TRANSFORMING WASTE TO WEALTH – A CASE STUDY OF KOCHI

KOCHI – THE LOCATIONAL MAP

CITY PROFILE

- Topography - 1.5 m above MSL ;
- Urban Agglomeration -Population :– 12,52,000 ; Area: 330 sq.km;
- Central city - Population – 6,55,697, Area:- 94.88 sq.km,
- Located between 76^0 14’ and 76^0 21’ East longitude and 9^0 52’ and 10^0 1’ North Latitude.

URBAN CHALLENGES

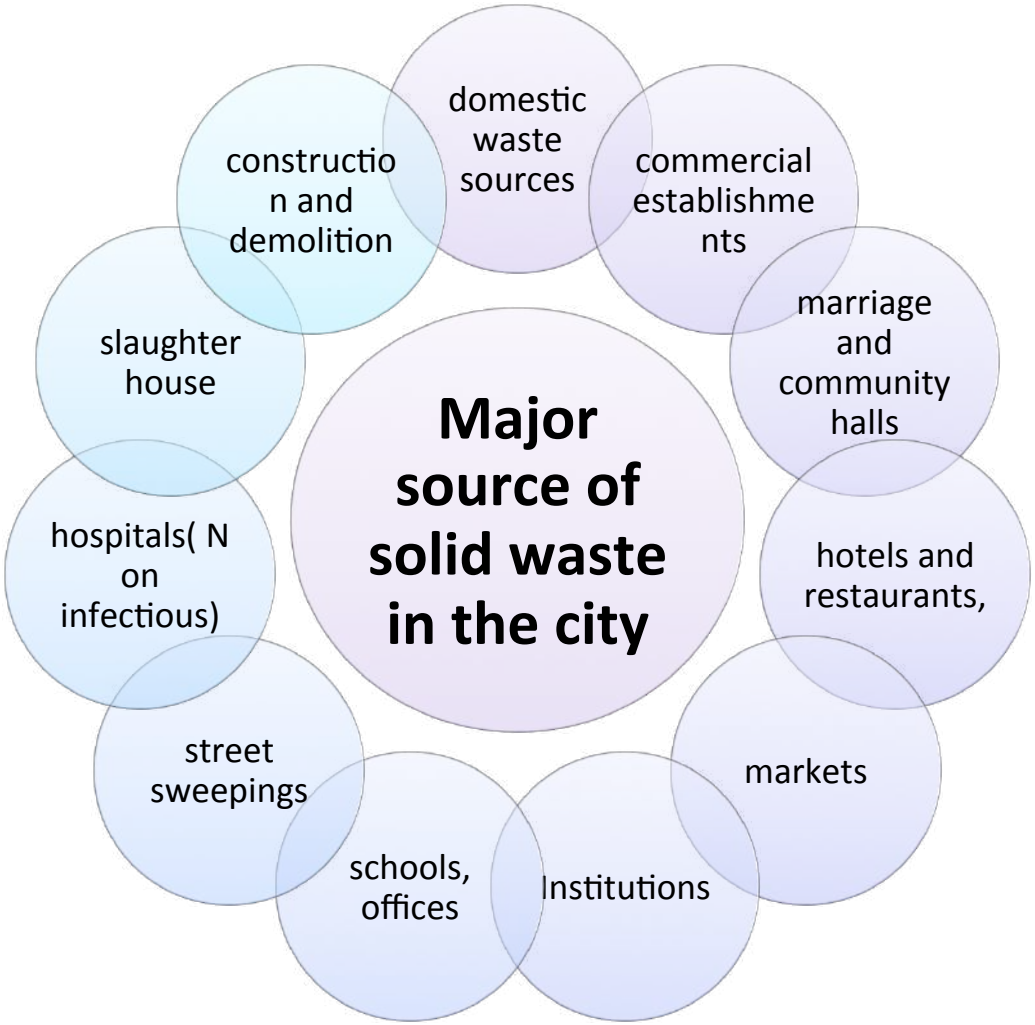
- Climate Change
- Waste Management
- Sea-Level rise
- Blocked canals and waterways leading to floods
- Growth in number of vehicles @ 70 % per decade compared to the population growth @ 9 % per decade
- Congested roads
- Poorly managed public transport
- Water pollution
- Lack of proper sewerage system
- Depleting conventional energy sources.

