Evaluation of Technology for processing existing waste at Seven Landfill sites of BBMP, Bangalore

Technical committee Recommendations on EOI application

REPORT

Date 03-01-2013

Bruhat Bengaluru
Mahanagara Palike

PREFACE

Two decades of economic growth since 1990 has changed the composition of India's urban wastes. The quantity of MSW generated in Bangalore is increasing rapidly due to high growth in population and change in lifestyles.

The continuous dumping of the wastes in the landfill sites is undesirable in the long run as the indiscriminate dumping in the land fill/dump sites has created pressure on land requirements and negative impact on the surroundings.

Land is scarce and public health and environmental resources are precious. The current SWM practice followed by BBMP requires holistic approach involving all stakeholders effectively. While planning for long term solutions, focus on the solving the present problems are paramount. The overall management will require streamlining the entire life cycle of waste management right from the door to door collection to the disposal by appropriate means.

Landfill site management becomes an integral part of this overall management. In order to process existing waste contained in the landfill sites and recover the land, BBMP has invited expression of interest from various organizations to select appropriate technology. The total number of responses received is 47 comprising of proposals with varied technologies.

A technical committee vide **Government Order No NA.AA.E/791/MNY/2012** Bangalore **dated 07-12-2012** to evaluate the EOI and make recommendations for the choice of technology.

The committee has held meetings, called for presentations from applicants and deliberated on the same. Additional data was sought from the organizations and compiled to make benchmark and comparative studies. The various organizations and their capability as well as the technology proposed were identified.

This is to enable the deployment of technology with respect to the 7 landfill sites of the BBMP.

Sl No	Name of the landfill site	Quantity in Lakh tons	Area in Acres
1	Mandur North	6.0	95
2	Mandur South	4.0	40
3	Mavallipura	7.0	46
4	Anjanapura	1.0	5
5	Cheemsandra	3.0	10
6	Kannahalli	1.05	25
7	S.Bingipura	1.45	20

(Source: secondary data)

Through the data collection process and its assessment, the various dump/waste quantities were complied along with the geographic locations and distances. The priority site where the bulk waste is accumulated is identified.

Based on the secondary sources, the quantity of waste and the waste characteristics were assessed. It emerges that the waste in the land fill/dump sites has high organic content (60 %) with high content of moisture and the inert's of about 15 %.

Waste to energy projects rely on the number of parameters for success such as the unit cost of power per KW, Power purchase agreements (PPA), need for high calorific content of the waste. The investments in such plants are heavy and will need to be structured in a manner involving both public and private sector. Besides, mass incineration, Refuse Derived Fuel, waste to energy has impacts on the emissions, etc. and needs careful consideration.

The permanent capping of the existing open land fill is both costly and in the long term not very environmentally friendly given the non segregated waste accumulated in the land fill .The potential of methane gas being generated. Land fill gas extraction, in the Indian context is still in the development stage.

Given the overall assessment, Bio mining techniques, which involve the processing of waste stabilization of landfill by separation and extraction of the RDF, Recyclables and making of construction related bricks or tiles is feasible .The inert materials will have to be disposed of in the landfill site in situ or in other location can be put in for permanent land fill capping and closure.

The Bio mining process can enable large number of organizations to participate, while clearing the dump and allowing for recovery of land in a relatively short span of time. This technique is of low end technology category, with low investment costs while providing effective results. Experiences in other cities such as Mumbai (Gorai), Hyderabad and Madurai are encouraging in this regard

The committee recommends speedy implementation of the clearance and processing of the waste at the existing dump sites by Bio mining technique for the following sites.

1. Mandur North
2. Mandur South
3. Mavallipura
4. Anjanapura
5. Cheemsandra

And waste to energy projects can be structured for the remaining sites within overall SWM strategy of BBMP.

1. Kannahalli
2. S.Bingipura

BBMP may call for tenders from the shortlisted entities identified in the EOI for Bio-mining, remediation of the land fill sites. The tender condition must stipule the working methodology, management plan, personnel, disposal of the waste in sustainable manner within the existing legislation/rules. The processing fee for the waste may be fixed through competitive bidding.

As "time is of essence", the contract conditions must insist on adherence to the time schedule. In this regard, suitable Project management methods must be adopted. A PMC may be appointed by BBMP to oversee the same and it needs to be assigned the job of monitoring the progress/quality on a day to day basis. A Detailed project report may be prepared for the ascertaining the detailed feasibility and viability of the proposed sites.

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Nominee KSPCB	DGM, HUDCO,	SWM-2, BBMP

*** On deputation abroad**

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ABBREVIATIONS

ADS	:	Anaerobic Digestion system
BBMP	:	Bruhath Bangaluru Mahanagara Palike
BMA	:	Bangalore Metropolitan Area
BDA	:	Bangalore development authority
BMRDA	:	Bangalore Metropolitan regional development authority.
BMW	:	Biodegradable Municipal Waste
BOT	:	Build Operate Transfer
BOOT	:	Build, Own, Operate, and Transfer
CV	:	Calorific Value
DBO	:	Design, Build, and Operate
EOI	:	Expression of Interest
EPA	:	Environment Protection Act 1986
IDD	:	Infrastructure Development Department
KSPCB	:	Karnataka State Pollution Control Board
MTPD	:	Metric Ton per Day
MW	:	Mega watt
MSW	:	Municipal Solid Waste
O&M	:	Operation and Maintenance
PPA	:	Power Purchase Agreements
PPP	:	Public Private Partnership
RDF	:	Refused Derived fuel
RFP	:	Request for Proposal
SWM	:	Solid Waste Management
SWOT	:	Strength Weakness Opportunity Threats
TPD	:	Tons per Day
WTE	:	Waste to Energy

GLOSSARY AND DEFINITIONS

Landfill site:

A **landfill site** (also known as **dump**, **rubbish dump** or **dumping ground**) is a site for the disposal of waste materials by burial and is the oldest form of waste treatment. Historically, landfills have been the most common methods of organized waste disposal and remain so in many places around the world. Some landfills are also used for waste management purposes, such as the temporary storage, consolidation and transfer, or processing of waste material (sorting, treatment, or recycling). The design, construction, management of the Landfill should be in accordance with the MSW Act 2000.

Bio-mining:

It refers to clearing landfills by converting waste into compost, methane gas, bio-diesel, Refuse Derived Fuel. It involves the segregation of part of a dumpsite to make a landfill, ideally creating as small a 'footprint' as possible. Compostable waste is removed through sieving, and sold for use as soil enriches or for landscaping.

Bio-mining eliminates leachate and landfill gases by performing such “bioreactor” activities above-ground, in the form of bio-treated aerobic windrows for almost total recovery of waste.

Gasification:

It is a process that converts organic or fossil based carbonaceous materials into carbon monoxide, hydrogen and carbon dioxide. This is achieved by reacting the material at high temperatures (>700 °C), without combustion, with a controlled amount of oxygen and/or steam. The resulting gas mixture is called *syngas* (from *synthesis gas* or *synthetic gas*) or *produce gas* and is itself a fuel. The power derived from gasification and combustion of the resultant gas is considered to be a source of renewable energy if the gasified compounds were obtained from biomass.

The advantage of gasification is that using the syngas is potentially more efficient than direct combustion of the original fuel because it can be combusted at higher temperatures or even in fuel cells, so that the thermodynamic upper limit to the efficiency defined by Carnot's rule is higher or not applicable. Syngas may be burned directly in gas engines, used to produce methanol and hydrogen, or converted via the Fischer-Tropsch process into synthetic fuel. Gasification can also begin with material which would otherwise have been disposed of such as biodegradable waste.

In addition, the high-temperature process refines out corrosive ash elements such as chloride and potassium, allowing clean gas production from otherwise problematic fuels. Gasification of fossil fuels is currently widely used on industrial scales to generate electricity.

Pyrolysis:

It is a thermo chemical decomposition of organic material at elevated temperatures without the participation of oxygen. It involves the simultaneous change of chemical composition and physical phase, and is irreversible. The word is coined from the Greek-derived elements *pyro* "fire" and *lysis* "separating".

Incineration:

It is the process of combustion of organic material such as waste with energy recovery is the most common Waste to Energy implementation. The method of using incineration to convert municipal solid waste (MSW) to energy is a relatively old method of waste-to-energy production. Incineration generally entails burning an RDF to boil water which powers steam generators that make electric energy to be used in homes and businesses.

One problem associated with incinerating MSW to make electrical energy, is the potential for pollutants to enter the atmosphere with the flue gases from the boiler. These pollutants can be acidic and in the 1980s were reported to cause environmental damage by turning rain into acid rain. Since then, the industry has removed this problem by the use of lime scrubbers and electro-static precipitators on smokestacks.

The limestone mineral used in these scrubbers has a pH of approximately 8 which means it is a base. By passing the smoke through the lime scrubbers, any acids that may be in the smoke are neutralized which prevents the acid from reaching the atmosphere and hurting the environment.

Biomethanization:

The word methanization means the decomposition of organic matters using micro organisms without oxygen or under anaerobic conditions. This process involves the participation of multiple bacteria who will transform together the organic waste in biogas.

The biogas is composed of 2/3 methane CH4 and around 1/3 of CO2 and small amount of other gas. The anaerobic bacteria are organisms from the prehistoric period where they developed when the atmosphere on earth didn`t have oxygen. The most important part of the energy coming from the decomposition is included in the methane. The bacteria don`t

have too much energy for their development and reproduction. The methanization in comparison with the compost process won`t generate extra heat energy.

Composting:

Waste materials that are organic in nature, such as plant material, food scraps, and paper products, are increasingly being recycled. These materials are put through a composting and/or digestion system to control the biological process to decompose the organic matter and kill pathogens. The resulting stabilized organic material is then recycled as mulch or compost for agricultural or landscaping purposes.

Composting is a controlled method of using microbial organisms to decompose the organic fraction of solid waste. Solid wastes in developing countries are composed of over 50% organic materials. Incineration of such waste is a waste of time whereas disposal in landfill will be a waste of resources. The only viable option to sustainably manage wastes in developing nations is composting because of the following advantages: lower operational cost, decreased water pollution, lessened environmental pollution and beneficial use of end products.

Sustainable waste management should be employed to maximize wastes generation while maximizing the ability to reuse and recycle. In composting, a strategy of sustainable waste management is recycling of organic wastes to a useful and valuable end point.

Capping of landfill:

The landfill cap includes an impervious clay liner, complete with an engineered drainage system. This is covered by a layer of clean soil and plants, which is sloped to prevent rainwater and surface water from infiltrating into the disposed waste. Landfill Capping is the most common form of remediation because it is generally less expensive than other technologies and effectively manages the human and ecological risks associated with a remediation site.

- Reduce the infiltration of precipitation into the landfill to control leachate generation;
- Minimize fugitive emissions of landfill gas through the surface of the cap (in Combination with an active gas abstraction system);
- Separate the waste in the landfill from its surrounding environment.

PROFILE OF THE CITY

Bangalore, the capital of Karnataka State is one of India's fast developing city with an average annual growth rate of 3.25 % and population of 8.4 Million (census 2011)and area of 800 sq km . Today, it is India's one of the largest city, the momentum of its industrial and commercial growth unequalled in the country. Bangalore is located at 12° 50' North Latitude and 77° deg 57' E longitude, over the ridges delineating four water sheds, viz. Hebbal, Koramangala, Challaghatta and Vrishabhavathi and is situated at an altitude of 920 m above mean sea level.. The salubrious climate all around the year has enabled in attracting the investment in technology and other sectors.

Climate and Rainfall:

Bangalore experiences a tropical savanna climate with distinct wet and dry seasons. Due to its high elevation, Bangalore usually enjoys a more moderate climate throughout the year. The mean annual total rain fall is about 970 mm. The coolest month is January with an average low temperature of 15.1 °C and the hottest month is April with an average high temperature of 33.6 °C. The highest temperature ever recorded in Bangalore is 38.9 °C and the lowest ever is 7.8 °C (on January 1884). Bangalore receives rainfall from both the northeast and the southwest monsoons and the wettest months are September, October and August, in that order.. Being situated with an altitude of 920 m above MSL, the mean annual total rain fall is about 880 mm with about 60 rainy days a year over the last ten years. The heaviest rainfall recorded in a 24-hour period is 179 millimeters (7.0 in) recorded on 1 October 1997.

Wind Direction and Relative Humidity:

Winds blow mainly from the directions between the south – west and north – west during the south – west monsoon season. In the post monsoon season, wind blows mainly in the north easterly or easterly direction. During the rest of the year, wind blows from the direction between north and east.

The maximum normal wind speed recorded at Bangalore is 17.5 km/hr in the months of May and July. The mean relative humidity varies between 24% to 86% at Bangalore IMD [India Meteorological Observatory].

SOLID WASTE MANAGEMENT

The rapid growth of population in Bangalore metropolitan area and changing lifestyles has resulted in increased waste generation. Consequently, waste management has become a key issue needing be addressed. The various waste streams include municipal solid waste (households, commercial establishments), Bio medical waste (Hospital, dispensaries), and industrial waste (industries) and electronic waste (discards from electronic equipments including PC's).

For the planning purposes and overall governance, the Bangalore Metropolitan Area comprises of:

1) The Bruhat Bangalore Mahanagara Palike (BBMP) or Greater Bangalore, it includes Bangalore City Corporation area, the erstwhile seven City Municipal Councils and one Town Municipal Council and 111 villages an extent of 800 sq km. With 84 lakhs (population as per census 2011).
2) Bangalore Development Authority the local planning authority prepares the master plan for the Bangalore Metropolitan area with an area of 1294 sq.km.

Most of the study reports suggest waste generation rate of 0.4 to 0.6 Kg per capita per day. Based on this per capita consumption of 0.5 kg per capita per day is proposed as waste generation pattern for Bangalore city.

The collection and disposal systems in the city are in line with the overall guidelines of the Solid Waste Management and Handling Rules 2000. BBMP has put in place both Primary and secondary collection and transportation. Over the past years, it has identified and developed land fill sites for Solid waste management on PPP route and on its own funds. The lands belong to the BBMP.

Key City Statistics related to SWM

- Population (Census 2011): 8.4 million
- Area: 800 sq. km
- Total Number of wards: 198
- Total number of Households: 25 lakhs (Approx)
- Commercial Properties: 3.5 lakhs (Approx)
- Total road length: 14,000 km (Approx)
- BBMP Pour Karmika's:3197
- Contractual Pour Karmika's:18562

- Estimated Municipal Solid Waste generation Projection from all sources for BBMP zones is 4000 MTPD
- Annually about 250 crores is spent on solid waste management (BBMP Poura Karmikas salary ,Contract payment, Tipping fees)

The current practice of solid waste management at BBMP is, about 70% of the MSW (Municipal Solid waste) activity starting from primary collection to disposal has been outsourced & 30% is managed by BBMP.

While the increase in population has been tremendous, there has been increase in the generation of Solid waste. Bangalore generates 4,000 tons of waste everyday from households and commercial establishments. Around 70% of this waste is organic. The balance is accounted for inorganic and hazardous waste.

