



PPP in Waste Management in India : Opportunities, Barrier and Way Ahead

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[IWMUSL]

Objective

- Existing Scenario : Management Solid Waste (MSW) , India
- Regulatory Framework
- IWMUSL : An Introduction and Initiatives
- Opportunities
- Barriers
- Way Ahead

Existing Scenario in Municipal Solid Waste

- **Over 50 Million Tonnes Municipal Solid Waste (MSW) generated per annum in Indian cities.**
- **Open dumping a common practice, no scientific closure of landfills – public health menace, GHG emissions.**
- **Negligible work on waste management including waste minimization, its reuse & recycling.**



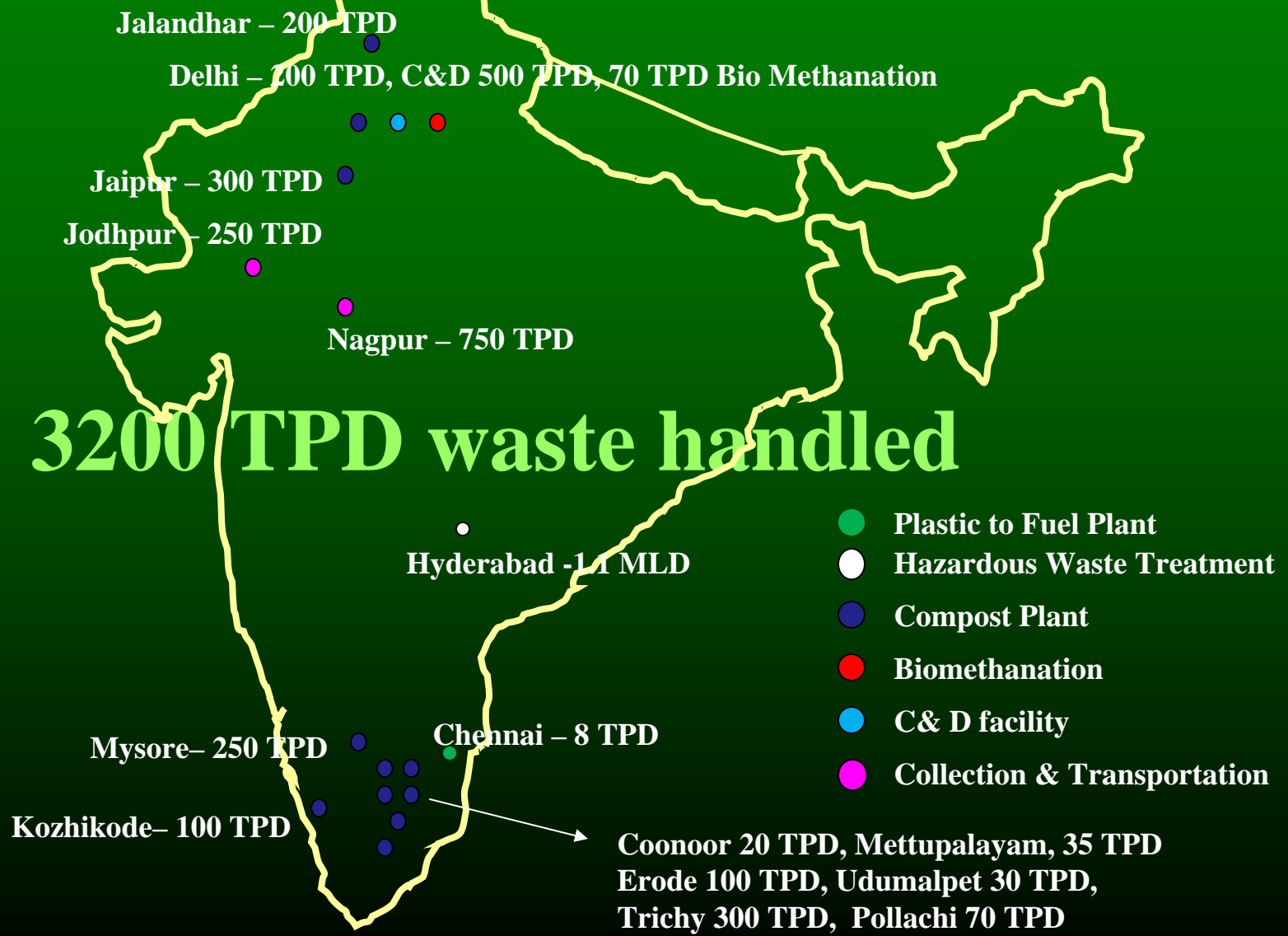
SWM - Regulatory framework

- Laid out in the 'Municipal Solid Waste (Management and Handling) Rules, 2000';
- Responsibility :
 - Municipalities:
Collection, Segregate, Transportation, Processing and Disposal of MSW in a scientific manner;
 - State Government:
To enforce the provisions of these rules.

