



# **Solid waste management present practices, challenges and future planning of Ahmedabad Municipal Corporation**

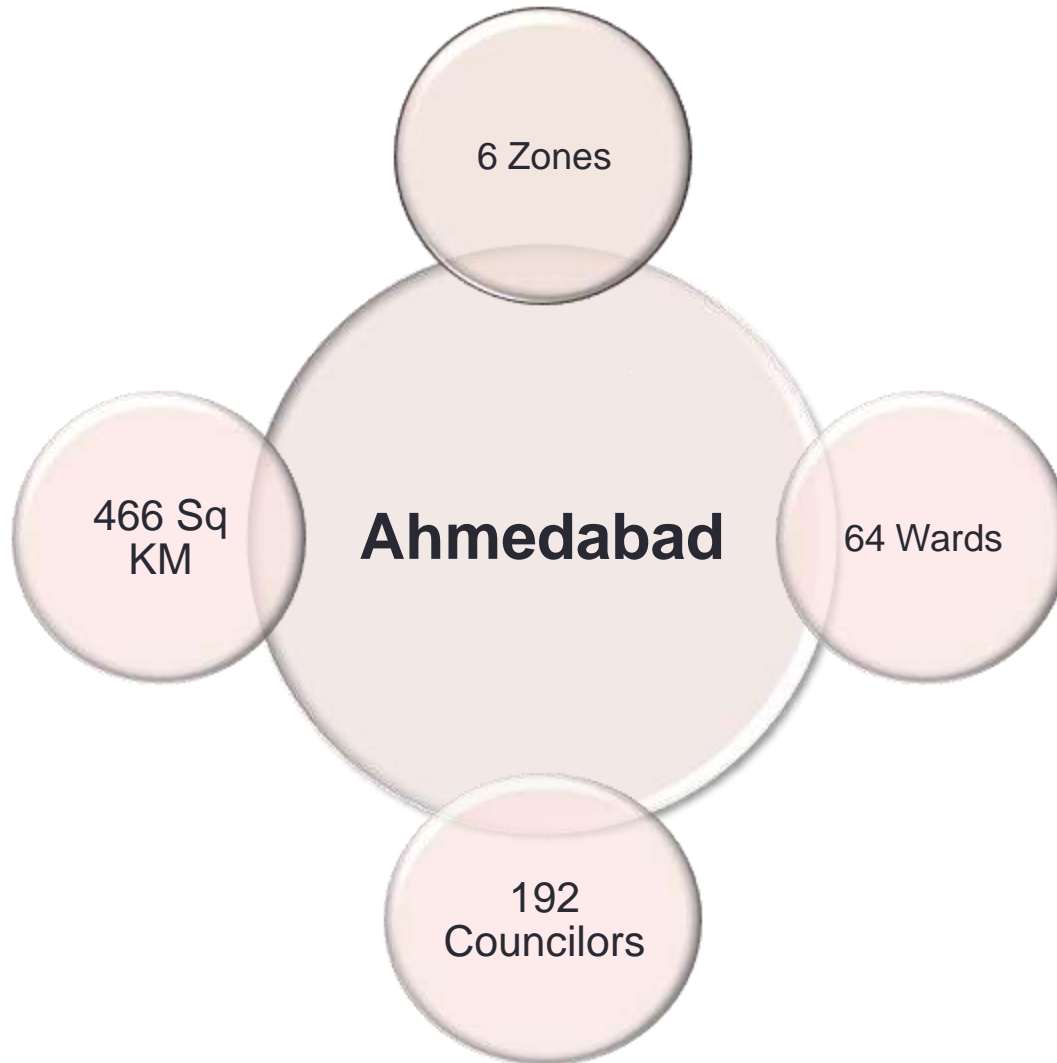
**Solid Waste Management Department  
Ahmedabad Municipal Corporation**



# Comparative study 2006 - 2014

<b>Details</b>	<b>Year 2006</b>	<b>Year 2014</b>
Area (sq. km.)	192	466
Population (Lacs)	55.70	62.70 (approx)
Wards	52	64
Staff	7500	12500+
Solid Waste (TPD)	2219	3600+
Vehicle - Equipments	450	1200+
Annual Budget (Rs in Crore)	94.84	340

