



Solid Waste Management



Brief profile of Ahmedabad and Ahmedabad Municipal Corporation

- Ahmedabad is the 7th largest metropolis in India, having a population of more than 63 lakhs and spread over an area of 466 Sq Km.
- The city is witnessing a major construction / infrastructure boom as well as a steady population increase. It is a growing hub of education, information technology and scientific Industries.

- The Ahmedabad Municipal Corporation (AMC) provides all basic services to citizens of Ahmedabad such as water supply, collection of sewage, solid waste management, building roads and transportation, street lighting, providing medical and educational facilities are some of the key services. For effective service provision and smooth administration to all citizens, AMC has divided its activities into 6 zones and 48 wards. Budget allocated and spent in the year 2015-16 was Rs 410 crore.

SOLID WASTE MANAGEMENT IN AHMEDABAD

- The Ministry of Environment and Forest (MoEF), Govt. of India issued a notification on the 25th 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 Solid Waste (Management & Handling) Rules 2016”.
- Almost, 4000 metric tons of solid waste (including 300 tons of C&D waste) is generated from the city on a daily basis. This waste is collected, transported, treated and disposed according to Rules.



Collection & Transportation:

- A.** Nearly 50 percent of the entire waste is collected from municipal bins and from street sweeping. **Street Sweeping** is carried out on all 365 days by more than 12,500 workers from the morning 6:30 am to 11:30 am and 3.00 pm to 6.00 pm on all roads of the city.
- B.** AMC introduced a new concept of **Door/Gate to Dump** since July 2009, in which the AMC appointed



contractor to collect waste from residential units in the morning hours and from commercial units in the evening in closed Hydraulic Euro III vehicles. The waste from these vehicles is transferred to transfer stations from each ward to the treatment plants. The project is successfully covering 100% of all residential & commercial units, on all 365 days of the year. More than 600 Vehicles have been deployed that start the collection process from 7.00 am onwards. Currently, more than 1300 metric tons of waste is collected from more than 14,33,000 residences and almost 1,50,000 commercial units in this manner and transported

to the processing plants through Refuse Transfer Stations. This work is monitored through GPS system.

- C.** AMC has identified more than 934 locations as waste collection points, where 1051 closed body M.S. Community storage bins have been provided for waste collection. These containers are lifted minimum once in a day and if required, then twice a day.
- D.** AMC has developed a fully mechanized transportation system that ensures handling of waste only once. Further AMC has also outsourced the secondary waste transportation system & ensure timely & efficient removal of waste from its collection point. AMC has deployed 25 trucks / tractors mounted road vacuum sweeping machines and 15 self ride on road vacuum sweepers and other rented vehicles in all 6 zones on daily basis for efficient cleaning of the city.



- E.** Waste Collection from Spots
(i) AMC collect more than 1000 TPD waste from various spots in six zones by deploying 149 tractors, trucks, JCB, etc. equipments &



machineries. Monitoring through GPS system. (ii) In order to remove nuisance spots and to meet the increasing needs as well as to maintain cleanliness and public health. AMC has purchased 660 / 1100 liters capacity galvanized 1050 trolleys (silver color) and 60 vehicles like Refuse Compactor. This work is given on O & M model for 5 years. Agency has to collect the waste from these Trolleys on a daily basis as per TPM. AMC is paying the agency on shift basis. Vehicles and TPM working is monitored through GPS, RFID Readers and Tags.

F. Waste collection from road side small litter bins 1240 litter bins of 90 liters size have been installed at various public roads, main roads, public places, pavements, as well as traffic locations, where citizens can dispose their waste easily, and it has been planned to install even more number of litterbins in the forthcoming year. This work is given on O&M model for 5 years. AMC has provided 8 vehicles and installed 1240 bins across the city. Agency has to put black garbage plastic bag in the bin and collect it on a daily basis (also put a new garbage plastic bag in a bin). AMC is paying the Agency on shift basis. Vehicles and TPM working is monitored through GPS, RFID Readers and Tags.



G. To reduce pollution and maintain cleanliness of river Sabarmati, citizens are motivated to deliver flower waste and such holy materials in the “KALASH” instead of throwing into the river. AMC has deployed 14 “KALASH” on 7 bridges of Sabarmati River. Such flower waste is delivered to compost plant for treatment.

