial institutions include the following:

- Housing and Urban Development Corporation (HUDCO)
- Infrastructure Development Finance Company (IDFC)
- Infrastructure Leasing and Financial Services (IL&FS)
- National Bank for Agriculture and Rural Development (NABARD)
- Indian Renewable Energy Development Agency (IREDA)
- Industrial Development Bank of India (IDBI)
- Industrial Finance Corporation of India (IFCI)
- Commercial banks, suppliers, creditors, and private venture capital funds

ULBs could also consider the opportunity of funds from bilateral and multilateral donors like Asian Development Bank (ADB), KFW Development Bank, the World Bank, etc. for soft loans and grants for infrastructure projects, after due approval from the State. States could also access these funds and provide them to the ULBs.

## **Municipal bonds and debentures**

- This is a good source of raising finance from the market and very popular in several developed countries.
- Tax-free municipal bonds can be issued for raising finances from the market for infrastructure development.

- Such bonds can be issued by ULBs having good financial health and good credit rating to attract investors to invest in municipal bonds. The amount invested is redeemable after a specific period with a definite rate of interest.
- Presently, the concept of municipal bonds is at a nascent stage in India and only a few ULBs with a large and buoyant revenue base (credit rating) have been successful in raising funds through them (e.g., Ahmedabad has raised funds several times through tax-free bonds and have been able to raise money for infrastructure development very swiftly).

## **Revenue from sale of products derived from waste processing**

- ULBs can minimize expenditure by seeking Private Sector Participation (PSP).
- For waste processing, private sector entities can be entrusted with the responsibility of processing the municipal waste at their own cost, by allowing them to set up the waste processing facilities on municipal land and giving them the agreed quantity of waste at designated site for a fixed contract period.
- ULBs may set up such facilities at their own cost and carry out its O&M through expert agencies and earn revenues from the sale of end products like compost, RDF, or electricity.

## **Tipping fee from the Private Sector**

- This could be another source of revenue.
- The fee may be prescribed for large waste generators for processing and disposal of their waste at the landfill.
- This could be in the form of fixed monthly fee for providing access to the processing and disposal facility.

## **Deficit Management**

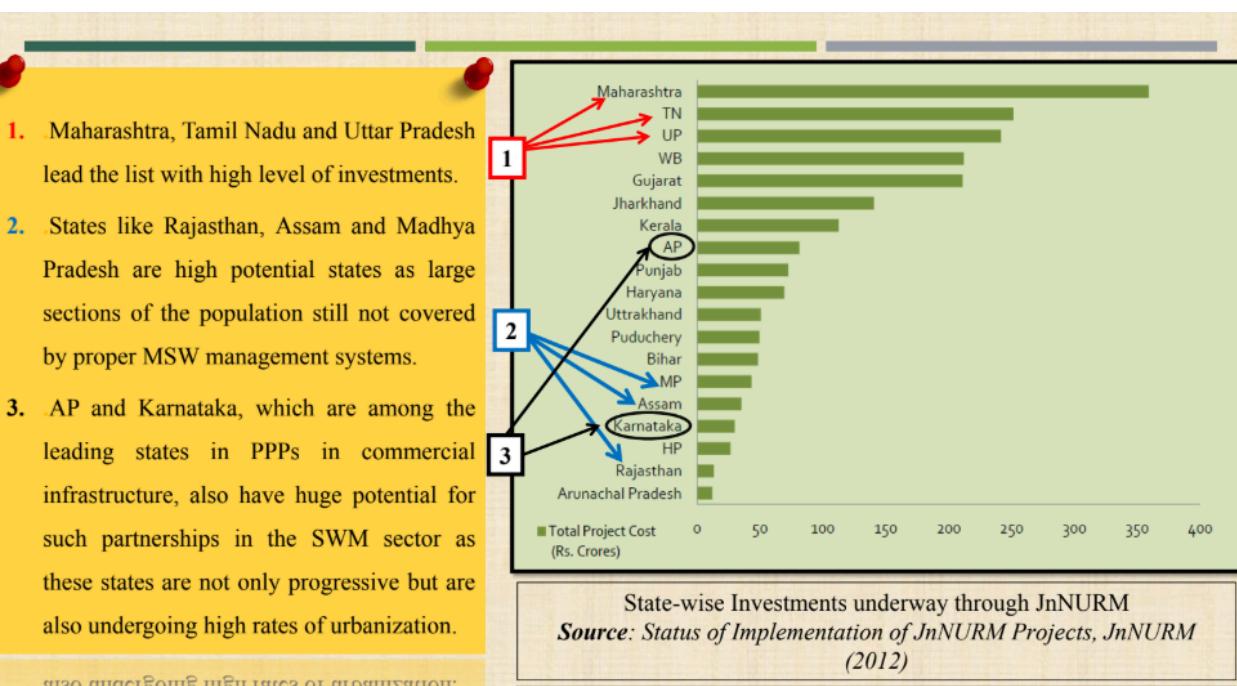
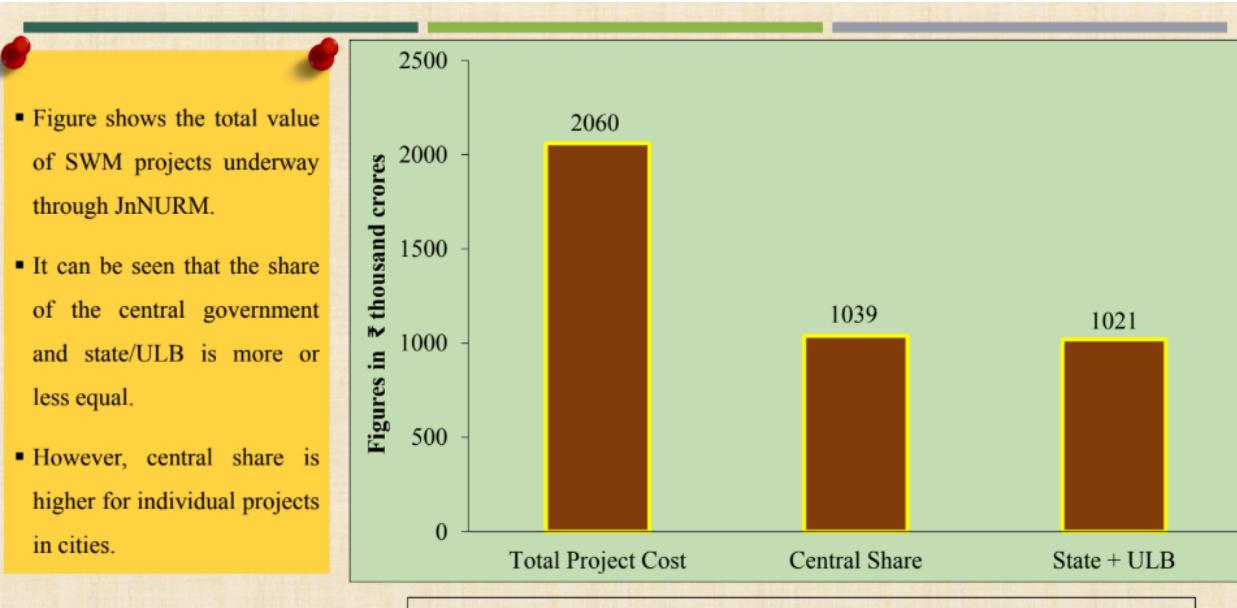
- The ULB should endeavor to recover 100% of the total costs of services as estimated above through levy of user charges on “polluter pays” principle.
- This should include costs of door-to-door collection, transportation, processing,

and final disposal of waste at the landfill.