IL&FS Waste Management and Urban Services Ltd. (IWMUSL)

- The Company was incorporated in August 2007
- IWMUSL currently has 20 mandates (12 in operation and 8 under construction) in the Waste sector covering:
 - Collection & Transportation of MSW
 - Composting
 - Bio-Methanisation
 - Construction & Demolition Waste
 - Plastic to Fuel
- Mandates in Composting alone is 2200 TPD, making IWMUSL one of the larger players in the MSW sector in India.

Plant Locations



Our Pathbreaking Initiatives



Composting

(Okhla: Lease of Defunct Assets)



C&D

(Burari :10 year concession)



Dumpsite closure

(Gorai : construction plus long term O&M)

Okhla Compost Plant

- Municipal Corporation of Delhi (MCD) signed a Concession Agreement for 25 years with IL&FS - Revival of Compost Plant (200 TPD to be expanded to 500 TPD) at Okhla, New Delhi
- Process using Aerobic Windrow Composting, compliant with MSW Rules, 2000,
- IL&FS to finance and operate, MCD to provide garbage and land at nominal lease



Dilapidated Okhla Plant



Present : Operating Plant



Existing Composting Projects

- Industry Experience so far has not been very encouraging
- Small scale of operations
- Lack of professional approach
- Inferior quality compost
- Low margin



Differentials which IL&FS/MCD built into the Project

- Signed offtake agreements with major fertilizer companies
- Professional management capability
- Pre and post processing quality checks
- CDM revenues

Financial Engineering (CDM Revenues)

- Waste processing projects avoids methane emissions from anaerobic decomposition of MSW in a landfill,
- Methane is a Green House Gas with high Global Warming Potential (21 times CO₂),
- IL&FS pioneered advance Carbon funds for MSW management project,
- Last year US\$ 2.5 million as upfront payment, this year US\$ 2 million as upfront payment for composting projects,
- Expected CDM revenues at Okhla till 2012 will be around US\$ 2 million.

1 US \$ = Rs. 49.72

Composting Process



Windrow Formation



Monsoon Shed



Coarse Segregation



Packing



End Product



Refinement

Project Benefits

- Clean Urban Landscape, prevent open dumping;
- Enhance Rural Soil Productivity;
- Reduce Green House Gas Emissions;
- Replicable role model.

C&D : Current Scenario

- About 10-12 million tons generated annually in India;
- Delhi generates about 2000 TPD;
- Wastes are heavy, with high density; and
- Consists mostly of inert and non-biodegradable material;



- Concrete and masonry waste, which is more than 50% of C&D waste – not recycled.



C&D Waste Management : A Pioneering Initiative

- Land Size -7 Acres in Burari, Delhi
- Capacity- 500 TPD, Greenfield project
- Land Ownership - Municipal Corporation of Delhi (MCD)
- Leased for a period of 10 Years to IL&FS on Develop, Build, Operate and Transfer (DBOT) basis

Before



After



Pavement Blocks and Kerbstones



Processing System

- **Processing site at Burari, equipped with**
 - Weighbridge
 - Processing machinery, including feed conveyor, and hopper, sizing and screening system
 - Backhoe, loader, trucks
- **Material after receiving is segregated, processed and graded by size; and**
 - Used for making pavement blocks and Kerb-stones;
 - Used as sub-base in road construction (certified by CRRI);
 - Dirt/loose soil to be used for landfilling.

Cooperation from Municipality (MCD)

- Facilitated office order to :
 - send the C&D waste generated by different sites under Government agencies to Burari facility;
 - approve rates for C&D waste processing fee for all Government agencies.
- Assurance to make Buyback arrangements of pavement blocks and Kerbstones;
- A true model working on Public Private Partnership (PPP).

Benefits to Delhi

- Compliance with MSW, 2000 Rules;
- Reduces stress on present disposal sites and increases the life of existing landfills;
- **Improvement in C&D Debris Management Situation in Delhi before Common Wealth Games;**
- Improving efficiency of Composting and Energy Efficiency processes;
- Long-Term Sustainable Solution;
- Recycle and reuse of C&D Debris;
- Gradual shift of illegal C&D debris dumping to legalized disposal system;



Gorai Dumping Ground, Mumbai

Mumbai - Waste Scenario

- Area : 437.71 sq km
- Population : more than 12 million people
- MSW generated : around 6,500 Tons Per Day (TPD) of MSW
- Construction and Demolition (C&D) waste : 2,400 TPD

Gorai Dumping Ground : A case study

- 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 neighbourhood Citizens.

