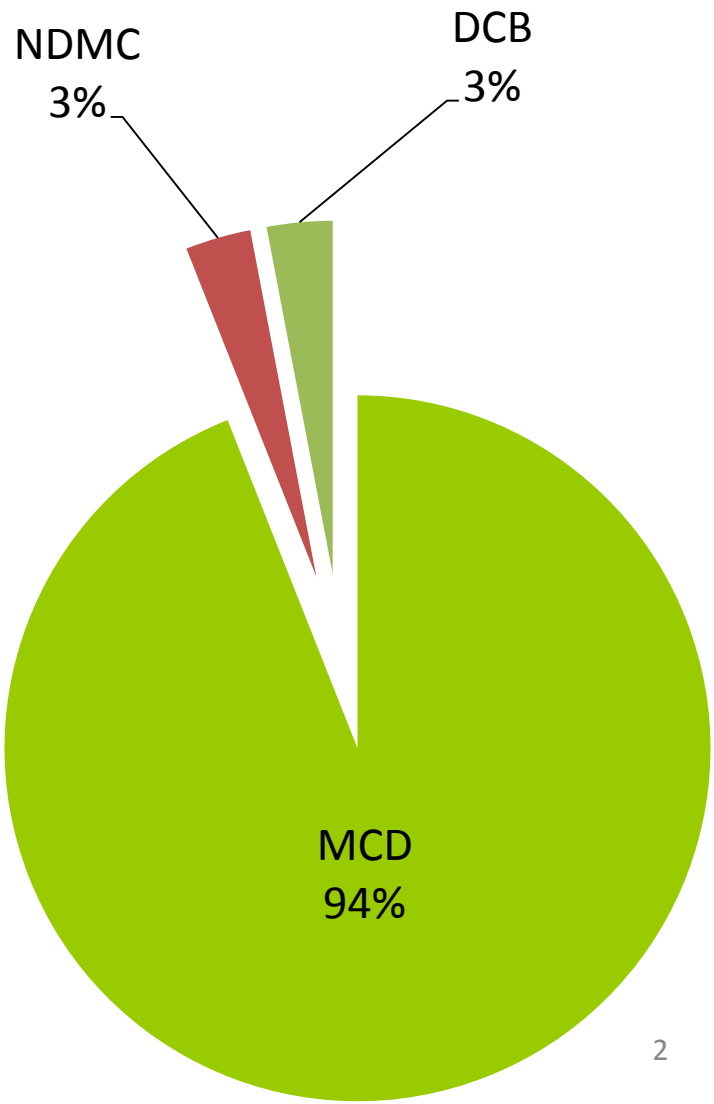
Presentation on
Solid Waste Management in Delhi
Municipal Corporation Of Delhi
AND
Proposed new
SANITATION WASTE MANAGEMENT SYSTEM
IN
SOUTH DELHI MUNICIPAL CORPORATION
26.01.2015

AREA & POPULATION OF DELHI

S. No.	Local Body	Area in Sq Km	Population in millions
1	NCT Delhi	1484.46	18
2	MCD	1399.26 (94%)	16.32
3	NDMC	42.4 (3%)	0.51
4	DCB	42.8 (3%)	0.17



MAP of DELHI SHOWING 12 MCD ZONES,NDMC AND DCB

SCENARIO OF MUNICIPAL SOLID WASTE MANGEMENT

- Delhi with a population of over 18 million is one of the biggest metropolises of the world.
- Population 2013 - 18.0million
  2021 - 22.4 million
- As per Municipal Solid Waste (Management & Handling) Rules, 2000
- Every Municipal Authority is responsible for :-
  - collection
  - storage
  - segregation
  - transportation
  - processing and disposal of Municipal Solid Waste (MSW) in an environment friendly manner.

SCENARIO OF MUNICIPAL SOLID WASTE MANGEMENT

- 49% of the total population of Delhi lives in
  - Slum areas
  - unauthorized colonies
  - about 860 Slum clusters with 4,20,000 hutments.

- A sizeable population therefore lives in unplanned areas having no proper system of collection, transportation and disposal of Municipal Solid Waste.

- There is also the floating population visiting Delhi in connection with business activities Delhi being a major distribution centre of retail business in North India.

SCENARIO OF MUNICIAPL SOLID WASTE MANGEMENT

- Municipal Solid Waste - heterogeneous mixture of various constituents.
- Due to Rapid urbanization/uncontrolled growth rate of population Municipal Solid Waste Management (MSWM) has become acute.
  - (i) The Per Capita Waste generated in a typical Indian Metro City increases by 1.3% per year .
  - (ii) and the urban population increase is around 3.5% per annum (World Bank Report).
- These two factors (i) and (ii) have led to a yearly 5% increase in Solid Waste burden.

SCENARIO OF SOLID WASTE MANGEMENT

- The quantity of Solid Waste generated at present is around 8000MT/day and shall reach 17000-25000 MT/day by 2021 in Delhi.

- Most solid waste is dumped in landfills without sorting or treatment leading to air, land and water pollution/foul odour/unsightliness .

