



# Climate robust and resilient waste governance in India: a pilots for capacity building and awareness raising

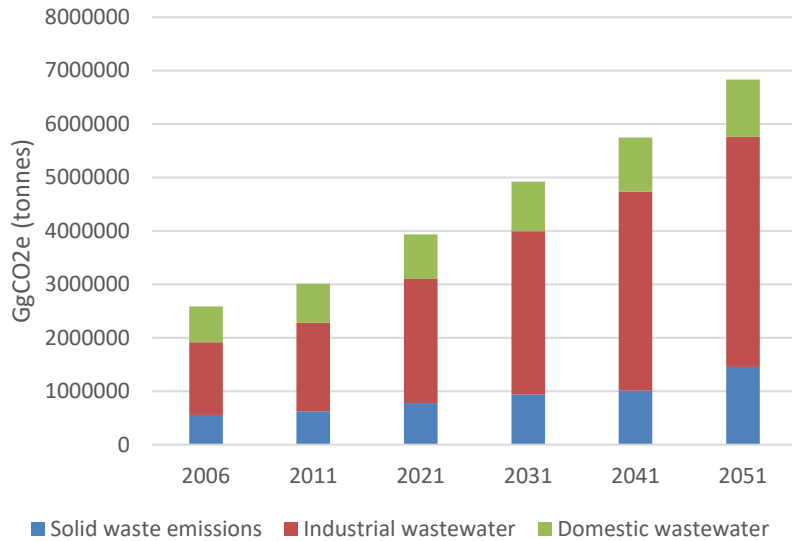
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# GHG Emissions for Waste Sector in India

GHG emissions projection BAU



GHG Emissions projection – current scenario)



*TERI estimates based on IPCC;  
Reduction largely due to recent Government Initiatives*

*GHG: Greenhouse Gas Emissions*

# Need to Decarbonize Waste Sector

- According to the Third Biennial Update Report, landfilling of MSW led to around 15.8 million tons of CO<sub>2</sub>e emissions in 2016 which is expected to increase to 41.1 million tons by 2030
- India's NDC prioritizes reducing waste-related emissions through promoting waste to wealth conversion and the abatement of pollution
- Low carbon, circular economy waste solutions thus look at measures focusing on diverting waste from landfills and maximizing resource recovery

*NDC: National Determined Contributions*

# Waste Solutions for Circular Economy in India

- Setting up of Material Recovery Facility and processing the sorted waste through
  - **Biomethanation**
  - Aerobic Composting
  - Recycling and
  - **RDF for co-processing in cement kilns**

*RDF: Refuse Derived Fuel*

# Case study Ayodhya

(Micro integrated waste processing)

# Key activities under project

- Detailed waste mapping and GHG emission baselining in “as is” and in “intervention” scenarios
- Installation and testing of a pilot on biogas and strengthening MRF to address dry and wet waste streams
- Training and capacity building for developed pilots for their long-term sustainability and scale up & scale out potential for entire region

# Assessment of physical characterization of waste into dry and wet waste.

**Total waste generation in Ayodhya: ~302 tons per day**

Type of waste	Percentage
Wet waste	55%
Dry waste	35%
Out of which* –	
Plastics	48%
Paper/Cardboard	25%
Metal	2%
Glass	7%
Other	18%
Domestic hazardous waste	Negligible
Other waste (drain silt and inert)	5%
C&D waste	5%



# Pilot plant on Biogas

Plant is ready for commissioning

**Location of the plant:** Kachehri Road, Ayodhya. (near new MRF plant)

**Capacity of the plant:** 1 TPD of OFMSW

**Biogas generation:** 30-40 m<sup>3</sup>/day

**Biogas utilization:** Supply to nearby households for cooking purpose.





# Strengthening of MRF at Ayodhya

- Location has been identified
- Work has been started
- Bailing machine has been ordered.
- Expected to be ready for operation by December, 2023



# Case study Udaipur (Sewage sludge co-digestion)

# Project : Managing organic waste and sludge: scaling up “waste to value” technologies

## Objectives:

1. Developing scientifically proven technological solution for STP sludge disposal and organic waste with resource recovery.
2. How to minimize the impact of STP on environment and human health

## Activities

1. Developing and optimizing technical parameters of the technology
2. Technology packaging
3. Up-scaling and replication in other parts of country.

# Developing technological solution through co-digestion process

Location: **Udaipur Municipal Corporation, Rajasthan**

Waste being treated: **OFMSW and STP Sludge**

Technology: **TERI's Advanced Anaerobic Co-digestion process**

Plant capacity: **2 TPD**



1. Reception of waste at site



5. 100% biogas-fed engine for power generation



4. Pre-treated slurry is fed into bio-digester



3. Waste slurry is pre-treated; addition of 200 kg/d of sewage sludge



2. Segregation of organic fraction

## Benefits from Co-digestion based AD plant

<b>Technology</b>	<b>Co-digestion based two phase anaerobic digestion</b>
<b>Quantity of waste being processed</b>	<b>700-800 kg/day (500 kg organic waste &amp; 200 kg STP sludge)</b>

### Biogas generation

<b>Quantity of biogas generation</b>	<b>~40-50 m3 per day</b>
<b>Use of biogas</b>	<b>Electricity generation through 100% biogas fed engine</b>
<b>Total unit of electricity supplied to Fire station</b>	<b>~130-150 units a day</b>
<b>Total savings on account of electricity supplied to fire station (@ Rs 12/unit)</b>	<b>Rs 1500-2000 per day</b>

### Manure generation

<b>Manure generation</b>	<b>50-60 kg/day</b>
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### Environmental benefits

<b>1. Scientific disposal of organic waste and sludge of STP plant</b>	
<b>1. Reducing load on landfill site</b>	
<b>1. Mitigation of greenhouse gases such as Methane and Carbon Dioxide resulting into Carbon Credit</b>	





# Thank You