

India's First MSW Treatment Facility

Fully Compliant
with
SWM 2016 guidelines



OREX powered Mechanical Biological Treatment

Presentation
SFC Environmental Technology Pvt. Ltd, India

We all agree.....

Urgent need to set up MSW treatment plants in India.

- **Hazardous Emissions & frequent fires !**
- **Ground water contamination**
- **Very poor sanitation condition, Slums all around**
- **Air quality degrading day by day**
- **Breathing problems and Poor Health.....**



MORE & MORE land is required for dumping garbage.....

How to solve the garbage problem....?

Legal provisions SWM 2016



What do the legal provisions prescribe under SWM 2016 rules..... ?

Mandatory to Segregate mixed waste into bio-degradable and non-biodegradable fractions.

1. Bio-degradable fraction to be treated via Bio-methanation & Composting method*Refer Clause 15(V)*
2. Incineration of only Non recyclable RDF, having calorific value of 1500 Kcal/kg or more*Refer Clause 21(1)*
3. Higher Calorific value waste (RDF) to be supplied for co-processing to Power plants and Cement kilns*Refer clause 15 V (b), 21 (2)*

4. Recovery of recyclables is mandatory and Recyclables shall be routed through appropriate recycling vendorsA(d)
5. In Case of incineration of RDF, Emission standards to include Carcinogenic compounds like Dioxin, Furan & Heavy metals with online sampling (C)
6. Fly ash, Residue & Bottom ash to be sampled and disposed in Hazardous Waste Handling facility (Note d)
7. Other measures include Odor control, Effluent treatment, Proper enclosed sheds, health & hygiene safeguards

Why are these SWM 2016 provisions

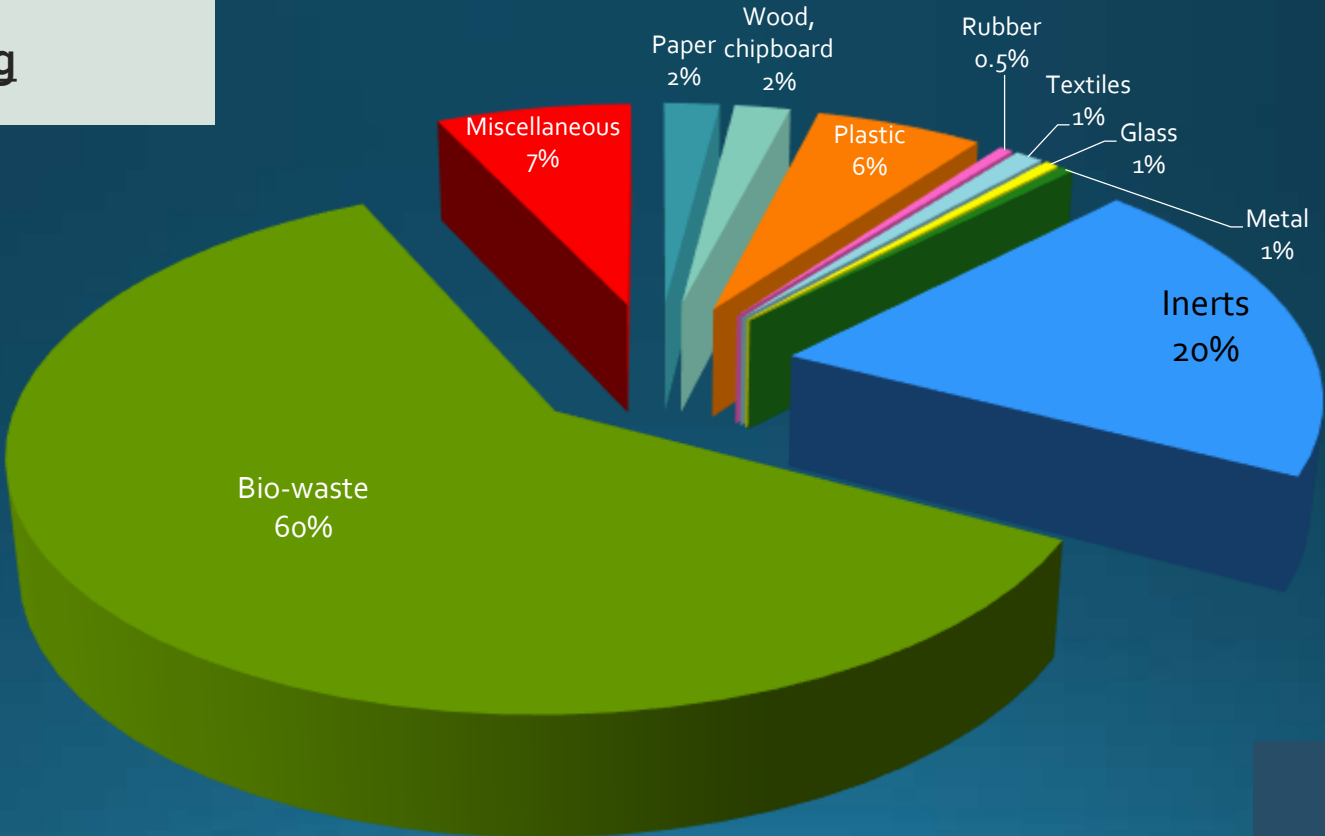
RELEVANT..... ?



