

The background of the slide features several large, stylized green recycling symbols (triangles with arrows) scattered across the white background. A yellow rectangular box with a green border is centered in the upper half of the slide, containing the main title. Below it, a white rectangular box with a blue border contains the subtitle.

Waste to Energy In India

***History & Present
Scenario***

Waste Statistics

Waste Generation:

- 2013: 1, 33, 670 TPD
- 2021: 2, 76, 342 TPD
- 2031: 4, 50, 132 TPD

Collection Rate: 68%

Treatment Rate: 19% of the total waste

Treatment Facilities:

279 Conventional Composting

138 Vermicomposting

172 Biomethnation Facilities

29 RDF facilities.

8 WTE

Source: Planning Commission Report on WTE

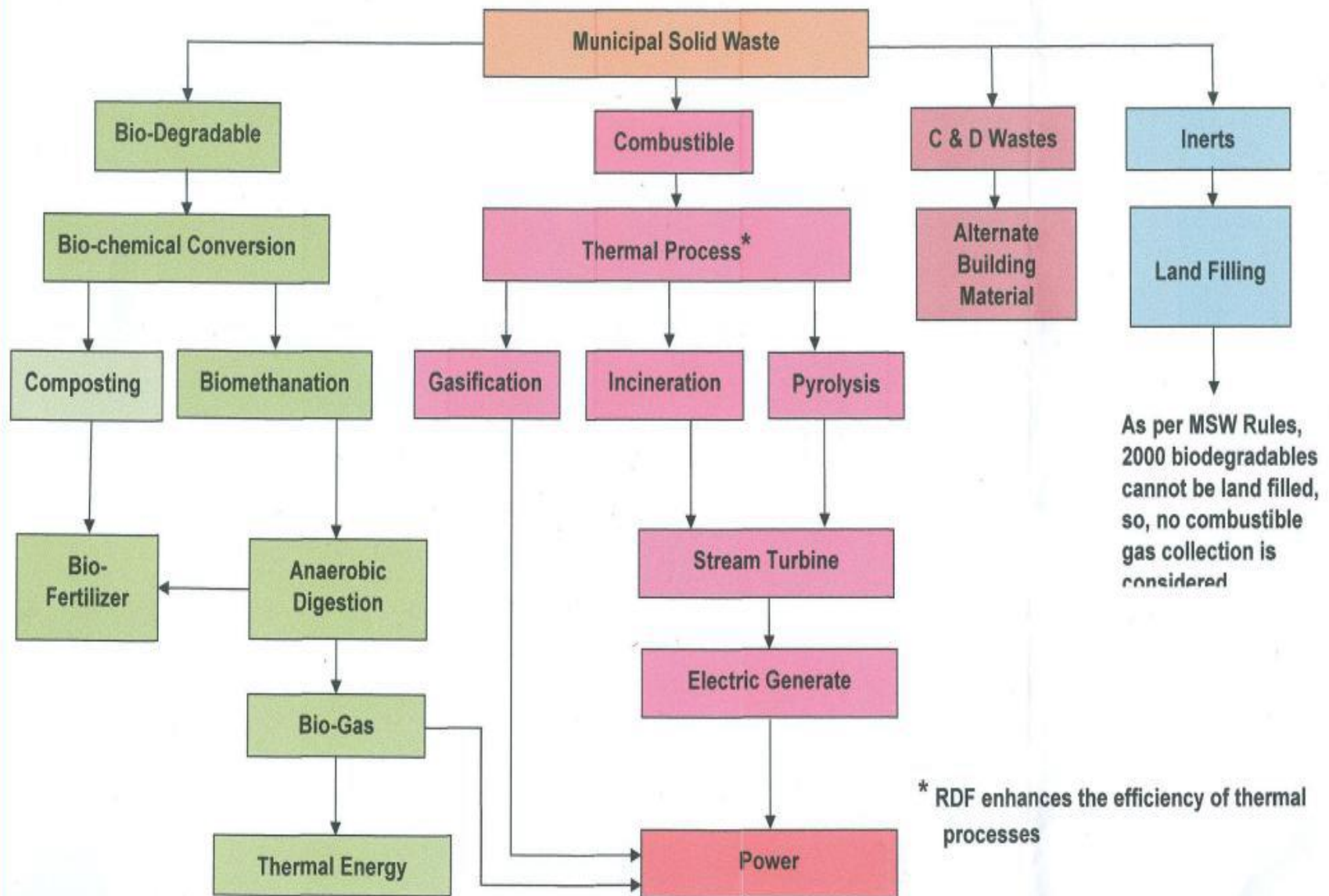
Composition of Indian Waste

- **MSW in India has following main components**
- **Biodegradable matter (green and food waste)**
- **Combustible matter or Refuse Derived Fuel (RDF) (plastic, cloth, paper, woody mass, etc.)**
- **Recyclables (metal, containers, etc)**
- **Inert/ Rejects (post removal of recyclables)**
- **Indian MSW is highly heterogeneous in composition and size**
- **Collection services in vogue makes it very dirty, mixed with soil, road sweepings (dust), drain silt and high moisture**
- **Replication of the technologies of other developed countries did not work in our case**
- **Need of a customized WtE solution for handling humongous waste quantities and save the precious land**

Characteristics of MSW in India

- **The organic fraction of MSW contains biodegradable matter ranging from 30% to 55%, which can be converted into waste-to-compost, waste-to-RDF and waste-to-energy (WTE) products.**
- **The calorific value varies from 800 to 1100 K/calories and moisture content 40% to 50%, whereas WTE projects requires calorific value more than 1200 K/calories and moisture content about 10%.**

Different Technology



Suitable technology in Indian context

