JSW STEEL LIMITED

BRINGING ALIVE A BILLION DREAMS

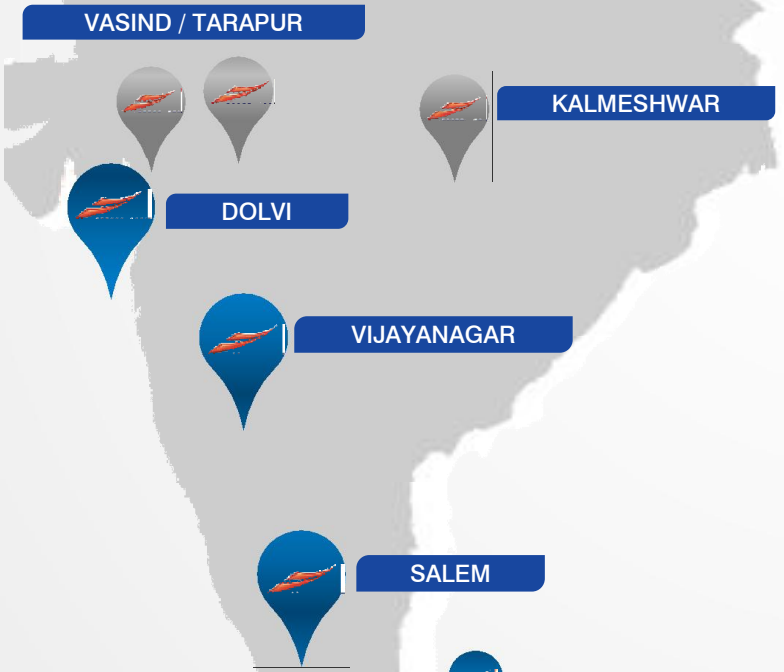
Manufacturing Process and Environment Management at JSW

FLOW OF PRESENTATION

1.  JSW Steel Overview
2.  Steel Making- Process Route
3.  Environment Management at JSW
4. Best Practices Case Studies

JSW STEEL - COMPANY AT A GLANCE

Steel making capacity of 14.3 MTPA
6 manufacturing facilities in India



HR Coils

HSM Plates

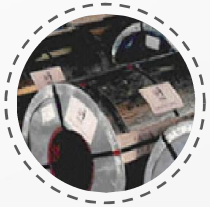
HRPO Coils

Hot Rolled Plates

Coated Products

Long Products

Cold Rolled CA,GL



Slabs

Integrated Steel Plant

Downstream Plant

BIRTH OF JSW STEEL

HISTORICAL BACKGROUND

The foundation stone for **"Vijayanagar Steel Plant"** under Public Sector, was laid by then India's PM, in 1971

More than 20 years later, in spite of Economic Liberalization in 1992, no one came forward to fulfill the dreams of the PM, because none considered it a viable proposition

The invitation from the Govt. of Karnataka in 1994, & naturally was accepted as a challenge:

THUS, JINDAL VIJAYANAGAR STEEL LIMITED WAS FORMED IN 1994

THIS WAS VIJAYANAGAR WHEN WE ARRIVED

CHALLENGES

- Barren Land
- Inadequate Water Source
- No Electricity
- Poor Road And Rail Connectivity
- Poor Infrastructure
- Non Availability Of Carbon Fuel
- Low Quality Iron Ore