- Around 25% is dumped at Waste to Energy plant and Compost plants.

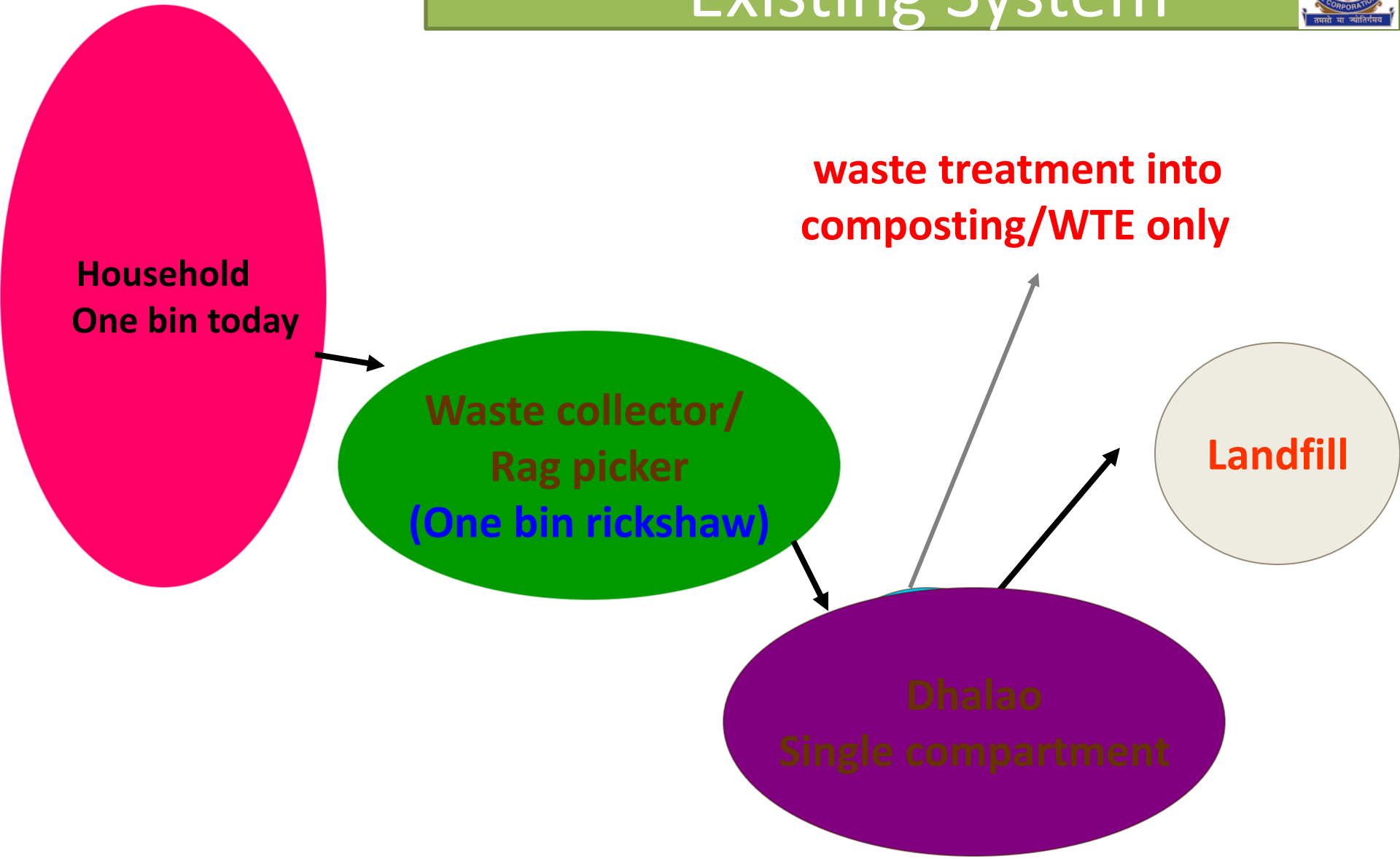
PRESENT STATUS OF DISPOSAL OF MUNICIPAL SOLID WASTE

S. No.	Name of SLF Site and Compost Plant	Area (in Acres)	D.O.S	D.O.C	Height in Meter	MSW being dumped per day in MT
1.	SLF Ghazipur	70.00	1984	Almost saturated	Average. 30.00 from general ground level	2500.00
2.	SLF Bhalswa	40.00	1994	Almost saturated	Average. 25.00 from general ground level	2900.00
3.	SLF Okhla Ph-I	32.00	1996	Almost saturated	Average. 50.00 from general ground level	400.00
4.	Waste to energy plant at Okhla					1200.00
4.	Compost Plant, Bhalswa	12.00	1999	2029	-	500.00
5.	Compost Plant, Okhla	08.00	2008	2038	-	300.00
6.	Integrated landfill facility at Narela-Bawana		2011	-	-	1500

Solid Waste Management

- **Municipal workers** — **over 52000**
- **Garbage collected** — **8000 MT/day**
- **Collection Bins** — **2500**
- **Active Landfill sites** — **3**
- **Cost of collection and disposal** — **50$/MT(Approx.)**

Existing System



COLLECTION OF MSW

- South, Central, City, Sadar Pahar Ganj, Karol Bagh West Zone of MCD (**Secondary only**) Started through concessionaire since Dec.'05
- Civil Lines & Rohini Zones (**Integrated Project**)

  [Door to Door Collection, Transportation, Processing] & Management of Engineered Land Fill Site] :Started since July'09
- Shahdra (N&S), Najafgarh & Narela -Departmentally
- Mechanical sweeping of roads having ROW > above 60' by deploying 28 machines and covering over 900 km.