- i) Biomethanation for wet biodegradable wastes - Biomethanation is an anaerobic slurry-phase process that can be used to recover both nutrients and energy contained in biodegradable waste. Biogas can be used either as a source of thermal energy or to generate electricity by using gas engines and turbines.
- ii) Combustion of RDF – Segregation of dry high organic component of combustible wastes from mixed MSW to prepare fuel in the form of briquette/pellets/fluff and combustion of same to generate energy.
- iii) Mass burning of MSW - Complete combustion of MSW on as it is received basis (unprocessed MSW) to generate energy.
- iv) In addition to the above, two other technologies which are currently under R&D and piloting stage are of-:
 - a) Gasification- Gasification is a process that converts organic or fossil based carbonaceous materials into carbon monoxide, hydrogen and carbon dioxide at elevated temperature in the presence of limited amount of oxygen.
 - b) Pyrolysis- Pyrolysis uses heat to break down organic materials in the absence of oxygen, producing a mixture of combustible gases (primarily methane, complex hydrocarbons, hydrogen, and carbon monoxide), liquids and solid residues."

History of WTE in India

- **First WTE plant commissioned in Delhi (Timarpur):**
 - ✓ **Commissioned in 1987 (Denmark) Incineration based**
 - ✓ **Capacity to process 300 TPD waste**
 - ✓ **Power generation capacity 3.75 MW**
 - ✓ **Capital cost 25 Crore INR**
 - ✓ **Closed down in 1990**
- **Lucknow WTE plant: 2003**
 - ✓ **Commissioned in 2003**
 - ✓ **Biogas Induced Mixed Arrangement (Australia) – Biomethnation**
 - ✓ **Capacity to process 300 TPD waste**
 - ✓ **Power generation capacity 5 MW**
 - ✓ **Capital cost 76 Crore INR**
 - ✓ **Closed down in 2005**

History of WTE in India

- **Vijayawada WTE:**
 - ✓ Commissioned in 2003
 - ✓ RDF-Incineration based technology
 - ✓ To process 225 TPD
 - ✓ Power Generation Capacity: 6 MW
 - ✓ Closed down in 2007
- **Hyderabad WTE:**
 - ✓ Part Commissioned in 1999
 - ✓ RDF-Incineration based technology
 - ✓ To process 225 TPD
 - ✓ Power Generation Capacity: 6 MW
 - ✓ Closed down in 2005