Typical Characteristics
of
Indian Municipal Solid Waste

- Production of waste 0,3 - 0,4 kg/person
- 40-60% bio-waste or organic
- 5-10% recyclable
- 20-30% Inorganic, non recyclable
- 15 -30% inerts like sand and stones
- 50-80% Moisture
- Calorific Value : 600 to 800 Kcal/Kg

DRY



WET

Municipal Waste Characteristics

SWM 2016

Prescribes Treatment Options
based on the Quality of Indian Mixed Waste



1. Waste is **Mixed** in nature with **High ORGANICS**
2. It has **High MOISTURE** and **Very Low CALORIFIC VALUE**
(600-800 Kcal/kg)

Emphasis ---

Sustainable & Environmentally Safe disposal

Not have any Carcinogenic Emissions or Disposal of Hazardous Ash & Residue, which are difficult to monitor and control



Case study

Garbage Treatment Plant 100 TPD

Calungute/Saligaon North Goa
OREX – Biomethantion – Composting- RDF





50,000 Tons of Existing Dumped Waste Remediated & Cleared, Land recovered
RDF sent to ACC Wadi.
Compost used in house



Remediation using Multi Deck Vibratory screens to Recover RDF and Compost

PRODUCTS GENERATED AT THE GOA MSW TREATMENT FACILITY

1. Recycling Materials: 5% to 8%

- Paper, Plastics foils, PET bottles, Glass, metals, Wood, Coconut, Al Cans, Tetrapack



2. Compost : upto 20%

- High quality compost for use as fertilizer in agriculture



3. Electricity/ CNG : upto 1 MWH per 100 Tons

- Electricity can be used by industries or in-house



4. RDF: 15%, upto 2 MWH per 100 Ton RDF

- High calorific material (plastic, paper, cartridge etc.)
- Alternative fuel (cement etc.) or incinerated to produce additional electricity