Gorai Site : Prior to Closure



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

Gorai Site : Scientific Closure (Phases)



Slope Reformation



During Capping

After Scientific Closure



A benchmark in Urban Rejuvenation

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.

Financing Engineering

- IL&FS Ecosmart Limited has pioneered the utilization of Carbon Credit advances for SWM projects.
- The Gorai transaction is one of the largest Carbon advance transactions in the Clean Development Mechanism (CDM).
- Gorai is the first dumpsite closure project from India to be registered at the UNFCCC.
- MCGM received a Carbon advance of Rs 250 million against future delivery of Carbon Credits from the Asia Carbon Fund of the Asian Development Bank for the project.
- The project is estimated to reduce Greenhouse Gases by an estimated 1.2 million tons of CO₂ over a 10 years crediting period.
- The project demonstrates that the Carbon financing can catalyze MSW projects and enhance the financial viability.

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 (CH₄) releases into the atmosphere are reduced.

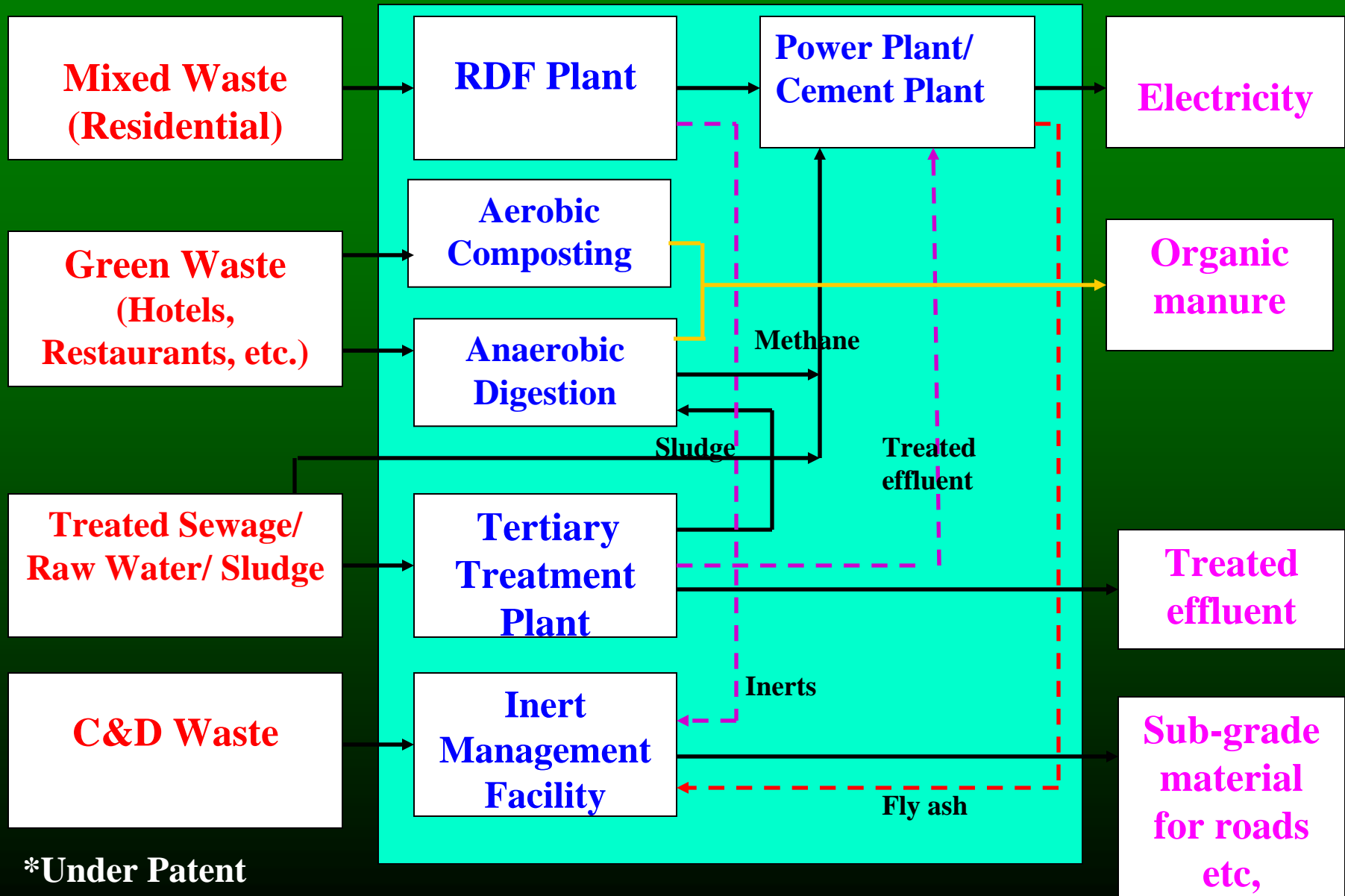
Project Benefits

- 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 odour 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.

Opportunities

- Integrated approach;
- Carbon Financing.

Integrated Technology*-Mix Option



Carbon Financing

- IWMUSL has pioneered the utilization of Carbon Credit advances for SWM projects.
- Demonstrated that the Carbon financing can catalyze MSW projects and enhance the financial viability.

Barriers

- Budgetary allocation by Municipalities for SWM - 40% ;
- Bulk of spending (80%) on Collection and Transportation;
- Very little on processing or treatment;
- Less than 5% of the MSW in our country is disposed in a proper scientific manner;
- Municipalities under tremendous pressure to address the processing and disposal of MSW;