The current practice of primary collection (door to door) as well as the secondary collection and transportation is in place. The waste is disposed off in the dump / landfill sites at the end.

Organization for SWM management:

- Solid Waste Management activity has been decentralized zone wise.
- At the Head Office the Chief Engineer is in charge for establishment of processing and disposal sites
- The zonal officers look after the collection and transportation of solid waste.
- About 80 % of the MSW activity has been outsourced
- Small numbers of Self Help Group's (SHGs) are engaged in door to door collection in some of the new areas.

Primary collection (Door to Door)

1. The primary collection is performed using pushcarts & auto tippers
2. There are around 11000 pushcarts & 650 auto tippers for Door to Door collection of waste.
3. There are about 4300 Pourakarmikas (Sweepers) of BBMP & 10000 Pourakarmikas (Sweepers) from contractor who performs Door to Door collection & Sweeping activities.

4. In some of the residential areas the Residential Welfare Associations (RWA's) are involved in Door to Door collection & decentralization of composting the waste.
5. Waste is collected in the unsegregated form as Segregation is not practiced at source.

Primary collection

Secondary collection

Secondary collection and transportation

1. There are about 600 MSW transportation vehicles including Compactors, Tipper Lorries, Dumper placers & Mechanical Sweepers Both belonging to BBMP and contractors.
2. The waste collected from the households is brought to a common point i.e., secondary locations from where the waste is shifted to the treatment sites through compactors & tipper lorries.
3. Segregation at source & the secondary storage is not happening hence un segregated waste reaches the processing plants.

Existing Landfill and dump sites

Till recently, the dumping has been ongoing and with increased un segregated waste reaching the landfill sites/ dump sites, objections have been raised by the surrounding villages for the nuisance created by the dumping – mainly smell, ground water contamination, etc. BBMP on the directions of the Hon. High Court has initiated a series of steps to remediate the existing dump/land fill sites.

The existing landfill sites and dump sites are proposed to be used for processing in a sustainable manner. The current processes and the organizations associated with each site are shown below:

Table 1: List of present contractors of BBMP operating the Dump/landfill

Sl No	Name of the Agency and Location	Capacity of the plant	Tipping fee	Technology adopted
1	M/s Ramky (Mavallipura)	600 MTPD	Rs.218/- per ton of rejects	Aerobic Composting & scientific landfill
2	M/s S.G.R.R.L (Mandur)	1000 MTPD	Rs.189/- per ton of rejects	Waste to energy (Presently composting & land filling the inert & combustible. material are stored for RDF)
3	M/s Terrafirma (Doddabalapur a)	1000 MTPD	Rs.66/- per ton of MSW	Integrated system where composting, vermin composting, bio methanization is followed
4	M/s Organic Waste India pvt ltd (yet to start) (Mandur)	1000 MTPD	Rs.-27/-	Integrated system (yet to be commissioned)
5	Hanjeer Biotech Pvt Ltd (R.R. Nagar	500 MTPD	Rs. 81/- per ton of MSW	Automated segregation and processing plant (yet to be start)
6	MK Aeromatics Pvt Ltd (Mandur Northern part)	10 TPD of Plastic	Rs. -2% on rate of crude oil	Conversion of plastic to crude oil (yet to start)
7	BBMP at a) R.R. Nagar b) Mandur c) Anjanapura	4000 MTPD	-	Present Land filling operations
8	KCDC (Bagandoddi)	300 MTPD	-	Composting of existing waste under progress, receiving of fresh waste from BBMP yet to be started.

ISSUES AND CHALLENGES

- **Continuous inflow of waste:**

  The continuous inflow of garbage of about 4000 TPD is cause of concern, as the quantum of waste cannot be allowed to be directly led into the existing landfills. The capacity of the landfill sites will be exhausted. BBMP has taken up the segregation at the source and efficiency of the system will be observed in the future. The partially segregated waste reaching the landfill site will have to be dealt simultaneously along with the processing of the existing waste.

- **Historical accumulation of the wastes at the land fill/dump sites.**

  The dumping of the waste in non segregated methods has led to the pile of up of waste over 24 Lakh Metric Tons. The waste are distributed unevenly between the seven sites. Processing of the existing waste is a priority and reduction of the ultimate inerts. The ultimate inerts can then be suitably capped.

- **Constraints of Land**

  The growth of the city in all directions and in a rapid pace poses serious problems. The developments are occurring in close proximity to the land fill sites. The existing waste on the land fill impacts these settlements and developments. The expansion of the existing land fill is not feasible. The existing landfill sites have finite capacity and land for sanitary landfill should be mobilized either through private sector or by working closely with other departments / acquisition of land. The non development buffers as mandated by the law around the landfill sites puts further constraints. The increased land values/prices does not enable the acquisition of land within the BMA.

- **Generation of Green house gases :**

  Due to the high organic content in the existing waste in the landfills. The unsegregated waste remains buried in layers within anaerobic conditions. This allows the production of Methane and other Green houses gases. It is necessary to prevent the generation of green house gases which are detrimental to the environment.

- **Biological activity :**

  Due to the accumulation of non segregated waste and conditions favourable for the biological activity, the landfill sites become the host for complex biological activity. The production of leachate and its disposal is of greater problem. This impacts the health and ground water conditions. Remediation is to be carried out in a scientific manner and in Indian conditions, aerobic treatment is helpful.

- **Land fill closure and capping :**

  The Capping and closure of landfill with mixed waste will lead to production of Methnation and GHG's [Green House Gases]. The tapping of landfill gases calls for use of patented technology along with large investments. The long term impacts of the land fill site such as the ground water contamination, etc will prevail as seepages may occur. The capping can be carried out for section of the landfill where the inerts have been dumped as further processing is not possible. .

- **Adherence to the MSW Act 2000**

  Though the aspects of technology is discussed in the MSW act, the basic operation discussed is the separation and the processing of the waste into the recyclables and recoverable thereby minimizing the inerts for ultimate disposal. Waste to energy through varied methods are to be adopted by testing the same for sustainability.

- **Public co-operation and participation of stakeholders:**

  With increased negative impacts of the dumping of the waste in the existing landfill sites, the public at large in and around the waste land fill sites have been seeking a solution for management of the waste effectively. Various forums and citizen groups have been leading, on site and off site protests. The Hon. High Court has recognized the ground realities and has sought action on the SWM from BBMP in a time bound manner.

EXPRESSION OF INTEREST

With this background of issue's, challenges, and under the direction of court, BBMP had called for EOI dated 18/10/2012 for interested parties to propose suitable technology like bio mining , bio-methanation , composting , waste to energy at the proposed following locations.

1. Mandur north
2. Mandur south
3. Mavallipura
4. Anjanapura
5. Cheemsandra
6. Kannahalli
7. S.Bingipura

The scope of the EOI invited restricts itself to the existing landfill sites only and owned by the BBMP. The interested firms were requested to inspect the site for necessary assessment of the field requirements as well as to propose the relevant technology under the broad heads of Bio methanation, Bio mining, waste to energy,

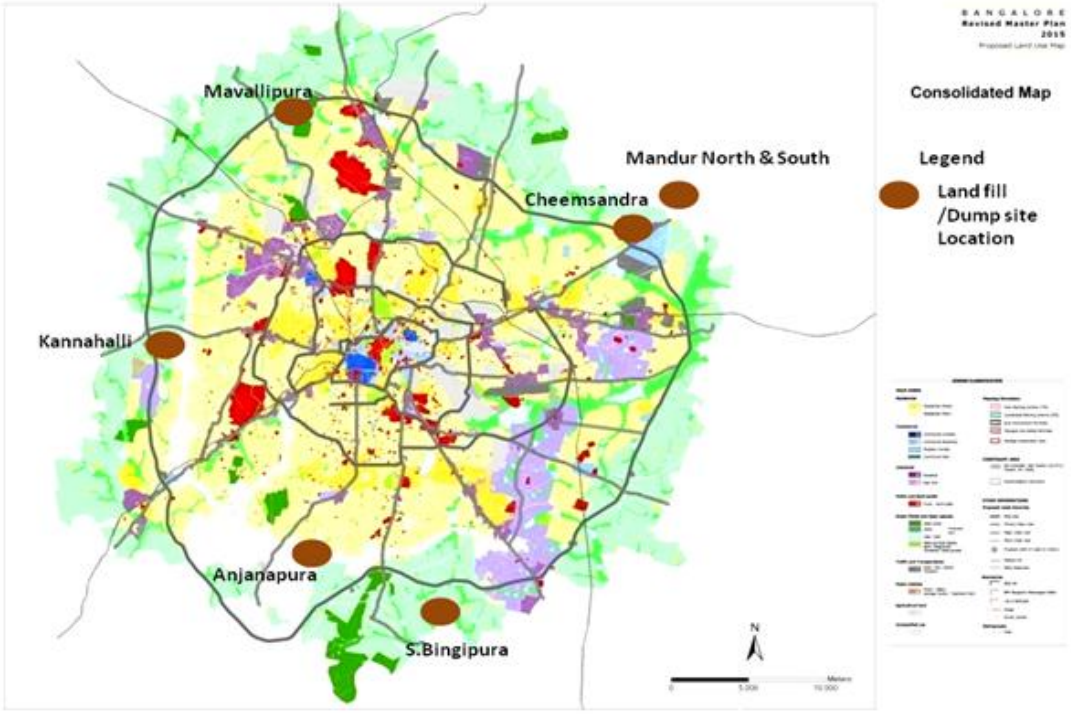
The EOI-Advertisement is affixed in Annexure 2

Table 2: CURRENT LAND FILL SITES – LOCATION DETAILS

Sl No	Name of the Dumpsite	Total Extent [in acres]	Approx Quantity of waste collected [in Lakh Tones]	Location	Existing Facility	Distance from the city
1	Mandur North	95	6.0 (200 TPD X 3004 Days)	Bidarahalli Hobli, Mandur village, Hoskote Road, (survey no 155).	Landfill Site is under operation	28
2	Mandur South	40	4.0 (200 TPD X 2000 Days)	Bidarahalli Hobli, Mandur village, Hoskote Road, (survey no 155).	Landfill Site is under operation	28
3	Mavallipura	46	7.0 (250TPD X 2800 Days)	Hesaragatta Hobli, Mavallipura Village, Dodabbalapur Road, Survey No 8 .	Landfill Site is closed By soil cover	25
4	Anjanapura	5	1.0 (100 TPD X 1000 Days)	BDA Avallalli layout , JP Nagar outskirts ,	Landfill Site is under operation	18
5	Cheemsandra	10	3.0 (200 TPD X 1500 Days)	Boodigere Cross, Hoskote Road.	Landfill Site is closed By soil cover	28
6	Kannahalli	25	1.05 lakh (150 TPD X 700 Days)	Magadi Road near Tavarekere	Landfill site is under operation	25
7	S.Bingipura	20	1.45 lakh (175TPD X 825 Days)	Anekal Taluk, Bannergatta Road.	Landfill site is under operation	25

Source: BBMP

SPATIAL LOCATION DETAILS OF SEVEN LANDFILL / DUMP SITES:



1. Mandur north : Google image

Mandur north composting plant

Mandur north unsegragated waste dumpsite

2. Mandur south unsegragated waste dumpsite

Mandur south: Google image

3. Mavallipura unsegragated waste dumpsite

Mavallipura: Google image

4. Anjanapura unsegragated waste dumpsite

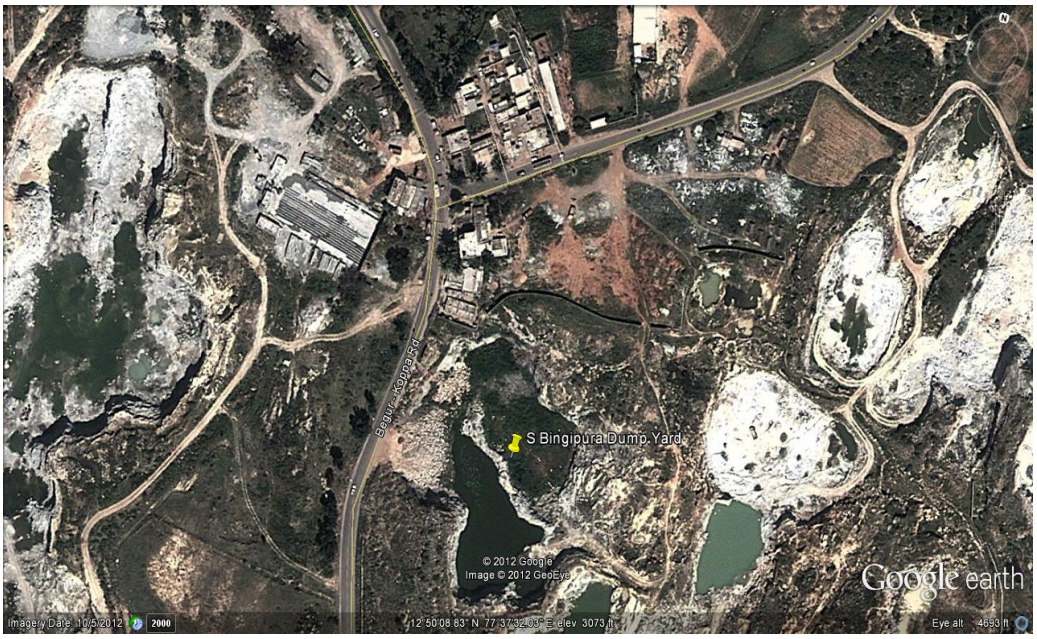
Anjanapura: Google image

5. Cheemsandra unsegragated waste dumpsite

Cheemsandra: Google image

6. S.Bingipura

S.Bingipura: Google image



Objective:

The objective of the evaluation of the EOI /technology proposals is to:

- Recommend the appropriateness of technology with respect to the context.
- Short list entities capable of deployment as well as operations for the said existing land fill sites.

Scope:

- The scope of the committee recommendations on the technology is restricted to the technology adoption suitable for the old dump/ land fill sites.
- The committee is to base its recommendation on the information provided by the EOI applicants.

