Economic Viability of Solid Waste Management Projects

A2Z Infrastructure Ltd.

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Introduction – Municipal Solid Waste & its Management

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- India generates about 1.5 Lac tonnes of urban Municipal Solid Waste (MSW) daily
- India is now among the top 10 countries* generating the highest amount of MSW due to growing urbanization and high consumption.
- The MSW is becoming a serious health hazard for our citizens and posing a big challenge in keeping the upkeep of our cities.
- Such large volumes of waste create environmental pollution damaging quality of air, water and soil by emission of toxic substances.
- There is an urgent requirement to find ways of disposing the municipal waste in the country while adopting the most efficient and cost-effective techniques which will also help to reduce the
  - Green House Gas emissions,
  - Mitigate the Climate Change impact and
  - Combat the Global Warming phenomenon.

* - http://www.worldwatch.org/global-municipal-solid-waste-continues-grow

Need for MSWM

- Most wastes that are generated, find their way into land and water bodies without proper treatment, causing severe water pollution. The adoption of environment-friendly waste-to-energy technologies that will allow treatment and processing of wastes before their disposal can mitigate this problem significantly.
- Promotes cleanliness in the cities improving the overall health conditions of citizens.
- Decrease Landfill Waste
- Reduce emission of Green house gases such as Carbon Di-oxide & Methane.
- Increase Recycling Rates
- Reduce reliance on fossil fuels
- Creating New Jobs

Brief Profile – A2Z Infrastructure Ltd.

A2Z Maintenance & Engineering Services Ltd.

Promoter Company

A2Z Infrastructure (Company)
Holding Company for all Municipal Solid Waste Concessions of A2Z Group

Type	Number	Total Capacity (TPD)	Operational Capacity (TPD)
Integrated	15	7,722 (C&T), 8,102 (P&D)	7,722 (C&T), 2,720 (P&D)
Collection & Transportation	2	240	240
Processing & Disposal	8	835	55
Total	**25**	**7,962 (C&T) 8,937 (P&D)**	**7,962 (C&T) 2,775 (P&D)**

MSW Portfolio with long term concessions..

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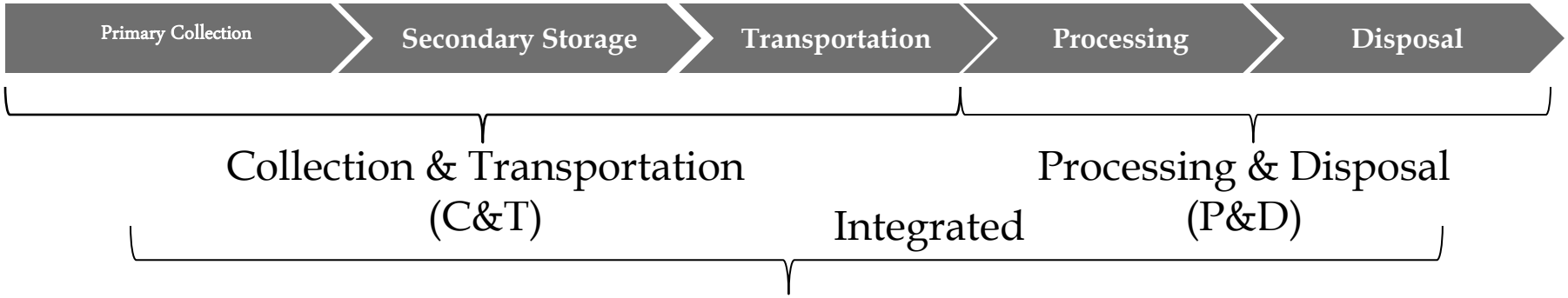
	Project	Capacity (TPD)	Concession Period (Yr)
Integrated	Aligarh	220	30
	Ghaziabad	275	30
	Kanpur	1500	30
	Meerut	600	30
	Ranchi	500	30
	Varanasi	600	30
	Moradabad	280	30
	Indore	600	C&T: 7+5; P&D: 25
	Muzzafarnagar	120	C&T: 10; P&D: 30
	Ludhiana	1,067	25
	Nainital	40	15
	Nanded	250	C&T: 5; P&D: 30
	Dhanbad	450	30
	Jaipur	1000 (C&T), 600 (P&D)	20
	Ahmedabad	220 (C&T), 1000 (P&D)	C&T: 6+3; P&D: 20
	Sub-total	**7722 (C&T), 8102 (P&D)**	
C&T	Darbhanga	120	7+5
	Bihar Sharif	120	7+5
	Sub-total	**240 (C&T)**	
P&D	Amravati	300	30
	Mirzapur	100	30
	Sambhal	75	30
	Badaun	55	30
	Ballia	40	30
	Fatehpur	55	30
	Jaunpur	80	30
	Firozabad	130	30
	Sub-total	**835 (P&D)**	
	Grand Total	**7962 (C&T), 8937 (P&D)**	