THIS IS WHAT WE MADE OUT OF IT…

MILESTONES

1999	2001	2004	2006	2009	2011
0.8	1.6	2.5	3.8	6.8	10*



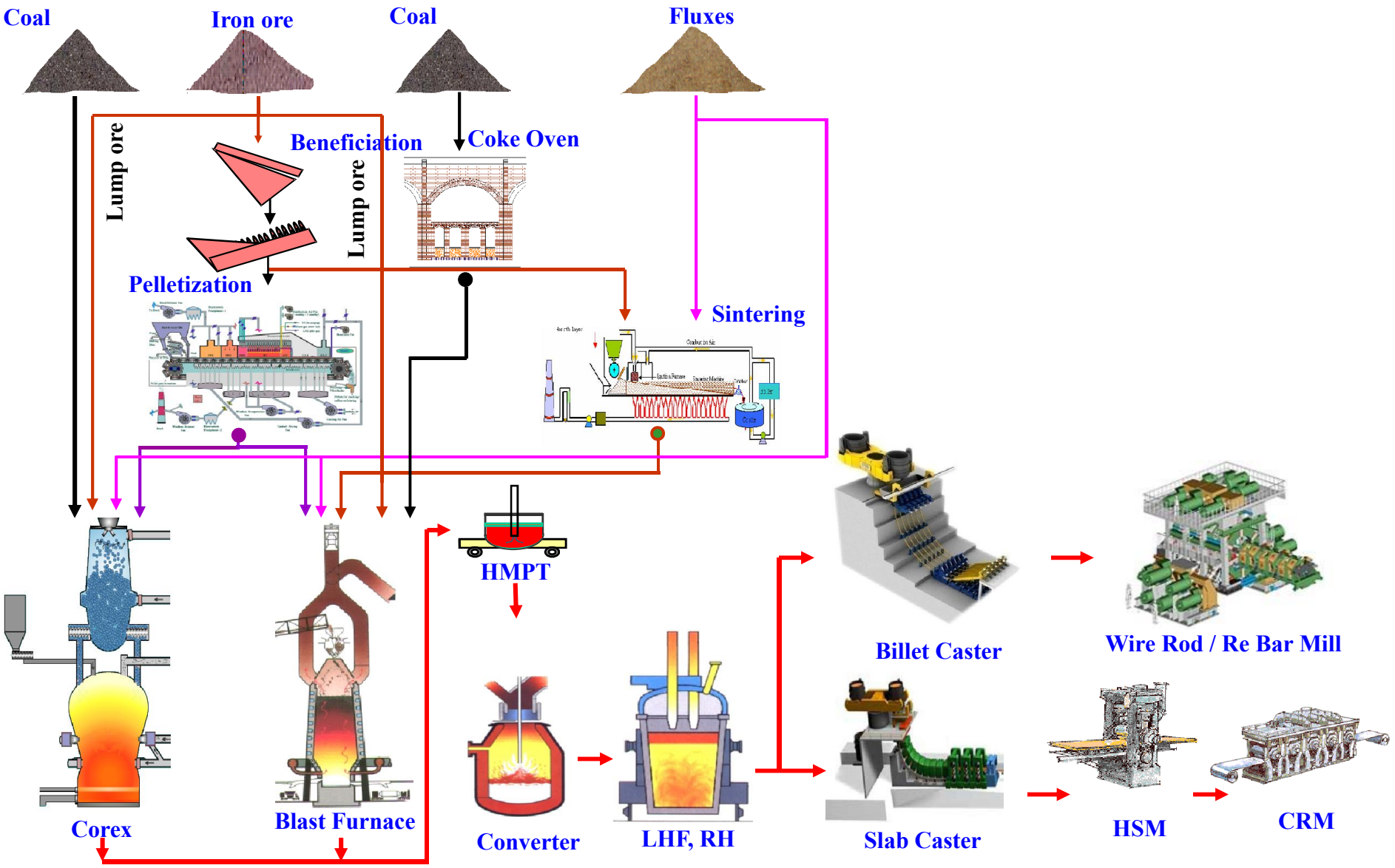



*Production capacity for Vijayanagar Works only

FLOW OF PRESENTATION

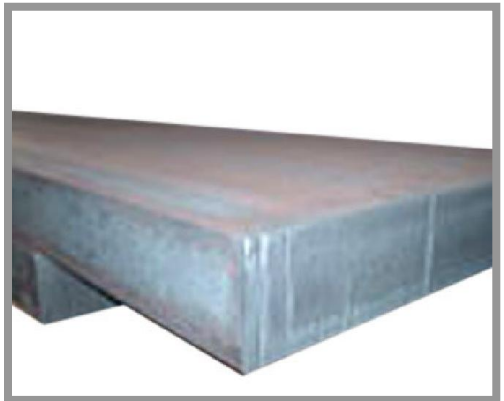
1. JSW Steel Overview
2. Steel Making- Process Route
3. Environment Management at JSW
4. Best Practices Case Studies

JSW: Process Flow



Products

WIDE RANGE OF PRODUCTS – FLAT AND LONG



Slabs

HR - Coils

Plates & Sheets

HRPO, HRSPO, CRFH and CRCA

Wire Rods

TMT Bars

UNIQUE PLANT CONFIGURATION

Beneficiation	Low grade Iron Ore Upgradation
Iron ore agglomeration	Pellet Plant + Sinter Plant
Coke making	Heat Recovery + Gas Recovery
Iron making	Corex + Blast Furnace + DRI
Steel Making	Convertor + EAF
Slag Utilization	Cement + Sand
Power plant to utilise gases	Self reliant in Power
Mills	Flat + Long Products