Limitations:

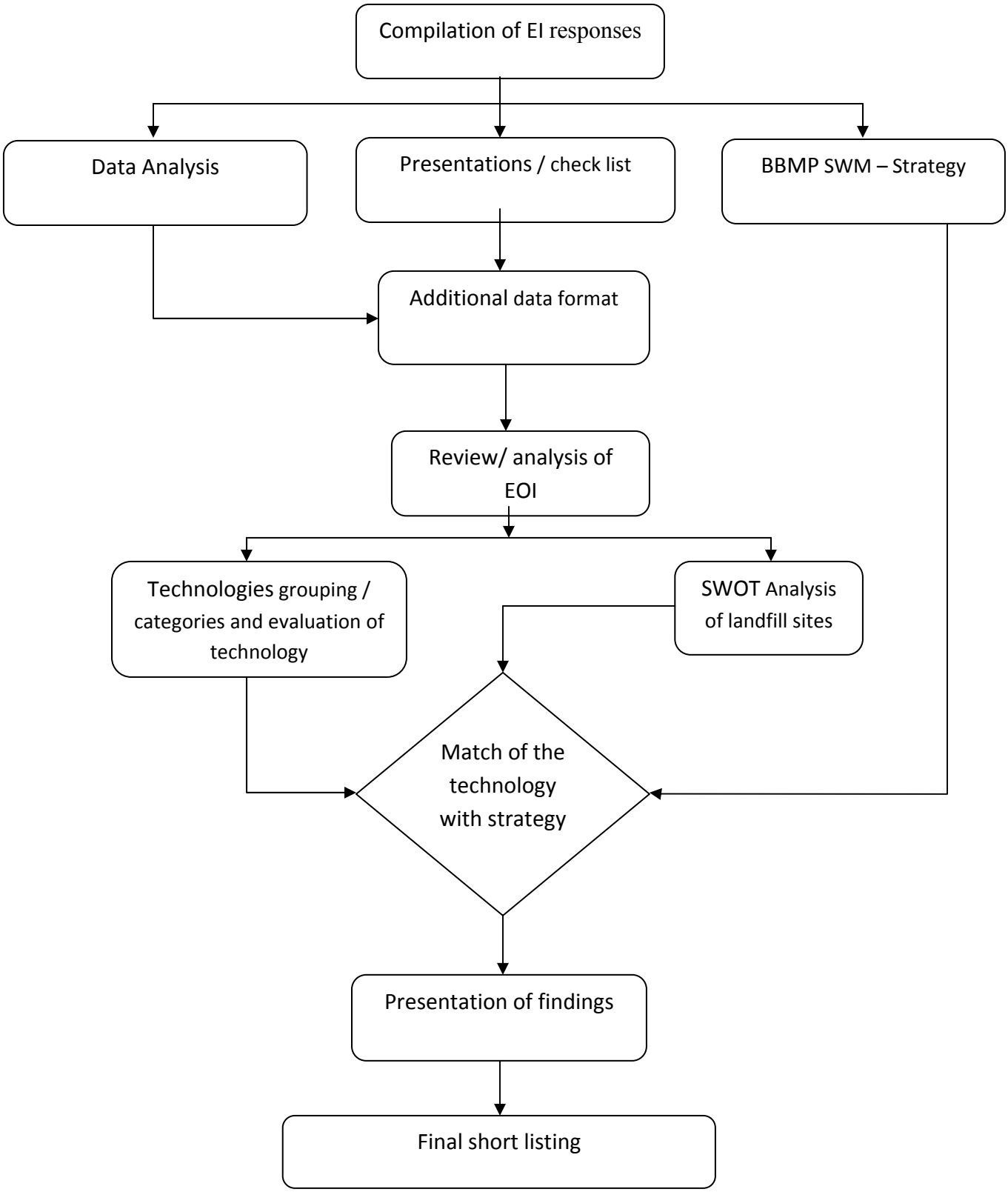
- The information provided by the EOI applicants have been referred. No independent verification or validations of data provided by the firms are carried out.
- The exercise is carried out within a strict time limit of 3 weeks.
- Benchmarking of the technologies is not possible due to the shortage of time and the available information. Secondary information is used for the discussion and derive the suitability.
- Detailed engineering and chemical tests are required for the actual prescription of the technology to the respective site. The broad category of technology for the site is proposed.

The committee has prepared the recommendations report by following a strict time table. The key activities are shown in the bar chart below.

ACTIVITY-CHART

Activity	**Dec – 2012: in weeks**			
	1st	2nd	3rd	4th
EOI Evaluation				
Presentations by EOI applicants				
Additional data collection				
Analysis				
Reporting				

FLOW CHART FOR THE EVALUATION OF TECHNOLOGIES



TEMPLATE FOR DATA COLLECTION

The EOI invited by BBMP has received positive responses from various technology and service providers. A good mix of individual, domestic and international consortiums have applied totaling to 47 responses. The various responses can be categorized into the following:

1. For Waste to energy projects including incineration, pyrolysis, gasification, RDF,

   Bio methanation.

2. Bio-mining and capping.

3. Composting.

4. Equipment/ machinery/ management for the Waste to energy, physical separation, organic bio enzyme for the management of foul odour, etc.

5. Fresh proposal for setting up a new Landfill site on their own land.

The responses by the entities include the following information:

1. Technology proposed.
2. Landfill site/s that they are interested.
3. Area requirement for setting up the plant and machinery, as well as processing.
4. Quantity proposed for processing.
5. Capital cost for setting up plant/ technology.
6. O&M cost.
7. Tipping fee.
8. Prior Experience both domestic and international with completion records.
9. By products.
10. Concessions sought from BBMP.

Data collected was compiled into a large spread sheet that was utilized for the comparison and analysis. The data submitted by the entities was in varied formats and the committee found it necessary to collect further information through a standardized format.

Table 3: LIST OF ENTITIES – SUBMISSION OF EOI

Sl. No	Name and Address of the Agency	Technology Proposed
1 ❖	**Ramky Enviro Engineers Limited.** #6-3-1090, 4th floor, TSR Towers , Rajbhavan Road , Somajiguda, Hyderabad -500082.	Bio mining.
2	**Loro Enviro Power, Inc.** THREERTHAPADAM TC N75/1418, Near AIR Vazhuthacud, Trivandrum Kerala – 695019.	Air fed Gasification.
3 ❖	**Organic waste India Pvt Ltd** #504 , 5th cross road , HMT layout , RT Nagar , Bangalore – 560032.	Bio Mining & Composting.
4	**IL&FS Environmental infrastructure & services Limited**. 4th floor, Dr. Gopaladas Bhavan, Barakhamda Road, New Delhi - 110001.	Integrated MSW Processing Facility which would comprise of: 1. Remediation of Landfill 2. Bio-mining 3. RDF Preparation.
5	**MVI Global Greens,** Dr (Mrs.) V Thankamani, Vijaya Nivas 39/4237, Ravipuram road, kochi -682016.	Waste to energy - Bio Methanation (Anaerobic Digestion).
6	**Renew Gen Ventures India Pvt ltd** #44/1, 2nd floor, VCl Building, KH Road. Bangalore - 560027.	Waste to energy through Incineration.
7	**JK Engineering works**, #50 Kothanur, Bagalur Road Bangalore – 560077.	Machinery / equipment for Bio mining.
8	**Steps Techniron limited** 101 sinchan , new link road , off veera desai road , Andheri West , Mumbai.	Waste to energy (Low temperature Gasification), Poly crack process.

9	**BVG India ltd ,** A Bharat Vikas group company , BVG House No 47, Millers tank bund road , Vasanth nagar , Bangalore-560052.	Bio mining and Composting.
10 ❖	**Satarem Enterprises (P) LTD.,** No 5D, Chitrapur complex , 15th cross , 8th main Malleswaram , Bangalore -560055.	Waste to energy through Incineration process.
11	**Connect infra research Pvt ltd** , 5th floor , Sona Towers , No 71, Millers road , Bangalore – 560052	Bio-mining, RDF, SYNGAS, Composting, Bio-Gas.
12	**Green & clean Solution Pvt ltd,** #62C, GF , millers road next to Benson town post office , Bangalore-560045	Bio-Methanation – wet fractions of waste (Organic extrusion technology) Processing of dry waste to recover High quality RDF(Refuse derived fuel).
13	**Eclean spectron Environment Private limited** #129, Andheri Industrial Estate, Off veera Desai Road , Andheri (W) Mumbai 400053	Equipment vendor - Rapid Composting system.
14	**MSGP Infra tech Pvt Ltd ,** #179, 4th main, A cross , Domlur 2nd stage , Bangalore 560071	a. Composting facility 500 TPD, b. Others 250 TPD (RDF, Landfill) for new facility only.
15	**Sham Construction company** , Delta house , Opp. Deepak petrol bunk, New Mangalore - 575011	Anaerobic Composting process and fuel production unit.
16	**Pat pert Teknow Systems** 30/3, pune satara road, Above Hindustan Traders, Balajinagar, Dhankawadi, Pune - 411043	Equipment vendors - Waste to Fuel technology (Catalytic Gasolysis technology).

17	**Pace power System Pvt Ltd.** 5th floor, Tehno residency, plot No 21, flat no 501, Hyderabad – 500081.	Equipment Vendors - for Waste to power and composting.
18	**Concord blue Technology Pvt Ltd.** 101, HDILTowers, 1st floor , Anant kanekar marg , Bandra (E) , Mumbai – 400051.	Waste to Energy- Non Incineration process using concord blue.
19	**Akson's solar Equipments pvt ltd.** "Vatsala-damodar", 42/1, sahajanand Society , Kothrud, Pune – 411038.	Equipment vendors Waste to energy - Bio gas based power generation capacity Compressed gas and fertilizer plant.
20	**Memios- India,** # 1603, 16th Floor, Nirmal Tower, Barakhamba Road, New Delhi – 110001.	Waste to energy & Pyrolistic Conversion
21	**Rochem Separation Systems, (India) Pvt Ltd.** Business Development Manager , # 101, HDIL Towers, Ananth Kanekar Marg, Bandra(E), Mumbai – 400015	Waste to Energy- non Incineration process using concord blue
22	**VMB Enterprices**. # 9, 5th Cross Street, United India Colony, Kodambakkam, Chennai - 600024.	Bio-mining, waste to energy and composting (Thermal Process, Pyrolysis & Plasma Arc Classification)
23	**MB Global**. # 83, Indal nagar post, Shindoli Dist, Belagum – 591124, Karnataka.	Bio mining, capping and waste to energy
24	**Karnataka Compost Development Corporation Ltd.** Haralukunte, Madiwala post, Bangalore – 560068.	Composting
25	**Adithya Recycling** # 155, 2nd Floor, Railway Colony, Shankar Nagar main road, Bangalore – 560096.	Equipment vendors for composting/seperators

26	**Nippon I Waste Management India Pvt. ltd** # 144, 5th cross, Prashanth Nagar, Thanisandra, K.Narayanapura Main Road, DR. Shivarama Karantha Nagar post, Bangalore	Waste to Energy, Proprietary grate combustion system .
27	**M/S Renewable Energy Consultancy** Wind Farm & Bio gas Projects & Consultancy # 824, Ground Floor 1st Main, Chinanna Layout, K.B.Sandra, Bangalore – 560032.	Waste to energy - bio methanisation (Hydrolysis, Organic Acid Formation)
28	**Innovision Engineers Pvt Ltd** # 1671, 1st Floor, 20th Main, HSR Layout, Sector - 1 Bangalore - 560102.	WTE Ready to set up 2 RDF Power Plants Ready to use old & new Waste - Integrated S.W.M
29	**UPL Environmental Engineers Limited** (UEEL) Near Banco Products, Bill Village, Padra Road, Vadodara – 391410	Bio Mining and capping
30	**Eco Mobil.** # 25, 4th main, 1st Cross, 3rd Phase, JP Nagar, Bangalore - 560078. # 93/1, 7th mile, opp. Chikkabegur Gate, Singasandra Post, Hosur Main road, Bangalore - 560068	Waste to energy - Gasification
31	**Sree Meenakshisundaram Textiles Ltd**, Basement " Sona Towers " # 71, Millers Road, Bangalore – 560052	Waste to energy - Bio-Methanisation
32	**K.K Plastic Waste Management Ltd** , Bangalore	Waste to energy - Pyrolysis method
33	**Organic Solutions.** # 16, Chinnaswamy Mudaliar road, Off Queens road, Tasker Town, Bangalore – 560051	Conventional Treatment, Probiotic Technologies using our In-House Bacterial Culture Organism [Odour & smell management]

34	**Pan Asia Project Consultancy Pvt Ltd.** # j-112, 1st Floor, Mayfield Garden, Sector - 51, Gurgoan - 122101.	Bailing Technology
35	**Green Energy Solutions** # 1479, Paduvana road, Kuvempu Nagar, Mysore – 570023	Pyrolytic gasification, Combustion process
36	**Atman Info Solutions** # 147/2, 2nd Floor, 5th block, 69th Cross, Rajajinagar. Bangalore – 560010	Equipment Vendor - Swatcha Garbage Disposal Machine of 1.5 ton (Suitable for ward level)
37	**M/S Ecofil Technologies India Pvt Ltd** # 303& 304, Sigma IT Park Rabale TTC Industrial Area, Navi Mumbai - 400701 Ph: 022 39646400	Bio-mining, Bioremediation/composting
38	**M/S Velankanni Renevable Energy Pvt Ltd.** # 43, Electronic City, Hosur Road Bangalore 560100 Ph : 8066145807/09	Waste to energy/ Bio methanation ,
39	**Noble Exchange Environment Solutions Pvt Ltd**. #402, Ishan, Sur No. 149/1A, ITI Banner road, Aundh, Pune 411007 E-Mail : Shweta@nobleexchangesolutions.com	Waste to energy - Noiseless & odorless Plant Operation (Green Technology)
40	**Shumgir Renewable Energy Pvy Ltd**. # 137, 5th Main, 2nd Block, 3rd Stage, Basaweshwara Nagar, Bangalore – 560079	Waste to energy - Biomethanisation
41	**Khoday Group Of Industries** 7th mile , Kanakapura Road Bangalore - 560062	Concord Blue Integrated Waste To Energy
42	**How biomass**, #27, 2nd Floor, 7th Cross, 2nd Main Indiranagar 1st Stage, Bangalore 560038 ,Ph: 080-41539321	Composting Technology Japan Joint Venture

43	**Vasavadatta Cements**, Gulbarga.	Equipment for incineration - Hot Disk Reactor
44	**Bhavani Bio Organics Private Limited**., Manjeera Heights, Phase - I, B Block, Flat No. 401, Chitra Layout, Saroor Nagar, Hyderabad 500 074, Andhra Pradesh, India ,Mobile 092465 70369, Tel 040 65159369, Tel fax 040 40172369 Email ID: bhavanibio@gmail.com	Bio mining
45	**Global Environmental Infrastructure Technology Solutions**, 1st Floor, old No.47 New NO.87, R.K Mutt road, Mandavelli, Chenai.- 600028 officeadmin@geitsglobal.com, Ph No. +33645490849	Waste to energy - Gasification
46	**Sree Eco Tech estates** S-314 , 3rd floor , Manipal Center , 47 Dickenson Road , Bangalore	Solar Energy Augmented rapid Bio degradation of MSW for fresh and power production
47	**Green Power Technology** , Bangalore	Catalytic Decomposing Technology

- ❖ Indicates –The Entities already working with BBMP on SWM

Note:

- Entities from 1 to 36 as mentioned above are submitted before due date as per notification (Due date: 20-11-2012).
- Entities from 37 to 47 are submitted after due date.

MINUTES OF TECHNICAL COMMITTEE MEETING

Meeting were held on the dates given below to evaluate the EOI

Agenda of the Meeting: To discuss Technical Scrutiny of EOI called on SWM

Venue: At BBMP Head Office

Sl. No	Meeting dates	Discussed on	Action taken
1	12th Dec 2012	Technical committee meeting for the implementation of SWM project, through PPT presentations from the below attendees called for EOI. 1. Organic Solutions [EOI No- 33] 2. Adithya Recycling [EOI No -25] 3. Satarem [EOI No 10] 4. Sham Construction Company [EOI No -15] 5. Loro Enviro power Inc. [EOI No – 2] 6. IL & FS [EOI No – 4] 7. Innovation Engineers [EOI No -28] 8. Organic Waste India Pvt Ltd. [EOI No–3] 9. KCDC [EOI No – 24]	Technical Presentations and discussion were held in detail.

