12 MW Waste to Energy Project
(Ghazipur, Delhi)

East Delhi Waste Processing Company Ltd.
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Introduction to IEISL
IL&FS Environmental Infrastructure & Services Ltd (IEISL)

- Incorporated in 2007, IEISL is a wholly owned subsidiary of Infrastructure Leasing & Financial Services Ltd (IL&FS), A Premier Infrastructure Company in India.

- The company provides sustainable solutions in Environmental Services and Waste Management Sector:
  - Integrated Municipal Solid Waste Management
  - Closure of Dumpsites
  - Waste to Energy
  - Clean Development Mechanism (CDM)
  - Environmental Consultancy, Audits & Energy Efficiency
  - Construction & Demolition Waste Management
  - Geospatial Solutions

- The Company has waste management projects across India and mandated to manage over 10,000 TPD waste.

CDM: All existing projects of IEISL have been registered with UNFCCC
Pan India Operations (Waste Management)

Over 10,000 TPD* of Waste Management Mandates

- Okhla Plant 500 TPD
- C&D Project 2500 TPD [East Delhi Corporation & Jahangirpuri]
- Waste to Energy 2000 TPD
- Integrated Project 1200 TPD
- Construction & Demolition Projects 2500 TPD
- Compost Plants 2749 TPD
- Collection & Transportation 1535 TPD
- Hazardous Waste 1.1 MLD
- Advisory Business Offices

- Vadodara 435 TPD
- Jaipur 300 TPD
- Nagpur 1100 TPD
- Hyderabad 1.1 MLD
- Mysore 250 TPD
- Mangalore 175 TPD
- Kozhikode 100 TPD
- Tamil Nadu (6 Projects) 524 TPD
- Conoor, Mettupalayam, Udmalpet, Trichy, Erode, Pollachi

* Tons Per Day
IEISL believes in Integrated approach of Waste Management, thus managing different fractions of waste separately with Proven & Environmentally sound technologies to produce useful by products.

Our footprints in Delhi’s waste management scenario:
- Okhla Compost Plant
- Ghazipur Waste to Energy Project
- Jahangirpuri Construction & Demolition Waste Management Project
- Upcoming C & D Waste Management Project at Shastri Park
About the Project
About the Project

- Ghazipur Waste To Energy (WtE) project is Public Private Partnership (PPP) project of Delhi Government for Scientific management of MSW
- EDMC will provide 2000 tons of MSW per day for processing
- Agreement has been signed with DJB to supply treated Sewage
- Treated Sewage from Kondli STP of DJB will be used for process water after detailed treatment system installed at Varun Enclave & Project Site.
- PPA for 49% of exportable power signed with BYPL
- EE & REM centre (Dept. of Power) is the Nodal Agency from Delhi Government
- IEISL is making all the investment for the execution of this project
Project Contours

ENVIRONMENT MANAGEMENT PLAN:

Flue Gas Treatment Plan (FGTP)
Odor Control
Noise Control
Leachate Treatment Plant (LTP)
Management of Solid Residues (Ash)
RDF Plant Details
MSW Characteristics

- Highly heterogeneous in composition and size
- Mixed with soil, road sweepings (dust), drain desilting, etc.
- High Moisture Content

70% of MSW is being collected and 12.45% is being processed or treated and rest quantities remain untouched (CPCB)

90% of the collected MSW is disposed of unscientifically in open dumpsites, creating problems to public health and environment

MSW without pre-processing poses following problems:

- Low combustion efficiency due to high Inert & Organic content
- Larger specific flue Gas volume - due to high moisture in MSW
- Larger Equipment & high cost of flue gas cleaning
- Larger Volume of Ash
- Extra supplementary Fuel (Oil) due to lower MSW CV
- Frequent breakdowns because of Corrosive
- Heavy load of dust in boilers
- Higher leachate generation in storage pit – more treatment cost
DST- TIFAC recommended process for pre-processing of mixed MSW to produce good quality fuel (RDF) and reduction in pollution. Steps are:

- Manual Sorting - Segregation of PVC, Oversized Combustible & Inert
- Mechanical Sieving - Segregation of Combustible, Organic & Inert
- Shredding - Use of World’s best Shredders for sizing of RDF
- Drying - Reduction in moisture content of RDF by Rotary Dryer
- Air Classification - Final segregation of Combustible & Inert

No other MSW facility in the Country has such elaborate Pre Processing

- Spray of Organic Culture on MSW and abetment measures for odor control by maintaining negative pressure and introducing the odorous air into the boiler
- Integrated Approach for Sustainable Management of Combustible, Organic & Inert
- Proper Treatment of Dryer Flue gases after reduction of moisture
- Double stage Biological Treatment of Leachate with advance Kurare PVA Gel Technology of Japan
Elaborate pre-processing provides redundancy to accept garbage with silt etc.
RDF Characteristics

- Low density material
- Moderate moisture content,
- High quantity of volatile matter (VM) and
- Low fixed carbon.

<table>
<thead>
<tr>
<th>RDF Specifications</th>
<th>Avg. Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Heating Value</td>
<td>2800 ±100 kcal/kg</td>
</tr>
<tr>
<td>Net Heating Value</td>
<td>1880 kcal/kg</td>
</tr>
<tr>
<td>Bulk Density</td>
<td>80 to 100 Kg/Cum</td>
</tr>
<tr>
<td>Size</td>
<td>All minus 100 mm</td>
</tr>
<tr>
<td>Moisture Content</td>
<td>15% to 25 %</td>
</tr>
<tr>
<td>Volatiles</td>
<td>40% to 60%</td>
</tr>
<tr>
<td>Fixed Carbon</td>
<td>10% to 15%</td>
</tr>
<tr>
<td>Ash Content</td>
<td>15% to 25%</td>
</tr>
</tbody>
</table>

The pre-processing gives following advantage:
- Sustained and efficient combustion
- Recovery of thermal energy for direct heating or power generation offers an added advantage
- Relatively higher boiler efficiencies
- Comparatively low specific volume of flue gases
- Lesser volume of ashes
- Higher Boiler reliability
- reduces the quantity of dioxins emitted from MSW combustion facilities
- Occasional generation of Leachates - less cost of leachate treatment
- Good shelf life of RDF-May be transported to nearby power & cement plants as alternate mixed coal fuel
- Combustibility - can be mixed with other solid fuels for energy
- No foul smell & dust free fuel
MSW PIT & GRAB OPERATIONS

PRE-PROCESSING SECTION
AIR-DENSITY SEPARATOR

HAG & DRYER
Power Plant Details
Technology Adoption – Power Plant

- Boiler Technology & Basic Engineering from Keppel Seghers Belgium World Leader in Waste to Energy Plants with more than 100 operational plants worldwide
- Tailor-made moving, reciprocating & tumbling Grate especially designed for better combustion efficiency of RDF and low emission
- Triple pass boiler for complete combustion & progressive removal of Suspended Particulate Matter (SPM) to reduce toxic emissions
- Design Provision in Boiler for more than 2 sec retention of flue gases at plus 850 °C temperature to disintegrate Dioxin & Furans
- **EURO Norms** Compliant Flue Gas Treatment System (FGTS) by Keppel Seghers Belgium. Most advanced FGTS technology for Emission control
- Detailed Scheme for FGTS to treat SPM, SO\(_x\), NO\(_x\), Heavy Metals, Toxic Gases & Dioxin & Furans
- Visitor Gallery & CEMS
Four member expert committee from IIT Delhi carried out Technical Evaluation of Ghazipur WtE Plant from April 2014 to Mar 2015. Excerpts of their report are:

- RDF route of combustion is more reliable than mass incineration
- Use of DST TIFAC technology can provide RDF of high combustibility - clean combustion, less pollutants
- Considering proximity of residential area, pollution control measures taken are commendable
- Land area has been efficiently used. Project site is only 5.63 acres against the standard of 1 acre per 100 tones of waste
- Monitoring of operational performance of plant is necessary and thus, recommended
- Plant incorporates highest standards of pollution control equipment
- Use of European technology for boiler & FGTS makes it a world class WTE plant
POWER PLANT SECTION