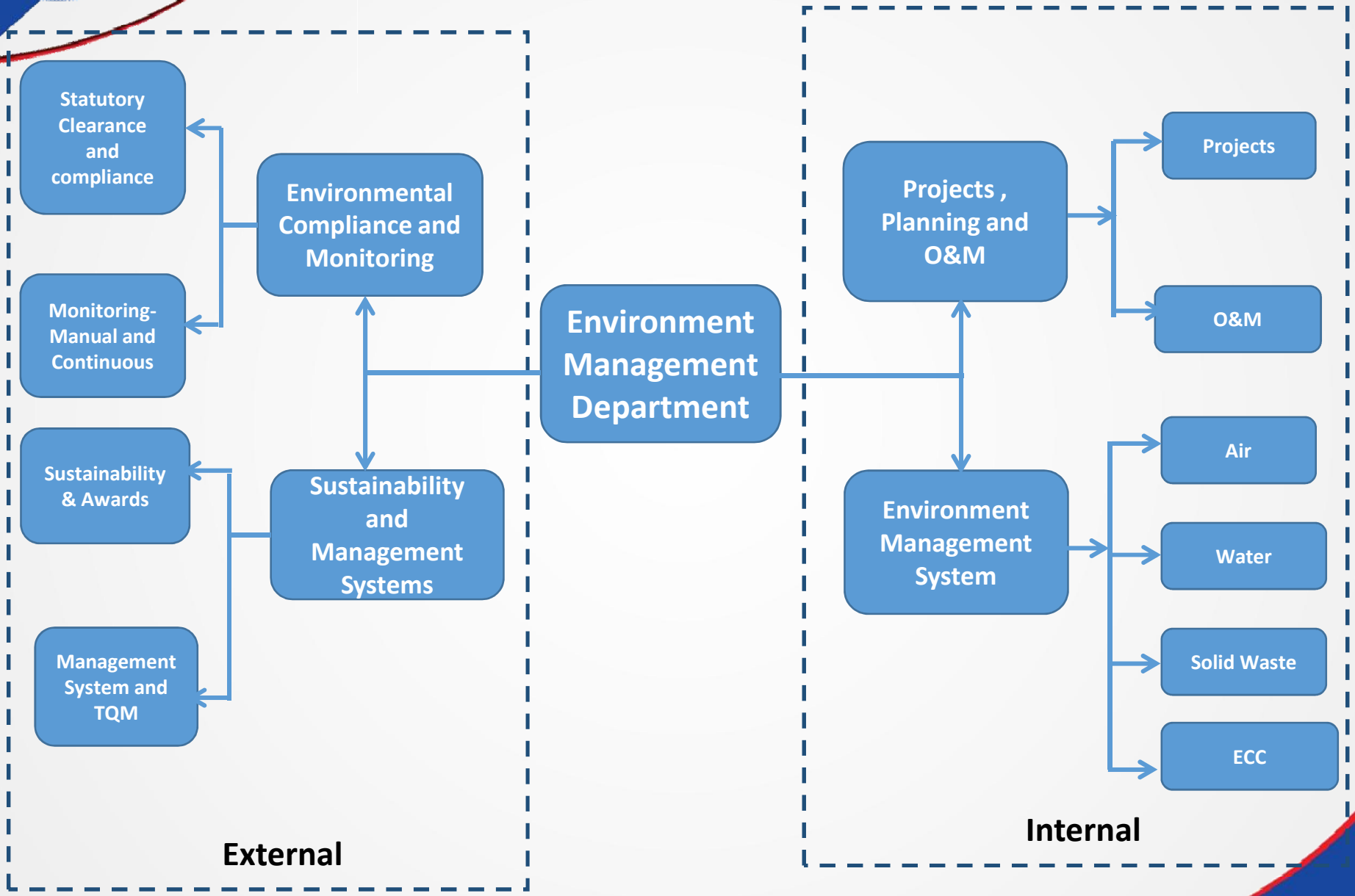
Above configuration provides flexibility w.r.t raw material usage and makes JSW Steel