- Lack of institutional and financial capability;
- Lack of viable business models in the sector.
- Municipalities dependent on budgetary sources of revenues from the State/Central Government.
- Identifying Suitable Site
- Willingness to Pay for Waste Management

Challenges (Waste to Energy)

- 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 Syndrome;
- Lack of Tipping Fees.

Way Ahead

- Tipping fee – User Charges for SWM services crucial for private participation ;
- Develop technologies given our waste characteristics. Combine liquid and solid waste;
- Reuse and Recycle all possible waste streams;
- Proliferate Education and benefits of segregation and waste management especially in schools.

Way ahead (cont.)

- Long term financing : Projects that are in a nascent sector and need long tenure financing secured by project cash flows and carbon revenues
- Carbon Financing – Advances and post 2012 financing
- Patient Equity capital

Way Ahead : Government help

- Uniform Enforcement of Rules;
- All Corporates to adhere ;
- Bill Discounting for approved Municipal bills ;
- Long term agreements including
 - a) commitment of waste
 - b) availability of land
- Charge a fee along with electricity, water bills for SWM.

Way Ahead : Government help (cont.)

- Fertilizer subsidy – Integrated Plant Nutrient Management.
- Waste to energy – preferential tariff as in Solar Mission
- Land (NIMBY) and Environmental clearances
- Carbon Revenue sharing – Major share to private sector
- E Waste – Producer Responsibility

Wastes are nothing but Misplaced Resources !

Thank You

Reduce, Reuse and Recycle !



Back Up

Typical Composition of MSW in India

- **Fast Biodegradable** : **Compost/biogas**
- **Woody Bio-mass / Biomass**
- **Paper** : **Energy**
- **Rags/Textiles**
- **Plastic / PVC**
- **Rubber etc.** : **Recycle/Re-use**
- **Glass**
- **Metals**
- **Stones** : **Building Material**
- **Sand/Earth etc.**