TURBINE
Environment Management System
EMS

Odor Control
- Negative pressure
- Herbal inoculums

Noise Control
- Enclosed facility
- Greenbelt

Social Inclusion
(Area Development Plan)

Occupational Safety & Health
(Dust and odor control)

Residue Management
(Fly ash & Bottom ash)

Disaster Management
(Fire Safety)

Leachate Treatment Plant

Flue Gas Cleaning System
(Boiler & Dryer)

Disaster Management
(Fire Safety)
Flue Gas Treatment System

**Lime** injection for neutralization of acidic gases and precipitation of heavy metals.

**Activated Carbon** injection to adsorb mercury vapours, odorous constituents and complex organic compound like dioxins and furans.

**Other Measures**
- Manual Segregation of chlorinated plastic.
- Temperature control in furnace.
- SNCR (Ammonia / Urea injection in boiler) for NOx control.
- Multi pass boiler to capture maximum particulate matter in bottom/boiler ash.

**Semi-wet Reactor**

**Bag Filter** removes remaining SPM (fly ash) including Air Pollution Control (APC) residue.

**Clean air**

**CEMS** for continuous emission monitoring for public display through website and boards.

**ID Fan**

**Chimney**
FLUE GAS TREATMENT SYSTEM
Leachate Treatment Plant

- Leachate
  - Skimmer
  - Collection/Equalization Tank
- Chemical Treatment
  - T/t of Total Suspended Solids, Colour removal and Heavy metals precipitation
  - Reduction of Ammonia
- Stripping Tower
- Two Stage Biological Treatment Process
  - Anaerobic Hybrid Reactor
  - Aeration Tank (KURA GEL Technology)
- Filtration
  - Treated Water for Horticulture use
- Biological Sludge

Homogenization of the variable characteristics of Leachate

- Reduction of BOD and COD

- Ferrous
- Lime
- Polyelec.
- Ambient Air Contact

- Chemical Sludge
LEACHATE TREATMENT PLANT
Management of Solid Residues

• **Bottom ash**: Use
  – Making hollow block for construction work
  – Raw material for cement production
  – Can be mixed with RMC
  – Can be used as filling material

• **Fly ash & APC residue**
  – Depending upon the characteristics, can be used for cement blocks and asphaltic mixtures
  – To be disposed at secured landfills after testing its leachability
Area Development Plan
Ghazipur – Inappropriate Land Use

- 70% of Delhi’s Poultry Trade
- 95% of Delhi’s Flower Trade
- 95% of Delhi’s Fish Trade
- 80% of Delhi’s Meat Trade
- 80% of Delhi’s Meat Trade
Prevailing conditions of the area around the Project Site

1. Incompatible land use
2. Poor condition of physical infrastructure
3. Hazardous living conditions in slums; no medical facility
4. Poor living conditions of workers in markets
5. Dismal social infrastructure
6. Negligible livelihood support
7. Accessibility and street network; poor connectivity to rest of city
8. Adverse environmental impact on surroundings

- **Solid Waste Disposal**
  - Attracts Scavenging Birds and Animals
  - Health and Safety Risks
- **Food Processing and Sale**
  - Smell and Noise
  - Traffic Congestion
  - Health & Safety Risks
- **Residential**
  - Smell
  - Health and Safety Risks
  - Ground Water and Soil Contamination
“Gulmeher”- An Initiative by IL&FS

- “Gulmeher” is a collective of waste-pickers of Ghazipur Slum
- Registered as a producer company with women as shareholders
- Women are making handicrafts products with waste flower
- Products made from recycled paper & waste flowers
“Gulmeher”- Financial Inclusion

- Kiosk Banking facility is being provided to the local community through Inde Pay and State Bank of India through CSP at Gulmeher

  - 1800 a/c opened since July-14

  - 1500 A/c holders have been issued passbooks

  - 900 passbooks given to A/c holders till date.

  - 145 persons from the waste picker community have an account at the centre
Thank You...