H. 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, 20 Road Vacuum Sweepers, 24 mini vans and other contractors' 700 vehicles in all 6 zones. AMC deploys more than 1500 Total vehicles/equipments on daily basis for efficient handling of waste cleaning of the city.

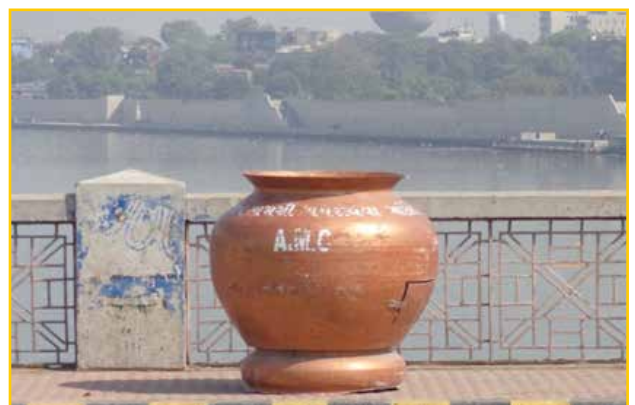
I. AMC has contracted the daily collection and transportation of bio-medical waste from 4 municipal hospitals, referral hospitals, 64 urban health centers to the incineration plant. The contracts have been given to GPCB approved and authorized contractors (Medicare Environmental Management Pvt Ltd and Pollucare Bio Medical Waste Management Pvt. Ltd.)

J. Dead animals and carcass are collected, transported to Gyaspur by Pail Depot of SWM Department. This facility is available from 7.00 a.m. to 11.00 p.m on all 365 days. (Telephone No. 7819862859). AMC has deployed 4 hydraulic based vehicles and staffs to collect carcass of dead animal like cow, camel, buffalo, donkey, dog etc. AMC has deployed 2 vehicles to collect fish, meat, and slaughter house waste from market. 8 TPD animal waste is collected from the city under this system.

K. 7 Transfer Stations of 400 MT capacity each, were constructed in 6 zones. All are functional and 1 RTS is in under construction. At each transfer station, 2 Stationary Compactors and 10 Large Containers (20 - 25 CMT Capacity which can carry 10 to 12 MT of MSW) will be deployed i.e. total of 14 Stationary Compactors, 70 Containers and 40 Large Hook Loader Vehicles. Advantages for these transfer stations are savings in transportation cost, reduction in pollution and reduction in traffic congestion.

L. Since 2008, for collection, transportation and final disposal of kitchen waste / biodegradable waste from hotels and restaurants, AMC has contracted with three agencies. Such segregated waste collected from such units is transported to AMC's composting plants - Excel Industries Ltd. and Bharuch Enviro Engineers Ltd. Currently, more than 1000 units are covered through this system.

M. For effective implementation of e-waste (Management and Handling) Rules, 2016 in city, AMC has assigned a work to a Consultant who Co-ordinate with Corporate Sector GPCB, dealers, producers, etc. to prepare effective plan & strategy, IEC plan, Finalise player on PPP mode activity to establish the collection centers for e-waste collection, safe transportation and safe storage / disposal.



Solid Waste Treatment / Processing

A. Present Scenario

Sr.No.	Name of Company	Daily MSW Treatment	Mode of Agreement	Operational Since
1	Excel Industries Ltd	300 to 400 Tons into compost	DBFOO * mode No tipping fee	January-2000
2	Bharuch Enviro Engineers Ltd. (UPL Djai Power Ltd.)	250 to 300 Tons into compost & RDF	DBFOO * mode No tipping fee	July -2009
3	Creative Eco-Recycle Port Pvt. Ltd.	400 to 500 Tons into compost & RDF	DBFOO * mode No tipping fee	December-2012
4	Amdavad Enviro Projects Pvt Ltd	300 to 500 Tons C&D Waste treatment into recyclable products	DBFOO * mode No tipping fee	December-2013
5	Innovative Eco-Care Pvt. Ltd.	1 Ton (Green Waste Treatment into compost)	DBO ** mode Capital investment by AMC Rs. 4.50 lacs and Monthly O & M Rs. 41,000/-	December-2013
6	Gujarat Consumer Industry	1 Ton (Green Waste Treatment into compost)	DBO mode Capital investment by AMC Rs. 11.11 lacs and Monthly O & M Rs. 50,000/-	December-2013