2	15th Dec 2012	Technical details for implementation of SWM project, through PPT presentations from the below attendees called for EOI. 1. Green & Clean Solutions [EOI No-12] 2. MSGP [EOI No-14] 3. MB Global [EOI No-23] 4. Eco-Mobil [EOI No-30] 5. How Biomass [EOI No-42] 6. Vasavadatta cement [EOI No -43] 7. Sham Construction Company [EOI No -15] 8. Organic Solutions [EOI No-33] 9. Green Energy solutions [EOI No-44] 10. K.K plastics [EOI No-32]	1. To make standardization of format to collect EOI details. And to send to all 47 entities (who have submitted EOI) to give the relevant detail. 2. Technical Presentations and discussion were held in detail.

3	18th Dec 2012	Technical details for implementation of SWM project, through PPT presentations from the below attendees called for EOI. 1. Ramky Enviro Engineers Limited [EOI No- 1] 2. Khodays Group of Industries [EOI No-41] 3. Connect Infra research pvt ltd., [EOI No-11] 4. Nippon I-Waste [EOI No -26] 5. UPL Environmental Engineers Ltd., [EOI No -29]	1. To receive data from list of Entities and update the information provided by them in the prescribed Performa 2. Technical Presentations and discussion were held in detail.
4	20th Dec 2012	Technical details for implementation of SWM project, through PPT presentations from the below attendees called for EOI. 1. Green power technology [EOI No – 48] 2. Eco fil Technologies India pvt ltd, [EOI No -37]	1. To receive data from Entities and update the information provided by them in the prescribed Performa 2. Technical Presentations and discussion were held in detail.

5	24th Dec 2012	Technical details for implementation of SWM project, through PPT presentations from the below attendees called for EOI. 1. Noble exchange [EOI No : 39] 2. Presentation from ides consulting on the methodology and analysis .	1. Discussions held on final evaluation procedure to be taken up in next date and to prepare draft report. 2. Technical Presentations and discussion were held in detail.
6	26th Dec 2012	Discussion with Hon. Commissioner and Additional Commissioner along with concerned officers regarding Draft Report held at IPP, Malleswaram. Presented by consultant.	Commissioner has directed to prepare final report and to submit the same immediately
7	27th Dec 2012	Final scrutiny and evaluation of all individual entities done by technical committee members and consultants.	To prepare Report incorporating evaluation and Recommendations

EVALUATION OF THE TECHNOLOGIES

The technologies for processing the Municipal solid waste can be categorized into three main categories. Though the technology adoption has received impetus in the past decade, it is considered, that many of the projects are still to achieve their full potential. The technologies have their inherent costs, benefits and impacts on the environment as well as the sustainability. All technology initiatives will need the approval of the CPCB/KSPCB and will require remaining within the framework of the MSW (Handling and Disposal) Act 2000.

Table 4: The Major classifications of Technologies are:

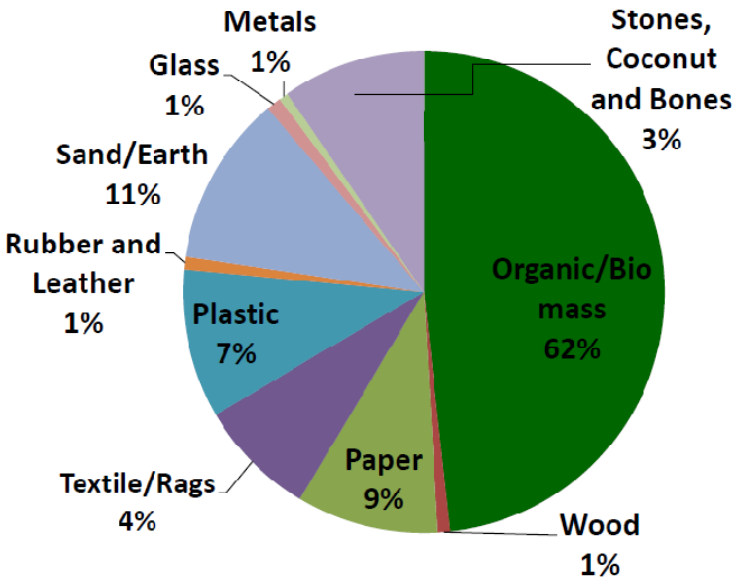
Waste processing Technology Group	Waste Processing Technology
Thermal processing Technologies	Incineration (Mass Burning)
	Pyrolysis
	Pyrolysis / Gasification
	Plasma Arc Gasification
Biological Processing Technologies	Aerobic Digestion (Composting)
	Anaerobic Digestion (Bio methanation)
	Landfill as Bioreactor (Bioreactor landfill)
Physical Processing Technologies	Refuse- Derived Fuel (RDF)
	Densification / Pelletisation
	Mechanical separation
	Size reduction

The adoption of the technology is dependent on the following parameters:

1. Composition of waste
2. Quantum of waste
3. Processing Efficiency
4. Support Infrastructure
5. Legal and environmental framework.

1. Composition of waste:

The analysis of the existing waste reveals large percentage of organic content and higher percentage of moisture. The detailed analysis by sampling at the various levels of the existing waste needs to be carried out for deriving the physical and chemical characteristics. The composition by bulk is as per the following chart:



Source: BBMP

The inert materials will need to be land filled and disposed. The organics may be processed further.

Table 5: Chemical Composition of Existing MSW waste at the dumpsite

Sl No	Constituent /Property	Minimum	Maximum
1	Carbon %	13.8	42
2	Nitrogen %	0.28	1.23
3	Phosphorous as K2O5 %	0.46	0.92
4	Potash as K2O %	0.45	1.07
5	Moisture %	13.8	40.9
6	Bulk Density Kg/m3	341	491
7	Calorific Value Kcal/ Kg	684	1240

Source: BBMP

2. Quantum of waste

The waste generation is about 4000 Metric tons and the waste generation is likely to grow over the coming years.

Table 6: Projected waste quantity for next 20 years

Reference	Average Total Quantity Generated per day (t)	Average per capita kg Generation Per day
Estimated 2012	4000	0.5
Estimated 2017	5600	0.53
Estimated 2022	7100	0.57
Estimated 2027	9100	0.6
Estimated 2032	11600	0.65

Source: BBMP

3. Processing efficiency

The processing efficiency is of utmost importance for making the decision on adoption of the technology. The key aspects related to the efficiency are the following:

- The origin and quality of the waste (mixed, segregated or non segregated)
- Presence of hazardous or toxic waste
- Category of the technology – Physical, biological, thermal or a mix of three.
- Time taken for processing the waste.
- Support infrastructure and manpower required for the processing
- Unit cost per Metric Tons for the processing.

4. Support Infrastructure:

The experience in the country in terms of waste treatment range from success stories at the pilot level to the moderate success at the large scale. The success factors can be attributed to the support infrastructure and institutional capacity. The projects for waste processing must be tested for the following:

- Engineering feasibility and operations
- Viability within financial inputs.
- Man power – technical inputs.
- Understanding and roles of the various stakeholders to make it successful such as the creating demand for compost, revision of tariff.
- Continuous input of the feed for continuous operation of the process.
- Ease in operations including enabling and obtaining permissions/ sanctions.

Further, the aspects related to the availability of outlets for the energy produced, Market for the compost/anaerobic digestion sludge, Energy prices/buyback tariff for energy purchase, Cost of alternatives, land price and capital and labour cost and capabilities/experience of the technology provider are crucial.

5. Legal and environmental framework.

The technologies allowed must comply with the allowable technologies under the MSW2000 Act. Composting, vermin composting, incineration, etc are allowed subject. The waste processing /separation in the existing land fill site needs to be allowed.

Waste to energy and other technologies require clearance from KSPCB and CPCB before implementation.

For projects requiring private investment, project structuring must be carried out. Detailed analysis for PPP mode may be adopted and the procedures laid out by the GoK as well IDD department, GOI must be followed. This may take time for inviting RFQ and RFP and finalizing the same.

For Waste to Energy projects, power purchase agreements need to be entered and the tariffs must be carefully adopted for the project viability.

Under the KTTP act, necessary documentation and procedures must be followed for the tendering action. Within the given framework, the RFP and bidding may be adopted.

Permissions and approvals from the KSPCB/ CPCB as mandated needs to be obtained by BBMP for speedy action.

Evaluation of variables:

The relevance of the technology proposed by the applicant were subjected to the following variables. The information was compiled for further analysis.

1. Technology proposed for the project:

The proposed technology was categorized and the adoption in various locations both National and international was considered. This was discussed with the overall sustainability of the waste treatment technologies for treating the MSW generally adopted in India.

Waste to energy: The low calorific content of the waste makes it difficult to harness the energy, waste to fuel and others need careful investigation for recommendation. The success of the plants has not been encouraging in various cases in the country.

Land fill capping : The capping of the land fill in " as is basis " is not recommended ,as cases from all over the world point out that the capping leads to the formation of Methane internally within the anaerobic conditions .The leachate and the ground water contamination may occur due to the seepages.

They key points to be noted under the adoption of waste processing are:

a. Waste is unsegregated, has high moisture content, and low –medium calorific value.
b. Processing of the waste for round the year in time bound manner.
c. Meeting environmental norms
d. Economically viable within the power tariff and tipping fee conditions.

2. Land requirements for the Technology:

The responses range from the need of land of about 3 Acres to about 30 acres of land for setting up the Waste to power projects. For Bio mining and composting, about 15 acres of land is on average a requirement. A few ancillary buildings associated with processing are proposed at the cost of the operators.

3. Plan for monetizing the by products from waste management:

The bio mining process leaves behind the products that can be converted to the compost, RDF and the inert materials. While the compost and the RDF can be monetized with minimum support. The inert materials will have to be put in the land fill site. Experienced players will have the capacity to monetize the RDF and the compost suitably.

The byproducts of the Bio methanation process are the material for the compost and the gas. In the gasification and pyrolysis methods, the end products such as the fly ash will be integrated with the infrastructure industry for consumption. Though the technologies promise the byproducts to be useful, it is of experience that a good supply chain and forward integration of the value chain is necessary.

4. Details of the R&D, patenting and licensing of the technology, etc.

Composting with some soil stabilization is one of time tested process and is very suitable. The Waste to energy especially in the bio methanation process is patented to research institutions, etc. Licenses and technology transfer may be required for the operationalising the same. Gasification and pyrolysis methods too require the licenses and are tied to the vendors. For the Bio-mining process- indigenous technology and equipment is available.

5. Equipment manufacturing / sourcing

The equipment will have to be sourced from other equipment vendors as the waste to energy players usually are system integrators with operation and maintenance capability.

6. Operation and management Plan for the project

Man power staffing for the project including details of the manpower requirements (skilled and Unskilled) and plans for sourcing such as manpower locally for the project.

The EOI respondents have adapted their plans for sourcing the talent locally. The skilled ones are to be brought from their respective joint venture partners. As the players may not be available at all times, it may be possible not to depend technologies that require intense, dependence on the foreign technologist.

The operation and management costs include the salaries to the workmen, the maintenance of plant and machinery, etc. This is expressed as per the per Metric Ton basis.

7. Assessment of the key risks:

The risks perceived by the private entity on the waste management and processing are mapped. The possible risk mitigation is discussed while recommending the technology.

8. BBMP contribution:

Expectations of the private entity for making the waste processing is mapped. The expectations include the concession period, payment of processing fee, clearances, approvals, permits and lease of land.

9. Cost criteria, environment capability, time bound execution, history, strength, experience in India and abroad, financial capability are captured in the evaluation of the EOI.

OUTCOME / CONCLUSIONS

Table 7: The Entities recommended for Bio mining:

Sl No.	EOI No.	Name Of the Company	Recommendations
1	3	Organic waste India Pvt Ltd	In view of the established unit at Sholapur and other places the technology may be utilized here also. Hence Recommended for long term.
2	4	IL&FS Environmental infrastructure & services Limited	70% Efficiency claimed by company & have operational experience at Mysore, Hence Recommended.
3	10	Satarem Enterprises (P) LTD.	The Technology is viable for long term implementation. Hence recommended for long term only (20 years).
4	15	Sham Construction company,	Company takes responsibility equipment, labour & methodology at small location. Hence Recommended for small landfill site for short term completion
5	22	VMB Enterprises.	Tied up with M/S Coramandal fertilizer, executed work at 3 locations in AP and Pondicherry. Hence Recommended
6	24	Karnataka Compost Development Corporation Ltd.	Technology is established. Infrastructure to be provided by BBMP, This requires decision of BBMP.
7	29	UPL Environmental Engineers Limited (UEEL)	Recommended for both short term & long term implementation. Company enclosed list of completed projects.
8	37	M/S Ecofil Technologies India Pvt Ltd	Well tested and proven in India at Mumbai & other places. Hence Recommended.

9	44	Bhavani Bio Organics Private Limited.,	Experience in Bio mining and open landfill stabilization in India. Hence recommended for Bio mining

Table 8: Entities recommended for Waste to energy

Sl No.	EOI No.	Name Of the Company	Technology Proposed	Recommendation
1	2	Loro Enviro Power, Inc.	Air fed Gasification	Recommended for long term basis for concession period limited to 20 years.
2	4	IL&FS Environmental infrastructure & services Limited	Integrated MSW Processing Facility which would comprise of: 1. Remediation of Landfill 2. Bio-mining 3. RDF Preparation	70% Efficiency claimed by company & have operational experience at Mysore, Hence Recommended.
3	10	Satarem Enterprises (P) LTD.,	Waste to energy	The Technology is viable for long term implementation. Hence recommended for long term only (20 years).
4	11	Connect infra research Pvt ltd ,	Waste to energy	Technology is viable for long term implementation. Hence recommended for long term only (20 years).