Illegal Dumping

Saket



Sarai Kale Khan



Near CPCB



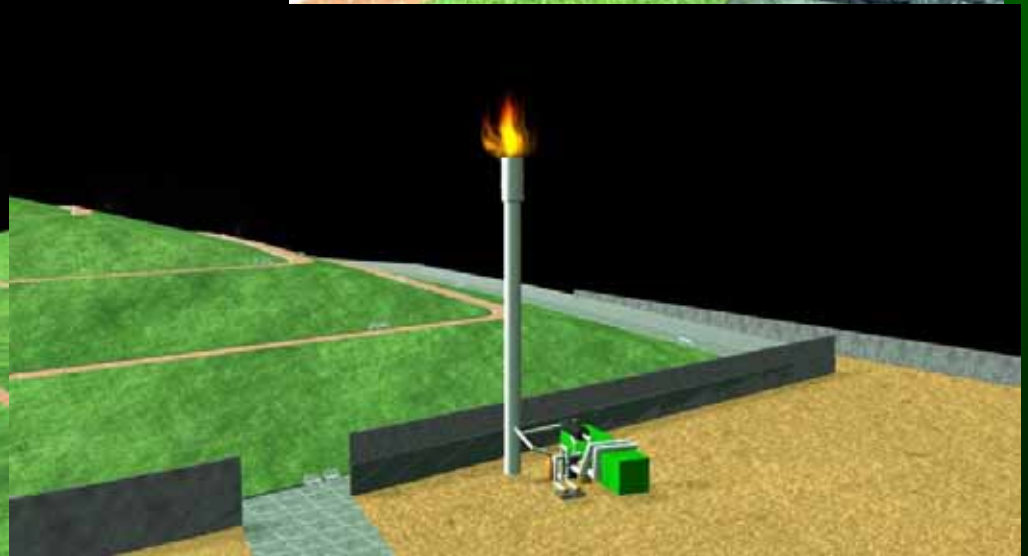
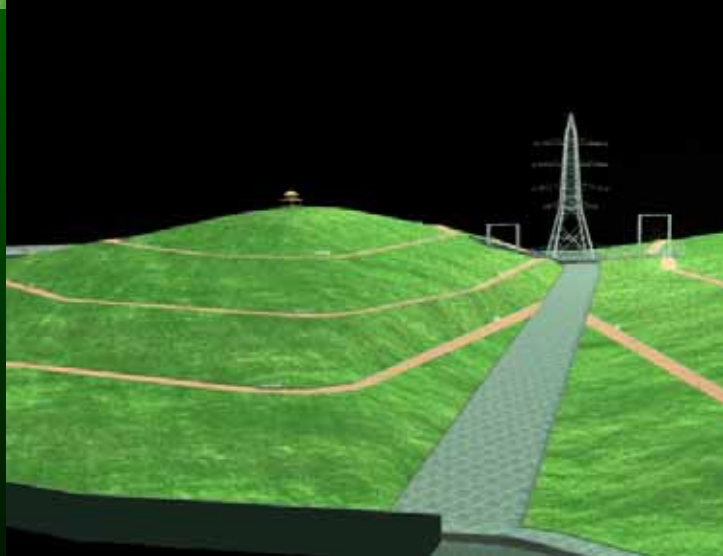
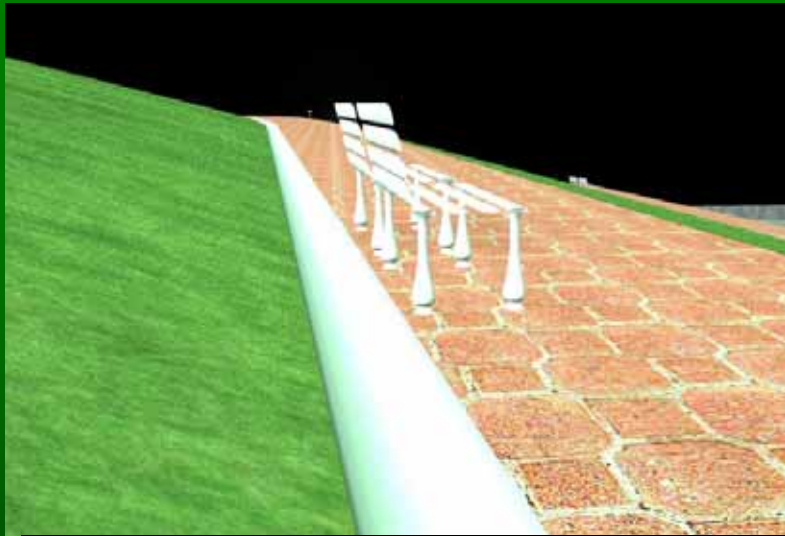
Near LNJP



Test Road



Gorai Landfill 3D Plan



Bidding Strategy

- Selection of private operator on **Design, Build, Own, Operate & Transfer (DBOOT)** basis
 - Concession period – **25 years**
- Operator's Responsibilities
 - Project implementation within specified timeframe
 - O&M of the site during the concession period
 - Mobilize funds for the project
 - Compliant with MSW Rules 2000 and other applicable laws
- Operator's rights
 - Rights over revenue from sale of process outputs
 - CDM Benefits (50% sharing)
- MCGM's obligations
 - Make arrangement for delivery of waste at the site
 - Provide land at disposal site on lease during concession period
 - Facilitate fund mobilization
 - Payment of tipping fees

India – from ‘Developing to Developed’

- India in midst of tremendous infrastructure and industrial growth;
- Greater Growth proportionate to Increased Waste generation;
- Needed proactive approach to create Waste Management Infrastructure to scientific management of waste
- Scientific Waste Management no longer only Corporate Social Responsibility – should be a legal binding/obligation in country;
- PPP provides an answer for ushering into ‘Sustainable Growth’;
- Need to set Robust examples in Country for Replication.