Key Issues *of* Kochi

- ***Transportation***
- ***Energy***
- ***Solid Waste Management***

SOLID WASTE MANAGEMENT

- Kochi Municipal Corporation responsible for the Solid waste management of the city.



SOLID WASTE COMPOSITION

130 TPD

- Food/Biodegradable waste

100 TPD

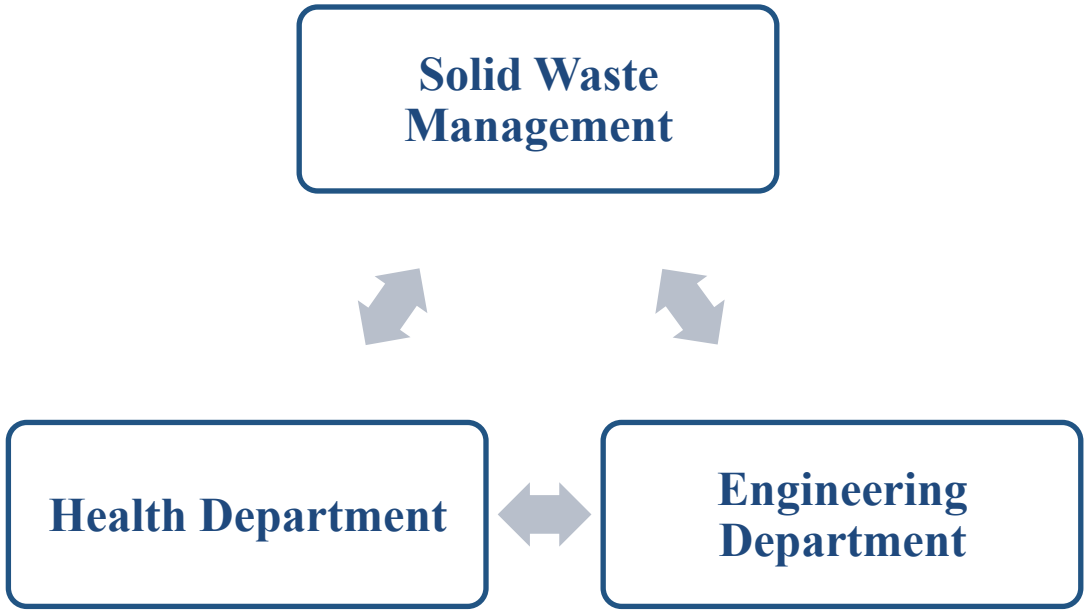
- Plastic/Non biodegradable waste

35 TPD

- Inert waste/tree cutting/construction debris etc(Not Processed)

Mechanism of solid waste management

- Two fully flourished departments of Kochi Municipal Corporation are fully dedicated for solid waste management in the city



PROCESS OF SOLID WASTE MANAGEMENT

Door to door collection

- Kudumbasree workers collect the segregated waste from households.
- Collected on a daily basis
- Hand carts, tipper auto rickshaws are used for waste collection
- Collected in transit stations

Transport

- 140 vehicles are used for solid waste collection and transport.
- Collected wastes are loaded to larger tipper trucks and compactor trucks and transported to treatment facility

Disposal and Treatment

- The Brahmapuram solid waste treatment plant is 20 Km away from the city.
- The plant consist of 120 acres of land
- Treatments adopted are Windrow Composting, land filling, Resource recovery Facility (RRF) and Material Collection Facility (MCF)

DOOR TO DOOR WASTE COLLECTION

TRANSIT POINTS

TRANSIT POINTS

WASTE MANAGEMENT PLANT

SOLID WASTE MANAGEMENT IN THE CITY- BEST PRACTICES

Kochi Municipal Corporation

•Plastic Shredding Unit – Plastic is collected from every sources and shredded into fine particles and used for Brick making and road construction.

