ENSURING BANKABILITY IN SWM & WTE PROJECTS IN INDIA

PREPARED FOR 3RD INTERNATIONAL WORKSHOP ON “SUSTAINABLE MUNICIPAL SWM IN INDIA”

ORGANIZED BY – WASTE TO ENERGY RESEARCH & TECHNOLOGY COUNCIL
PM Narendra Modi’s Mission
Swachh Bharat / Clean India

National level campaign covering 4041 statutory towns to clean streets, roads and infra; involving industry, government, media, entertainers, and overall population.
Indian Waste Scenario – Favorable Climate

- India’s annual generation of urban waste is ~69M tons
- Expected to increase to 137M tons annually by 2025
- 63.7% of MSW is not collected
- Large potential and under-penetrated
- PPP emerging as new model for SWM
- Current spending on waste management by municipalities is principally on collection and transportation
- Potential of about 1700 MW from urban waste (1500 from MSW and 225 MW from sewage) and about 1300 MW from industrial waste exists in India
- Indian municipal solid waste to energy market could be growing at a compound annual growth rate of 9.7% by 2013

MSW Generation in India (Million Tons)
Sample Waste Characteristics

Sample Municipal Waste Characteristics
(Analysis of Western India Site)

Tonnage = ~500 TPD
Avg. Calorific Value = 1250 Kcal / Kg
Indian Waste Scenario – Key Factors

**Key Drivers**

**Increasing Population → Increasing Waste**
- Burgeoning population is ensuring India is generating waste in epic proportions that is overstressing the already overburdened municipal infrastructure

**Reducing Space of Landfills**
- Increasing gravitation of population to metro and tier II cities has dramatically reduced space available for landfills
- Existing mismanaged landfills are overflowing

**Landfill Mismanagement → Health Issues**
- Improper SWM is deteriorating public health, causing environmental pollution & climate change and greatly impacting the quality of life of citizens

**Accelerated Government Initiatives**
- Many government schemes are being provided for infrastructure development in small and medium sized towns

**Key Challenges**

**Inefficient Storage / Segregation System**
- Source storage and segregation of waste based on degradability and hazards is almost not done in India
- Proper planning and specific benchmarks for street sweeping do not exist

**High Reliance on Age-old Technologies**
- Absence of scientific landfills encourages open dumping of wastes which are highly polluting to nearby aquifers, water bodies and settlements

**Lack of Financial Closures and a Fragile Regulatory Framework**
- There is lack of bankable and financially sustainable projects considering the opportunities and risks involved
- An ambitious waste management strategy without considering project development realities is resulting in stalled projects
Indian SWM Industry – Quick Snapshot

- Household level coverage of waste C&T in metro and Tier I cities is 100%
- For example BMC\(^{(1)}\) spends ~Rs. 1160/ton ($25/ton) on C&T and disposal of MSW
- C&T constitutes ~80% of the total cost of a project
- In India, the average municipal expenditure on solid waste management is `500 to `1500/ton ($10 to $32/ton)

- Segregation is an emerging practice at the household level with awareness increasing slowly but steadily
- Rag pickers pick up recyclables from bins and sell them in the market
- Due to this informal segregation, volume reduction is achieved, but it ignores economic, environmental and health aspects

- In India, MSW is disposed of in an unregulated and unscientific manner in open dumpsites
- Most dumps lack systems for leachate collection, landfill gas collection or monitoring, nor do they use inert materials to cover the waste
- This results in ground and surface water contamination from runoff and lack of covering, air pollution caused by fires resulting in severe health problems

- Recent WtE projects have not yielded positive results since technologies were deployed without considering the local waste characteristics
- Based on the composition of Mumbai MSW, processing the waste in a WtE facility would reduce its volume significantly, thus freeing up land that would otherwise have been used for landfills
- With space in urban areas at a premium WtE provides an effective way to reduce the volume of waste

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\(^{(1)}\) BMC is the Municipal Corporation of Greater Mumbai.
What about Investor Returns?

Which is better?

<table>
<thead>
<tr>
<th>IRR_A</th>
<th>16.2%</th>
<th>Attractive Opportunity</th>
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<tbody>
<tr>
<td>IRR_B</td>
<td>11.7%</td>
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Same project ... but ...