# Civic Administration of the City



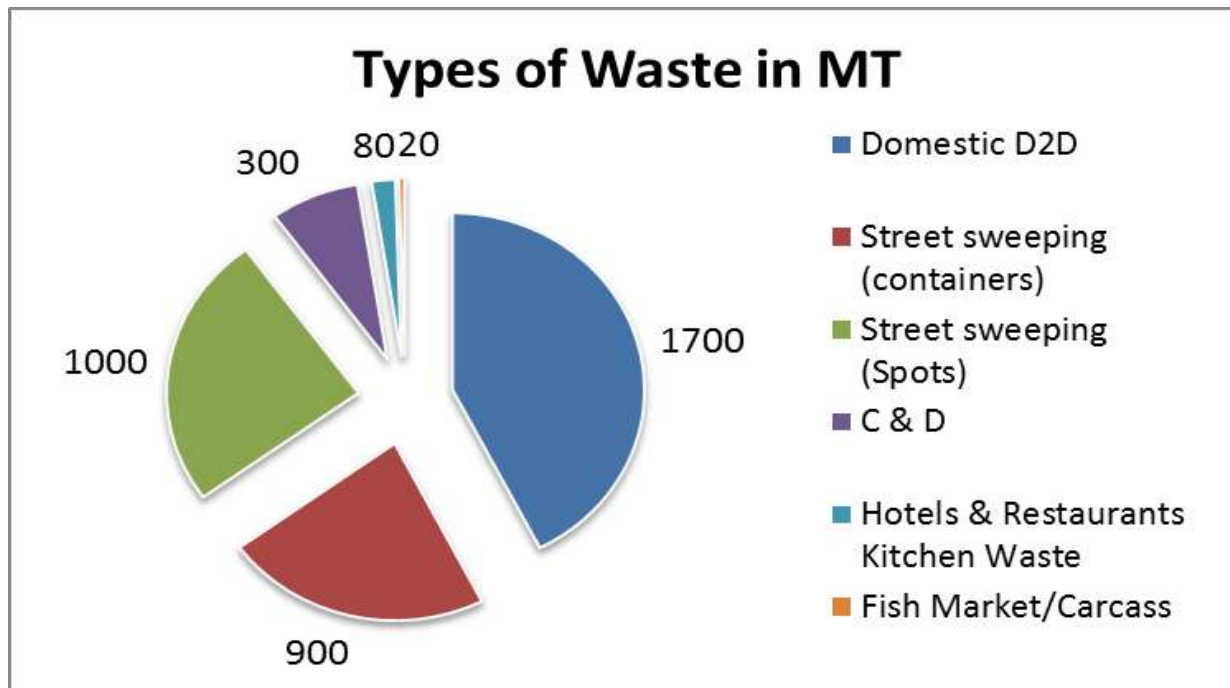
## System as per Rules

The Ministry of Environment and Forest (MoEF), Government of India issued a notification on 25 September, 2000 under the Environment Protection Act 1986 stating that all cities and towns of India should undertake municipal solid waste management as prescribed by the rules. These are known as “The Municipal Solid Waste (Management & Handling) Rules 2000”.



# An Overview of Solid Waste Management from different sources

Population of City is 60 lacs plus and daily per capita waste generation is more than 600 gms. City generates 4000 TPD waste including 300 MT of construction and demolition debris Waste. All waste is collected, transported, treated and disposed according to the MSW Rules.



## **(A) Waste Collection System of City**

1. Sweeping of roads by employees.
2. Scrubbing of roads by mechanized sweeping machines.
3. Waste collection from open spots.
4. Domestic Waste Collection by Door to Dump System.
5. Lifting of Community bins / Containers.
6. Construction & Demolition waste collection.
7. Segregated collection of kitchen waste from Hotels and Restaurants
8. Bio-Medical Waste Collection.
9. Collection of carcass / Animal Waste.
10. Collection of Flower Waste / holistic materials.
11. Manure Lifting Machines.

## **(1) Sweeping of Roads by Safai Kamdar**

1484 km roads are swept by more than 12,500 Street sweepers on a daily basis. Street sweepers are provided a lorry and 6 bins for cleaning activity.



## (2) Night scrubbing through Road Sweeping Machines



Before



After



- All major public roads, BRTS roads & Model roads are covered under this system.
- 30 truck/tractor mounted road vacuum sweepers & 15 self ride on road vacuum sweepers are used
- Working time: 10 pm to 6 am
- Each machine has a cost of Rs. 64 lakh plus
- These machines are helping AMC to keep city as a dust free city.