History of WTE in India

- **M/s Srinivasa Gayatri Resource Recovery Limited**
 - ✓ **Could not Take-off**
 - ✓ **RDF-Incineration based technology**
 - ✓ **Cost : 70 Crores**
 - ✓ **Power Generation Capacity: 8 MW**
- **Rochem Pune:**
 - ✓ **Part Commissioned**
 - ✓ **RDF-Incineration based technology**
 - ✓ **To process 225 TPD**
 - ✓ **Power Generation Capacity: 10 MW**
 - ✓ **Closed down in immediately for technical reasons**

Reasons for failure

- **Poor Planning and Project Structuring and Design**
- **Lack of financial viability assessment**
- **Composition of the waste with low calorific value**
- **Inadequate solid waste collection system in place**
- **Lack of inter institutional cooperation and coordination**
- **Loose implementation of the contracts and laws**

Running Plant

Ramky, Narela, Delhi

- **Commissioned 2013**
- **Waste Processing Capacity 1400 TPD**
- **Power Generation Capacity 24 MW**

IL&FS Energy WtE ,Ghazipur, Delhi

- **Commissioned 2013**
- **Waste Processing Capacity 1300 TPD**
- **Power Generation Capacity 12 MW**

Running Plant

- **Jindal Ecopolis Okhla, Delhi:**
 - ✓ **Commissioned in 2012**
 - ✓ **RDF-Incineration based technology**
 - ✓ **To process 2000 TPD**
 - ✓ **Power Generation Capacity: 16 MW**

**AP(Karimnagar) commissioned in 2011 (102.13 Crore
INR, 12 MW)**

**Pune Commissioned in 2012 (250 Crore, 650 TPD, 10 –
MW (2.5 MW)**

Jabalpur, Madhya Pradesh 11.4 MW

Future Projects/Under construction

S. No	State	Name of city/town	Proposed capacity (MWe)
• 1.	Andhra Pradesh	Vishakhapatnam	15
• 2.	Andhra Pradesh	Vijayawada	12
• 3.	Andhra Pradesh	Tirupati	5
• 4.	Andhra Pradesh	Kadapa	5
• 5.	Andhra Pradesh	Nellore	4
• 6.	Andhra Pradesh	Anantpur	4
• 7.	Andhra Pradesh	Kurnool	1
• 8.	Andhra Pradesh	Vizianagaram	4
• 9.	Andhra Pradesh	Tadepalligudem	5
• 10.	Andhra Pradesh	Guntur	15

Future Projects/Under construction

S. No	State	city/town	Proposed capacity (MWe)
11	Bihar	Patna	12
12.	Gujarat	Surat	11.5
13.	Gujarat	Rajkot	4
14.	Himachal Pradesh	Shimla	1.7
15.	Jharkhand	Ranchi	11
16.	Karnataka	Bengaluru	8
17.	Karnataka	Bangalore, Karnataka	12
18.	Kerala	Kochi	10
19.	Madhya Pradesh	Indore	8
20.	Maharashtra	Pune	7
21	Maharashtra	Thane	10
22	Maharashtra	Nagpur	11.5
23	Manipur	Imphal	1
24	Odisha	Bhubaneswar & Cuttack	11.5
25	Punjab	Ludhiana	8
27.	Punjab	Bathinda	8
28	Tamil Nadu	Coimbatore	8
29	Telangana	Hyderabad	11
30			

Biomethenation Plant

- **Koyembedu Whole Sale Market, Chennai**
- **The vegetable waste based power plant in the Koyambedu wholesale market complex is designed to handle about 30 to 50 tons of vegetable, fruit and flower wastes per day.**
- **The project cost is about Rs.5.0 Crores (Rs 352lakhs + US \$ 320000) and is jointly borne by Chennai Metropolitan Development Authority (CMDA) and Ministry of Non Conventional Energy Sources, (MNES), Gov of India. Central Leather Research Institute, Adyar, Chennai (CLRI) is the technical agency monitoring the project implementation.**
- **This is the first project in the country with vegetable waste**

RDF Plant Process