Quantifies penalties and uncertainties ...
Example of Risk-adjusted Returns ...

Tariff Selection based on Evaluation of Impact of Risk on Returns

3 cases for Penalty / Uncertainty Evaluation

3 Concession Periods

Several Tariff Models
REST OF THE SLIDES ELABORATE ON

VARIOUS ASPECTS OF

ENSURING BANKABILITY ... &

MITIGATING RISKS
Ensuring Bankability Requires …

- Contractual Considerations
- Project Size & Type
- Governance & Permitting
- Technology Selection
- Revenue Model & Returns
- Project Structure Design

360° perspective on project development
MSW Value Chain & Recommendation

Collection & Transportation
- Community bins provided
- Block collection is common
- Manual collection
- Irregular transportation
- Underutilization of fleet
- Equipment upkeep
- Fleet management

Segregation
- Increasing awareness of segregation at house-holds
- Waste-pickers siphon off recyclables in the open market
- Exposed to health risks
- Use of automated / MRF technology
- Challenges in generating robust investor returns

Processing
- Govt & municipalities are promoting processing
- Low use of Efficient Technologies
- Landfill land is expensive
- Scientific Landfilling (SLF)
- Can be considered if deployment of segregation technology delivers +ve returns
- Utilize global experience & techniques to develop profitable scientific landfills

WTE
- Govt and municipalities are promoting WTE
- Expensive technologies
- Poor Financial closures
- Proven WTE technologies
- Leverage WTE technologies to commission cost-effective WTE plants
Project Size Considerations

- Rural and small towns
  - Activities include waste collection, transportation to local dump-yards, limited segregation, prospects of composting and bio-methanation

- Tier II cities and regions in metros
  - Activities include waste collection, transportation to local landfill, tenders out for scientific landfills, composting, RDF, and waste to energy

- Metropolitan cities
  - Activities include integrated waste processing landfill facilities, waste to energy facilities and landfill gas to energy facilities

- Ideal for C&T and Processing
- WTE is expensive

- Processing & WTE in this segment is the suggested sweet-spot
- Leverage efforts in the 1,000 TPD segment and replicate projects for sustained success
Partnering for Successful Mid-to-Large Projects

Goals

1. Focus on Processing & WtE
2. Quantify risks and educate investors / lenders
3. Ensure robust project returns
4. Deploy cost-effective solutions
5. Work with synergistic partners
6. Ensure successful project execution & long term ownership

Met By

- Project Development Experience
- Robust Tech, Process, and solutions
- Smart Capital & Local Partnership
The Winning Partnership Formula for Processing & WTE Projects

- **Global Expertise**
  - PQ's, Design, Financing and O&M

- **Local Partner**
  - Procurement, Execution & Commissioning

- **Smart Capital**
  - Investors with deep SWM/WTE understanding
  - Lenders aware of risks

- **Project Lead**
  - Robust Tech, Process, and solutions

- **Project Partner**
  - Smart Capital & Local Partnership

- **Financial Closure**
  - Global Tech Partner
  - Investors & Lenders
The Ideal SWM/WTE Project Structure

Building a Foundation for a Long Term Win-Win Relationship

**Strategic Investor**
- Majority Equity Owner
- O&M (supported by Local Partner)

**Local Partner**
- Main EPC Contractor, minority stake, on the ground activities

**Others**
- Technology providers
- Subcontractors
- Lenders

**SPV**
- Designs, Finances, Builds, Owns and Operates Plant & Machinery
- Handles permitting

**Municipalities / Industrial Clients**
- Provides
  - Land lease
  - MSW
  - Statutory permits

**Project Concession period & terms**
Example SWM/WTE Business Models

A Well-Defined Structure and Business Model is Key to Profitability and Bankability of the Project

- **Tipping Fee / Ton**
  - Based on tonnage of waste delivered to landfills

- **Fixed Costs + O&M**
  - Based on tonnage of waste processed

- **Royalty Model**
  - Based on a royalty fee paid to the Municipalities

- **Product Sales**
  - Sales of recyclables, compost, RDF, landfill gas, power and steam

A Combination of these Models can be utilized ...