### **(3) Door to Dump System:-**

- Collection of domestic waste from 14.50 lacs residential and commercial units are covered under Door / Gate to Dump project.
- More than 600 vehicles of Tata ACE with more than 1 ton capacity are deployed and more than 1700 TPD waste collection in this System.



### **(4) Waste Collection from Spots:-**

- AMC collect more than 1000 TPD waste from various spots in six zones by 130 tractors, trucks, JCB, etc, equipments & machineries.

## **(5) Lifting of Bins / Containers**

More than 941 locations are defined as waste collection points where 1147 closed body 7 cubic meter M.S. Community storage bins have been provided. AMC ensures that these containers are lifted at least once in a day and 900 TPD waste is collected under this system.



## **(6) Construction & Demolition waste collection**

Citizen are well informed to dump their C& D waste at their own cost at the defined 16 locations. Amdavad Enviro Pvt. Ltd. is authorized by AMC on PPP mode to collect, transport & process 300 TPD C & D waste from designated 16 locations of the city.



## **(7) Segregated collection of kitchen waste from Hotels and Restaurants**

- AMC has contracted with three agencies, who collect food waste from such units and charge from hotel units on monthly basis so there is no cost to AMC in this system.
- 80 TPD food waste is collected from more than 950 units of hotels and restaurants.
- It is delivered to compost plant for treatment.
- AMC is in a process of planning to utilize food waste for Gas / Electricity generation by bio-methanation.

## **(8) Collection of Municipal Bio Medical Waste**

AMC has contracted 2 agencies approved by GPCB for daily collection, transportation and disposal of bio-medical waste from 4 municipal hospitals, 2 referral hospitals, 64 urban health centers and dispose it in their incineration plant.

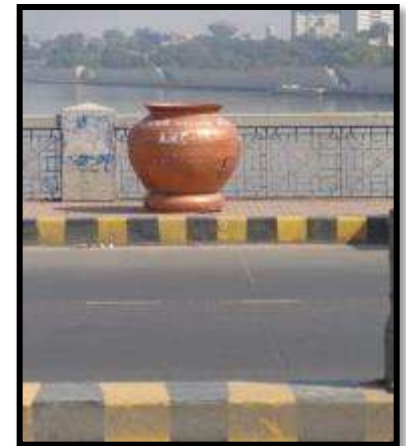
## **(9) Collection of Carcass / Animal Waste**

AMC has deployed 4 hydraulic based vehicles and staffs to collect carcass of dead animal like cow, camel, buffalo, donkey, dog, rat, etc. AMC has deployed 2 vehicles to collect fish, meat, slaughter house waste from market. 8 TPD animal waste is collected from the city under this system.



## **(10) Collection of Flower Waste / Holistic Materials**

City has a historical Sabarmati river. To reduce pollution and maintain cleanliness citizens are motivated to deliver flower waste and such holistic materials in the “KALASH” instead of throwing into the river. AMC has deployed 16 “KALASH” on 8 bridges of Sabarmati river. Such flower waste is delivered to compost plant for treatment.



## Deployment of Machineries & Equipments

AMC has deployed 89 Tipper Trucks, 40 JCB Machines, 33 Bobcat type machines, 120 Hydraulic Dumper Placers, 11 Skip Lifters, 54 Compactors, 4 Dead Animal Vans, 14 Nuisance Tankers, 1 Mobile Court, 60 Tractors, 3 Excavators, 5 Bull dozers, 3 Wheel dozers, 30 Truck/Tractor mounted Road Vacuum Sweepers, 15 self ride on road vacuum sweepers, 12 manure lifting vehicles (for cleaning of open defecation spots), 24 mini vans and other contactors' 700 vehicles in all 6 zones. AMC deploys more than 1173 Total vehicles/Equipments on daily basis for efficient handling of waste cleaning of the city.

## (B) Transfer Stations for Secondary Transportation of Waste

- AMC has decided to construct one transfer station with capacity of 400 TPD in all Six Zones. Out of which 3 are operational and 3 are under construction (except Central Zone). Civil & Mechanical cost of each transfer station is more than Rs. 5.5 crores.
- Each transfer Station have 2 Stationary Compactors, 9 Large Hook Loader Vehicles and 11 Large Containers with 20-25 CMT Capacity to carry 10 to 12 MT waste.
- Compaction & Transportation of waste on each transfer station is about 350 TPD.
- Transfer station helps AMC to save on transportation cost, reduce pollution and ease traffic congestion, and effective & speedily collection of waste.
- AMC is planning to construct additional 6 Transfer Stations in zones.