ENVIRONMENT FRIENDLY STEEL PLANT WITH ZERO EFFLUENT DISCHARGE

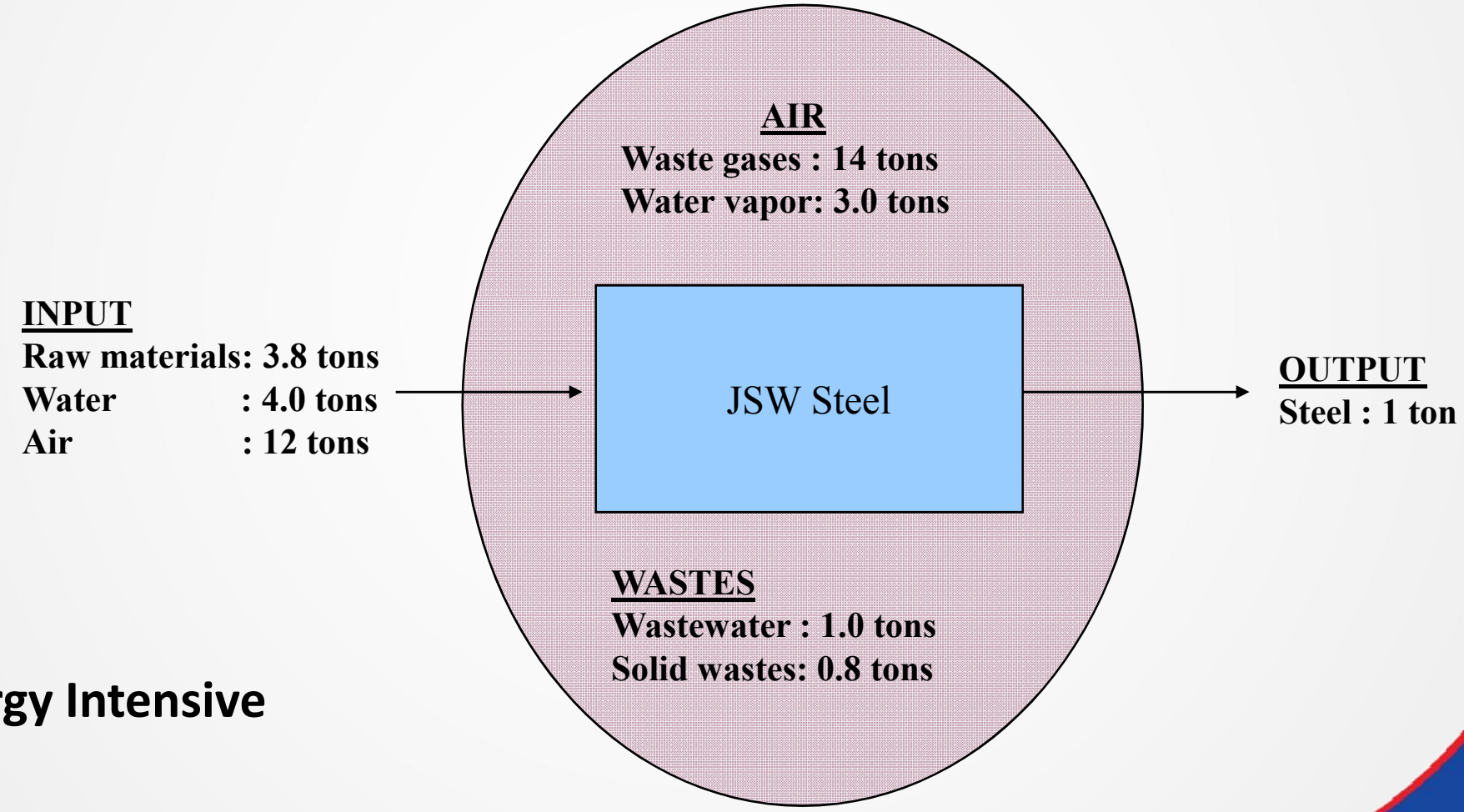
FLOW OF PRESENTATION

1. JSW Steel Overview
2. Steel Making- Process Route
3. Environment Management at JSW
4. Best Practices Case Studies

ENVIRONMENT MANAGEMENT ACTIVITY



STEEL MANUFACTURING - MASS BALANCE

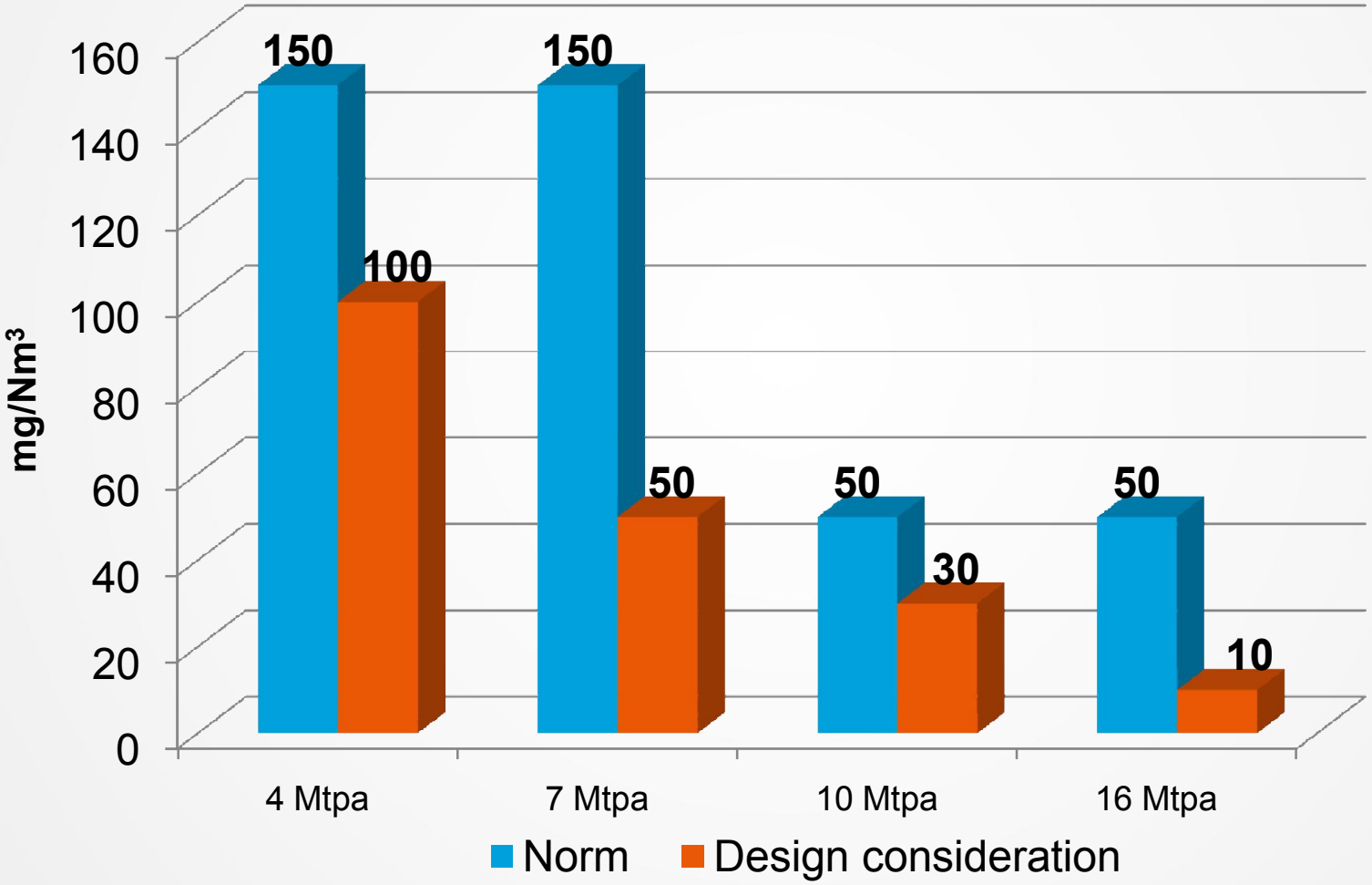


Energy Intensive

Environmental Infrastructure

Air		Water		Solid Waste	
ESP	18	RWTP	9	Micro pellet plant	1600 TPD
Bag Filter	223	RO Plants	6 Units (17650 m^3/day)	MSB Plant	600 TPD
Scrubbers	32	ETP	9 Units	Incinerator	250 kg/hr
Dry fog	112	Guard Ponds	3	Centralized Oil Storage	1 Unit
CEMS	35	ZLD Plant	1	WWP	1000 TPD
		Online Flow meters	7		

JSW Steel Dust Norms - getting stricter



Air Pollution Control Performance Assurance

Secondary Fume Extraction(SMS-2)

Sinter Plant-3 Process ESP

- **Choice of APC equipment-** Preference towards Bag filters
- Periodic audit of APC health through internally developed audit methodology.
- Centralized Procurement of filter bags to ensure Quality Control
- In house Bag Filter Testing laboratory

Fugitive Dust Emission Control (PM 10)

Infrastructures

- Dust Suppression System
- Wind curtains
- Paved areas
- Vacuum Cleaning
- Tyre washing

Administrative Measures

- Surveillance through high resolution CCTV Cameras.
- Internally developed audit methodology for junction house and transfer tower healthiness
- Dedicated water spraying tankers to suppress dust

Fugitive Emission Control

Foam Dust Suppression System

Dust Suppression System

Vacuum sweeping in shops

Vacuum sweeping on roads

Fugitive Emission Control

Spraying in stock yards with latex

Spraying in RMHS

Water Spraying in coal yard

Wind Curtain in Energy yard

Water usage – Company "Policy"

1. **Efficient use of water**
   - Reduction of evaporation rate
   - Maximize use of alternate sources rain water & seepage.
   - Reduction of fresh water in closed circuits by higher COC.
   - Reverse osmosis plant for recovering good quality water.

2. **Zero Discharge**
   - Cascading usage of water
   - Use of blow down water in other processes
   - Treated sewage for makeup

Towards ZERO water discharge (ZLD)