WASTE- A CHALLENGE

	2015	2020	2024
Population of the State of Delhi (in millions)	20.00	22.30	22.50
MSW collected per capita (kg per day)	0.470	0.530	0.635
MSW Generated (in TPD)	9400	11,800	14,300
C&D Waste Generated (TPD)	3500	5000	6500
Green Waste Generated (TPD)	80	110	160

GAZIPUR LANDFILL SITE

BHALSWA LANDFILL SITE

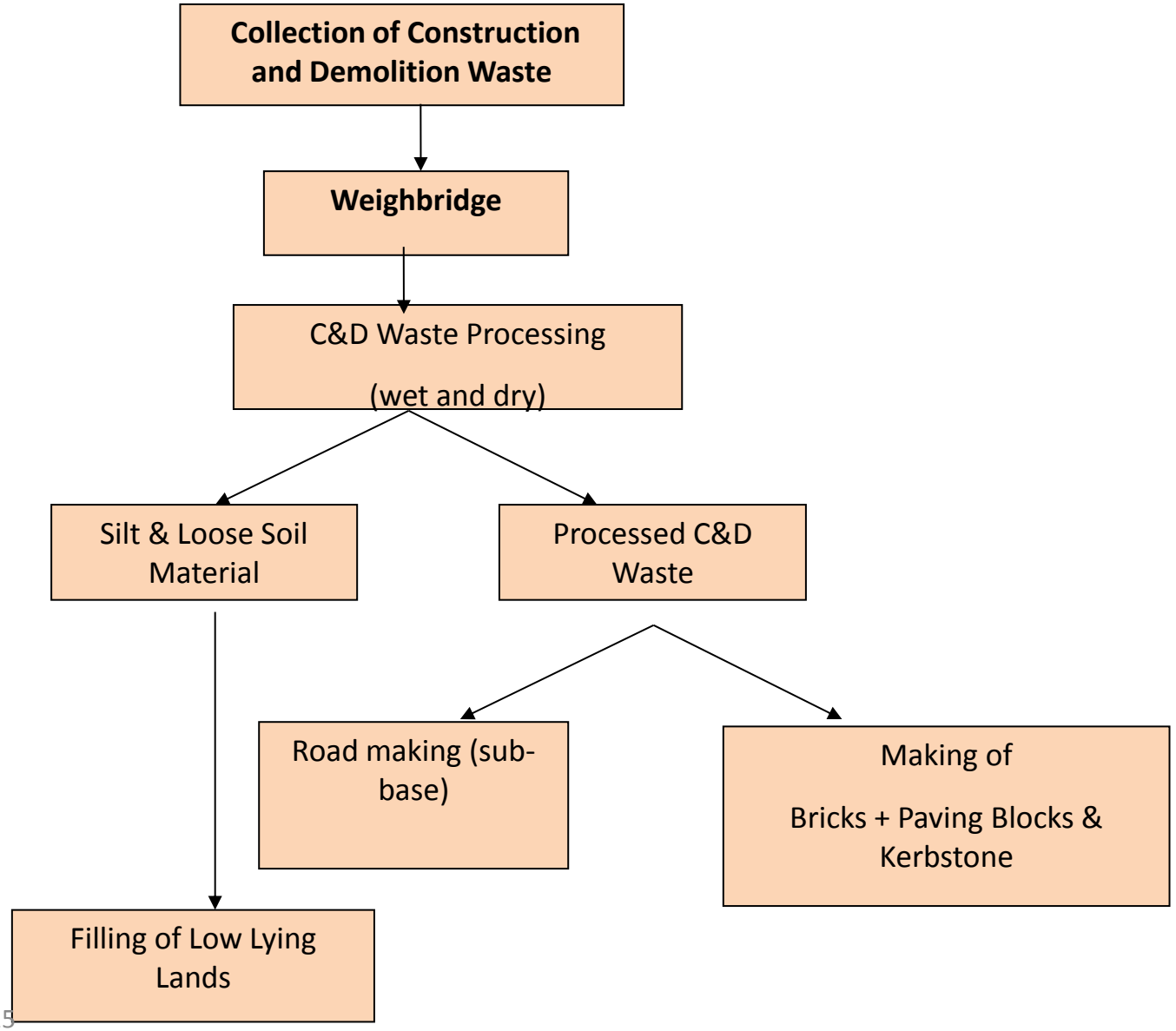
OKHLA LANDFILL SITE

C&D WASTE PROCESSING FACILITY AT JAHANGIRPURI (BURARI)

A Pioneering Initiative

- Pilot Project of 500 TPD of Construction and Demolition Waste
- First of its kind in Country
- Land Size -7 Acres in Burari, Jahangirpuri
- Greenfield project
- Leased for a period of 10 Years to IL&FS on Develop, Build, Operate and Transfer (DBOT) basis

PROCESS FLOW



OKHLA COMPOST PLANT, OKHLA

In May 2007, IL&FS signed a Concession Agreement with MCD to revive establish, finance, design, construct, operate and maintain the compost plant at Okhla as PILOT PROJECT.