# Transfer Station



# (C) Recent Initiatives in Waste Management

## (1) IEC Project for Awareness to citizens

AMC has Started a Project for IEC (Information, Education, Communication) Activities and Awareness of citizens towards Cleanliness, Waste Treatment & Waste Disposal and get their co-operation & participation

- Regular meetings of Committees in the Wards
- Publicity through Television Channels / Local Cable Network
- Advertisement in Newspapers
- Distribution of pamphlets and Banners
- Exhibition of Awareness Creation slides in Cinema Theatres
- Conducting Street plays
- Organizing of rally involving School & College students
- Awareness training to Municipal staff and Councilors
- Conducting miscellaneous even







## **(2) Preparation of Public Health Byelaws:-**

AMC has prepared Public Health Bye-laws for effective enforcement and maintaining discipline.

- Classification of waste in 30 categories
- Generators of waste based on their type, 20 categories
- Segregation of waste
- Storage of waste
- Delivery & collection of waste
- Processing & disposal of waste
- Liquid Waste Management
- Prevention of Waterborne, Vector borne and Food borne diseases
- Offences under the bye-laws
- General offenses which is applicable to all the citizens within city limit (20 in number)
- Enforcement of the provisions
- Schedule of Fines

With the approval of Municipal General Board, byelaws are sent to the State Government for approval & notification.

### (3) Mobile Court for Littering & Nuisance

AMC launched country's first Sanitation Mobile Court on 4<sup>th</sup> June, 2009 dedicated to contain littering. Total of 1,63,808 cases have been registered and Rs. 7.52 crore penalty levied from such offenders.



Year	Cases	Penalty (Rs)
Jun 09 – Dec 09	14,939	15,92,470
2010	27,358	51,76,150
2011	30,276	4,8,22,165
2012	38,111	2,79,52,402
2013	29,234	2,37,02,120
2014	43,547	1,73,39,999
Up to Jan 2015	2897	19,37,550

Year	Seizure of Plastic below 40 micron (kg)	Notice	Penalty (Rs)
2011	16903	3608	6,56,725
2012	5135	7527	15,27,780
2013	8748	22037	44,01,925
2014	7408	15588	19,96,100
Up to Jan 2015	161	816	71,500



#### **(4) Construction & Demolition Waste collection, transportation & making recyclable products on PPP mode :-**

- Amdavad Enviro Pvt. Ltd has been awarded the project for Design, Construct, Operate & Maintain 300 TPD plant for Construction & Demolition waste Processing Treatment to produce final products likewise Bricks, Hollow block, Paver Block, Curbstone, Concrete, etc from C & D Waste of waste from designated locations (16) from city area on Public Private Partnership mode for 30 years.
- AMC has allotted 5 acres land for processing plant.
- AMC will get 2.5% royalty on sale value.

## **(5) Decentralized Model for Effective Utilization of Garden / Green Biodegradable waste**

AMC started a Pilot Project in a Garden, Hotel Kitchen and other Green waste is converted into Organic Manure on PPP mode. A machine with the capacity of converting 200 kg of biodegradable waste into compost has been put on experimental basis for 60 days to observe the process and effectiveness of the machine. Such small plant to convert biodegradable waste to compost is also useful for residential societies, big hotels, canteens, etc.



- With such experience of decentralized treatment/processing compost, AMC has awarded work for design, build, operate and transfer of 2 bio-degradable waste convertor machines, each has a capacity of 1 metric ton, at Zoo and at Victoria Garden. Both Plants are in operation since December 25, 2013
- AMC is planning to set up a such more bio-degradable waste convertor machine / bio-gas plant at fruit/vegetable market for converting 5 to 10 TPD for effective utilization of Green Waste.





## **(6) Compliance to Manual Scavenging Act**

Department of Social Justice & Empowerment, Ministry of Social Justice & Empowerment, Government of India published the “Prohibition of Employment as Manual Scavengers and their Rehabilitation Act, 2013” on October 1, 2013

- For compliance with Section 37 of the Act, AMC vide circular no 85, formed a system of effective monitoring of zone level activities by Additional City Engineer/Dy. Health Officer of each zone
- Urban Management Consulting Pvt Ltd (UMC) was awarded the project work for Audit of Public Toilets, Community Toilets, Pay & Use, Public Urinals. AMC has initiated implementing the recommendations of the Audit Report.
- UMC has also been awarded the project to frame an Action Plan in order to meet the conditions of Section 37 in the Act.
- AMC has also purchased 20 Manual Lifting Machine (6-trolley mounted, 14 auto rickshaw mounted) at a cost of Rs 83 lacs to clean the Open Defecation Spots in the city.