B. Construction & Demolition Waste Processing Plant

Under PPP mode, AMC has awarded the project of 300 tons per day plant for processing of Construction & Demolition (C & D) waste to produce final products likewise Bricks, Hollow block, Paver Block, Curbstone, Concrete etc. from designated locations (16) across the city. AMC has allotted 5 acres land for processing plant for 30 years. The plant is operational since December 2013. Recently AMC make a policy to buy 25 % of Manhole Cover and 50% Paving Blocks, Kerb Stone from the C & D Waste processing agency in the development of different civil & infrastructures projects of AMC by the approval of competent authority.



C. Effective Utilization of Garden / Green Waste

AMC had awarded work for design, build, operate and transfer of 2 bio-degradable waste convertor machines, each has a capacity of 1 metric ton, at Kankaria Zoo and at Lokmanya Tilak Baug (Victoria Garden). Both Plants are in operation since December 25, 2013. AMC is planning to set up more such bio-degradable waste convertor machines / bio-gas plants at fruit / vegetable markets for effective utilization of Green Waste.



Other Activities:

A. Information, Education and Communication activities for Awareness among the Citizen of Ahmedabad

AMC has initiated IEC (Information, Education and Communication) activities for generating awareness among the general public towards cleanliness, waste treatment & waste disposal. Activities include formation of committees, conducting group meetings in the wards, short films, publicity through television channels / local cable network, advertisement in newspapers, distribution of pamphlets, erecting of Banners, Slides in cinema theatres, conducting street plays, organizing of rallies involving school & college students. Imparting awareness training to municipal staff and councilors has also been included.

B. Mobile Sanitation Court

AMC launched country's first Sanitation Mobile Court on 4th June, 2009 which is dedicated to disciplining those who litter and help to keep city clean. Till December 2016, total 2,37,020 cases have been registered and Rs. 9.49 Crore penalty levied from such offenders.

C. 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

This PHBL has sanctioned by Government of Gujarat and Notified in Government Gazette.

D. GPS & RFID based monitoring system

AMC has invited bids for installation of GPS and RFID technology based solution for the vehicles deployed for collection & transportation of solid waste management of Ahmedabad city for 5 years on two bid system with a technical demo as a part of bidding process. This project has commenced from August-2014. This system is deployed in more than 800 vehicles of Door / Gate to dump collection vehicles, Container lifting vehicles, Road Sweeping machines etc.

E. Scientific landfill site

AMC has secured engineered landfill site in operation and made provision for another five scientific landfill sites for disposal of inert/post process solid waste at Gyaspur



Future Planning of Solid Waste Management

(1) Roadmap for Zero Waste Ahmedabad by 2031

AMC had participated at the Special Event of International Solid Waste Association (ISWA) World Congress 2011 and agreed on the "Declaration for Zero Waste Ahmedabad" by 2031. Further, AMC with the technical assistance of UNCRD (United Nations Center for Regional Development, Japan) developed a "Roadmap for Zero Waste Ahmedabad by 2031".

(2) SWM Master Plan upto the year 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. Included process tracking of all streams of SWM, numerous stakeholders' consultations, strategy development towards zero waste, infrastructure gap and management assessment, recommendations and capital investment, etc.

(3) Swachhata Jan Model (SJM): Waste segregation at source and inclusion of waste pickers in main stream:

AMC has started an initiative (November, 2014) by approving private agencies to collect dry recyclables from commercial units in 2 zones out of 6 zones by engaging waste pickers. Observing success of this practice, AMC

has planned and started Swachhata Jan Model (SJM) in 3 wards on 2nd October, 2015 and spread it in another 4 wards in February, 2016. Total 44000 residential units are covered under SJM. All units will be provided with 2 bins of 10 liters each, one green for wet waste and one blue for dry waste. Separate vehicle / compartmentalized vehicle will be used for collection of segregated waste by deploying hydraulic vehicles. AMC will bear collection charges. Such vehicle will be equipped with GPS system. Dry waste will come at a sorting centre where AMC appointed agency will recover valuable dry waste and sale it to recyclers by engaging waste pickers. Such agency will retain 10% income over expenditure and remaining proceed will be distributed among waste pickers. Wet waste will be sent to a decentralized treatment plant for making manure. After the successful result in 3 wards, AMC initiated this project in more 5 wards of different zones. SJM will be implemented in 1,00,000 residencies covering all 6 zones in phase manner.