5	12	Green & clean Solution Pvt ltd,	Bio-Methanation – wet fractions of waste (Organic extrusion technology) Processing of dry waste to recover High quality RDF(Refuse derived fuel)	The company is yet to form a JV with inter geo SWM Ltd. Can be utilized in post segregated phase of SWM and long term strategy , can recommend for long term (20 years) measures
6	21	Rochem Separation Systems, (India) Pvt Ltd.	Waste to Energy- non Incineration process using concord blue	The technology indicated as same as concord blue technology. The company has established in its name in 6 Indian cities Can be Recommended for only new plants.
7	22	VMB Enterprises.	Waste to energy and composting (Thermal Process, Pyrolysis & Plasma Arc Classification)	Tied up with M/S Coramandal fertilizer, executed work at 3 locations in AP and Pondicherry. Hence Recommended
8	26	Nippon I-Waste Management India Pvt Ltd.	Proprietary grate combustion system guaranteeing high durability in the proper treatment of municipal solid waste.	Technology is Recommended for new landfill site, provided inert is restricted to 10% without bottom ash / fly ash.
9	29	UPL Environmental Engineers Limited (UEEL)	Waste to energy	Recommended for both short term & long term implementation. Company enclosed list

				of completed projects.
10	32	K.K Plastic Waste Management Ltd	Waste to energy - Pyrolysis method	Recommended only for plastic waste to fuel technology
11	35	Green Energy Solutions	Pyrolytic gasification , combustion process	Technology is not yet tested in India, can be utilized for long term measures of SWM, can be recommended for Waste to energy projects.
12	39	Noble Exchange Environment Solutions Pvt Ltd.	Waste to energy - Noiseless & odourless Plant Operation (Green Technology)	This technology is suitable for only fresh separated organic waste from bulk generation in BBMP, hence not Recommended for 7 landfill sites

Table 9: Entities recommended for Composting

Sl No.	EOI No.	Name Of the Company	Recommendation
1	3	Organic waste India Pvt Ltd	In view of the established unit at Sholapur and other places the technology may be utilized here also. Hence Recommended for long term.
2	11	Connect infra research Pvt ltd ,	Technology is viable for long term implementation. Hence recommended for long term only (20 years).
3	15	Sham Construction company ,	Company takes responsibility equipment, labour & methodology at small location. Hence Recommended for small landfill site for short term completion
4	24	Karnataka Compost Development Corporation Ltd.	Technology is established. Infrastructure to be provided by BBMP, This requires decision of BBMP.
5	29	UPL Environmental Engineers Limited (UEEL)	Recommended for both short term & long term implementation. Company enclosed list of completed projects.

Table 10: Equipment vendors

Sl No.	EOI No.	Name Of the Company	Technology Proposed	Recommendations
1	7	JK Engineering works,	Machinery / equipment for Bio mining	Equipment based technology, is of low capacity. Hence not suitable for 7 BBMP dump sites, Hence not Recommended.
2	13	Eclean spectron Environment Private limited	Equipment vendor - Rapid Composting system	This is only Equipment supplier, do not wish to take full responsibility to the current landfill site for operation. Hence not recommended.
3	16	Pat pert teknow Systems	Equipment vendors - Waste to Fuel technology (Catalytic Gasolysis technology)	This is only equipment vendor & plastic to fuel technology. No individual responsibility for recent landfill site. Hence not Recommended.
4	19	Akson's solar Equipments pvt ltd.	Equipment vendors Waste to energy - Bio gas based power generation capacity Compressed gas and fertilizer plant.	This is only equipment vendor. Not assured of taking independent handling / processing. Hence not Recommended for 7 landfill sites
5	25	Adithya Recycling	Equipment vendors for composting/separators	This is only Equipment vendor, not assured independent handling, hence not Recommended for 7 landfill sites.
6	36	Atman Info Solutions	Equipment Vendor - Swatcha Garbage Disposal Machine of 1.5 ton	Only equipment vendor, independently not handled landfill sites, hence not Recommended

Table 11: Entities recommended for setting up new facilities

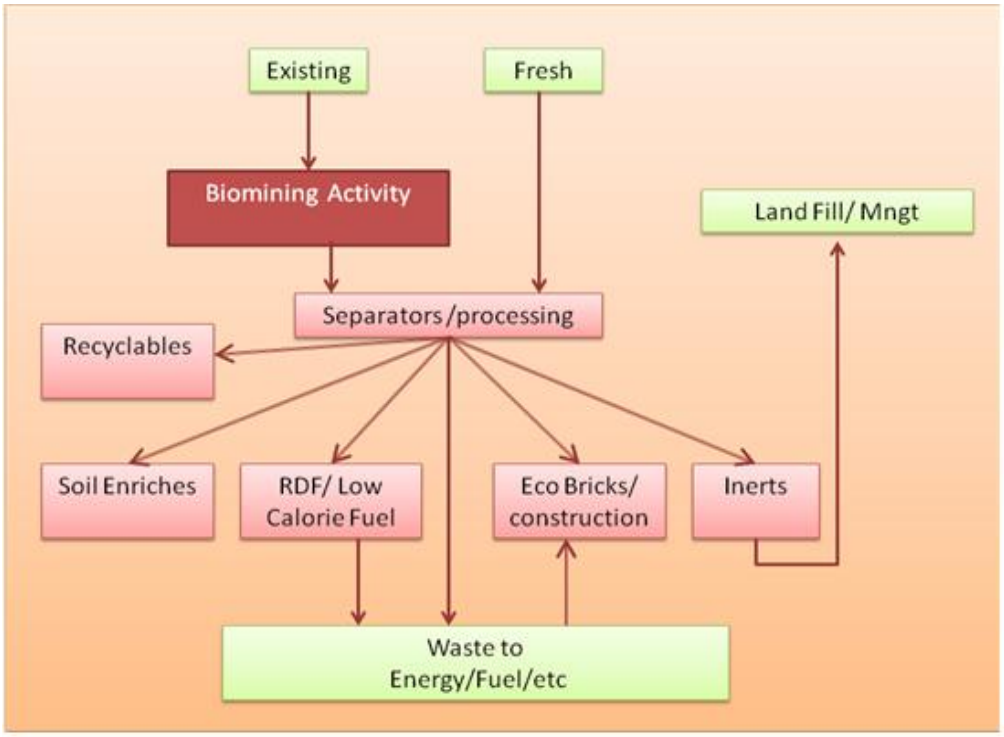
Sl No.	EOI No.	Name Of the Company	Technology Proposed
1	14	MSGP Infra tech Pvt Ltd ,	a. Composting facility 500 TPD, b. Others 250 TPD (RDF, Landfill) for new facility only
2	41	Khoday Group Of Industries	Concord Blue Integrated Waste To Energy

ACTION PLAN

Based on the evaluation, Bio-mining, composting and Remediation can be taken up immediately. The average time for the start up of operations for the bio mining is about 6 months. The first stage of the Bio-mining activity is to allow for the open land fill stabilization. This needs care and technical expertise. The exercise can be taken up in modular fashion, in phases and the investment is in the range of about 20 Crore. The average processing capacity can be in modules of 500 TPD- 750 TPD and 1000 TPD and more depending on the site conditions.

Bio mining will involve physical separation and recovery as well conversion to the byproducts. The inert material/end use which cannot be processed further will generally be deposited in the final land fill for closure.

Flow chart showing process for fresh and existing waste:



Source: ides consulting Pvt Ltd.,

Table 12: By products and their uses

Sl No	By Product	End use	Remarks
1	Combustible waste (RDF)	Fuel	Calorific value will be low, disposal as per CPCB/KSPCB norms
2	Eco bricks/ tiles	Construction industry	Feasibility to be established
3	Soil enricher	Organic use- bio fertilizer	MSW rules and agricultural norms will be adhered.
4	Inerts	To be land filled	Closure / remediation/ shifting to new site

Source: BBMP

Pre-requisites for the Bio Mining – waste processing at the existing sites:

The private entities will require inputs on various parameters and will require BBMP to be enabler for some of the activity. The key points are covered below:

Contractual conditions:

- Approvals and permits must be accorded by BBMP or facilitated for reducing the delays due to procedures and interdepartmental co-ordination.
- Electricity – Min.300 KVA and water connection is to be facilitated.
- Identification of site within the dump site for disposal of inerts/ or transportation to new site.
- Permits from Statutory bodies
- Handing over the portion of the dump site for processing.

Financial support:

- BBMP may pay a processing fee on Per MT basis after the ascertaining the actual scope on preparation of feasibility study.
- Escalation at the rate of 5 % may be provided on year to year basis.
- Advance / mobilization charges to be adjusted from the tipping fee on Pro rata basis. Given the total investment – a percentage (%)of the cost can be supported as the advance.

Project Risks:

- Risk of implementation is low, as the technology is time tested and requires care and skill in operations.
- Risk of Cost over runs are low, as there are no major construction/ plant implementation
- No major import of equipment is necessary , Currency fluctuation, Exchange risks are not present.
- Operation and management – Time tested and local resources. Can be kept in operation throughout the year
- Environmental management – risks can be mitigated through management plan.
- Dependence on Technology – low risk technology
- Competition – more players
- Time over runs – the site can be allocated to 3-4 players
- Availability of feed – Continuous and un-segregated condition

Implementation chart for the activities:

Project Implementation Time Frame							
Major activities during project commissioning are summarized below							
Sl No	**Activities**	**M 1**	**M 2**	**M 3**	**M 4**	**M 5**	**M 6**
1	Site Allocation by BBMP	■					
2	Waste characterization	■					
3	Geo-technical Investigations	■					
4	Approvals, Permit and consents	■					
5	Electricity and water Connections	■	■				
6	Land Development Activities		■				
7	Civil Cnstruction		■	■	■	■	
8	Procurement of Machinery & vehicles		■	■	■		
9	Testing. Trial run					■	
10	Processing of waste on regular basis						■

Source: ides consulting Pvt Ltd.,

A well drafted RFP may be issued for inviting the private players participation in the bidding process. The recommended sites for immediate implementation are as follows:

Table 13: Names of land fill sites taken up for Bio mining

Sl No	Name of the site	Technology proposed
1	Mandur–North	Bio-mining, RDF and Remediation
2	Mandur- South	Bio-mining, RDF and Remediation
3	Mavallipura	Bio-mining, RDF and Remediation
4	Cheemasandra	Bio-mining, RDF and Remediation

Salient aspects to be considered during the RFP stage:

- RFP for the Bio mining activity at the sites can be floated on short term tender.
- Time is of essence – by regular monitoring and if the agency is unable to carry out the work, the tender may be cancelled with first right of BBMP to get its work done.
- Decision on the financials compensation/fee in form of tipping fee/ any advance/ etc.
- A DPR shall be prepared including approx. cost of the Project, in order to fix the EMD etc.
- A Project Management Consultancy is to be appointed for the technology, work progress for the clearance of the dump through bio mining exercise on time.
- Incoming waste may be accepted and on the award of contract for the waste to energy or any other option, the work will be restricted only to the clearing of the dump. The EOI is limited to only old dumped waste and there should not be any scope for handling fresh garbage.

- BBMP should clearly define on the residual inert waste left out after the processing of old MSW is disposed (land filled) and responsibilities thereafter. An upper limit for quantity of inert waste to be finally land filled shall be fixed (15% or 20% etc) in the tender documents.

- BBMP shall clearly mention about how the bio-mining of the old MSW dumps needs to be carried out, as the old dumps may contains huge amount of methane gas in it. Besides care should be taken for the open land fill stablisation.

- Priority may be given to those Bidders who will propose less Tipping Fee as well as less time period to complete the processing and disposal of existing old waste dumps. Prior experience in handling the waste is necessary.

- As per the requirements, BBMP may form packages containing only individual landfill sites or including several landfill sites. BBMP shall take a clear stand on, entrustment.

- RFP should contain clauses regarding payment of minimum wages, ESI & PF, compliance to various relevant Acts and Rules including MSW rules 2000, providing safety gears to workers etc.

- Joint venture partners to hold minimum 26% in the consortium

- RFP should seek for a Management Plan from each preferred bidder, regarding how the bidder is planned to handle the Project.

- Net worth of the entity is to be established more than 150 crores.

- Convergence with marketing effort for “soil enriches” with other government departments such as horticulture, agriculture department.

- Permission / approvals from PCB, CFE’s etc as mandated by the laws are to be obtained /facilitated by BBMP.

Table 14: Summary of the proposed technologies for the landfill sites

Sl No	Name of Land fill site	Proposed Technology	Existing Quantum of waste in lakh tons
1	Mandur – North	Bio-Mining, RDF & Remediation.	6.0
2	Mandur – South	Bio-Mining, RDF & Remediation	4.0
3	Mavallipura	Bio-mining, RDF & Remediation	7.0
6	Anjanapura	W2E and composting	2.0
4	Cheemasandra	Bio-mining, RDF & Remediation	3.0
5	Kannehalli	W2E and composting	1.05
7	Bingipura	W2E and composting	1.45

MEMBER CONVENER

Proceedings of technical committee meetings vide Government Order No. NA.AA.E/791/MNY 2012, Bangalore.

Dated 07-12-2012 and meeting conducted as on 12th, 15th, 18th, 22nd, 24th, 26th, 27th (December 2012) and following resolution drawn as per detailed technical presentation made in the committee members present. List of members

1. **Shri M.R Venkatesh**, Chairman, Chief Engineer SWM-2, BBMP, Bangalore.
2. **Shri Sriprakash** MHM, member Executive Engineer, DMA, Bangalore.
3. **Shri Ashok Jain**, member, General Manager, KUIDFC, Bangalore
4. **Shri Venkatesh Shekar** , member nominee KSPCB, Bangalore
5. **Shri Parameshwaraiah R.L** , member, DGM, HUDCO, Bangalore.
6. **Shri Narasimharaju.N**, member convener, Executive Engineer, SWM-2 BBMP, Bangalore.

The final recommendations are as follows.

DATA SHEET

EOI No.	Name of Agency with address, Phone No, Email	Key Professionals of the organization proposed	Turnover / income of the company for the last 5 years	Number of Similar Projects		Total Quantity of waste proposed to be process
				India	Abroad	
1	Ramky Enviro Engineers limited, IV Floor, MSW Division,TSR Towers, Rajbhavan Road,Somajiguda,Hyderabad-500082,AP ph : 040-44422222,fax-040-44422008,mob : 8008675050	Attached/ as per document	2011-12: 488.38 Cr, 2010-11-492cr, 2009-10-274cr, 2008-09-166.91cr, 2007-08-119cr	21	NA	10 acres for 1 Lakh MT and 20 to 25 acres for 10 lakh MT of waste.

Site Proposed to be Processed	Reference certificates of successful completion of works	Technology Proposed				
		Type of Technology proposed	Plant capacity	By products	% of Residue	Envisaged O&M cost
Mandur North, Mandur south, Anjanapura, Cheemsandra , Mavallipura , Kannahalli , S.Bingipura	Provided in EOI	Bio mining and Composting		Compost	60 %	350

Estimated capital cost in crores	Funding structure	Capital investment by the contractor	Concession period (Years)	BBMP		
				Time required for setting up plant	Area requirement	Tipping fee quoted per ton
10	From internal funds and bank.	**100% by contractor**	2	6 Months	8 to 10 acres for 1 Lakh tons of waste and 22 to 25 acres for 10 Lakh tons of waste including landfill	250

Suggestions / Recommendations
The inerts is more than 60%, in the processing and the performance of the entity has not been very satisfactory on several projects in Karnataka including BBMP. Hence the firm is not recommended.