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A Example BOOT SWM/WTE Business Model

**Fixed Monthly Charge**
Covers project capital expenditures

**Monthly Fixed O&M**
Covers fixed monthly costs

**Variable O&M**
Based on tonnage of waste

**Contractual Considerations**
- Type: BOO, BOOT, BOT etc
- Minimum off-take
- MSW calorific values
- Plant outages / shutdowns
- Equity structures & exit scenarios
- Termination and take over
- Delays, liabilities & damages
- Force Majeure & Indemnity
- Jurisdiction & arbitration
- Others
SWM/WTE Project Development Considerations

- Ensuring timely payments from Government bodies and clients
- Financial status of ULB’s

Revenue Assurance

- Understand municipal processes
- Progress monitoring
- Intervention

Governance

- Contractual terms such as min offtake, first charge, default, termination etc.
- Financial health of SPV members

Bankability

- Partnering with technically and commercially capable comp.
- Ensure similar corporate culture

Partner Qual

- Tariff and business model consideration
- Winning project award in L1 regime
- Taking advantage of local lower costs

Cost Competitiveness

- Rag pickers
- Infrastructure
- Employment of local labor
- Incumbents

Local Issues

- Land availability & acquisition
- Power infrastructure
- RoU / RoW
- Inundated records

Land & Infra Issues

- Nodal clearances
- Permit issuance delays
- Multi-nodal system

Permitting
The Consortium SPV Structure Advantages

The goal of the consortium is to build effective long-term partnerships delivering robust project returns

- A Well-defined Objective
  - MSW segregation, processing and WTE Projects
  - Leverage partners technical pre-qualifications to win projects

- Technical Qualifications
  - Combine Partners’ financial strengths for BOO/T projects

- Financial Qualifications
  - Utilize local cost benefits to boost chances of L1 awards

- Operating Synergies
  - Owning and operating project is SPV’s core competency

- Project Ownership
  - Bankable contract ensures financial closure & robust returns

- Bankability
  - Deploy global & local references

- References
Additional Financing Considerations ...

Methods of bid evaluation (e.g. NPV, Payback, etc.)

Favorably managing forex impacts

Bankability of the project

Harnessing incentives from Global initiatives

These factors need to be carefully evaluated to ensure success in the SWM Projects
A Case Study – Water BOOT

- Identified solid project opportunities with industrial clients having excellent credit ratings and good payment history
- Identified local partner (LP) with very good track record and references
- Enabled technical collaboration between client and LP to submit technical bid
- Advised partners to develop tariff / pricing / operational model such that NPV would be lowest
- Led or supported (as need be) negotiations on water purchase agreement. Explained implications of various WPA clauses to water consumer and EPC partner
- Developed financial models for project, tariff, forex impact etc
- Supported client in due diligence, negotiating EPC contract, share holding in SPV etc
- Advised SPV location, structure etc
- Introduced client to banks to ensure bankability of project and lending terms
- Introduced legal counsel with experience in water to draft local agreements
- Held detailed discussions with tax consultants when evaluating tax implications of business model options
- Addressed critical stumbling blocks during project development and contract negotiations using innovative project planning, structures or approaches
Select Project Opportunities*

- Projects tracked: ~12,000 TPD across India
- Projects are either in PPP, BOOT, DBFOO etc models

*Tender Geographical Analysis (in TPD)*
- West, 8961, 70%
- South, 2450, 19%
- East, 300, 2%
- North, 1100, 9%

*Tender Status Analysis (in TPD)*
- EOI, 3161, 27%
- Planned, 3400, 29%
- RFP / RFQ, 3700, 31%
- Awarded, 1500, 13%
References

- Encito Advisors proprietary research
- India’s annual generation of urban waste in 2025 – World Bank Reports
- MSW Potential in India – Ministry of New & Renewable Energy (MNRE)
- Ministry of Agriculture (MOA)
- Ministry of Environment & Forests (MOEF)
- MNRE Annual Reports
- WBI Development Studies
- National Solid Waste Association of India (NSWAI)
Encito Advisors
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- Hydro
- Biomass/Biofuels
- Oil & Gas
- Energy Efficiency
Thank you …