(4) Solid Waste Recycling Centre (Material Recovery Facility)

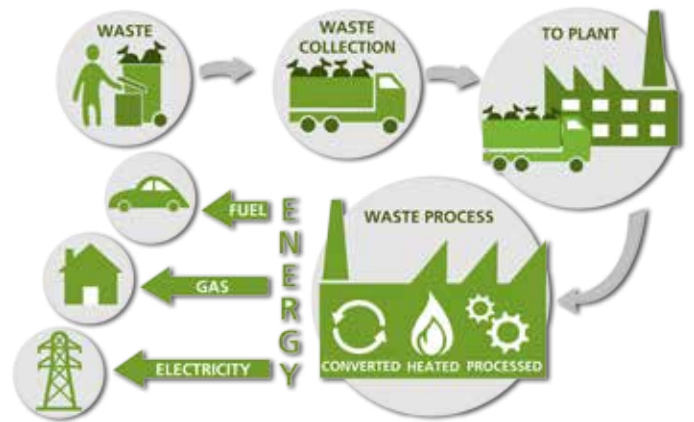
Recently AMC has awarded work to Nepra Resources Management Private Limited (NRMPL) as a pilot project to establish a "Solid Waste Recycling Centre (Material Recovery Facility)" under this Pilot Project, AMC has allotted 4000 sq. mt. (mortgage not allowed) of land at Gyaspur for 6 months to NRMPL to carry out segregation of dry waste at its own costs, and recover the same from different streams. NRMPL will collect dry waste from Large Commercial and Industrial units from agreed areas and segregates into different streams, which shall be supplied to various recyclers as raw material.



(5) For Solid Waste Treatment : Waste to Energy

Sr. No	Name of Company	Daily MSW Treatment & Capital Investment (Rs in Cr)	Land given on Rs. 1 per Sq. Mtr. lease (not allowed to mortgage) & Daily production of MW	Emission norms and Technology details
1	Abellon Clean Energy Ltd	1000 Tons Rs. 211.62 Cr	13 acres for 29 years 14 MW	Will follow European Union emission norms. Mass Incineration, core technology from Europe + make in India fabrication of standard components
2	JITF Urban Infrastructure Ltd	1000 Tons Rs. 122.80 Cr	14 acres for 30 years 11 MW	Will follow MoEF, CPCB, SPCB emission norms Use its own technology (Pre-processing Section - Sorting of recyclables, drying with Thermophillic enzyme digestion process, mechanized elaborate segregation system for separating into recyclables/inert, producing processed MSW for combustion in Waste to Energy Plant and Power Generation Section - producing steam in boiler with processed MSW as fuel, Steam Turbine Generator module to produce power)

- A.** All plants are Design, Build, Finance, Own and Operate basis.
- B.** No tipping fee, capital cost support, viability gap funding from AMC, GoG, GoI.
- C.** AMC has allotted land (on lease rent of Rs. 1 per year, not allowed to mortgage)
- D.** Gujarat Electricity Regulatory Commission (GERC) has issued an order for levelized tariff for MSW to Energy Project on 10th November, 2016. In this order GERC has given levelized tariff of Rs. 7.03 KWh for Mass Incineration Technology and Rs. 7.07 KWh for RDF Technology.
- E.** All the companies are in the process of doing Power Purchase Agreement with DISCOM (Torrent / GUVNL) and financial closure with financial institutions.



& Rejuvenation / Reclamation & Post Scientific Closure Management / Resource Extraction of existing Landfill site at Pirana.

AMC has also invited a Global Request for Proposal for Pirana Site Bio-Mining (or any other suitable technology)-cum-Clearance-cum-Recovery of Land with / without Capping of the Site with / without Waste to Energy-cum-other type of treatment plants for Pirana Dump Site of Ahmedabad on Design, Build, Finance, Own & Operate (DBFOO) basis from reputed organizations on Public Private Partnership mode.

(6) Solution for existing Pirana Dump Site

AMC has invited an offer / proposal from reputed & experienced consulting firms for Project Management Consultancy for Assessment, Evaluation, Management





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