- The cost of street sweeping, its transportation, and disposal should be met from the municipal general budget.

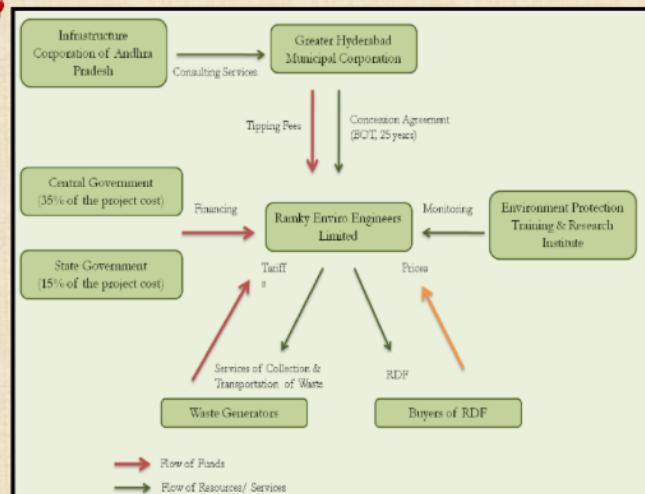
## **JnNURM (Jawaharlal Nehru National Urban Renewal Mission)**

- Jawaharlal Nehru National Urban Renewal Mission (JNNURM) was a massive city-modernization scheme launched by the Government of India under Ministry of Urban Development. It envisaged a total investment of over \$20 billion over seven years. It is named after Pt. Jawaharlal Nehru, the first Prime Minister of India .
- The scheme was officially inaugurated by then Prime Minister Manmohan Singh on 3 December 2005 as a programme meant to improve the quality of life and infrastructure in the cities. It was launched in 2005 for a seven-year period (up to March 2012) to encourage cities to initiate steps for bringing phased improvements in their civic service levels. The government had extended the tenure of the mission for another two years, i.e from April 2012 to March 31, 2014.
- JNNURM was a huge mission which relates primarily to development in the context of urban conglomerates focusing to the Indian cities. JnNURM aims at creating 'economically productive, efficient, equitable and responsive Cities' by a strategy of upgrading the social and economic infrastructure in cities, provision of Basic Services to Urban Poor (BSUP) and wide-ranging urban sector reforms to strengthen municipal governance in accordance with the 74th Constitutional Amendment Act, 1992.



## A Case of Financial Failure Project

- Total waste collected by private concessionaire: 3800 Metric Ton.
- Total budget of the project: Rs. 434.91 crores.
- **Problem:** A financing issue was faced during the project implementation phase. Government of India (GOI) refused to contribute its share of 35% of the project cost, amounting to Rs. 152 crore by claiming that the state had already exhausted its investments of seven years under the Jawaharlal Nehru National Urban Renewal Mission (JnNURM).
- **Solution:** The state government agreed to bail out GHMC by bearing that part of the project cost, which was to be provided by the GOI.



Stakeholder Map of MSW Management in Hyderabad, India

## Swachh Bharat Mission (SBM)

- SBM is being implemented by the Ministry of Housing and Urban Affairs (M/o HUA) and by the Ministry of Drinking Water and Sanitation (M/o DWS) for urban and rural areas respectively. These guidelines are for the implementation of Swachh Bharat Mission (Urban).
- The Swachh Bharat Mission (SBM) emanates from the vision of the Government articulated in the address of **The President of India in his address to the Joint Session of Parliament on 9th June 2014**: “**We must not tolerate the indignity of homes without toilets and public spaces littered with garbage. For ensuring hygiene, waste management and sanitation across the nation, a “Swachh Bharat Mission” will be launched.**

### Mission Objectives

- Elimination of open defecation
- Eradication of Manual Scavenging
- Modern and Scientific Municipal Solid Waste Management
- To effect behavioral change regarding healthy sanitation practices
- Generate awareness about sanitation and its linkage with public health
- Capacity Augmentation for ULBs to create an enabling environment for private sector
- participation in Capex (capital expenditure) and Opex (operation and maintenance)

## Mission Components

- Household toilets, including conversion of insanitary latrines into pour-flush latrines
  - Community toilets,
  - Public toilets and urinals
  - Solid waste management

- Information, Education and communication (IEC) & Public Awareness
- Capacity building and Administrative & Office Expenses (A&OE)

## Funding Pattern and Financial Process

- a) First instalment will be released to states on receipt and acceptance of proposal containing the brief concept state sanitation strategy.
- b) For Household Toilets, funds in the first instalment will be released as per number of beneficiary household identified, in the concept sanitation plan, at the rate of Rs. 2000/-Central assistance.
- c) For Community and Public Toilets and Solid Waste Management Projects, adequate funds will be released on the proposal of the State Government for SWM and Community toilet projects. It will be ensured that funds do not remain parked with the state governments Government of India (GoI) share of grant / VGF may be drawn from this pool fund maintained at state level. This will be replenished on demand by states based on progress.
- d) For IEC, Capacity Building and Administrative expenditure, appropriate percentages of (a) and (b) above shall be added to the first instalment.
- e) States will contribute a minimum of 25% funds towards all components to match 75% Central Share. This will be 10% in the case of North East and special category States.
- f) Subsequent instalments shall be released based on utilization certificates of previous grants, physical and financial progress and other indicators as approved and desired by the National Advisory & Review Committee (NARC).