Power Project	Capacity (MW)
Kanpur	15

MSW Business Model

- MSW business entails a private entity taking up concession contracts from municipal corporations for undertaking solid waste management services in a designated area

- The contracts are primarily of three types:
  - C&T Contracts (Collection and Transportation Contracts)
  - P&D Contracts (Processing and Disposal Contracts)
  - Integrated Contracts (i.e. contracts covering collection, transportation, processing and disposal)



Each individual step in the MSW Value Chain is explained in subsequent slides (with reference to A2Z's Kanpur Integrated Project)

The current contracts awarded by Municipalities are typically C&T or P&D or Integrated Projects

The MSW Processing Derivatives

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	% Output
Compost *Complements Chemical Fertilisers*	~12%
RDF *Used as a supplement to coal*	~28%
Recyclables	Negligible
Inerts & Moisture	~60%

Net realization	INR 1.2 – 1.5/kg

Net realization	INR 1.5 /kg

The A2Z Experience – What we inherited in Kanpur..

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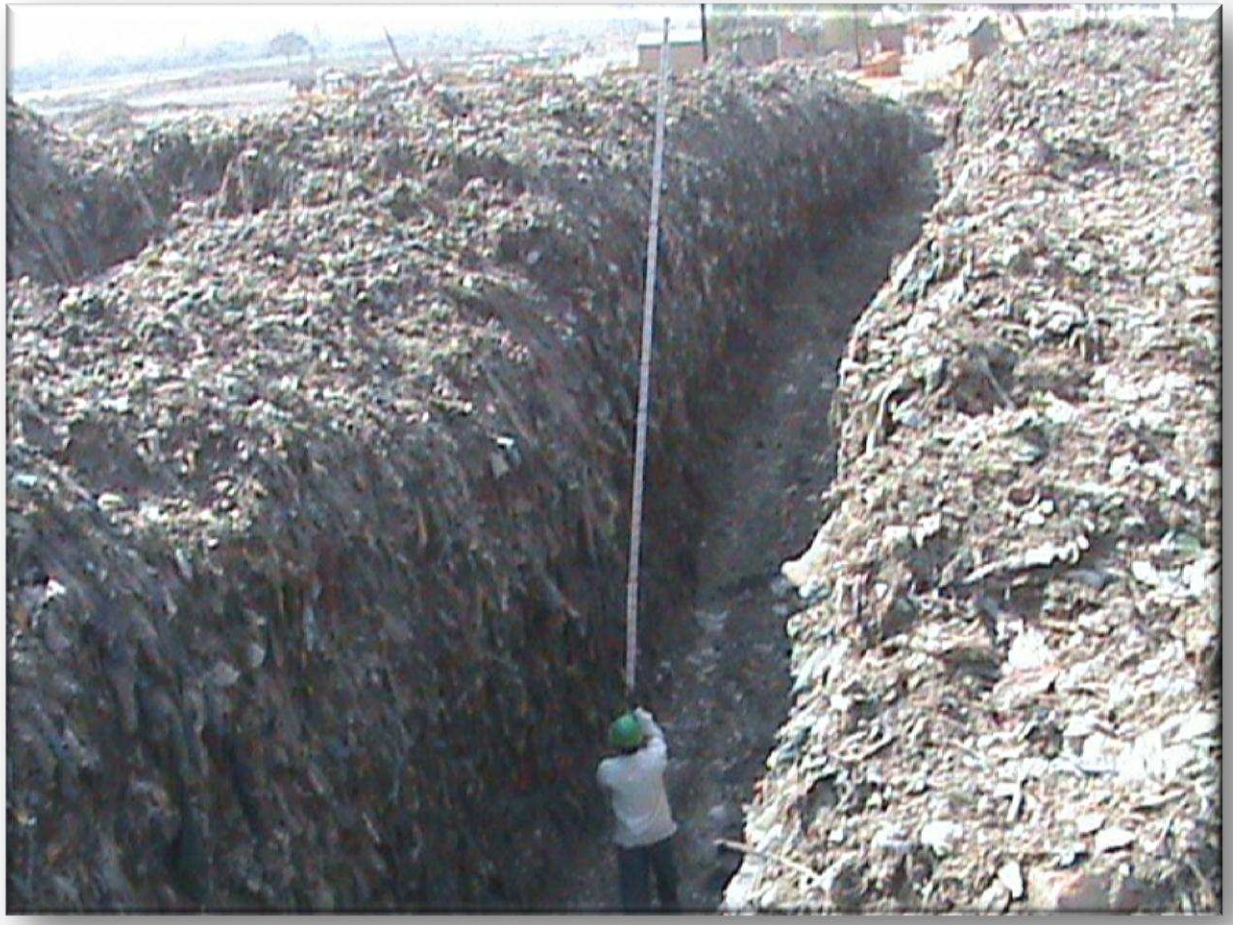