## **(7) Capacity Building and Welfare Activities of Staff**

- Sweepers, supervisors and supervisory staff is given training by experts to develop skill, knowledge updation, capacity building and strengthen the activities.
- Seminars and Workshops are conducted periodically to update the knowledge.
- Officers are sent for visit to see the best practices of other cities.
- 1984 Permanent sweepers are allotted houses under Dr. Ambedkar Aawas Yojna. 512 more houses are under construction.
- Health Check up of sweepers is carried out regularly.
- Promotion given to 63 sweepers as Sanitary Sub Inspectors.
- A policy is in process for temporary sweepers to make permanent employee of Ahmedabad Municipal Corporation.

## **(8) A Project of GPS in Waste Management**

### **Name of the Initiative:-**

Installation of RFID based GPS system to the vehicles deployed for collection & transportation of solid waste management of Ahmedabad City. AMC has assigned a work to provide GPS-RFID based monitoring system for effective supervision of more than 900 vehicles deployed in waste management.

### **Scheme Under Which the Initiative has been taken up:-**

- Domestic Waste Collection by door to door system
- Lifting of Community bins-containers
- Hotel Kitchen Waste Collection

### **Cost of the project and the funding pattern:-**

Capital cost is Rs. 281,44,095 and Operation and Maintenance for five years Rs. 198,05,136. Total cost of project is Rs. 479,49,131. Cost is shared between AMC & Contractors who had assigned a work of garbage collection & transportation on PPP mode.



## **Main features of the scheme including modules**

- Satisfactory response to citizen complaints
- Management of fleet of vehicles with time
- Information of collection of solid waste of each route and vehicle with time
- Working of vehicles can be seen on map
- Increase in service ,accuracy and safety
- Integration of dump site ,weigh-bridge
- More effective system of collection of solid waste
- More effective assessment of working of contractor
- Trustworthiness in payment of contractor
- Ahmedabad city will be more neat & clean

## **Status of the project that likely date of completion**

- Deployment of RFID tags in more than 1000 bins and 900 vehicles with Control Room



## **(D) Waste Treatment / Processing :-**

### **(1) Existing Plants / Facilities :-**

<b>Sr. No.</b>	<b>Name of Company</b>	<b>Daily Treatment</b>	<b>MSW converting into</b>	<b>Land Given (Acres)</b>	<b>Agreement Period</b>	<b>Technology Used</b>
<b>1</b>	Excel Industries Ltd.	300 Tons	Composting	25	15 Years	Windrow Method
<b>2</b>	Bharuch Enviro Engineers Ltd. (UPL Djai )	250 Tons	Compost and RDF / Pellets & Fluff	15	25 Years	Windrow Method
<b>3</b>	Creative Eco-Recycle Port Pvt. Ltd.	800 Tons	Compost and RDF / Pellets & Fluff	12.5	25 Years	Gasification & thermalization Spiritless
<b>4</b>	Hanjer Biotech Energies Pvt. Ltd	500 Tons	Compost and RDF / Pellets & Fluff	12.5	30 Years	Multi Product Integrated Technology



## (2) Additional Two Companies are assigned Processing Work

For the remaining untreated waste AMC has assigned work on PPP mode to two companies for setting up Treatment / Processing of waste Plants. Land has been allotted in March 2013 but companies have not initiated any construction work yet.

<b>Name of Company</b>	<b>Daily Treatment</b>	<b>MSW converting into</b>	<b>Land Given (Acres)</b>	<b>Agreement Period</b>	<b>Technology Used</b>
1. Abellon Clean Energy Ltd.	1000 Tons	Electricity	13	29 Years	Use European technology and follow European Emission Standards
2. A2Z Infrastructure Limited	1000 Tons	Compost and RDF/ Pellets & Fluff	25	29 Years	Multi Product Integrated Technology

## **(E) Disposal of Inert Waste**

AMC has secured engineered landfill site in operation and made provision for another five scientific landfill sights for Disposal of Inert / Post Process Solid Waste at Gyaspur.