- Plant Capacity : 200 TPD of MSW
- Compost production : 40- 44 TPD
- Technology : Open windrow Aerobic composting
- Term period : 25 years
- Sources of revenue : Selling of compost & Carbon Credits
- Last year the plant has earned carbon credit to the tune of $40,000

OKHLA COMPOST PLANT

WASTE TO ENERGY PLANT OKHLA

MID TERM MEASURES (INITIATED)

- C&D Waste Processing Facility at Gummanhera
- Augmenting the Machinery and equipments (Auto-tippers, Loaders, Rickshaws, Wheel barrows)
- Workshops for machinery
- New Tenders for Door to Door Waste collection & transportation
- Introduction of segregation at source (household level) on pilot basis

Zonal Sanitation Management Plan

- Consultant has been engaged for preparation of Zonal Sanitation Management Plan.
- Salient Features-
  - Separate management chain for 4 kind of waste; viz.- MSW , C&D Waste, Green Waste, Ash & Silt.
  - 1 Concessionaire to manage all aspect of sanitation in a zone; viz.- Primary collection and Secondary collection/transportation to disposal site – for all the 4 kinds of waste.
  - Concessionaire to deploy Rickshaws, Auto tippers, Transfer-station; Refuse Trucks/ Compactors
  - Customized System for each kind of colony/Settlement
  - Electronic GPS based reporting and monitoring system
  - Door-step Collection of waste from Bulk generators (on charge basis)
  - Introduction of door-to-door collection in phased manner.
  - Modernisation / Technology introduction in Waste Collection points.

Decentralised Zero Garbage System

- Household segregation; Door-step Collection, Decentralised Management leading to Zero Waste in 5 Clusters (of 4-5 wards each)
- Requires Facility Site (~5-10 Acre) to be established in the Cluster
- 200 MT/day MSW to be managed in each cluster
- Pilot Project is proposed at Dwarka
- Project report has been prepared; Workshop conducted; Land identified .

PROPOSED WASTE PROCESSING FACILITIES

ADDITIONAL WASTE PROCESSING FACILITIES COMING UP

- Waste to energy plant at Ghazipur -1300 TPD
- Capacity Addition at Narela Bawana Integrated facility -1500 TPD
- C&D waste processing facility at Shastri Park- 500TPD
- C&D waste processing facility at Gumman Hera-500 TPD

Roadmap, Down Further

- We will require to plan for-
  - E-waste collection, management and processing.
  - Plastic Waste Processing & Recycling in a scientific manner
  - Modern Slaughter-houses for sheep & goat; for pigs.
  - Regulations for mandating Solid waste management within premises for large establishments.
  - Reducing Parking on main roads so that they can be cleaned by mechanised sweeping.
  - Landfill Site for dumping residue and inert

PROPOSED PROJECTS AT GHAZIPUR

❖Ghazipur waste to Energy project

- 1300 TPD MSW Processing Facility with anticipated generation of 12 MW Green Power
- MSW will be processed to produce Refuse Derived Fuel (RDF)
- RDF will be used as fuel to generate 12 MW Green Power

WASTE TO ENERGY PLANT AT GHAZIPUR

INTEGRATED MSW PROCESSING & DISPOSAL PLANT BAWANA

- The plant is having following facilities

  - Processing Plant (Material Recycle Facility (MRF), Composting, and Refuse Derived Fuel (RDF)
  - Engineered Sanitary Landfill facility
  - 2 number Weigh Bridges of 60MT each
  - Green Belt
  - Laboratory
  - Leachate system and Treatment plant
  - Other Ancillary facility as per MSW Rules, 2000

- Plant is operational since August , 2011

INTEGRATED MSW PROCESSING & DISPOSAL PLANT BAWANA

INTEGRATED MSW PROCESSING & DISPOSAL PLANT BAWANA

OTHER ISSUES IN WASTE MANAGEMENT & SANITATION

- In-situ remediation of large surface drains, especially, natural drains

- **Bio medical waste management**

- **e-waste management**

- **Hazardous Waste**

INCOME & EXPENDITURE

1. Total Expenditure by the MCD $1000 millions /annum

2. Out of the total amount $125 million is spent on Solid Waste Management/annum

3. No charges is levied for the Solid Waste Services

4. 80% of expenditure is on Collection and Transportation and 10-15% on Disposal of Solid Waste.