The A2Z Experience – What we inherited in Kanpur..







The A2Z Experience – What we made out of it..

The A2Z Experience

- Scientific Waste management is required to get rid of burgeoning problem of waste
- Noble cause that cleans the city and keeps the environment clean
- Huge Public support for utilities that deliver. E.g. Kanpur and Ludhiana

However, there have been hiccups too…

- Production of compost is seasonal in nature, so is the demand
- RDF has very low off take and very little acceptability as a fuel even though it is a green substitute of coal.
- Mixed waste is highly corrosive leading to higher wear and tear in plant & machinery
- Site provided for setting up processing plant is not free from incumbency leading to unnecessary delays.
- Site provided sometime has legacy waste there and significant cost is incurred on clearing the waste which leads to cost overruns.
- Land provided in not contiguous & there is no interconnectivity between the pieces of land.
- Concessionaire is treated as Contractors & not as partner for long duration.
- Political changes in local or state level administration disrupt operations adversely.

Major Financing Hurdles

- The financing of these projects is difficult as the lenders can only have charge over the movable fixed assets
  - No charge over the civil works done as the underlying land cannot be hypothecated as per tenders. Further, a significant cost is incurred in site development as well as development of SLF which doesn't give a tangible charge to the lenders of the project

- Several contracts terms & conditions do not allow assignment of contracts in favor of the lenders making financing difficult from banks.

- Lack of a Model Concession Agreement results in an agreement skewed in favour of the ULB.

Economic Viability

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- Typically, under JNNURM & UIDSSMT schemes, one time viability gap funding is provided by Central govt., State govt. & Urban Local Body (ULB, Municipal Corporation)
- However, this is not a long term sustainable solution as once the plant & machineries get deteriorate over a period of time, the returns are negligible and at times non existent because of low marketability of Compost & RDF.
- This results in non-availability of funds for replacement capital expenditure after a few years.
- Therefore, in order to make these projects financially viable, the operations should be self sustainable.
- This can happen only if the off-take of Compost & RDF are given support of the government & RDF is converted to energy by using appropriate environment friendly technologies.
- The Waste to Energy (W2E) projects are considered to be the most successful mechanisms across the world which not only help to manage the urban waste but also generate precious electricity.

Project Economics – Waste to Energy Projects

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- Through our experience, we have realized that recovery of compost & RDF from the waste and using RDF to fuel boilers and generate electricity is the most viable, self sustainable & environmentally suitable alternative.
- Waste to Energy – Utilizing RDF to produce electricity to be sold at a preferential tariff
- To encourage private sector participation, the government needs to provide a minimum return on equity of 20% to the project proponents.
- **SAMPLE ECONOMICS**

1000 MTPD MSWM project & 10 MW Waste to Energy Project

Project Cost	**(INR Crore)**
MSW Project Cost	70
Power Plant Cost	80
Total Project Cost	**150**
Debt: Equity	2.33:1

Key Parameters	
Compost Yield	12-15%
RDF Yield (Dried & Destoned)	28%
Plant Load Factor Stabilized	80%
Auxiliary Consumption	12%

Assuming Compost revenues at Rs. 1,500 per Ton, the estimated power tariff to earn a 20% Return on Equity is Rs. 12.00 per unit of electricity.