EOI No.	Name of Agency with address, Phone No, Email	Key Professionals of the organization proposed	Turnover / income of the company for the last 5 years	Number of Similar Projects		Total Quantity of waste proposed to be process
				India	Abroad	
2	Loro Enviro Power, Inc. THREERTHAPADAM TC N75/1418 , Near AIR Vazhuthacud , Trivandrum Kerala 695019	Project Manager Dr Neil Williams, Deputy Project Manger- Krishnan Iyer, Project Finance Mr Jel Openhiem, Waste gasification expert- Dr Barry Liss,	3814 crores - Turnover of the 4 companies consortium	one in Trivandrum sanctioned yet to start	40	1000 tons/day

Site Proposed to be Processed	Reference certificates of successful completion of works	Technology Proposed				
		Type of Technology proposed	Plant capacity	By products	% of Residue	Envisaged O&M cost
Anjanapura	Kelsey groupInc, reClean LLC, JR capital 2 certificates, Muncipality of ZAHLE MALAAKA,Ricelnd all attached	Air fed Gasification	72Mw	low grade cement bricks	2% to landmine, 10% as by products	55 crores

Estimated capital cost in crores	Funding structure	Capital investment by the contractor	Concession period (years)	BBMP		
				Time required for setting up plant	Area requirement	Tipping fee quoted per ton
1200	90% funding from partners consortium from USA and Dubai, 10 % will be raised locally if not contributed from the BBMP -the corporation or as a PPP with the Government of Karnataka	**1100 crores**	25 years	1 year	4 hectares	Rs.200 for the fresh waste, and Rs.500 for waste from mining of landfill

Suggestions / Recommendations
Recommended for long term basis for concession period limited to 20 years.

EOI No.	Name of Agency with address, Phone No, Email	Key Professionals of the organization proposed	Turnover / income of the company for the last 5 years	Number of Similar Projects		Total Quantity of waste proposed to be process
				India	Abroad	
3	Organic waste India Pvt Ltd #504 , 5th cross road , HMT layout , RT Nagar , Bangalore 560032	Refer Annexure Attached	Net worth certificate Attached	Certificate attached	Nil	400 TPD

Site Proposed to be Processed	Reference certificates of successful completion of works	Technology Proposed				
		Type of Technology proposed	Plant capacity	By products	% of Residue	Envisaged O&M cost
North Mandur	Certificate attached	Bio Mining & Composting	400 TPD to Process 5,84,000 Tons in 4 years of plant operation	Compost Recyclable material plastics etc	0.18	Total O&M cost for project tenure of 4 years is Rs. 28.44 Crores. (This cost includes cost of manpower, chemicals & consumables, spears, repayment of loan & contractors margin etc.)

Estimated capital cost in crores	Funding structure	Capital investment by the contractor	Concession period	BBMP		
				Time required for setting up plant	Area requirement	Tipping fee quoted per ton
8.12 crores	70:30 Debt Equity ratio	2.43 Crores	4 years	1 year	Approx 3 acres	Rs 487/-

Suggestions / Recommendations
In view of the established unit at Sholapur and other places the technology may be utilized here also. Hence Recommended for long term.

EOI No.	Name of Agency with address, Phone No, Email	Key Professionals of the organization proposed	Turnover / income of the company for the last 5 years in crores	Number of Similar Projects		Total Quantity of waste proposed to be process
				India	Abroad	
4	IL&FS Environmental infrastructure & services Limited. 4th floor, Dr. Gopaladas Bhavan, Barakhamda Road, New Delhi – 110001	Mr. Shajahan Ali, VP (Environment) Mr. C. Basavaiah, VP Major Vikas Chaudhary, Sr Manager (Operations) Arun Kr. Sharma, Sr Manager (Operations) Mohit Kaushik, Sr Manager (Civil)	2012: 121.09 2011: 61.86 2010: 40.99 2009: 29.51 2008: 20.96	12	NA	Processing of 1000 TPD

Site Proposed to be Processed	Reference certificates of successful completion of works	Technology Proposed				
		Type of Technology proposed	Plant capacity	By-products	% of Residue	Envisaged O&M cost
1. Mandur North 2. Cheemsandra	Experience certificates for Okhla Compost Plant, Delhi and Mysore Compost Plant, Karnataka have been attached.	Integrated MSW Processing Facility which would comprise of: 1. Remediation of Landfill 2. Bio mining 3. RDF Preparation	1000 TPD	Compost and RDF	3%	Rs 400/ton

Estimated capital cost in crores	Funding structure	Capital investment by the contractor	Concession period	BBMP		
				Time required for setting up plant	Area requirement	Tipping fee quoted per ton
15.54	70:30 Debt Equity ratio	15.54	5 years	6 months	8 acres	Rs 500/ ton with an annual escalation of 5%

Suggestions / Recommendations
70% Efficiency claimed by company & have operational experience at Mysore, Hence Recommended.

EOI No	Name of Agency with address, Phone No, Email	Key Professionals of the organization proposed	Turnover / income of the company for the last 5 years in crores	Number of Similar Projects		Total Quantity of waste proposed to be process
				India	Abroad	
5	MVI Global Greens, Dr (Mrs) V thankamani , Vijaya Nivas 39/4237, Ravipuram road , kochi -682016	Dr Thankamani	NA	NA	NA	0.5 to 4 tons / day

Site Proposed to be Processed	Reference certificates of successful completion of works	Technology Proposed				
		Type of Technology proposed	Plant capacity	By-products	% of Residue	Envisaged O&M cost
--	--	Waste to energy -Bio Methanation (Anaerobic Digestion)				

Estimated capital cost in crores	Funding structure	Capital investment by the contractor	Concession period	BBMP		
				Time required for setting up plant	Area requirement	Tipping fee quoted per ton
			NA		400 Square meters, 0.5 to 4 tons / day	

Suggestions / Recommendations
The agency has quoted 0.4 to 0.5 tonnes, It is very low capacity of processing, Hence not Recommended

Sl No./ EOI No.	Name of Agency with address, Phone No, Email	Key Professionals of the organization proposed	Turnover / income of the company for the last 5 years	Number of Similar Projects		Total Quantity of waste proposed to be process
				India	Abroad	
6	RenewGenVentures India Pvt ltd #44/1, 2nd floor , VCl Building , KH Road . Bangalore 560027	B Senthil Kumar , MD				500TPD to 1500 TPD Mixed & segregated

Site Proposed to be Processed	Reference certificates of successful completion of works	Technology Proposed				
		Type of Technology proposed	Plant capacity	By products	% of Residue	Envisaged O&M cost
		Waste to energy through Incineration.		Fly ash + FGT residues could be used for road substrate or cement substitute.	15	

Estimated capital cost in crores	Funding structure	Capital investment by the contractor	Concession period	BBMP		
				Time required for setting up plant	Area requirement	Tipping fee quoted per ton

Suggestions / Recommendations
Failed to establish the technical capability during presentation, hence not recommended, bottom ash production is very high (15% of production). Disposal of this ash is very difficult practically, hence not recommended.

EOI No.	Name of Agency with address, Phone No, Email	Key Professionals of the organization proposed	Turnover / income of the company for the last 5 years	Number of Similar Projects		Total Quantity of waste proposed to be process
				India	Abroad	
7	JK Engineering works , #50 Kothanur, Bagalur Road Bangalore - 560077	Almitra H Patel				500TPD to 1500 TPD Mixed & segregated

Site Proposed to be Processed	Reference certificates of successful completion of works	Technology Proposed				
		Type of Technology proposed	Plant capacity	By products	% of Residue	Envisaged O&M cost
All sites		Machinery / equipment for Bio mining				

Estimated capital cost in crores	Funding structure	Capital investment by the contractor	Concession period	BBMP		
				Time required for setting up plant	Area requirement	Tipping fee quoted per ton

Suggestions / Recommendations
Equipment based technology, is of low capacity. Hence not suitable for 7 BBMP dump sites, having large quantity. Hence not recommended.

EOI No	Name of Agency with address, Phone No, Email	Key Professionals of the organization proposed	Turnover / income of the company for the last 5 years	Number of Similar Projects		Total Quantity of waste proposed to be process
				India	Abroad	
8	Steps Techniron limited 101 sinchan , new link road , off veera desai road , Andheri West , Mumbai	T R Rao - Vice Chairman Mohnish A Shukla - Executive Director	Nil . Company was started last year to promote the technology	We are in the process of setting up plants for various ULBs	We are setting up 24 Plants for plastic processing. Have set up plants of 3000 TPD for Oil Waste	250 TPD

Site Proposed to be Processed	Reference certificates of successful completion of works	Technology Proposed				
		Type of Technology proposed	Plant capacity	By products	% of Residue	Envisaged O&M cost
We can take up any site	NA	Waste to energy (Low temperature Gasification) , Poly crack process	250 - 500 TPD	Oil , Gas and Coal	2 % - Cand D	Rs 3/kg

Estimated capital cost in crores	Funding structure	Capital investment by the contractor	Concession period	BBMP		
				Time required for setting up plant	Area requirement	Tipping fee quoted per ton
35 - 40 Crores for 250 TPD	We can look at doing the project on BOO Basis	30 % of the project cost	20 Years	8 months	3 - 5 Acres	Zero tipping charges

Suggestions / Recommendations
Technology is viable for long term processing, Hence Recommended for long term only (20 years)

EOI No	Name of Agency with address, Phone No, Email	Key Professionals of the organization proposed	Turnover / income of the company for the last 5 years	Number of Similar Projects		Total Quantity of waste proposed to be process
				India	Abroad	
9	BVG INDIA LTD , A Bharat Vikas group company , BVG House No 47, Millers tank bund road , Vasanth nagar , Bangalore-560052	Ulhas v kulkarni , GM				

Site Proposed to be Processed	Reference certificates of successful completion of works	Technology Proposed				
		Type of Technology proposed	Plant capacity	By products	% of Residue	Envisaged O&M cost
		Bio mining and Composting				

Estimated capital cost in crores	Funding structure	Capital investment by the contractor	Concession period	BBMP		
				Time required for setting up plant	Area requirement	Tipping fee quoted per ton

Suggestions / Recommendations
The Technology is not viable for mass waste, adequate details are not furnished. Hence not recommended.

EOI No	Name of Agency with address, Phone No, Email	Key Professionals of the organization proposed	Turnover / income of the company for the last 5 years	Number of Similar Projects		Total Quantity of waste proposed to be process
				India	Abroad	
10	Satarem Enterprises (P) LTD., No 5D, Chitrapur complex , 15th cross , 8th main Malleswaram , Bangalore -55	Attached	Attached		2	1000 TPD

Site Proposed to be Processed	Reference certificates of successful completion of works	Technology Proposed				
		Type of Technology proposed	Plant capacity	By products	% of Residue	Envisaged O&M cost
Mandur North Mavallipura	Attached	Integrated Waste to energy.	1000 TPD	Compost recyclables, power and power blocks	5% of input waste quantity.	50 crores

Estimated capital cost in crores	Funding structure	Capital investment by the contractor	Concession period	BBMP		
				Time required for setting up plant	Area requirement	Tipping fee quoted per ton
250 crores	Equity 25% Debt 75 %	62.5 crores	30 years	28 months	25 acres	Rs. 350 / ton or 15 % less of Ave of tipping fee quoted by others.

Suggestions / Recommendations
The Technology is viable for long term implementation. Hence recommended for long term only (20 years).

EOI No	Name of Agency with address, Phone No, Email	Key Professionals of the organization proposed	Turnover / income of the company for the last 5 years	Number of Similar Projects		Total Quantity of waste proposed to be process
				India	Abroad	
11	Connect infra research Pvt ltd , 5th floor , sona Towers , No 71, Millers road , Bangalore560052	Shiva Subramaniam Karn Malhotra Dinesh CS	1 Crores INR	2		1000 TPD

Site Proposed to be Processed	Reference certificates of successful completion of works	Technology Proposed				
		Type of Technology proposed	Plant capacity	By products	% of Residue	Envisaged O&M cost
At North Mandur Village Landfill Site - Open to other landfills as well	Yes	Bio mining , RDF, SYNGAS, Composting, Bio-Gas	1000 TPD old waste 1000 TPD fresh Waste from BBMP	Debri Bricks, Compose Manure, Renewal Energy, Recyclable Plastics and metals	4-5%	2.5 Crores Annually for the Mandur north rehabilitation project

Estimated capital cost in crores	Funding structure	Capital investment by the contractor	Concession period	BBMP		
				Time required for setting up plant	Area requirement	Tipping fee quoted per ton
Cap EX for Rehabilitating the North Mandur site - 60 Crores	Government aid = 50% of Cap Ex for Rehabilitation (30 Crores)	50% of Cap Ex in from of Private Funding (30 Crores)	40 Years of Irrevocable lease hold	13 - 18 Months	25 Acres For Rehabilitaton of Mandur North Site	48 INR / tons

Suggestions / Recommendation
Technology is viable for long term implementation. Hence recommended for long term only (20 years).

Sl No./ EOI No.	Name of Agency with address, Phone No, Email	Key Professionals of the organization proposed	Turnover / income of the company for the last 5 years	Number of Similar Projects		Total Quantity of waste proposed to be process
				India	Abroad	
12	Green & clean Solution Pvt ltd, #62C, GF , millers road, next to Benson town post office , Bangalore-560045	Maheshwari - Managing Director / Rajesh Malik - Director	357 Crores	Integration of technologies under each technologies there are many plants operational in Germany, Europe and US.	None	1000 TPD

Site Proposed to be Processed	Reference certificates of successful completion of works	Technology Proposed				
		Type of Technology proposed	Plant capacity	By products	% of Residue	Envisaged O&M cost
1) Koratagere 2) Mavallipura 3) Anjanapura , 4) Kannahalli 5) S.Bingipura	None	Bio-Methanation – wet fractions of waste (Organic extrusion technology) Processing of dry waste to recover High quality RDF(Refuse derived fuel)	1000TPD	Compressed Biogas	5 to 10% Landfill	Rs.250 Per Tonne

Estimated capital cost in crores	Funding structure	Capital investment by the contractor	Concession period	BBMP		
				Time required for setting up plant	Area requirement	Tipping fee quoted per ton
300 Crores	DBOOT	300 CR	6 to 9 months from the date of concession agreemtna and financial closure	6 to 9 months	Minimum 25 Acres	300 Rs/Tonne

Suggestions / Recommendations
The company is yet to form a JV with inter geo SWM Ltd. Can be utilized in post segregated phase of SWM and long term strategy, recommended for long term (20 years) measures.

EOI No	Name of Agency with address, Phone No, Email	Key Professionals of the organization proposed	Turnover / income of the company for the last 5 years	Number of Similar Projects		Total Quantity of waste proposed to be process
				India	Abroad	
13	Eclean spectron Envirnment Private limited #129, Andheri Industrial Estate, Off veera Desai Road , Andheri (W) Mumbai 400053	Anindyo sarkar, Director				

Site Proposed to be Processed	Reference certificates of successful completion of works	Technology Proposed				
		Type of Technology proposed	Plant capacity	By products	% of Residue	Envisaged O&M cost
		Equipment vendor - Rapid Composting system		Ceramic Ash		100% monthly operational cost to be paid at the end of 30 days of operation against invoicing

Estimated capital cost in crores	Funding structure	Capital investment by the contractor	Concession period	BBMP		
				Time required for setting up plant	Area requirement	Tipping fee quoted per ton
					a. Organic waste - 2acres b. Inorganic waste - additional area is required for land fill.	