5. Reduced residuals to landfill: (10 to 15%) to Land fill

- Inert heavy material, sand, stones



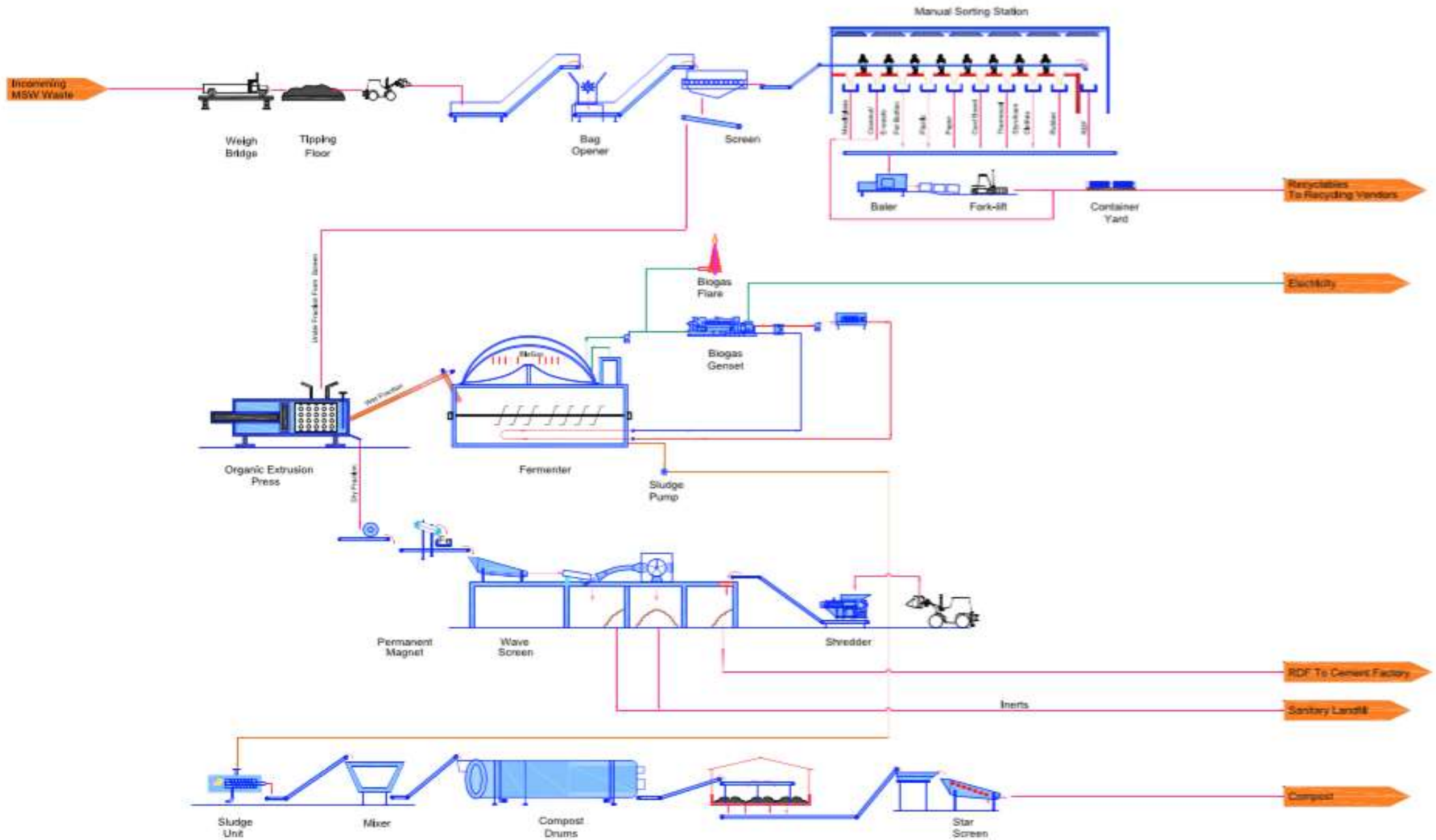
Key Aspects of the MSW treatment Plant at Goa

Key aspects of the Facility – 100% compliance to SWM 2016

- The treatment process has been vetted and approved by an expert committee under the chairmanship of Padam Shri Dr. Sharad Kale and experts from NEERI, IIT Mumbai and BITS Goa
- 100% treatment of the mixed garbage is done under enclosed shed with proper ventilation and lighting. No storage of garbage, “daily in – daily out” concept.
- More than 15 fractions of Recyclables are sorted and recovered daily and sent to recycling vendors.
- 100% of the waste is segregated into wet and dry fraction using OREX technology. Biodegradable fraction is sent for biomethanation / composting and dry fraction is cleaned and converted into high calorific value RDF.