Comparable Projects' Economics

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- **A2Z's projected cost of Rs. 8 Crore/ MW is much lower by international standards**
  - A 95 MW Waste to Energy facility in Palm Beach, Florida awarded to a consortium including Babcock and Wilcox. Estimated Contract Value - $668 Million (~Rs. 42.2 Crore/MW)
  - Hitachi Zosen Inova (HZI) - an engineering, procurement and construction (EPC) contractor specialised in waste to energy facilities - has been awarded the contract for FCC Environment's 22 MW Greatmoor facility in Buckinghamshire, UK.. Project Cost - GBP 144 Million (Rs. 58.90 Crore/MW)

- **And by Indian standards too**
  - Essel Infraprojects to set up a 3 MW project at Pallavaram at the project cost of Rs. 100 Crore (Rs. 33.33 Crore/MW)

http://www.waste-management-world.com/articles/2013/05/22-mw-greatmoor-waste-to-energy-contract-for-hitachi-zosen-inova.html
http://www.waste-management-world.com/articles/2011/04/palm-beach-awards-668-million-waste-to-energy-contract.html
http://www.eai.in/ref/ae/wte/wte.html

Justification for a higher tariff for such Projects

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Power Generation Potential

- According to the Ministry of New and Renewable Energy (MNRE), there exists a potential of about 1500 MW from MSW which is less than even 0.75% of total electricity capacity installed in India.
- Indian Renewable Energy Development Agency (IREDA) estimates indicate that India has so far realized only about 2% of its waste-to-energy potential
- Further, as the potential is even 0.75% of total electricity capacity installed in India, the final impact on utilities will be minimal.
- Providing a higher tariff & attracting private investments in the waste to energy sector will accrue future benefits in health, sanitation, job creation, & environment protection which far outweigh the minimal costs that the government will incur by giving a higher tariff to such projects.

http://www.waste-management-world.com/articles/2013/05/22-mw-greatmoor-waste-to-energy-contract-for-hitachi-zosen-inova.html
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The Way Forward – Requirement of Govt. Support

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- Source segregation of MSW to Inorganic matter, Metallic, Non Metallic, Organic Waste would reduce the operational expenditure incurred in segregation of waste.
- Formation of Standard and Uniform Concession Agreements (CA) will help these projects get financing easily as existing Concession Agreements are one sided putting all the risks on concessionaire and rewards to ULB.
- 100% capital grant should be given for
  - S.L.F construction
  - Laying of HT power line up to project site
  - Site development including removal of garbage, earth filling and land levelling
- Single Window Clearance for all statutory requirements/compliances
- Waiver of fee for "Consent to Establish" and "Consent to Operate" as these facilities are mitigating Air and Water pollution

The Way Forward – Requirement of Govt. Support

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- Classification of MSW industry as "Priority sector" and provide Soft loan with 3 years moratorium on interest payment etc. as these projects take time to set up and stabilize
- Extension of exemption of "Excise Duty" on all equipment and machinery used in MSW management
- Implementation of "Agricultural Electric Tariff" for processing plants as per the directives of Hon'ble Supreme Court.
- Implementation of "Road Tax Exemption" on all vehicles used for MSW management
- Implementation of Co-Marketing of Organic Compost with Chemical fertilizers as per the directives of Hon'ble Supreme Court
- State Govt. should guarantee "Purchase of minimum 50% of Compost Produced" & to market the same for improving the soil quality in the state
- Fiscal and Financial Incentives for MSW Power Plants at par with other non-conventional energy sources like Solar and Wind
- **Special tariff for Power Plants using MSW as fuel on lines of Solar and Wind Energy**
- Compulsory usage of RDF as an auxiliary fuel not less than 15% by all coal based Thermal Power Plants and Cement Plants

The Way Forward – Requirement of Govt. Support

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- Purchase obligation for NTPC and other power generation companies for cogeneration coal where 25% higher premium should be given to RDF for getting the same amount of calorific value as coal.
- Renewable generation mandate should be there for generation company as in case of distribution sector in RPO
- Tax holidays, exemption of custom duty, excise duty, sales tax and other local taxes on equipment, machinery, processing plant etc.

All these factors will help in attracting private investment in this sector and will help in providing a Long-term, Self Sustainable & Economically Viable solution to Waste.

Thanks