### **Capacity:**

11.50 Lakh Metric Tones  
(i.e. 1.15 million tons)

### **Total construction cost of the site:**

Rs. 13 Crore  
(i.e. Rs.130 million )

**Area:** 12.88 Hectares  
(32.8271 acres)



## **(F) Future planning to strengthen the system**

1. SWM Master Plan up to 2031
2. Roadmap for Zero Waste Ahmedabad by 2031
3. Landfill Mining & Reclamation Project of Present Dump Site
4. Collection, Transportation & Safe disposal of E – waste
5. Scientific and safe disposal of Carcass of Animals & Waste from Slaughter House, Fish Market, Meat Market etc.
6. EOI for 1000 TPD solid waste treatment
7. Set up of Decentralized small Bio-Gas / mechanized compost plants

## **(1) SWM Master Plan upto 2031**

AMC prepared a SWM Master Plan which provides a detailed profile of Ahmedabad City, existing system in city, solid waste characteristics, current leading waste management practices, strategy and options for city, planning for 'Zero Waste' management system, institutional strengthening and training, capital investment plan and need for monitoring & evaluation.

### **Process adopted**

- Process tracking of all streams of SWM
- Numerous stakeholders' consultations
- Strategy development towards zero waste
- Infrastructure gap and management assessment
- Recommendations and capital investment

## **(2) Roadmap for Zero Waste Ahmedabad by 2031**

AMC has participated at the Special Event of ISWA World Congress 2011 and agreed on the “Declaration for Zero Waste Ahmedabad” by 2031. AMC has signed a Memorandum of Understanding with UNCRD (United Nations Center for Regional Development, Japan) to get technical assistance for developing a “Roadmap for Zero Waste Ahmedabad by 2031”. AMC had a detailed Multi-stake holders' consultation meetings with the help and support from UNCRD Japan and Zero Waste South Australia.



- The Zero Waste concept for Ahmedabad will serve as a catalyst for policy changes at National level in realizing Resource efficient and Zero waste societies in India.





### **(3) Landfill Mining & Reclamation of Present Dump Site**

Legacy Solid Waste is being disposed & accumulated at Pirana dumping site having total area of about 84 acres for a long back. 65 acres of land is accumulated with heaps of garbage having 15-20 meter height. AMC has planned a project for Reclamation of the site on PPP mode. AMC has received offers from 6 private parties to provide feasible solution of legacy waste by Landfill Mining & Reclamation (LFMR) on Public Private Partnership mode. AMC has initiated the process to evaluate these offers and also appointed a legal firm for legal vetting.



#### **(4) Collection, Transportation & Safe disposal of E - waste**

For effective implementation of e-waste (Management and Handling) Rules, 2011 in city. AMC has assigned a work to a Consultant who Coordinate with Corporate Sector GPCB, dealers, producers, etc. to prepare effective plan & strategy, IEC plan, Finalise player on PPP mode activity to establish the collection centres for e-waste collection, safe transportation and safe storage / disposal. RFQ-RFP is invited and process is on to finalization the player for collection, transportation & disposal of E-waste.

#### **(5) Scientific and safe disposal of Carcass of Animal & Waste from Slaughter House, Fish Market, Meat Market etc.**

AMC is in process to explore best suitable technology. AMC has assigned a work to a Consultant to finalize RFQ a competitive Bid for Design, Construction, Operation & Maintenance of a daily 8-10 tons processing plant on Public Private Partnership mode for 30 years.

## **(6) EOI for 1000 TPD waste treatment**

AMC has planned for 100 % Processing/Treatment of waste generated from city on daily basis. RFQ bid is issued for additional 1000 TPD waste treatment/Processing on PPP mode. Process is on to finalize the operator. So in next 3 Years AMC can Treat/Process 100 % Waste in an effective manner.

## **(7) Decentralized Bio-Gas Plants / Mechanised Compost Plants**

AMC is planning to set up decentralized bio-gas plant of 2 to 10 tons capacity in different Zones/locations of the city to utilize vegetable waste, food waste, flower waste, green waste, night soil, to generate bio-gas and energy.

**In World level competition of ISWA, AMC achieved 3<sup>rd</sup> place for Best Short Film giving message 'After Life' for Public Awareness (Prepared with the help of Students from Mahatma Gandhi International School)**



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***Thank You***

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