Key aspects of the Facility – 100% compliance to SWM 2016

- No burning of waste, No harmful emissions. High Calorific value RDF (> 4500 Kcal/kg) is sent to ACC Wadi due to the excellent initiative and support of Geocycle.
- No human contact with waste – fully automatic PLC/Scada controlled.
- Special emphasis is on hygiene and cleanliness of the facility
- All effluents are treated via MBR/RO technology and recycled for flushing, cleaning and gardening
- Ventilation and bio-filters ensure odor generation is minimized and safely disposed.
- Only 10% inert go for land fill
- Very important --- Land usage is very low and is fixed for next 30 years





Plant Entrance and Security Gate with

- Visitor waiting area
- Toilet
- Drinking water facility





Weigh Bridge Station
2 Nos. at entry and exit points
All sides Glass panels for proper view





- Material Recovery shed and Compost shed
- Completely enclosed with motorized rolling shutters
- Self supporting Roofs with no columns inside for free movement of vehicles





- Administrative Building (G+1)
- Facility Centre- showers, toilets, lockers
- Canteen
- Medical Room
- Drivers Rest room





- Material Recovery shed with proper
- Motorized Rolling shutters
 - Ramp for trucks to unload waste
 - Input bunkers



Ventilation fans and bio-filter for odor control inside the shed



Input feed bunker- chain belt conveyor with bag opener



Single shaft blade of the bag opener

Roller Screen followed by a Sorting Station to recover recyclables





Manual Sorting Station with bunkers to sort 15 fractions

- Ventilation system
- Lighting
- Safety switches



Baler press and
Container storage yard

OREX for automatic segregation of the mixed waste into wet and dry and fraction in a single step using very high pressure to squeeze the waste



Organic Extrusion Press

Segregated Pure Organic fraction outlet directly into Fermenter



Segregated In Organic RDF
fraction going to the RDF line



Organic Extrusion (**OREX**)
is a single stage automatic segregation process.....

Most important step

"Segregation"

organic (wet) and inorganic (dry) fraction

Only then any downstream treatment process work.

OREX operation



OREX

How does the OREX work ?

OREX separates waste into 2 fractions –
Wet (organic) and Dry (inorganic)