Guard Pond-1

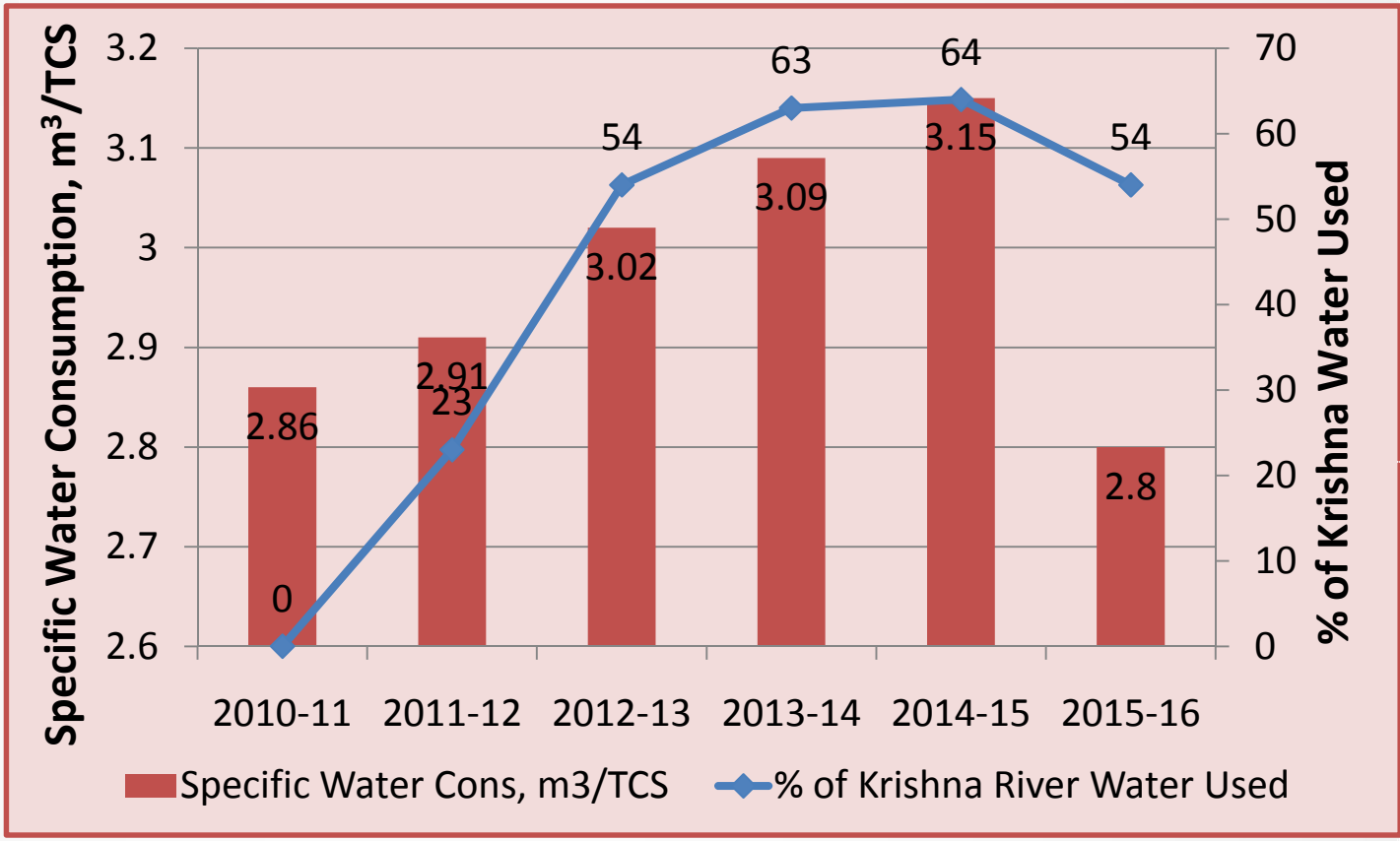
Guard Pond-2

Slag & Coke quenching

Ore washing

Environmental Performance - Water

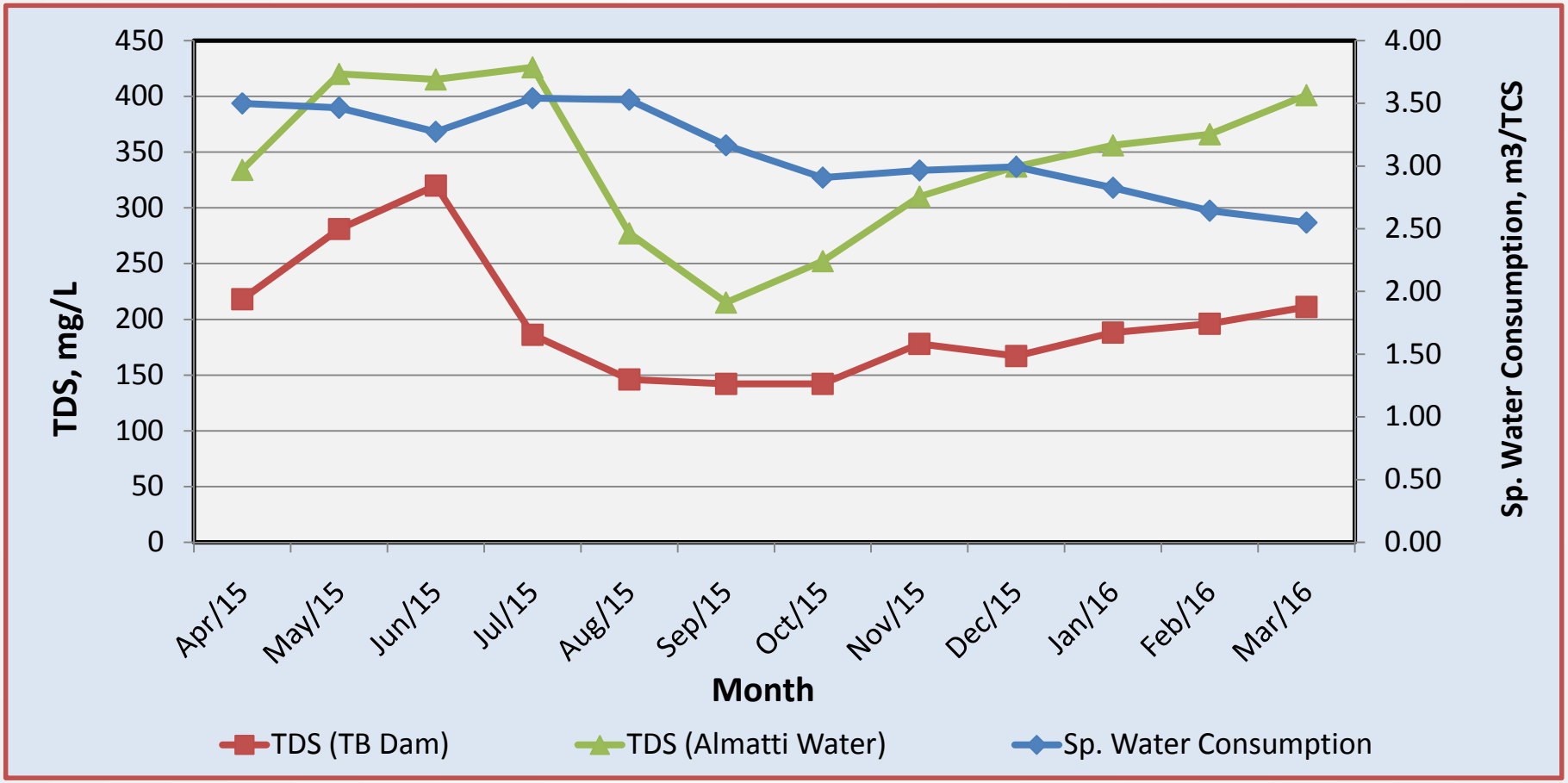
Continual improvement measures to reduce Specific Water Consumption in spite of continuously increasing TDS (due to increase in usage of Krishna water with 45% higher TDS)