•Segregation of waste – The segregation is done at source. Food waste and plastic waste collected seperately.

• Composting – Practiced in many households and also in the waste treatment plant

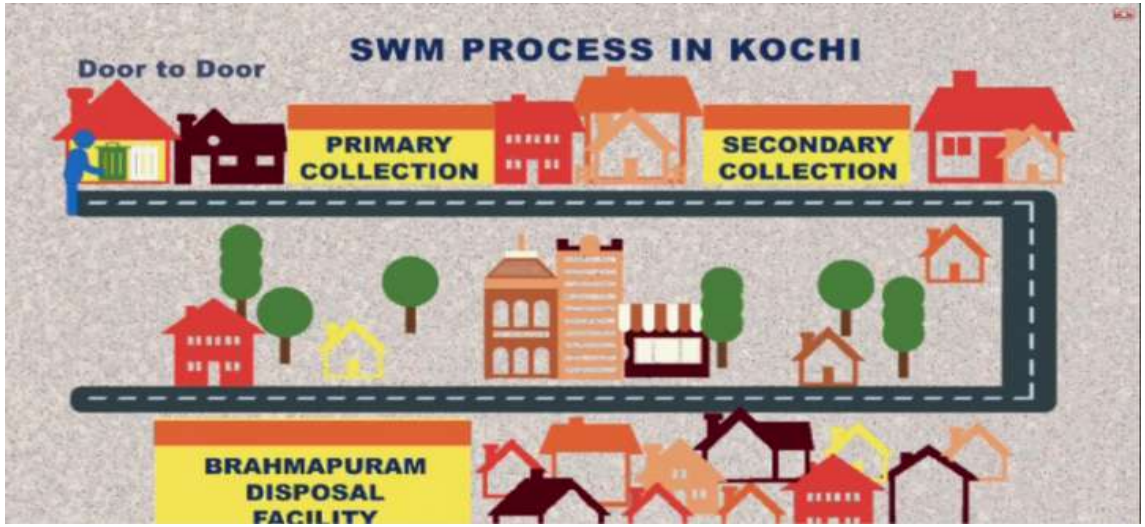
• Bio methanation - Practiced in many households

SOLID WASTE MANAGEMENT IN THE CITY- BEST PRACTICES

Kochi Municipal Corporation

•The Kochi module reflects the best practices on source segregation of waste as exemplified by the Kochi Municipal Corporation (GOI).

•It shows how source segregation, composting, stringent legal system coupled with multi-stakeholder participation leads to effective waste management in urban places which are devoid of adequate landfill spaces.



SOLID WASTE MANAGEMENT IN THE CITY- BEST PRACTICES

Kochi Municipal Corporation

- Source level segregation and treatment of biodegradable waste is promoted at Source level (Household/Institutional/Community Level).
- The biodegradable fraction is treated at the source level through composting and bio methanation (Biogas plants).

SOURCE LEVEL COMPOSTING OF BIO-DEGRADABLES – HOUSEHOLD LEVEL

- Devices of various capacities distributed to households to manage kitchen waste


Kitchen bin


Bucket composter


Tri-bin compost


Pipe compost


Biogas plants


Pot composter


Ring compost


Tri-pot compost

BIODEGRADABLES

- **Aerobic bins, Biogas plants, Organic Waste Converters for housing colonies, apartment complexes and public places like markets**


Organic waste converter


Portable biobins


Biogas plants


Aerobic bins

SOLID WASTE MANAGEMENT IN THE CITY- BEST PRACTICES

CREDAI – Clean city movement

•CREDAI is the builders association

•Plastic Shredding Unit – Plastic is collected from every sources and shredded into fine particles and used for road construction.