## Allocation of funds to States / UTs

S. No.	Classification	Percentage Allocation (Central Govt. funding)	Total Amount for Mission Period Rs. Crore
I.	Project Fund based on Normative Criteria	60%	8773.80
II.	Performance Fund based on Performance Matrix	20%	2924.60
III.	Public Awareness & IEC Activities	15%*	2193.45
IV.	Capacity Building & A&OE	3%	438.69

10.3.2. The Project Fund specified in 10.3.1(i) above shall be allocated as follows:

- i. The distribution of the Project fund will be as under: (Rs. in Crore.):

a.	Project Funds for States other than the North-East	80%	7019.04
b.	Project Funds to North-East States	10%	877.38
c.	Flexi Funds*	10%	877.38

\*Flexi Funds in terms of the Department of Expenditure OM No..No.55(5)/PF.II/2011 dated 06.01.2014) will be available to states

V.	Research, Capacity Building & A&OE (M/o UD)	2%	292.46
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\* 3% will be retained by MoHUA

### Successful Projects in Swachh Bharat Mission

OTHER STATES

'Cleanest city' Indore earns ₹4 crore annually through proper waste management

INDORE, JANUARY 01, 2020 10:04 IST  
UPDATED: JANUARY 01, 2020 10:05 IST

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A private company has invested ₹ 30 crore under the Public Private Partnership (PPP) mode by setting up a plant to process 300 tonnes of dry waste through artificial intelligence

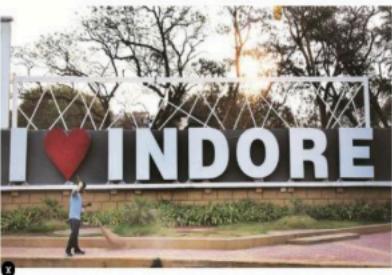
**Inside India's cleanest city, Indore**

Over 600 city corporations have visited Indore to learn how a city, which ranked 25 in the 2016 cleanliness survey, has managed to consistently top the charts since then. From over 700 new toilets and urinals to 3,000 roadside bins and a live tracking system to monitor garbage vans, Indore did a lot of things right.

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Written by Tabassum Barnagarwala | Updated: April 7, 2019 10:41:11 pm



**LIVE BLOG**

Coronavirus India LIVE Updates: Over 10 lakh cases, 38,135 deaths in India, Karti Chidambaram tests positive 31 mins ago

Stars celebrate Raksha Bandhan: Zoya Akhtar, Suniel Shetty and others share throwback photos 31 mins ago

# **Public-Private-Partnership (PPP)**

- An arrangement between a government/statutory entity/ government-owned entity one side and a private sector entity on the other, for the provision of public assets and/or related services for public benefit, through investments being made by and/or management undertaken by the private sector entity for a specified time period (Department of Economic Affairs (DEA), Government of India).
- Risk taken up by the party best suited to handle it.

## **Important characteristics and pillars of PPP projects-**

- Risk transfer
  - Value for money
  - Output specifications
  - Promise of better project structure and design
  - Affordability
  - Efficiency

# **PRIVATE SECTOR IN SOLID WASTE MANAGEMENT**

## **□ Mid 1990s**

- Large scale projects in metro cities like Chennai, Delhi etc. were not able to execute SWM projects properly due to inappropriate value chain and less scope of private participation.

## **□ Late 1990s**

- ULBs gradually realized to reduce the burden on landfills.
- Along with there was a notification of MSW rules handbook 2000, making waste processing and development of sanitary landfill mandatory.
- Government was unable to spend money in infrastructure
- Private sector participation was involved in solid waste sector.

## **□ Late 2000s**

- Large Private Companies to get into Collections, Transportation. Earlier it was limited to local contractors only.

- Moreover, few ISWM have also been implemented under PPP mode.

## WHY PPP....?

- For economic growth and development, we need a lot of investments. Government could not provide enough funds for investments in public goods (infrastructures & services)
  - Private sector has a lot of capital for investments.
  - If a system can be developed whereby private players can invest in public goods, they can help create investments, and also earn profits.
- Thus, to develop infrastructures for development, the government needs to work out a system where private players can come in towards creation of public infrastructures which are traditionally provided by the government.
  - There are various services which could not sufficiently be managed by government agencies due to various inherent institutional weaknesses.
  - But such services are required to be provided to the citizens.
    - Private sector has expertise, managerial capability and institutional strengths to manage various services and utilities efficiently.
    - If a framework is developed whereby private players can come in, it will result in good management of services, better services, etc.
  - It is with the realization of these advantages, and the possibility of leveraging private capitals and management expertise, that the public authorities have now introduced the concept of Public Private Partnership.

## SOME FACTS

- India spends **just 6 percent of its GDP** on infrastructure, compared to **China's 20 percent**.
- To achieve its targeted GDP growth rates, the country will need to invest approximately **\$250 billion** in infrastructure over the next five years.
- “The importance of infrastructure for rapid economic development cannot be overstated,” explains ***then India’s Finance Minister (Budget Speech 2005-06)***.
- The most glaring deficit in India is the **infrastructure deficit**.
- The resultant effect is retardation of economic growth.

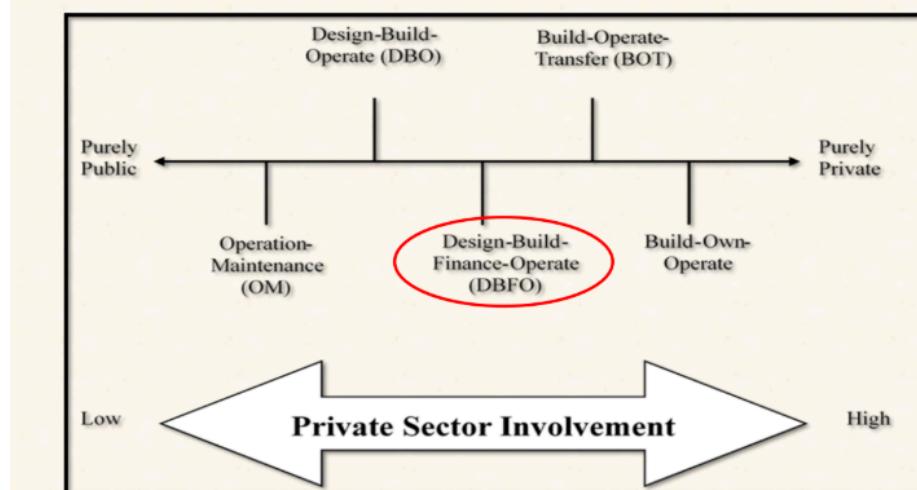
### General Features of PPP

- Public sector transfers an asset to a private sector entity, usually for the term of the arrangement
- Private sector builds, extends, renovates a facility
- Public sector specifies the service to be provided through the facility
- Private sector provides the services, using the facility for a defined period
- Private sector entity agrees to transfer the asset back to the public sector at some point

### Benefits of PPP Model

S. No	Citizens	Government	Private Partner
1	Easy access to service	Minimizing financial outgo	Reliable stream of revenues
2	Single window/one stop shop	Better liquidity	Low risk
3	24x7 Convenience	Protection against technology obsolescence	Creation of employment
4	Flexibility in access methods	Speedier Implementation	Capturing business from relevant sectors
5	Saving of indirect cost and hardship	Efficiency in management	Invoking private sector skills, experience, access to technology, and innovation

- Different models of PPP are normally adopted in various **Indian cities** are Management Contracts, BOT/BOOT, DBFOT and DBO (DEA, GOI-2011).