Organic or Wet

Inorganic or Dry

- Specific treatment
- Bio-methanation
 - Compost

- Specific treatment
- Thermal Process
 - Co-Processing
Cement/Power plants

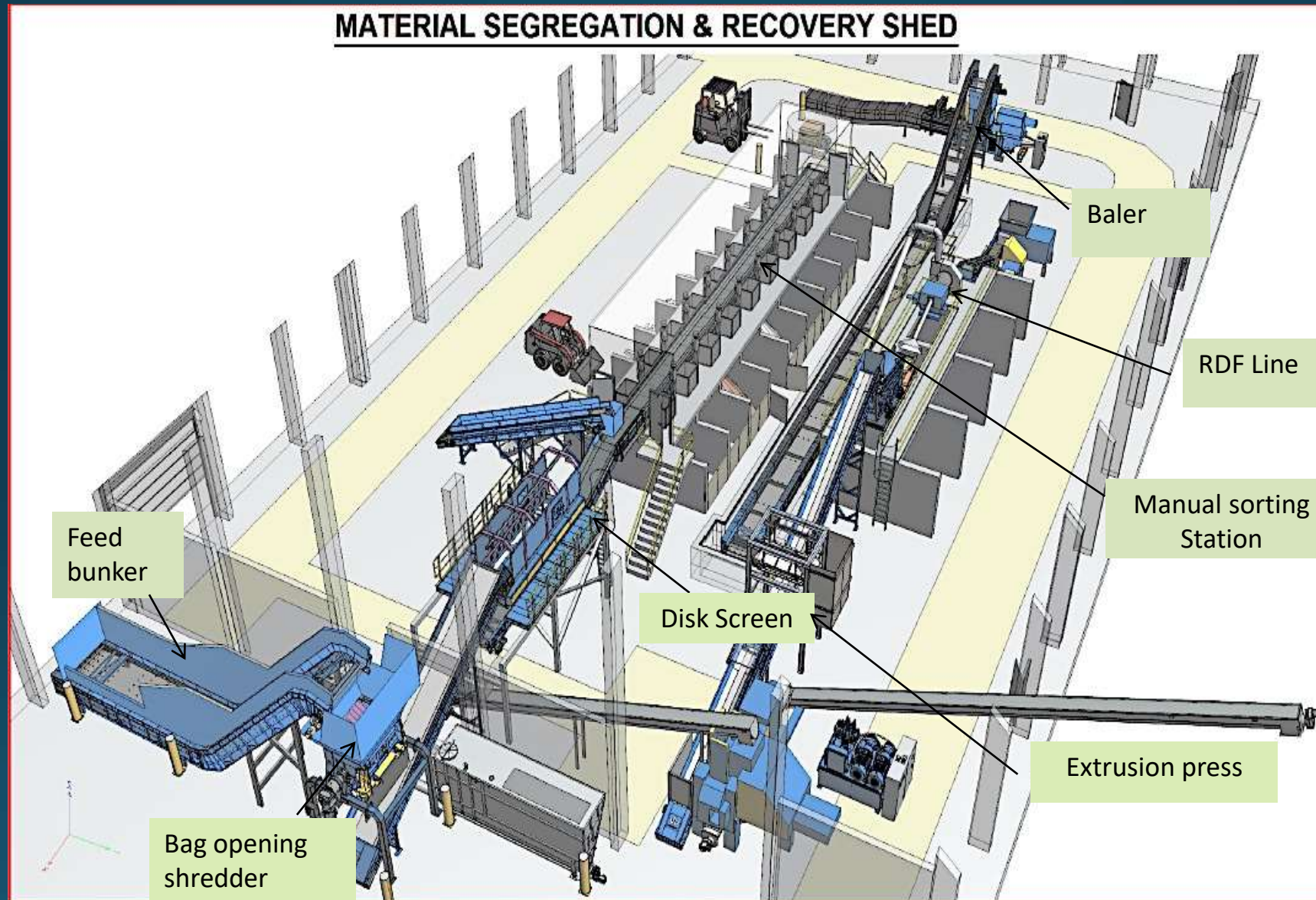
Dry fraction from OREX goes to a RDF line