MCD- Trifurcation

SDMC at a Glance…

- South Delhi Municipal Corporation (SDMC) comprises of four zones-South, Central, West and Najafgarh Zone for the management of the sanitation system in a systematic manner.
- SDMC, part of the Delhi, has a population of 6031247 souls as per census 2011 and 1278191 households as per census 2011 with decadal growth rate of 21% in the decade 2001-2011.
- SDMC encompasses an area of 657 sq. km. approximate.

S. No.	Name of Zone	No. of Wards	Area (in Sq. km)	Population
1	South	26	190.02	1358791
2	Central	30	99.98	1674194
3	West	28	59.71	1708285
4	Najafgarh	20	307.35	1289977

Cardinal Points

- Cleaner City
- Huge increase in Waste generation
- Address Shortage of Landfills
- 3R (Reduce, Reuse & Recycle) through IEC
- Single Hand Management
- Tipping Fee = Work Done
- Door to Door Collection/ Street Level Collection
- Secondary Collection Points (Dhalaos/ Open Sites)
- Segregation
- Technology Driven Monitoring System
- Fair Penalty System
- Project Monitoring

SOUTH DELHI WASTE FORECAST

Quantity in TPD

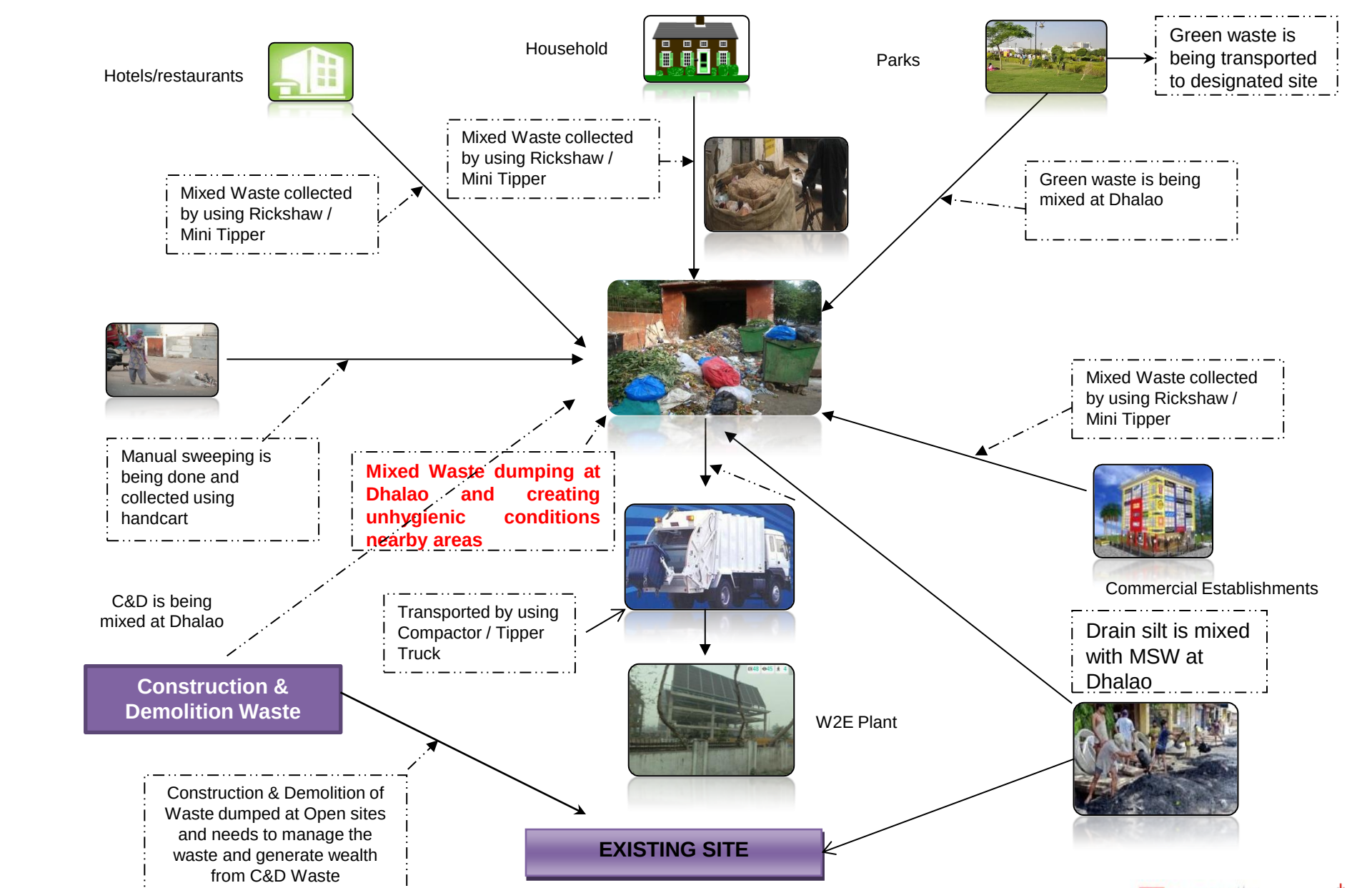
Year	2014	2015	2016	2017	2018	2019	2020	2021
Central Zone	1294	1327	1362	1398	1434	1472	1510	1550
South Zone	1023	1048	1073	1099	1125	1152	1180	1208
West Zone	1126	1154	1183	1213	1244	1275	1308	1341
Najafgarh Zone	795	820	846	872	899	928	956	986
Total	4238	4349	4464	4582	4702	4827	4954	5085