•Segregation of waste – The segregation is done at source. Food waste and plastic waste collected separately.

• Composting – Practiced in every housing complex

•Trash guard– To collect the segregated waste in every housing complex

SEGREGATION OF WASTE

PLASTIC SHREDDING UNIT

COMPOSTING

SOLID WASTE MANAGEMENT IN THE CITY- BEST PRACTICES

Zero Waste Concept

- Practiced in many neighbourhoods
- Bio- methanation : The produced fuel is used within the hoseholds
- Composting

SOLID WASTE MANAGEMENT IN THE CITY- BEST PRACTICES

Environment Master Trainers

•1000 students from different colleges were trained in solid waste management and spreading environmental awareness.

• Student who successfully completed this training were awarded the title "Environment Master Trainers", who in turn provide training in scientific systems of waste management to other students in various schools and colleges in the city.

SOLID WASTE MANAGEMENT IN THE CITY- BEST PRACTICES

Clean Kochi Campaign

•Cleaning drive initiated by the Kochi Municipal Corporation

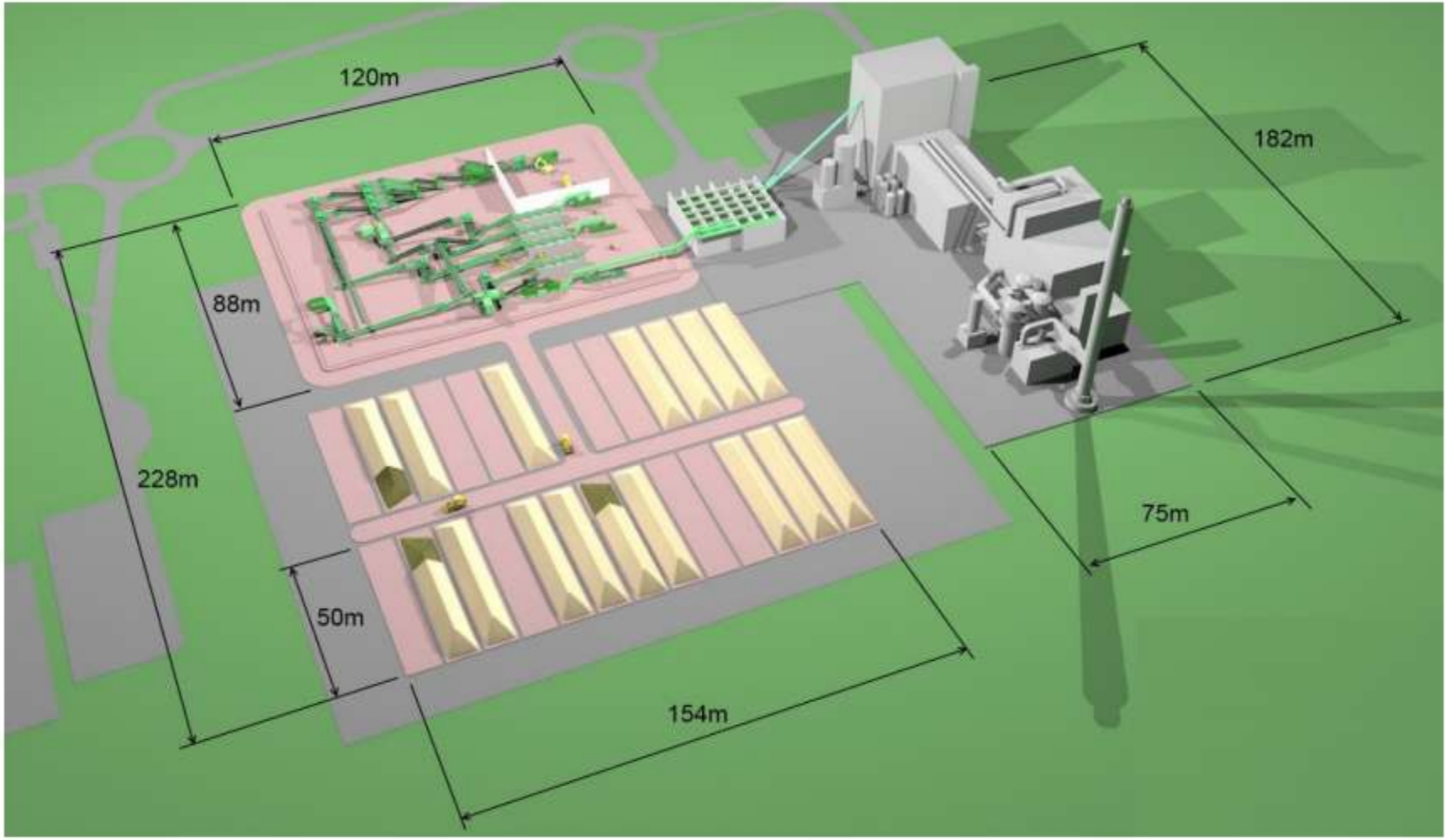
KOCHI CITY IS GOING TO HAVE A NEW WASTE TO ENERGY PLANT SOON..