RDF line for dry fraction

- Magnetic separator
- Flip flow screen
- Wind sifter
- Separated Inert fraction



Overall View of the Material Recovery & Segregation shed





**Bio-methantion of Organic fraction
Dry Type Fermenter**

&

**Composting
In-Vessel composting drums**



Biomethanation
Gas holder
Paddle mixer



Gas engine
with
flare





Gas engine building with
Gas cleaning system



Screw press for dewatering of sludge

In vessel composting drums, Compost Screens





Compost Shed fully enclosed
In vessel composting Drums

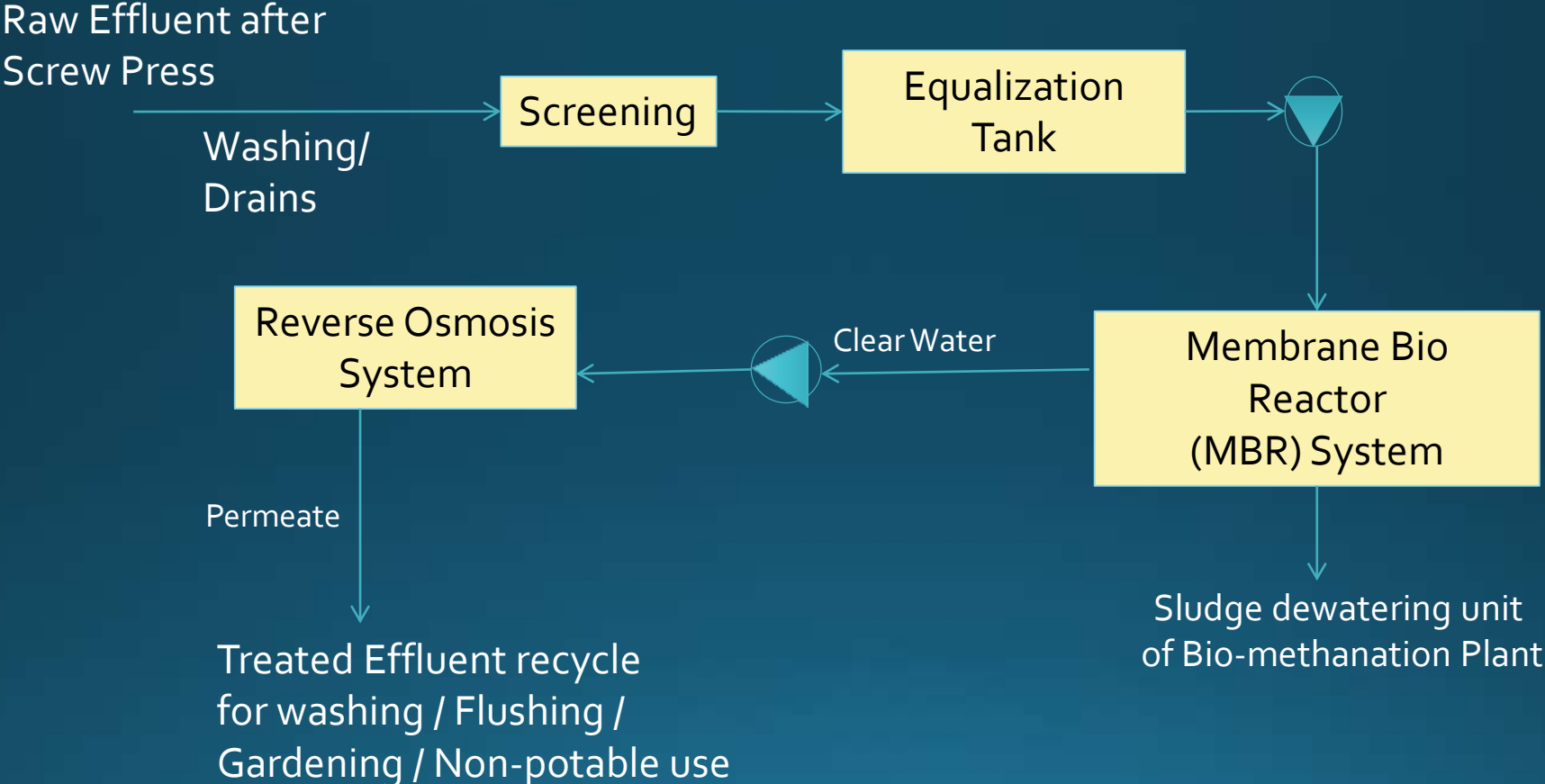


Effluent Treatment
cum
Recycle plant
(Based on MBR+RO)

*Completely recycled for in-house applications like gardening, flushing,
cleaning etc.*

Effluent Treatment Plant

Flow Diagram of ETP





ETP Shed

- MBR Blowers
- RO Skid
- Panels
- Chemical dosing units

Sanitary Landfill cells

**Only for 10% residual
Inert fraction**



Land fill cells only for
recovered inert
fraction < 10%

Last But Most important Points To Remember.....

- Indian Garbage does not have the "Wealth" as commonly thought of.
- It has some value, which can offset part of the operating cost.
- Aim of a MSW treatment plant is to treat the waste and not generate revenue.
- Select proper treatment technologies keeping in view quality of Indian mixed waste, overall environmental impact of treatment and disposal of carcinogenic and hazardous residues, which have very long term impact on all future generations.
- Capital & Operating investments are required to be made by the government to ensure success in this segment

OREX... Changes the way we look at garbage



We invite you to come
&
Experience the MSW plant at Goa
Thank You

OREX