Most of the PPP projects are under DBFO model, but most of the SWM projects are under BOOT and DBFO

**Build – Operate – Transfer (BOT):** - This is the simple and conventional PPP model where the private partner is responsible to design, build, operate (during the contracted period) and transfer back the facility to the public sector. Role of the private sector partner is to bring the finance for the project and take the responsibility to construct and maintain it. In return, the public sector will allow it to collect revenue from the users.

**Build – Own – Operate (BOO):** - This is a variant of the BOT and the difference is that the ownership of the newly built facility will rest with the private party here.

**Build – Own – Operate – Transfer (BOOT):** - This is also on the lines of BOT, after the negotiated period of time, the infrastructure asset is transferred to the government or to the private partner.

**Build – Operate – Lease – Transfer (BOLT):** - In this approach, the government gives a concession to a private entity to build a facility (and possibly design it as well), own the facility, lease the facility to the public sector and then at the end of the lease period transfer the ownership of the facility to the government.

**Rehabilitate – Operate – Transfer (ROT):** - Under this approach, the governments

or local bodies allow private promoters to rehabilitate and operate a facility during a concession period. After the concession period, the project is transferred back to governments or local bodies.

**Design – Build – Finance – Operate – Transfer (DBFOT):** - The most common form of PPP used where the private sector operator designs, builds, finances, owns and constructs the facility and operates it commercially for the concession period, after which the facility is transferred to the authority. In this case, legal ownership of the asset vests with the public sector the concession period ends.

**Design – Build – Finance – Operate (DBFO):** - In this model, the private party assumes the entire responsibility for the design, construction, finance, and operate the project for the period of concession.

**Management contract:** - Management contract is an arrangement to bring private participation in managing a portion or whole part of public infrastructure. In this model private entity has to design, deliver, operational control and procurement of equipment and has to look into labour management. Public sector retains the ownership and commercial risk.

**Service Contracts:** - This approach is less focused than the management contract. In this approach, the private promoter performs a particular operational or maintenance function for a fee over a specified period of time.

## PROCESSES IN PPP PROJECTS

### Phase 1 – Identification

- Phase 1 takes place before entry to the PPP development pipeline.
- Its purpose is to identify and test projects so that the quality of the PPP pipeline is increased.
- At the completion of this phase the Sponsoring Agency will have identified a project that is suitable for further development as a PPP.

- This project then enters the PPP pipeline, which starts in Phase 2, where it undergoes more detailed study and preparation.
- Responsibility for Phase 1 will be with the Sponsoring Authority (e.g., ministry(s) for Central-level projects, sponsoring department(s), Urban Local Body, or other statutory or public sector corporate entity as appropriate to the case).
- Support might be provided by dedicated PPP agencies, such as a PPP Cell or Project Development Agency, and the Sponsor may wish to engage external advisors.
- Strategic planning to identify and prioritise infrastructure service needs and identify a set of potential projects.
- Project pre-feasibility analysis to assess specific needs and consider service delivery options, and to test if an identified project is feasible and worth developing further.
- PPP suitability checks of the identified project to test suitability for development as a PPP.
- The first Readiness Check, based on the results and outputs of the suitability and mode tools and the pre- feasibility study.
- An internal clearance should take place within the Sponsoring Agency before projects are allowed to enter the PPP pipeline.
- If this Readiness Check is favourable the project is given Internal Clearance to move to Phase 2.

## **Phase 2 - Full feasibility**

- Planning and preparing for PPP project management.
- Carrying out a detailed feasibility study including PPP due diligence of the project, including:
  - ✓ Updating the Financial Viability Indicator Model and using it to reassess the impact of changing parts of the project design and verify the feasibility study model results.
  - ✓ Using the VFM(Value for Money) Indicator Tool to test the likelihood of achieving Value for Money,

based on the results of the feasibility study and the experience and knowledge of the analytical team.

- Deciding on the best-suited procurement method for the project.
- Preparing first drafts of the key project documents.
- Carrying out Readiness Check, to check that the project is ready to proceed to the clearance stage.
- Applying for In-principle Clearance from the appropriate Appraisal / Clearance Authority.
- If In-principle Clearance is granted then the project is able to proceed to PPP procurement.

## Phase 3 – Procurement

- Important activities that should be carried out to prepare for procurement are described.
- The (Expression of Interest) EOI and the EOI process are described.
- The qualifying process, covering the Request for Qualification (RFQ) and shortlisting, is described.
- Final drafts of key bidding documents are discussed, including the contents of the Request for Proposal (RFP).
- The requirements and process for Readiness check 3 and the application for Final Approval are outlined.
- The bidding process, covering RFP and bid evaluation, is described.
- Finally, contract finalisation and award are covered.

## Phase 4 – Operation (Project management & Monitoring)

- Phase 4 begins once the project reaches technical closure with the signing of the Concession Agreement.
- The life of the PPP during Phase 4 involves:
  - ✓ Implementation and operation of the project by the concessionaire and
  - ✓ Performance monitoring and contract enforcement by the Sponsor.
- When the contract is signed the Sponsor goes from preparing the PPP to

managing its implementation and ongoing operation according to the terms set out in the Concession Agreement. The Sponsor remains engaged with the PPP in this new role until the end of the contract's life.

- Contract management and monitoring is an especially important part of a PPP.
- The responsibilities and obligations for contract management will be specified in advance in the Concession Agreement.
- Responsibility for Phase 4 will typically be with a Contract Management Team within the Sponsor.

## Institutional Framework

Two important bodies were set up to deal with PPP's in India:

- Public Private Partnership Appraisal Committee (PPPAC) and Empowered Committee / Empowered Institution
- PPP Cell

### **Public Private Partnership Appraisal Committee (PPPAC) and Empowered Committee / Empowered Institution**

- PPPAC was setup in January 2006 under chairmanship of the Secretary, Department of Economic Affairs.
- The members of the committee consists of Planning Commission, Department of Legal Affairs and the Administrative Department.

### **Empowered Committee (EC)**

- It consists of secretaries of the Economic Affairs, Planning Commissions, Expenditure and the Secretary of line Ministry.
- It has a provision to provide Viability gap funding up to Rs 200 crores in audit by providing clarification relating to the eligibility of the project.