WASTE TO ENERGY PLANT

- Waste to energy plant is going to be implemented in Kochi.
- New plant will have capacity to process 800 tones of waste daily.
- Waste is heated at 900-1,000 degree Celsius to produce energy (pollution free) [GASIFICATION]
- As many as 8 MW energy can be generated by the plant.
- Technology uses minimal energy with effective drying through eco-friendly patented natural process.
- Power generated from the MSW will be purchased by Kerala State Electricity Board (KSEB)

The project fully supported by the Kochi Municipal Corporation, State Government and the Government of India.

PROPOSED WASTE TO ENERGY PLANT



MATERIAL RECOVERY FACILITY (MRF)

- Separates Metals & Plastics
- Creates recycling Materials
- Prevent Landfill
- Generates high quality Biofuel (RDF)
- Prevent Poullution
- Provide local job

3

RECYCLABLES
Metals & Plastics

4

REFUSED DERIVED FUEL

- High quality Biofuel
- Suitable for wide range of heating application
- Very good fuel for energy generation
- Free from toxic material

GASIFICATION

- Environmental friendly
- Internationally proven technology
- Very high temperature process
- No direct burning
- No direct emission to atmosphere
- No contaminated water emitted
- Heat used in boiler to get genetrate steam

5

ASH

BI PRODUCTS

Bricks/Pavement block/Road

EMISSIONS

- Environmental friendly technology
- No toxic fumes
- Prevent insects, rodents & Bad odur
- Continues Emission Monitoring System (CEMS)
- Prevent Water, Land & Environmental Contamination
- Meets stringent European Standards

6

ENERGY GENERATION

- Clean green energy
- Renewable energy
- 10 MW of Electricity powers 10,000 homes

20-25% of
Moisture Content

2

BIO DRYING

- 21 - 28 days of process
- Reduction of moisture
- Increases Calorific Value
- Bacteria activity makes heat and Waste become sanitised
- Cortex Membrane only allows water vapour to exit supresses order from passing.
- Dirty waste converted in to useful material

75 - 80% of
Moisture Content

1

WASTE

- Encourages Pest & Stray Dogs
- Epidemics like H1N1, Malaria
- Increases dangerous Dengue generating mosquito
- Life critical diseases from toxic contents
- Contaminates & poison Waterbodies
- Contaminates land & atmosphere
- Emission of toxic fumes & foul smell

THE EXPECTED BENEFITS OF KOCHI'S WASTE-TO-ENERGY PROJECT

- Transform Kochi
- Smart city
- Stray dogs
- Tourism
- Health Benefits
- Restore Brahmapuram
- Carbon Footprint
- Employment opportunity
- Soil, Water, Air Pollution

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