NOTE: Though adequate care has been taken for forecasting the population for the four zones as mentioned above, the quantities of waste generated can vary during the course of actual implementation

PROPOSED SOLID WASTE MANAGEMENT SYSTEM

- All types of waste Collection & Transportation-
  - Municipal Solid Waste
  - Drain Silt
  - Green Waste
  - Construction and Demolition Waste
  - Street Sweeping Waste
- All four zones under the jurisdiction of SDMC-
  - South Zone,
  - Central Zone,
  - West Zone, and
  - Najafgarh Zones
- Segregation of waste-
  - Dry Waste
  - Wet Waste
- Information, Education & Communication (IEC) about the System
- Automated Monitoring of the System

EXISTING STATUS OF SWM SYSTEM



PROPOSED SYSTEM (for Streets/Households/Commercial)

Segregation at source

Wet waste & Dry waste shall be collected separately

Only wet waste shall be transfer directly in MTS

Mobile Transfer Station

Fixed Compactor Transfer Station

Hook Loader

Segregation at source

Hotels

Commercial Establishments

Only wet waste shall be transfer directly in MTS

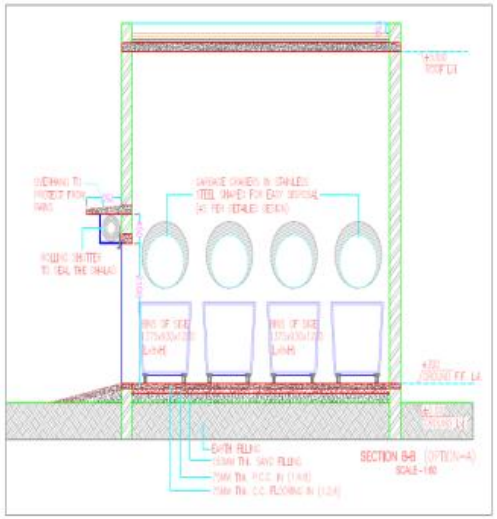
Auto tipper compatible with 240/120 litre bin

Waste to Energy Plant

Dry waste collected from households and commercial establishments shall be transported to designated recycling centres in each zone

Dry waste shall be further segregated & sold to Kabadiwala

PROPOSED SYSTEM (For Dhalao)



Modernization of Dhalao

PROPOSED SYSTEM Contd….

Manual (for narrow roads) & Mechanical Street Sweeping (for selected wider roads)

Street Sweeping waste to be dumped at nearby SCPs in the specified Bin by SDMC Staff

Waste received at 1.1 cum Bins to be transported to SLF by using Refuse Collector

Household

Green Waste generate from H/H to be collected by Auto Tipper (on Demand Basis)

Waste to be transported to Nurseries Specified by SDMC

Landfill Site

Waste received from 5Cu.M Bin to be transported to Sanitary Landfill Site by using Hook Loader

Silt Generated from drains upto 4ft.

Collecting by using Mini Tipper

Waste received from Mini Tipper / Auto Tipper (5Cu.M Bin)

5 cum container to be placed at designated modified Dhalaos

INTEGRATED SOLID WASTE MANAGEMENT

WASTE GENERATOR

Commercial / Institution

Segregation of Bio / Non Bio degradable waste at Source

Dhalao / Fixed Compactor

Fixed Transfer Station

Transported to the existing / Compost Plant / Processing Site

Households

Promote segregation of waste in Bio / Non Bio degradable Waste at Households Level

Segregation of H/H Waste

Collection of Waste

Collection of Waste by Auto Tipper / Battery Operated Rickshaw (through organized rag pickers / existing sanitary workers)

Mobile Transfer Station

Bio / Non Bio degradable Waste to be carried to existing Mobile Transfer Station

Transported the waste to existing Site / Compost Plant using Compactor

Compost Plant / Processing Site

Hotels / Restaurants / Sabzi Mandi

Collected using Compactor at Scheduled Time

Street Sweeping

Done by Manual / Mechanical Sweeping depending upon the Roads

Separate Dhalao / RC Bin for Street Sweeping and Drain Silt Waste

Transported to Landfill site

Street Sweeping / Drain Silt Waste

Drain Silt

Collected by Tipper and directly transported to dedicated Dhalao / landfill site

Transported to Landfill site

Landfill Site

Construction & Demolition Waste (C&D)

- Each waste generator would be responsible to inform the Department for collection of C&D waste .
- C&D Waste will be collected by using Tipper Truck and transported to Brick Making Plant.