TDS Value of Krishna River Water:350 mg/L
TDS of Tunga Bhadra River Water:200 mg/L

CREP Guidelines : 5.0 m^3/tcs - Long Product
CREP Guidelines : 8.0 m^3/tcs - Flat Product

Variation in Inlet Water TDS and Specific Water Consumption



Zero Liquid Discharge Plant

FLOW OF PRESENTATION

1. JSW Steel Overview
2. Steel Making- Process Route
3. Environment Management at JSW
4. Best Practices Case Studies

MBR

- MBR technology incorporated for Shankar Hill Town(SHT) Sewage Treatment Plant(STP)
- The high quality treated water of 3000 m^3/day is used as replacement of make-up water in CRM-2 water systems

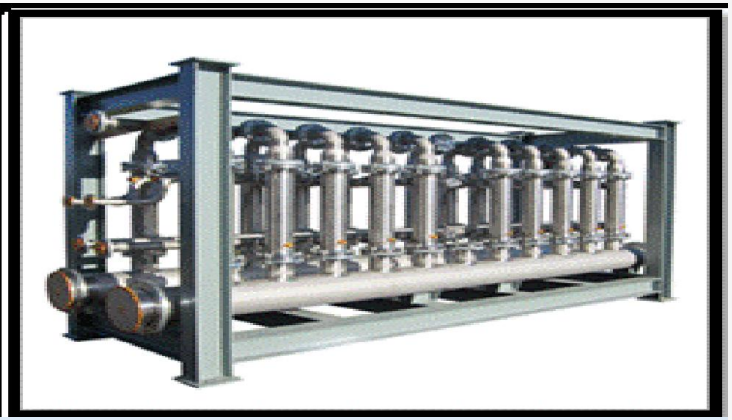
ZLD at Coke oven

- The organic chemical laden effluent from coke oven byproduct is treated through MBR+ RO system
- 4000 m3/day of treated clear water of high quality is generated

Slag Sand Preparation Unit

- Objective: Produce Slag Sand for Concrete
- Project Cost: Rs. 2 Cr.
- Vertical Shaft Impact Crushed (VSI)
- Plant capacity: 40 tonnes/day
- The unit produces sand meeting the IS-383 gradation requirements
- Environmental Friendly alternative to river sand

Ceramembrane



1. Material of construction: Aluminium oxide, silicon carbide, titanium oxide, or zirconium oxide
2. Range: Microfiltration to Ultrafiltration
3. Benefits:
   - Suitable for continuous operation across full pH range of 0 to14.
   - Suitable for elevated temperature operation
   - Increased membrane permeability, chemically-durable, high abrasion resistance, removes oil and grease

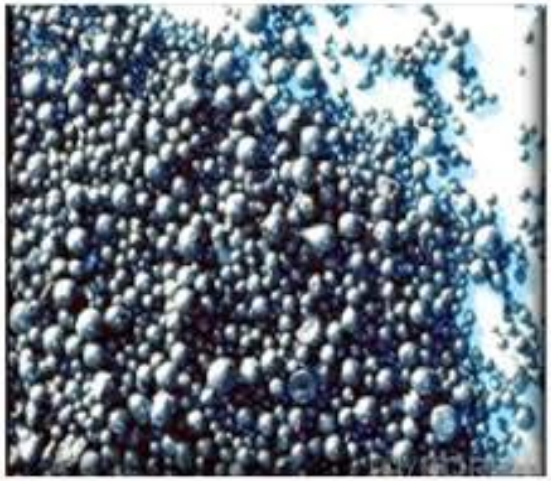
Solid Waste Management

Waste to wealth plant(WWP)

- To recover the iron and carbon content from process waste generated from steel making . Around 1000 TPD are available for recycling.
- Plant Capacity: 600 TPD of iron concentrate with 65-68% Fe(utilized in Pellet Plant)

Precious Slag Ball Plant

- Process: Air quenching of slag which generated from steel making process by means of Slag Atomizing Technology
- Characteristics: Superior to sand or Copper Slag on compressive strength, hardness for
- Plant Capacity: 0.2 MTPA



Greenery Development beyond Steel Plant




- JSW has planned to develop greenery for an area of 517 Acres out of which 287 Acres are completed in FY 2015-16.
- 8 km pipeline was laid and 2 intermediate pump houses are erected to cater the water requirement for the development on the hillocks.
- Treated blow-down water from process (4500 m3/day) will be utilized for the development of greenery on surrounding hillocks.

Environment Product Declaration

- A single, comprehensive disclosure of a product's impact on the environment throughout its lifecycle.
- JSW Steel Ltd is the first Indian Steel Industry to declare its footprint through EPD
- Third Party verification of the EPD report under progress.
- Customers will have access to environmental foot print data of the product and can chose for sustainable product.