### **Empowered Institution**

- It has an authorization to sanction Viability gap funding of Rs 100 crores for each project

### PPP Cell

- It has been set up in Department of Economic Affairs (DEA), Ministry of Finance (MOF)
- It deals with matters and proposals relating to clearance by PPPAC

- looks into the examination and approvals relating to PPP projects costing between Rs 100 crores to Rs 250 crores.

## Financing Schemes

□ Various schemes have been started to provide financing to PPPs. The important scheme are: -

- Viability Funding scheme
- Indian Infrastructure Finance Company (IIFCL)
- Indian Infrastructure Project Development Fund (IIPDF)
- **Viability Gap Funding (VGF)** is an incentive scheme in which a certain percentage of total capital cost is paid by the government to make the project economically viable.
- **India Infrastructure Finance Company Ltd (IIFCL)** IIFCL provides long-term finance to viable infrastructure projects in broad sectors of transportation, energy, water, sanitation, communication, social and commercial infrastructure.
- **The India Infrastructure Project Development Fund (IIPDF)** provides financial support for quality project development activities. The Sponsoring Authority will, thus, be able to source funding to cover a portion of the PPP transaction costs, thereby reducing the impact of costs related to procurement on their budgets.

## PPP IN DIFFERENT STATES OF INDIA

- Many states in India already have PPP framework.
- They have PPP & infrastructure policy.
- They established PPP cell, with institutional framework like PPP Apex Authority, etc.
- 19 states in India have been shown as having PPP system in place (Source: [www.pppinindia.com](http://www.pppinindia.com))
- Govt. of India availed technical assistance from Asian Development Bank for assisting 12 states for setting up PPP framework during 2009-2016.
- Many states have now taken up projects on PPP mode.

- Convergence of projects of central government with part PPP has become a common feature of project implementation.

## PPP IN INDIA

- Realizing the huge potential offered by PPP, the government of India have taken up PPP on a big scale.
- PPP policy was drawn up and PPP Policy Guidelines were drawn up in 2005.
- PPP-Viability Gap Funding Guidelines was also drawn up and notified in January, 2006.
- A dedicated website, [www.pppinindia.com](http://www.pppinindia.com) was developed for dissemination of information on PPP and knowledge sharing.
- Various PPP documents like Model RFP, Model Concession Agreement, etc. were drawn up and are in place.
- Technical assistance from ADB to provide handholding support to 12 states in India.
- Such states now have PPP policies and institutional frameworks.
- PPP have now started showing a sizeable share in investments in infrastructures and services.

## Public-Private-Partnership (PPP) in MSWM Projects

- The overarching framework for management of MSW in the urban areas was created by the Ministry of Environment & Forest in 2000 with the enactment of MSW (Management & Handling) Rules, 2000 under the Environment Protection Act, 1986 that entrusted the ULBs with the responsibility of managing MSW.
- Also, since the launch of JnNURM in 2005, Central Government grants are being channelized through the Urban Infrastructure Governance (UIG), and Urban Infrastructure Development Scheme for Small & Medium Towns (UIDSSMT) under JnNURM and the Finance Commission Grants.
- There are two systems for SWM in India -
  - ✓ Centralized (technology driven)

- ✓ Decentralized (community based) systems of waste management
- Integrated MSWM or processing and disposal will be mostly operated by DBFO model (centralized system).
- Most of the decentralized systems will be operated by Management contract model.

## DATABASES FOR PPP MSWM PROJECTS

### ❖ Websites referred

- <https://www.pppinindia.gov.in/infrastructureindia>
- [https://vmc.gov.in/Department\\_smw\\_Approach.aspx](https://vmc.gov.in/Department_smw_Approach.aspx)
- <http://www.jnnurm.nic.in/>
- <http://mohua.gov.in/cms/about-jnnurm.php>
- <https://amrut.gov.in/>

### ❖ SWM Schemes referred

- JnNURM scheme
- AMRUT scheme

### ❖ Classification of cities was done on population and HRA basis.

### Critical Success Factors (CSFs) of MSWM projects in PPP

- The critical success factors (CSFs) are the key factors, which play a crucial role in the success of an infrastructure project.
- According to Rowlinson and McDermott (2005), CSFs are those fundamental issues inherent in the project that must be maintained for teamwork to take place in an efficient and effective manner.

#### 5 CSFs are most crucial for MSWM projects-

- Integration of Informal Sector
- Waste Segregation
- Public Awareness
- Appropriate toll/tariff
- Public engagement and support

**Source:** Ngullie, Nzanzhung. (2020). Assessing the Interrelationships among Critical Success Factors for Municipal Solid Waste Management Projects under PPP mode in India (Doctoral dissertation).

There are 10 critical factors for MSWM projects in India.

1. Integration of informal sector
2. Waste segregation
3. Detailed project planning
4. Strong & competent private sector partner/s
5. Public awareness
6. Transparent procurement process
7. Capacity building of ULB's
8. Appropriate toll/tariff
9. Project feasibility
10. Public engagement and support

- The most crucial CSFs of MSWM are given in the previous slide.
- These are important factors because all these factors represent their role in every aspect of solid waste management.
- There are so many projects, which are failing due to the absence of these factors.

Tier 1 Cities MSW Projects in India					
S.no	City	Project	value chain/Model	Private partner	Project Status
1	Turbi (Mumbai)	Municipal solid waste management project	DBFO	Navi Mumbai Waste Processing Company Limited	Operation and Maintenance Stage
2	Hyderabad	Integrated solid waste management	DBFOT	REEL	Operation and Maintenance Stage
3	Bangalore	Sanitary Landfills in Bangalore	BOT	Ramky Enviro Engineers Limited	Operation and Maintenance Stage
4	Delhi	Development, Construction, Operation and Maintenance of An Integrated Municipal Waste Processing and Disposal Facility At Okhla	BOOT	TIMARPUR-OKHLA Waste Management Company Private Limited (TOWMCL)	Under Construction

Tier 2 Cities MSW Projects in India					
S.no	City	Project	Value chain/Model	Private partner	Project Status
1	Visakhapatnam	Municipal Solid Waste management	BOOT	M/S Feedback Infra (Pvt) Ltd	
2	Nellore Cluster	Integrated solid waste management	DBFOT	Ipe Global Private Limited	
3	Jodhpur	Implementation of solid waste management facility of 500 TPD at Keru dumping station	DBFOT	JITM Skills Private Limited	Operation and Maintenance Stage
4	Kanpur (U.P)	Implementation of solid waste management unit in Kanpur district	BOOT	A2Z Green Waste Management Limited	Operation and Maintenance Stage
5	Mysore	Integrated Disposal & Landfill Facility (Mysuru) Project	BOT	Jamshedpur Utilities and Services Company	Under Construction
6	Rajkot(Gujarat)	Solid Waste Management (Rajkot) - Upgradation	DBFOT		Operation and Maintenance Stage
7	Guwahati	Solid Waste Management	BOT	REEL	