Dedicated Separate Dhalao for C&D Waste

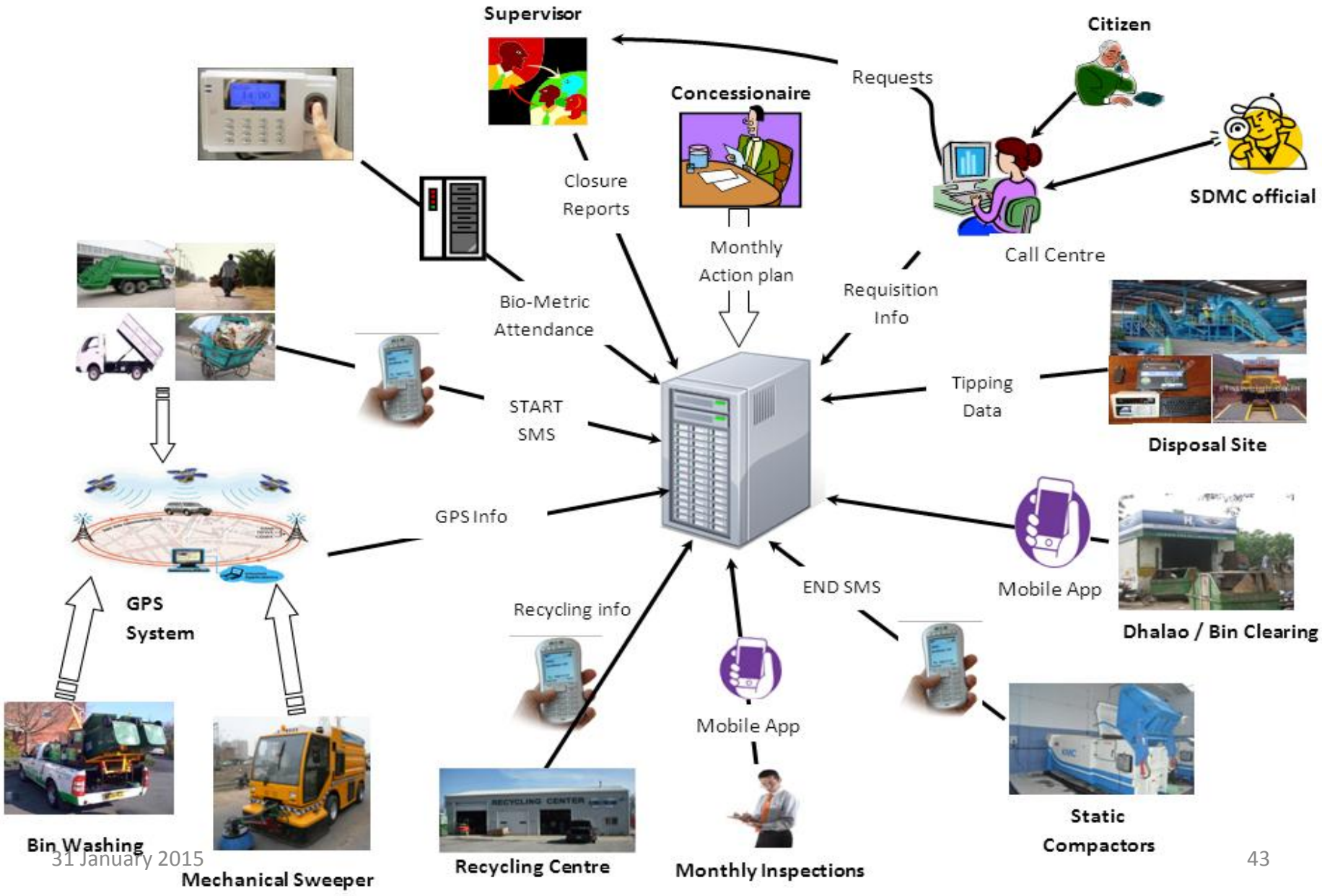
Brick Making Plant (Site)

Horticulture Waste (Parks / Road Side Trees etc.)