Suggestions / Recommendations
This is only Equipment supplier, do not wish to take full responsibility to the current landfill site for operation. Hence not recommended.

EOI No	Name of Agency with address, Phone No, Email	Key Professionals of the organization proposed	Turnover / income of the company for the last 5 years	Number of Similar Projects		Total Quantity of waste proposed to be process
				India	Abroad	
14	MSGP Infra tech Pvt Ltd , #179, 4th main, A cross , Domlur 2nd stage , Bangalore 560071	KP Praveen Joint managing director				750 TPD

Site Proposed to be Processed	Reference certificates of successful completion of works	Technology Proposed				
		Type of Technology proposed	Plant capacity	By products	% of Residue	Envisaged O&M cost
		a. Composting facility 500 TPD , b. Others 250 TPD (RDF, Landfill) for new facility only				

Estimated capital cost in crores	Funding structure	Capital investment by the contractor	Concession period	BBMP		
				Time required for setting up plant	Area requirement	Tipping fee quoted per ton
					100 acres of own land in village (Chiguranahalli village , Doddabalapur taluk)	

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Suggestions / Recommendations
Recommended for long term fresh landfill sites of BBMP.

EOI No	Name of Agency with address, Phone No, Email	Key Professionals of the organization proposed	Turnover / income of the company for the last 5 years	Number of Similar Projects		Total Quantity of waste proposed to be process
				India	Abroad	
15	Sham Construction company , Delta house , Opp. Deepak petrol bunk , New Mangalore 575011	KB Sharief , Satishan Nair	14 crore	2	2	450 MT /day

Site Proposed to be Processed	Reference certificates of successful completion of works	Technology Proposed				
		Type of Technology proposed	Plant capacity	By products	% of Residue	Envisaged O&M cost
Any Locations	Will be provided	Anaerobic Composting process and fuel production unit	800 to 1000 TPD	a)Organic Compost b) Marine fuel c)Syngas d) carbon	2- 3% hardly	4 Lakh PA

Estimated capital cost in crores	Funding structure	Capital investment by the contractor	Concession period	BBMP		
				Time required for setting up plant	Area requirement	Tipping fee quoted per ton
5- Crores	BOOT(Build own operate transfer)	5 crores	15 years	60 days	5 acres	250 Rs

Suggestions / Recommendations
Company takes responsibility equipment, labour & methodology at small location. Hence Recommended for small landfill site for short term completion

EOI No	Name of Agency with address, Phone No, Email	Key Professionals of the organization proposed	Turnover / income of the company for the last 5 years	Number of Similar Projects		Total Quantity of waste proposed to be process
				India	Abroad	
16	Patpert teknow Systems 30/3, pune satara road , Above Hindustan Traders , Balajinagar , Dhankawadi , Pune 411043	Nilesh p inamdar				

Site Proposed to be Processed	Reference certificates of successful completion of works	Technology Proposed				
		Type of Technology proposed	Plant capacity	By products	% of Residue	Envisaged O&M cost
		Equipment vendors - Waste to Fuel technology (Catalytic Gasolysis technology)				

Estimated capital cost in crores	Funding structure	Capital investment by the contractor	Concession period	BBMP		
				Time required for setting up plant	Area requirement	Tipping fee quoted per ton

Suggestions / Recommendations
This is only equipment vendor & plastic to fuel technology. Comprehensive in whole responsibility is required for processing. The entity has limited itself to manage only a part of the processing. Hence not recommended.

EOI No	Name of Agency with address, Phone No, Email	Key Professionals of the organization proposed	Turnover / income of the company for the last 5 years	Number of Similar Projects		Total Quantity of waste proposed to be process
				India	Abroad	
17	Pace power systems Pvt Ltd 5th floor , Tehno residency , plot No 21, flat no 501, Hyderabad 500081					

Site Proposed to be Processed	Reference certificates of successful completion of works	Technology Proposed				
		Type of Technology proposed	Plant capacity	By products	% of Residue	Envisaged O&M cost
5 to 10% Landfill		Equipment Vendors - for Waste to power and composting				

Estimated capital cost in crores	Funding structure	Capital investment by the contractor	Concession period	BBMP		
				Time required for setting up plant	Area requirement	Tipping fee quoted per ton

Suggestions / Recommendations
This is only equipment vendor. Not been handled a full project independently, Hence not Recommended for waste to energy.

EOI No	Name of Agency with address, Phone No, Email	Key Professionals of the organization proposed	Turnover / income of the company for the last 5 years	Number of Similar Projects		Total Quantity of waste proposed to be process
				India	Abroad	
18	Concord blue Technology Pvt Ltd. 101, HDILTowers, 1st floor , Anant kanekar marg , Bandra (E) , Mumbai 400051. Phone : 022670490000.	Soumya Bhattacharya				700 TPD

Site Proposed to be Processed	Reference certificates of successful completion of works	Technology Proposed				
		Type of Technology proposed	Plant capacity	By products	% of Residue	Envisaged O&M cost
		Waste to Energy- Non Incineration process using concord blue				

Estimated capital cost in crores	Funding structure	Capital investment by the contractor	Concession period	BBMP		
				Time required for setting up plant	Area requirement	Tipping fee quoted per ton
			30 years		6 acres	

Suggestions / Recommendations
Technology is not fully established at Pune, requires further investigation / studies, hence not recommended for short term at 7 landfill sites.

EOI No	Name of Agency with address, Phone No, Email	Key Professionals of the organization proposed	Turnover / income of the company for the last 5 years	Number of Similar Projects		Total Quantity of waste proposed to be process
				India	Abroad	
19	Akson's solar Equipments pvt ltd. "Vatsala-damodar", 42/1, sahajanand Society , Kothrud, Pune411038	M.D . Akole , MD				5 MTD to 20MTD

Site Proposed to be Processed	Reference certificates of successful completion of works	Technology Proposed				
		Type of Technology proposed	Plant capacity	By products	% of Residue	Envisaged O&M cost
		Equipment vendors Waste to energy - Bio gas based power generation capacity Compressed gas and fertilizer plant.				

Estimated capital cost in crores	Funding structure	Capital investment by the contractor	Concession period	BBMP		
				Time required for setting up plant	Area requirement	Tipping fee quoted per ton

Suggestions / Recommendations
This is only equipment vendor. Not assured of taking independent handling / processing. Hence not recommended for 7 landfill sites

EOI No	Name of Agency with address, Phone No, Email	Key Professionals of the organization proposed	Turnover / income of the company for the last 5 years	Number of Similar Projects		Total Quantity of waste proposed to be process
				India	Abroad	
20	Memios- India, # 1603, 16th Floor, Nirmal Tower, Barakhamba Road, New Delhi - 110001	Dinesh Mathur , Executive director & CEO				1000 TPD

Site Proposed to be Processed	Reference certificates of successful completion of works	Technology Proposed				
		Type of Technology proposed	Plant capacity	By products	% of Residue	Envisaged O&M cost
		Waste to energy & Pyrolistic Conversion				

Estimated capital cost in crores	Funding structure	Capital investment by the contractor	Concession period	BBMP		
				Time required for setting up plant	Area requirement	Tipping fee quoted per ton
					8 Acres,	

Suggestions / Recommendations
Technology is not established in India. Hence not Recommended for short term measures.

EOI No	Name of Agency with address, Phone No, Email	Key Professionals of the organization proposed	Turnover / income of the company for the last 5 years	Number of Similar Projects		Total Quantity of waste proposed to be process
				India	Abroad	
21	Rochem Seperation Systems, (India) Pvt Ltd. Business Development Manager # 101, HDIL Towers, Ananth Kanekar Marg, Bandra(E), Mumbai - 400015	Soumya Bhattacharya				1000 TPD Un segregated Solid Waste

Site Proposed to be Processed	Reference certificates of successful completion of works	Technology Proposed				
		Type of Technology proposed	Plant capacity	By products	% of Residue	Envisaged O&M cost
All Seven locations	Attached in EOI	Waste to Energy- non Incineration process using concord blue				

Estimated capital cost in crores	Funding structure	Capital investment by the contractor	Concession period	BBMP		
				Time required for setting up plant	Area requirement	Tipping fee quoted per ton
					6 Acres,	300 per MT

Suggestions / Recommendations
The technology indicated as same as concord blue technology. The company has established in its name in 6 Indian cities Can be Recommended for only new plants.

EOI No	Name of Agency with address, Phone No, Email	Key Professionals of the organization proposed	Turnover / income of the company for the last 5 years	Number of Similar Projects		Total Quantity of waste proposed to be process
				India	Abroad	
22	VMB Enterprices. # 9, 5th Cross Street, United India Colony, Kodambakkam, Chennai-600024.			03	NA	250 TPD to 500 TPD

Site Proposed to be Processed	Reference certificates of successful completion of works	Technology Proposed				
		Type of Technology proposed	Plant capacity	By products	% of Residue	Envisaged O&M cost
Mandur		Bio mining, waste to energy and composting (Thermal Process, Pyrolysis & Plasma Arc Classification)		Composting, Bio methanisation & Bio Mining		

Estimated capital cost in crores	Funding structure	Capital investment by the contractor	Concession period	BBMP		
				Time required for setting up plant	Area requirement	Tipping fee quoted per ton
					1 Acre	Reasonable

Suggestions / Recommendations
Tied up with M/S Coramandal fertilizer, executed work at 3 locations in AP and Pondicherry. Hence recommended

Sl No./ EOI No.	Name of Agency with address, Phone No, Email	Key Professionals of the organization proposed	Turnover / income of the company for the last 5 years	Number of Similar Projects		Total Quantity of waste proposed to be process
				India	Abroad	
23	MB Global. # 83, Indal nagar post, Shindoli Dist, Belagum - 591124 Karnataka.	Mr. Kumar Tiwari, Dr. J. Porst.	Michaelis-Rs.80Crores Avr, MB Global- New Company, incorporated in 2011 , current Year TO-Rs.10 lakhs , Dr. Porst International,Rs.70 Lakhs average. German Consultant , Company	One under, implementation , for waste-to-energy Capping at Tumkur, Gujarat, TN, Maharashtra, AP, Kerala etc. Numerous, projects	over 1000 plants across the world, 83 in Germany , for waste-to - energy, over 100 in Germany for capping	600 TPD and 200 TPD for modular plants can be added

Site Proposed to be Processed	Reference certificates of successful completion of works	Technology Proposed				
		Type of Technology proposed	Plant capacity	By products	% of Residue	Envisaged O&M cost
All of it or mavallipura , mandur	Will be provided	Bio mining, capping and waste to energy	600 TPD and 200 TPD for modular plants can be added	Ash & filter dust	20%	can be worked out after DPR

Estimated capital cost in crores	Funding structure	Capital investment by the contractor	Concession period	BBMP		
				Time required for setting up plant	Area requirement	Tipping fee quoted per ton
Rs 200 crore for 600 TPD plant , Additional module 200 tpd 80 crore	can indicate only after DPR	can we work only after DPR, 10 % capital cost by contractor	After DPR	one to two months after getting order	10to 12 Acre	Rs.2500-3500 for 600 TPD plant

Suggestions / Recommendations
Technologies explained are very expensive to the tune of Rs 2500 to 3000 tipping fee per MT, techno economic feasibility not viable hence cannot be recommended.

EOI No	Name of Agency with address, Phone No, Email	Key Professionals of the organization proposed	Turnover / income of the company for the last 5 years	Number of Similar Projects		Total Quantity of waste proposed to be process
				India	Abroad	
24	Karnataka Compost Development Corporation Ltd. Haralukunte, Madiwala post Bangalore - 560068					600 TPD

Site Proposed to be Processed	Reference certificates of successful completion of works	Technology Proposed				
		Type of Technology proposed	Plant capacity	By products	% of Residue	Envisaged O&M cost
Mandur North		Composting		Compost & Vermicompost		

Estimated capital cost in crores	Funding structure	Capital investment by the contractor	Concession period	BBMP		
				Time required for setting up plant	Area requirement	Tipping fee quoted per ton
10.26 Crores						

Suggestions / Recommendations
Technology is established. Infrastructure to be provided by BBMP, This requires decision of BBMP.

EOI No	Name of Agency with address, Phone No, Email	Key Professionals of the organization proposed	Turnover / income of the company for the last 5 years	Number of Similar Projects		Total Quantity of waste proposed to be process
				India	Abroad	
25	Adithya Recycling # 155, 2nd Floor, Railway Colony, Shankar Nagar main road, Bangalore - 560096	Prasanna Datt , CEO				

Site Proposed to be Processed	Reference certificates of successful completion of works	Technology Proposed				
		Type of Technology proposed	Plant capacity	By products	% of Residue	Envisaged O&M cost
Mandur		Equipment vendors for composting/separators				

Estimated capital cost in crores	Funding structure	Capital investment by the contractor	Concession period	BBMP		
				Time required for setting up plant	Area requirement	Tipping fee quoted per ton

Suggestions / Recommendations
Equipment vendor, not assured of independent & comprehensive handling, hence not recommended for 7 landfill sites.

EOI No	Name of Agency with address, Phone No, Email	Key Professionals of the organization proposed	Turnover / income of the company for the last 5 years	Number of Similar Projects		Total Quantity of waste proposed to be process
				India	Abroad	
26	Nippon I-Waste Management India Pvt Ltd. #144, 5th cross, Prashanth Nagar, Thanisandra, K.Narayanapura Main Road, Bangalore 560077	Vikram Gulecha , Uno Iqbal (MD & CEO)	I-waste (Project SPV) was incorporated in Year 2012, However parent company NIC GLOBAL LIMITED is incorporated at Japan in Year 2008	Nil	Over 480 Projects	2000 Tons per day of MSW

Site Proposed to be Processed	Reference certificates of successful completion of works	Technology Proposed				
		Type of Technology proposed	Plant capacity	By products	% of Residue	Envisaged O&M cost
Identified both Private and Government Locations (Details attached)	Data enclosed with this excel document	Proprietary grate combustion system guaranteeing high durability in the proper treatment of municipal solid waste.	2000 Metric Tons per day of MSW	Waste Water, Fly Ash and Bottom Ash. We have adopt best available flue gas cleaning technologies in order to guarantee the effective elimination of pollutants and lowest emissions required by legislation.	Less than 10% (Residue will be recycled and will be converted into useful products) Hence ZERO Waste at the end of the cycle	INR 15 Crores per annum

Estimated capital cost in crores	Funding structure	Capital investment by the contractor	Concession period	BBMP		
				Time required for setting up plant	Area requirement	Tipping fee quoted per ton
INR 380 Crores	Foreign Investors Group	100% of the total project cost	30 years with Renewable Terms	12-15 Months for Plant Construction, However Waste will be accepted from 3rd Month onwards at Site)	20 Acres	(Rs 1200 for the entire existing MSW and Rs 800 for fresh/daily MSW for project sustainability)

Suggestions / Recommendations
Technology is recommended for new landfill site, provided inert is restricted to 10% without bottom ash / fly ash.