8	Calangute (Goa)	<u>Implementation of 100 TPD solid waste management facility unit at Calangute</u>	DBFOT	Hindustan Waste Treatment Private Limited	Operation and Maintenance Stage
9	Dehradun	Door to Door Collection of Solid waste Composting and Landfill at Dehradun	Primary Collection	M/s SPML Consortium	Under Construction
10	Ahmedabad	Development of 1000 TPD solid waste management in Ahmedabad	DBFOT	Abellon Clean Energy Limited	Under Construction
11	Asansol(West Bengal)	Solid Waste Management (700 TPD) at Asansol UA	BOOT	Consortium of Gujarat Enviro Protection Infrastructure Ltd. and Hanjer Biotech Ltd.	Under Construction
12	Vadodara(Gujarat)	Secured Engineered Landfill Facility (Vadodara)	BOOT		Under Construction
13	Madurai(Tamil Nadu)	Integrated Municipal Solid Waste Management Facility for Madurai City	BOT	Subhash Projects and Marketing Ltd	Under Construction
14	Bhubaneswar	Development of a regional municipal solid waste management facility in Bhubaneswar	BOT	Essel Bhubaneshwar MSW Limited	Operation and Maintenance Stage

Tier 3 Cities MSW Projects in India					
S.no	City	Project	Value Chain/Model	Private partner	Project Status
1	Katni(M.P)	Implementation of integrated solid waste management project at Katni	DBFOT	Katni MSW Management Private Limited	Under Construction
2	Moradabad(U.P)	Solid Waste Management (Moradabad) Project	DBOOT	A2Z Waste Management (Moradabad) Limited	Operation and Maintenance Stage
3	Pernem	Setting up of 10 TPD solid waste management unit at Pernem	DBOOT	MK Aromatics Limited	Under Construction
4	Lingadheeranahalli (karnataka)	Municipal Solid Waste Management (Lingadheeranahalli) Project	DBFOT	Karnataka Urban Infrastructure Development and Finance Corporation	Completed
5	Ferozepur	Municipal Solid Waste Management (Ferozepur) Project	DBFOT	JITF Urban Waste Management (Ferozepur) Ltd.	Operation and Maintenance Stage
6	Belgaum(Karnataka)	Development of Integrated Solid Waste Treatment (100 TPD) and Landfill Facilities at Belgaum	BOT	M/s. RAMKY Enviro Engineers Ltd., Hyderabad	Under Construction

7	Mandur(Karnataka)	Waste to Energy Project Mandur	BOOT	M/s Srinivasa Gayathri Resource^& Recovery Ltd (SGRRL)	Under Construction
8	Tiruppur (Tamil Nadu)	Solid waste management at Tiruppur	BOOT	IVR Infrastructure & Projects Ltd	Operation and Maintenance Stage
9	Varanasi(bihar)	Solid Waste Management (Varanasi)	DBOOT	A2Z Waste Management Limited	Under Construction
10	Pallavapuram(Tamil Nadu)	Solid Waste Management (Tambaram-Pallavapuram) Project	DBFOT	Essel Private Limited	Operation and Maintenance Stage
11	Koyambedu(Tamil Nadu)	Integrated Solid Waste Management at Koyambedu wholesale market complex	DBFOT	Ramky Enviro Engineers Ltd. (REEL) & Ramky Energy and Environment Ltd. (REnEL)	Operation and Maintenance Stage
12	Nainital(Uttarakhand)	Door to Door Collection of Solid waste Composting and Landfill at Nainital	DBFOT	A2Z Waste Management Limited	Under Construction
13	Kacchar	Implementation of common municipal solid waste management facility with a capacity of 180 TPD at Kacchar	DBFOT	Delhi MSW Solutions Limited	Pre-construction Stage

## Gorai Dumping Ground : A case study

Gorai Site : Prior to Closure

- Location : Western suburbs of Mumbai
- Area : 19.6 ha
- Operational (open dumping) : since 1972
- Adjacent to Gorai creek, close to habitation
- The creek waters polluted due to inflow of leachate
- Degradation of mangroves
- Deterioration of the air quality, No clean air for neighborhood Citizens.



Approximately 2.34 million tons of waste upto an average height of 26 m was lying at the site

## Structuring of the Project

The scientific closure of the Gorai dumping ground, the first of its kind in the country, was the first project to be completed as per the proposed Waste Management Plan.

- Designed by IL&FS and structured as a 15 year PPP with Construction and Operations and Maintenance (O&M).
- The Construction and O&M contract awarded to a consortium led by United Phosphorus Limited (UPL) and M/s Van Der Weil Strotgas BV.
- The construction completed in 20 months and at a cost of INR 50 crores.
- O&M estimated at INR 12crores (15 years of post-closure care).
- A successful and balanced PPP project which can be modified for local requirements and replicated across the open dumpsites in the Country.

## Waste to Energy

To set-up a 3 MW landfill gas based power plant on a DBOOT basis. Expected returns from the project are :

- Capex : 11 crores
- Cost of Electricity generated from the Landfill – Rs.3.50 / unit
- Estimated Selling Price of Electricity – Rs.6 / unit

- Gross Profit from sale of electricity – Rs.2.50/unit Advantages of using gas Engines for Landfill gas
- Landfill gas (designed for 1500 cubic meters per hour) is highly efficient for power generation, an alternative to conventional fuels.
- Methane (CH<sub>4</sub>) releases into the atmosphere are reduced.

## Challenges (Waste to Energy)

- Marked improvement in the quality of life of people in Gorai
  - Creation of 19 hectares of green space in Mumbai
  - Restoration of mangroves that had degenerated due to toxic leachate from the dumpsite
  - Improvement in public health and hygiene
  - Elimination of foul odor that enabled residents to open their windows after 3 decades
  - Realty value in the area increased with higher property tax collection for the municipality
  - Elimination of fire, health hazards and breeding of flies and rodents
  - Improvement in the quality of creek water due to treatment of leachate
  - Significant improvement in the quality of marine life
  - Increase in avian fauna population
  - Power generation from methane.