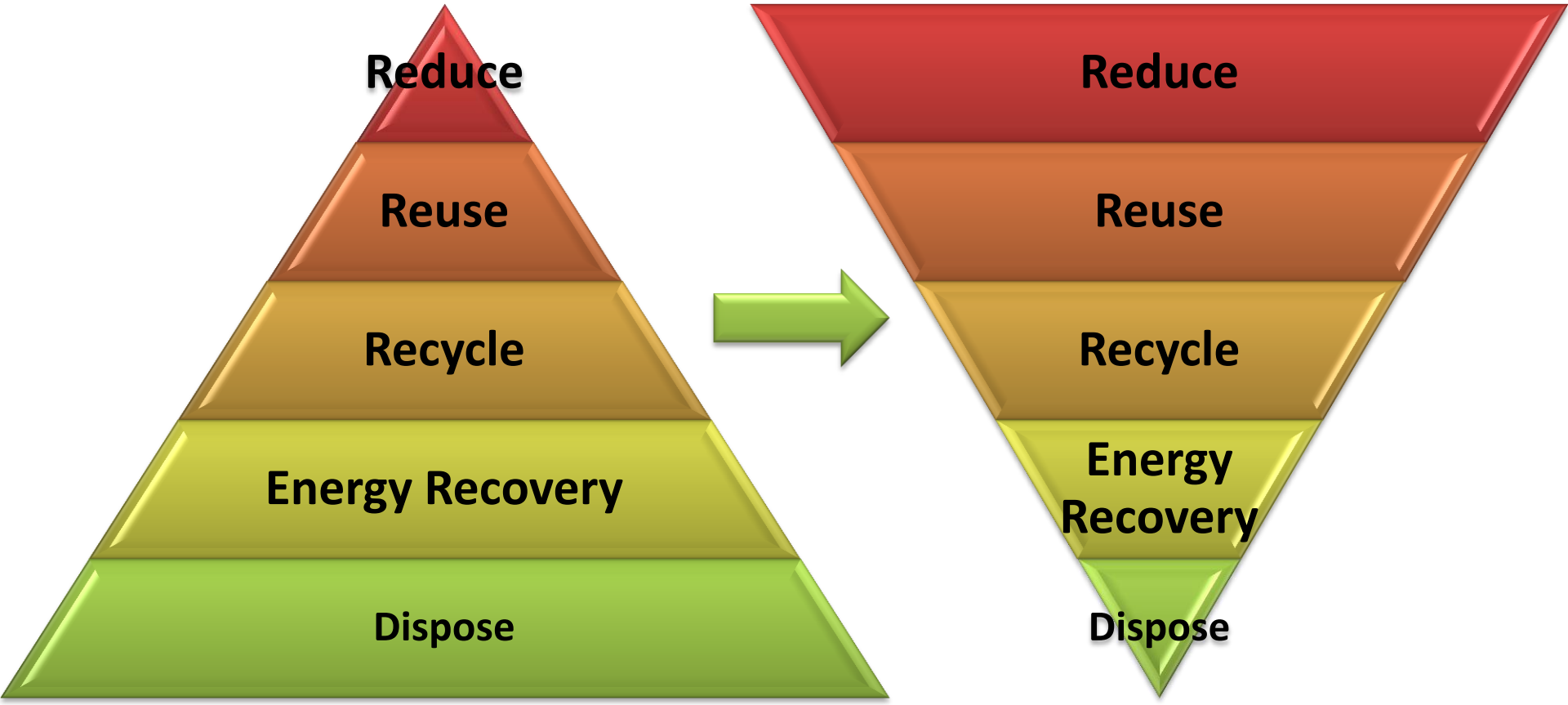
Collected through Auto Tipper

Zone wise Mini Compost Plant

Automatic On-line Real Time Monitoring System based on GPS/RFID/Mobile Application



The 3R-Approach: Reduce – Reuse - Recycle



Where We Are → **Where We Should be**

KEY HIGHLIGHTS

- One Zone- One Concessionaire.
- All Solid wastes- One Concessionaire.
- Segregated (Dry & Wet) waste Collection & Transportation.
- Collection & Transportation of all solid wastes separately through the different types of vehicles.
- Dedicated Resource deployment for different types of colonies.
- Calculated minimum resource (Human & Non-Human) requirement.
- Modernization of Dhalaos.
- System for Zero waste at Dhalaos/ Open sites.
- Maximum use of Fixed/ Mobile Compactor Stations.
- Focus on Primary Collection & Transportation.

KEY HIGHLIGHTS

- Different User Charges for selected services.
- Double Monitoring- Automated & Manual.
- Dedicated Complaint Redressal System.
- Flexibility in Agreement for changing needs & Situations.
- Provisions for Experiments.
- Well defined Penalty System.
- Involvement of Public.
- Project Monitoring System (PMC)
- Project IT Consultant (PITC)
- Project Communication Strategy Partner (CSP)

INNOVATIONS

- Different Tipping fees for Different type of wastes.
- 60:40 Tipping fee for Primary & Secondary Collection & Transportation.
- Annual Inflation in Tipping Fee on basis of WPI.
- On Demand paid Services
- IT Enabled System- online MIS, Mobile Applications.
- Self- reporting System.
- Maximum Automated Real Time Monitoring through secured Controlled Room.
- Automation of System generated Penalty System.
- Introduction of 3 Independent Consultants- Project IT Consultant, PMC & Communication Strategy Planner (IEC).

INNOVATIONS

- Dedicated Route Plans for each vehicles.
- Different Source & effective waste lifting mechanism.
- Provision for localized composting.
- Recycling Centers for Dry wastes in each ward
- Introduction of System under ESMA Act.

EQUIPEMENTS FOR PRIMARY COLLECTION

Rickshaw having capacity of 600 litre

Auto Tipper with 1.75 Cum /0.6 ton capacity

Three wheeler of 1.0 Cum /0.35 ton capacity

Auto Tipper with (Bin lifting system) 1.75 Cum /0.6 ton capacity

EQUIPEMENTS FOR SECONDARY COLLECTION

Compactor having capacity of 14 cum

Hook loader

Refuse collector having capacity of 8 cum

Static Compactor having capacity of 10 cum

Refuse Collector Bin having capacity of 1.1 Cum

Covered Container having capacity of 5.0 Cum

THANK YOU