Initiatives Started in FY 16

Fly Ash Beneficiation

- The technology is aimed at reducing the LOI of the fly ash from CPP boilers
- Air classifier will separate coarse and fine fractions (Cut off fraction is 45µ).
- Fine fraction will be sold as product and coarse fly ash with high carbon as a by-product
- Capacity of classifier : 40 TPH

CO2 injection

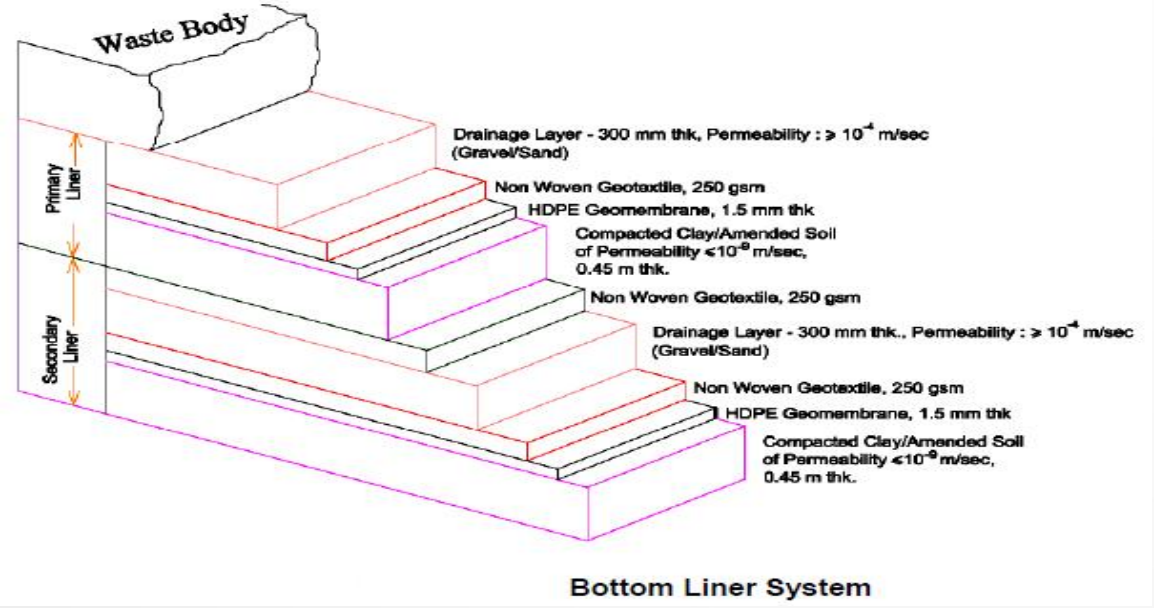
- Objective`:Treatment of BOF recirculation water for the removal of hardness.
- The replacement of Na2CO3 in BOF recirculation water by CO2
- 0.3 to 0.6 Tons/TLS is required .
- Cost of treatment @ 1.0 kg/TCS= Rs. 3.0/TCS
- Advantages: Drastic reduction in TDS, water conservation, Waste minimization

Initiatives Started in FY 16

TSDF Landfill

- Objective: Minimize the cost of hazardous waste disposal.
- Hydrological Studies Cost: Rs. 20 Lakh
- Currently sent to landfill of Ramky at Dabaspet, Bangalore Disposal cost : Rs.20 Cr. per annum (300 days)

Transportation cost : Rs. 8 Cr. per annum (300 days)

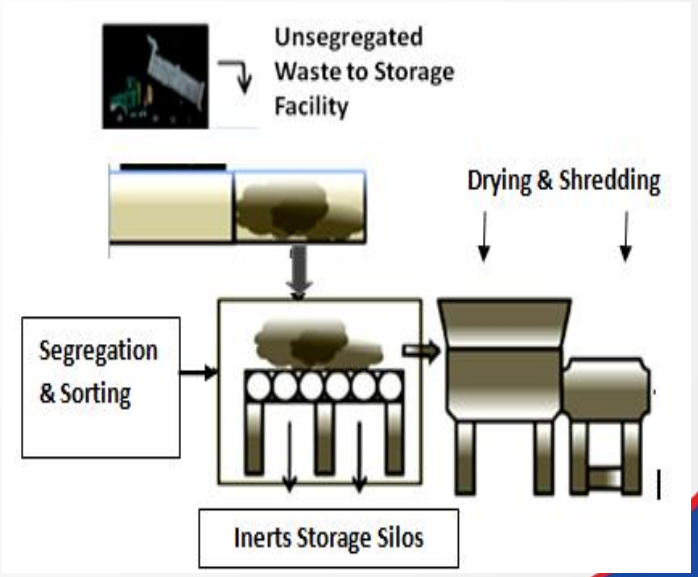


Bottom Liner System

Municipal Waste Treatment

- Objective: Convert municipal solid waste in to segregated dried waste for use as fuel.
- Cost: Rs. 3 Crore (20 Tons/day)
- Technology:

Drying, Segregation, sorting, shredding and conversion to RDF



MAKING STEEL IS OUR

PROFESSION...

...GENERATING SMILES IS OUR

PASSION