## Project Benefits

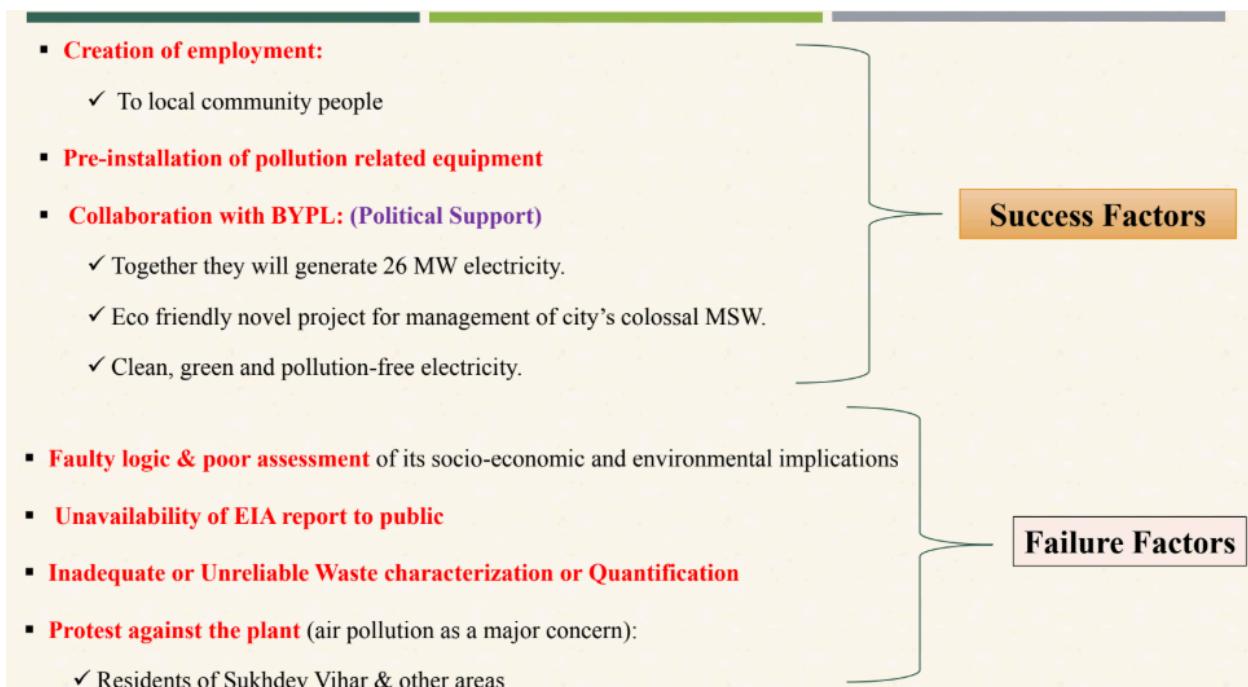
- Waste has low calorific value (CV) of about 800 kcal / kg
  - High moisture and inert content
  - High capex required for meeting stringent emission norms
  - NIMBY (Not In My Back Yard) syndrome;
  - Lack of tipping fees

## Some case studies

### 1. TIMARPUR AND OKHLA PROJECT

Project Identification

- Name of the project: Integrated Solid Waste Processing Complex Waste to Energy
- Proposed Capacity:
  - ✓ 1950 TPD
  - ✓ After expansion: 2950 TPD
  - ✓ Waste to Energy: 16 MW to 40 MW.
- Name of the applicant: Timarpur Okhla Waste Management Company Private Limited (TOWMCPL)
- Budget: 175 crores, Later extended to 200 crores.
- Land Acquisitions
  - ✓ The land is earmarked for ISWM Facility by NDMC. There will be no change in land use.
- Emissions from combustion of fossil fuels from stationary or mobile sources
- Emissions from materials handling including storage or transport:
  - ✓ Odorous gas generated from MSW pit will be sucked and burnt in the boiler.
- This project is revenue generated, so no toll tax has been implemented.
- Waste is been sorted by municipal corporation of that area, waste sorting is not there in agreement.



## 2. COIMBATORE PROJECT

### Project Identification

■ Name of the project:- Integrated solid waste management at Coimbatore

■ Name of the private concessionaire:- Bharuch Enviro Infrastructure Ltd

■ Project capacity:- 815 TPD

■ Scheme:- JnNURM

■ Budget:- 96.51 crores

■ Concession period:- 20 years

- Work allotment:
  - o Part 1:- CCMC:- source segregation, PC, SC, transportation to TS
  - o Part 2:- private partner:- SS at TS, ST to treatment, disposal site
    - ✓ Construction of sanitary landfills, compost plant
- Bio-degradable treatment:- compost plant of 375 MT/day
  - G.O.I:- Rs 48.26 crores

### **3. TIRUPUR PROJECT**

- 1990s: Faced difficulty for managing the waste
  - In 1999:
    - ✓ IVR Infrastructure & Projects Ltd
    - ✓ BOOT
    - ✓ In 2000: Construction of plant got completed
    - Concession Agreement (Toll Tariff)
    - ✓ TMC: should provide 100MT per day (40MT Biodegradable)
    - ✓ IVR pays Rs 3.5 per ton
    - ✓ Private concessionaire took land on lease for Rs 1.75 Lakh/annum
    - ✓ Plant cost: Rs 55 crores

#### **Success Factors**

- Selection of the technology was done by taking waste characteristics into consideration. Organic matter content was more(40 MT out of 100MT).
  - Involvement of local community was strong and they have given good cooperation to the project.
  - Skill development training were given to the people in the local area to equip them with required technical project.

#### **Failure Factors**

- Processing plant did not comply with MSW rules
  - ✓ Concession agreement finalised before the introduction of MSW handbook 2000, so contract amendment not done
  - ✓ Specifications are not as per rules.
  - Solid waste sent for processing into compost plant without segregation.
  - The concessionaire faced problems
  - ✓ Villagers who refused to allow its operation by threatening the workers at the plant.

## 4. PALLAVARAM AND TAMBARAM PROJECT

### Project Identification

- Name of the project: Solid waste management in Pallavaram and Tambaram
- Budget: 100 crores
- 300 tones per day
- Private concessionaire: Essel private limited
- Model: **DBOT**
- Concession period: **20 years**
- There is no provisions for toll tariffs
- This project is based on **waste to energy**
  - ✓ **2.9 MW** waste to energy, disposal of waste from **3.5 lakh** household

### Lack of garbage bins in Chennai's Pallavaram force residents to dump waste on open grounds

Frustrated with the civic apathy, Rishi took it upon himself to bring the garbage disposal issue to the notice of the authorities.



Published: 06th January 2020 04:03 AM | Last Updated: 06th January 2020 04:03 AM

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Garbage dumped on vacant lands in Pallavaram (Photo | Debadatta Mallick, EPS)

By Naaz Ghani

### Success Factors

- Scientific closure of existing dumpyard at Ganapathipuram and Kannadapalyam.
- Constructed waste processing plants at Ganapathipuram and Kannadapalyam.
  - ✓ Transfer station cum MRF at Ganapathipuram.
  - ✓ RDF and Eco bricks plant: to generate RDF and Eco bricks from inert materials and organic compost.
- Proposing three satellites municipal corporation in Avadi, Pallavaram and Tambaram (Political support).
- Residents were very cooperative towards handling waste.

### Failure Factors

- Residents near the plant are suffering from flies, and **filthy surroundings**
- Foul smell generated from the plant affects the residents of **8 panchayats**
- Maintaining hygienic conditions was **ensured in the agreement**, but it was not followed
- Plant was unable to produce **2.9MW** electricity
- Gasification **technology** used to process waste was a failure

## 5. HYDERABAD PROJECT

### Project Identification

- Name of the project:- Integrated solid waste management for Hyderabad city
- Name of the private concessionaire:- Ramky Enviro Engineers Limited
- Project capacity:- **3800 Metric Ton**
- Scheme:- **JnNURM**
- Budget:- **Rs 434.91 Crores**
- Concession period:- **30 years**
- Model: **DBFOT**

NATION CURRENT AFFAIRS

**Hyderabad: Only 25 per cent of 5,000 tonnes of waste segregated**

DECCAN CHRONICLE | ANURAG  
Published Jun 29, 2019, 8:28 am IST Updated Jun 29, 2019, 8:28 am IST



One GHMC official said, "The most difficult task in our dumping sites is segregation of waste."

The garbage which fell during transit from the city to dumpyard lies unattended near Malakpet road.

Hyderabad: Segregation of waste is the key to urban waste management. It not only reduces landfill size in the cities but also paves the way for sustainable development.

### Success Factors

- There was good coordination between various teams managing the different value chain because of centralized control.
- There was accountability on the part of the private party.
- There was success in creating public awareness in the zones covered by the private partner.
- There were environmental considerations as bio remediation of the existing dumpsites was included as an essential criterion in the concession agreement.

### Failure Factors

- **Financing support by the state**
- **Commitment by Government:** Protests and strikes by the GHMC employee unions against privatization (Athena Infonomics India Private Limited, 2012).
- **Argument by REEL**
  - ✓ It was noticed that there was Inadequate finance support, government pursuance, concession agreement problems.

## 6. ASANSOL PROJECT

### Project Identification

- Name of the project:- Solid waste management at Asansol
- Name of the private concessionaire:- Consortium of Gujarat Enviro Protection Infrastructure Limited and Hanjer Biotech Limited
- Project capacity:- **200-210 MT/Day**
- Scheme:- **JnNURM**
- Budget:- **Rs 156 Crores**
- Concession period:- **15 years**
- Model: **BOOT**

### Success Factors

- One of the most important achievement of AMC is the introduction of Tricycle.
- Capacity building of ULB's was good enough as they have accepted to do collection job.
- Daily average disposed of solid waste to these sites is 200-210 MT/day.
- For improving the existing landfill sites as scientific engineered landfill, M/s. GEPIL has constructed a sanitary engineered landfill site.

### Failure Factors

- There was no support from political leaders
- Problem raised with primary collection, workers are not properly trained and they do not perform their duty properly
- Insufficient number of bins
- Wrong placement of dustbins was found influencing by political leaders, which creates disparities among the people.
- No proper awareness about how to handle waste
- The number of workers engaged for the collection is not sufficient
- Non economical locations of dumpsites, they are very far from the city
- No centralized pattern of duties allotted to workers

## 7. CHANDIGARH PROJECT

### Project Identification

- Name of the project:- Municipal Garbage Processing Unit in Chandigarh
- Name of the private concessionaire:- M/s Jai Parkash Associates Ltd
- Project capacity:- **500 TPD**
- Scheme:- **JnNURM**
- Budget:- **Rs 30 Crores**
- Concession period:- **15 years**
- Model: **BOT**
- The **main objective** of the private concessionaire was to **convert MSW to RDF**

**HT Spotlight: Welcome to Chandigarh's wasteland**

The sprawling dumping ground at Dadumajra is not just the bane of people living in adjoining sectors, but also of the entire city.

By **Shivani Gaggar** | Published on Sep 26, 2016 10:30 AM IST

**SHARE** **COMMENT** **EMAIL**



The usually dung-free Dadumajra is spread across 20 acres as the treatment plant can process only 50% of city's waste. (Sandeep Singh Chopra/HIT Photo)

**f** Half a million tonnes of garbage lying at Chandigarh's waste disposal facility in Dadumajra speak volumes about the city's waste management woes. It's also the main reason why the city is unable to garner the No 1 position in the annual Swachh Survekshan.

**t** While Panchkula and Mohali are still struggling to set up a waste processing plant, Chandigarh was the first to get this facility in 2005. But what was touted as a solution has turned into a problem for the city due to inadequate functioning of the plant and failure of the corporation to either legally exit from the firm running the plant or take it over for larger public interest.

**in** The current waste disposal facility at Dadumajra comprises a waste processing plant run by JP Associates and a dumping ground that was meant to just store the waste before its disposal.

### Success Factors

- The project was revenue-generated model.
- The produced RDF was sold to Ambuja cement plant, Roper.
- The overall collection efficiency was found to be 70% with collection efficiency of 60% to 70% for the registered households and 20% for the slums.
- The collection system and transportation system was good. The house-to-house collection was done in all the residential sectors and covers about 70-80% of the registered households.

### Failure Factors

- There was lack of suitable trained man power, inappropriate collection routes and often unavailability of collection vehicles.
- Further, insufficient number of bins and bin capacity at different locations often leads to overflow of waste.
- Solid waste was processed to generate RDF and no additional treatment was provided to the waste, remaining waste be directly disposed in landfill. The existing landfill does not have a proper lining system to control the percolation of leachate into the groundwater.

## Few Failure Project Cases in India

## ~~Waste management in a mess, Lucknow growing by heaps and bounds!~~

~~Leave alone segregation of waste, door-to-door garbage collection is in a shambles~~

LUCKNOW Updated: Apr 11, 2017 14:52 IST

## ~~10 years on, solid waste management plant in Haridwar yet to operate~~

Sheo S Jaiswal | TNN | Jan 17, 2018, 22:43 IST

A- A+

### ~~Dehradun, Haridwar ULBs flout waste disposal rules, says CAG~~

~~Report says, collected waste was dumped in trenching grounds without segregation or processing.~~

DEHRADUN Updated: Sep 21, 2018 23:50 IST

## ~~No 'swachh' municipal waste disposal in Rajkot~~