EOI No	Name of Agency with address, Phone No, Email	Key Professionals of the organization proposed	Turnover / income of the company for the last 5 years	Number of Similar Projects		Total Quantity of waste proposed to be process
				India	Abroad	
27	M/S Renewable Energy Consultancy Wind Farm & Bio gas Projects & Consultancy # 824, Ground Floor 1st Main, Chinanna Layout, K.B.Sandra, Bangalore - 560032	Sanaaulla IS		TN, AP, MP, GUJ		

Site Proposed to be Processed	Reference certificates of successful completion of works	Technology Proposed				
		Type of Technology proposed	Plant capacity	By products	% of Residue	Envisaged O&M cost
		Waste to energy – Bio methanisation (Hydrolysis, Organic Acid Formation)				

Estimated capital cost in crores	Funding structure	Capital investment by the contractor	Concession period	BBMP		
				Time required for setting up plant	Area requirement	Tipping fee quoted per ton

Suggestions / Recommendations
Technical details not furnished, as sought during technical presentation, insufficient information is given. Hence not Recommended.

EOI No	Name of Agency with address, Phone No, Email	Key Professionals of the organization proposed	Turnover / income of the company for the last 5 years	Number of Similar Projects		Total Quantity of waste proposed to be process
				India	Abroad	
28	Innovision Engineers Pvt Ltd # 1671, 1st Floor, 20th Main, HSR Layout, Sector - 1 Bangalore - 560102.	Mr.K.S.Shivaprasad Managing Director AND Inventor and Patent Holder of Waste-to-Energy Technology.	1million U S $.			1200 TPD

Site Proposed to be Processed	Reference certificates of successful completion of works	Technology Proposed				
		Type of Technology proposed	Plant capacity	By products	% of Residue	Envisaged O&M cost
Mandur	our work order , reports from the power magazine , are published in USA	WTE Ready to set up 2 RDF Power Plants Ready to use old & new Waste - Integrated S.W.M	300 tons of waste and 700 tons of fresh arrival of waste daily totalling 1000 tons will be processed daily with power export potentil 9/10 mw	Metals and plastics, will be soted for sale as by products , kitchen waste will be segregate and sent for biomethanation	Inertised process residue about 20 % of incoming waste will be sent for sanitary land filling	Rs. 50 crores approx.

Estimated capital cost in crores	Funding structure	Capital investment by the contractor	Concession period	BBMP		
				Time required for setting up plant	Area requirement	Tipping fee quoted per ton
Rs 400 Crores	SPV will be formed to implement project funded by equity and term loan and grant from USTDA	Equity & Term Loan Rs.160 crores Venture capital funding Rs. 240 crores Grant From USTDA.	25 years	Govt assistance will be required to get all (stautary & other) clearances.	30 Acre Plot Located in an Existing Dumsite, 1000 TPD	R s.400 per ton Based on total waste processed.

Suggestions / Recommendations
Recommended for long term implementation using power plant technology for RDF and recycle / sale of plastics, metals, compost at the intermediate stage and sale of electricity at the end.

EOI No	Name of Agency with address, Phone No, Email	Key Professionals of the organization proposed	Turnover / income of the company for the last 5 years	Number of Similar Projects		Total Quantity of waste proposed to be process
				India	Abroad	
29	UPL Environmental Engineers Limited (UEEL) Near Banco Products, Bill Village, Padra Road, Vadodara - 391410	Kamlesh .H Parikh Chief Operating officer	2009-10 = 16,31,48593 2010-11 = 52,58,95830 2011-12 41,67,16,892	GUJ, KER, MH		2000 TPD

Site Proposed to be Processed	Reference certificates of successful completion of works	Technology Proposed				
		Type of Technology proposed	Plant capacity	By products	% of Residue	Envisaged O&M cost
All Seven locations	list of completed projects attached in EOI	Bio Mining and capping				

Estimated capital cost in crores	Funding structure	Capital investment by the contractor	Concession period	BBMP		
				Time required for setting up plant	Area requirement	Tipping fee quoted per ton

Suggestions / Recommendations
Recommended for both short term & long term implementation. Company enclosed list of completed projects.

EOI No	Name of Agency with address, Phone No, Email	Key Professionals of the organization proposed	Turnover / income of the company for the last 5 years	Number of Similar Projects		Total Quantity of waste proposed to be process
				India	Abroad	
30	Eco Mobil. # 25, 4th main, 1st Cross, 3rd Phase, JP Nagar, Bangalore - 560078. # 93/1, 7th mile, opp. Chikkabegur Gate, Singasandra Post, Hosur Main road, Bangalore - 560068	1) Krishna Khandige Mobile: +91-9902272978 2) Prasad Keshava Mobile: +1-630-946-4161 3) Ananth Soma 4) Singh Khanna 5) Anthony V	> 100 crores for consortium	Nil	7 Projects	300,000 tons per annum.

Site Proposed to be Processed	Reference certificates of successful completion of works	Technology Proposed				
		Type of Technology proposed	Plant capacity	By products	% of Residue	Envisaged O&M cost
Where land availability of 10 acres is possible 1) Mandur North 2) Mandur South 3) Mavallipura 4) Any other site with 5 to 10 acre space for plant setup	1) Yorkshire Municipal EfW Facility 2) South Wales Municipal EfW Facility 3) Newport - Toxic liquid waste treatment plant 4) 91 other projects signed conditional on financing with order book Euro 9,000 million in Brazil, Caribbean, Mexico, Russia, USA etc. 5) 42 years of experience in project delivery	Waste to energy - Gasification	1000 tons/ day (3 modules each of 300T/day) Each 300T/day produces 5MW of power	Fly Ash	10-15%	Rs. 5cr/ year / 300 ton

Estimated capital cost in crores	Funding structure	Capital investment by the contractor	Concession period	BBMP		
				Time required for setting up plant	Area requirement	Tipping fee quoted per ton
Rs. 160cr/ 300 tons	1) Investor 2) Private Partnership 3) Bonds 4) Public Issue 5) (Any combination of above)	30% to 100% based on BBMP investment participation BBMP to guarantee land and waste for a period of 30 years	Will be determined with signed PPA	14 months	10 Acres	Rs. 700 to Rs. 1,000/ ton

Suggestions / Recommendations
Technology is not tested and proven in India, Hence not recommended.

EOI No	Name of Agency with address, Phone No, Email	Key Professionals of the organization proposed	Turnover / income of the company for the last 5 years	Number of Similar Projects		Total Quantity of waste proposed to be process
				India	Abroad	
31	Sree Meenakshisundaram Textiles Ltd Basement " Sona Towers " # 71, Millers Road, Bangalore - 560052					

Site Proposed to be Processed	Reference certificates of successful completion of works	Technology Proposed				
		Type of Technology proposed	Plant capacity	By products	% of Residue	Envisaged O&M cost
		Waste to energy - Bio-Methanisation		Fertilizer, Cooking Gas		

Estimated capital cost in crores	Funding structure	Capital investment by the contractor	Concession period	BBMP		
				Time required for setting up plant	Area requirement	Tipping fee quoted per ton
17 Million USD					4 Hectares	48 INR/ton

Suggestions / Recommendations
In J V technology is proposed by the company (diversified). The technology is not proven in India. Hence not recommended.

EOI No	Name of Agency with address, Phone No, Email	Key Professionals of the organization proposed	Turnover / income of the company for the last 5 years	Number of Similar Projects		Total Quantity of waste proposed to be process
				India	Abroad	
32	K.K Plastic Waste Management Ltd Bangalore	MR. Rasul Khan Mr. Murthy	07-08 , Rs 22,54177 08-09 , Rs 97,25,566 09-10, Rs 1,68,99,277 10-11 , Rs 1,23,27,588 11-12 , Rs 64,68,055	30	Nil	150 MTPD

Site Proposed to be Processed	Reference certificates of successful completion of works	Technology Proposed				
		Type of Technology proposed	Plant capacity	By products	% of Residue	Envisaged O&M cost
AT BBMP ALLOTTED AREA	NEW PROJECT	Waste to energy - Pyrolysis method Concept PROVEN TECH	150 MT/DAY	ZERO DISCHARGE PLANT	Nil	RS 20 LAKHS per Month

Estimated capital cost in crores	Funding structure	Capital investment by the contractor	Concession period	BBMP		
				Time required for setting up plant	Area requirement	Tipping fee quoted per ton
40 Crores	THROUGH BANK	15% ON TOTAL investment	5 YEARS	12 MONTHS AFTER THE LOAN APPROVAL	Min 5 Acres,	200

Suggestions / Recommendations
Recommended only for plastic waste to fuel technology

EOI No	Name of Agency with address, Phone No, Email	Key Professionals of the organization proposed	Turnover / income of the company for the last 5 years	Number of Similar Projects		Total Quantity of waste proposed to be process
				India	Abroad	
33	Organic Solutions. # 16, Chinnaswamy Mudaliar road, Off Queens road, Tasker Town, Bangalore - 560051	Naveen chopra	2007 - 2008 Rs. 90.00 lakhs 2009-2010 Rs. 151 lakhs	4	Nil	1000 TPD

Site Proposed to be Processed	Reference certificates of successful completion of works	Technology Proposed				
		Type of Technology proposed	Plant capacity	By products	% of Residue	Envisaged O&M cost
attached with document submitted	Sanitization of waste using Osldms	Conventional Treatment, Probiotic Technologies using our In-House Bacterial Culture Osldms [Odor & smell management]	5000 TPD	Nil	Nil	Rs. 1, 42,320.00 per month per 100 tons per day. As per documents submitted.

Estimated capital cost in crores	Funding structure	Capital investment by the contractor	Concession period	BBMP		
				Time required for setting up plant	Area requirement	Tipping fee quoted per ton
1.5 crores	By BBMP	Nil	Nil	1 month	As per existing dumping grounds	Nil

Suggestions / Recommendations
This is the part of technology to suppress the odor at high cost. This can be integrated with other technological options. On standalone basis, the technology is not recommended for 7 landfill sites.

EOI No	Name of Agency with address, Phone No, Email	Key Professionals of the organization proposed	Turnover / income of the company for the last 5 years	Number of Similar Projects		Total Quantity of waste proposed to be process
				India	Abroad	
34	Pan Asia Project Consultancy Pvt Ltd. [Sadana Environ Engineering services] # j-112, 1st Floor, Mayfield Garden, Sector - 51, Gurgoan - 122101.					

Site Proposed to be Processed	Reference certificates of successful completion of works	Technology Proposed				
		Type of Technology proposed	Plant capacity	By products	% of Residue	Envisaged O&M cost
		Bio Mining,				

Estimated capital cost in crores	Funding structure	Capital investment by the contractor	Concession period	BBMP		
				Time required for setting up plant	Area requirement	Tipping fee quoted per ton

Suggestions / Recommendations
Technology not suitable in India. The waste is converted into bale, covered with plastic film. Hence not recommended.

EOI No	Name of Agency with address, Phone No, Email	Key Professionals of the organization proposed	Turnover / income of the company for the last 5 years	Number of Similar Projects		Total Quantity of waste proposed to be process
				India	Abroad	
35	Green Energy Solutions # 1479, Paduvana road, Kuvempu Nagar, Mysore - 570023	T.V. Gopinath,MR. Patrick Stansbury, Jay Culberth And others,	Consortium turnover11-12 $11,000m,Or 55.000 cores	Nil	USA, Canada , Mexico	4000 TPD

Site Proposed to be Processed	Reference certificates of successful completion of works	Technology Proposed				
		Type of Technology proposed	Plant capacity	By products	% of Residue	Envisaged O&M cost
Four Existing sites or New sites to process 4000tpd, of MSW. 1000tpd X 4 units	Will forward	pyrolytic gasification , Combustion process	1000tpd X 4 unit = 4000tpd	100 MW Electricity	6% dry weight aggregate used for asphalting	320 Cr/year

Estimated capital cost in crores	Funding structure	Capital investment by the contractor	Concession period	BBMP		
				Time required for setting up plant	Area requirement	Tipping fee quoted per ton
2000 Cr	100%			10 to 12 Months	8 to 10 Acre	Rs.400

Suggestions / Recommendations
Technology is not yet tested in India, can be utilized for long term measures of SWM, can be recommended for Waste to energy projects.

EOI No	Name of Agency with address, Phone No, Email	Key Professionals of the organization proposed	Turnover / income of the company for the last 5 years	Number of Similar Projects		Total Quantity of waste proposed to be process
				India	Abroad	
36	Atman Info Solutions # 147/2, 2nd Floor, 5th block, 69th Cross, Rajajinagar. Bangalore - 560010	Amaresh K , Director				1.5 Tones of garbage per day

Site Proposed to be Processed	Reference certificates of successful completion of works	Technology Proposed				
		Type of Technology proposed	Plant capacity	By products	% of Residue	Envisaged O&M cost
		Equipment Vendor - Swatcha Garbage Disposal Machine of 1.5 ton (Suitable for ward level)				

Estimated capital cost in crores	Funding structure	Capital investment by the contractor	Concession period	BBMP		
				Time required for setting up plant	Area requirement	Tipping fee quoted per ton
Rs 12,00,000 + TAX						

Suggestions / Recommendations
Equipment vendor,& has not independently handled landfill sites, hence not recommended

EOI No	Name of Agency with address, Phone No, Email	Key Professionals of the organization proposed	Turnover / income of the company for the last 5 years	Number of Similar Projects		Total Quantity of waste proposed to be process
				India	Abroad	
37	M/S Ecofil Technologies India Pvt Ltd # 303& 304, Sigma IT Park Rabale TTC Industrial Area, Navi Mumbai - 400701 Ph: 022 39646400	1) Dr.S.R.Maley 2)N.Narayana Rao 3) Anil Verma 4) Shiv Om Satyam 5) Dr. B.B. Nagar	Rs. 40 cr.	5 Nos.	3 Nos.	1000 MT/day

Site Proposed to be Processed	Reference certificates of successful completion of works	Technology Proposed				
		Type of Technology proposed	Plant capacity	By products	% of Residue	Envisaged O&M cost
All 6 sites of BBMP	Enclosed for Mumbai, Nashik, Kolkata, Manila, Colombo.	Bioremediation Treatment of entire Waste to Salvage and reclaim minimum 70% land under each dumpsite.	Annual plant capacity for 3 lakh MT at each dump site.	Bio earth for use as garden sub soil, Sand + Stones for construction material & RDF material, coconut shells and glass for re-cycling.	15 to 20% maximum to be used for landscaping	Rs. 551.00 per MT

Estimated capital cost in crores	Funding structure	Capital investment by the contractor	Concession period	BBMP		
				Time required for setting up plant	Area requirement	Tipping fee quoted per ton
Rs. 6.00 Cr per site.	Capital cost to be invested by the bidder through debt & equity (70% + 30%)	Rs. 1.50cr per site.	18 to 24 months for each two sites. For fresh MSW processing and disposal (at 1/3rd reclaimed area) concession period will be minimum 20 years.	9 months from final go-ahead.	20% of the total area under each dump site.	Rs. 626.00 per MT or as may be translated into m3 basis after exact verification.

Suggestions / Recommendations
Well tested and proven in India at Mumbai & other places. Hence recommended.

EOI No	Name of Agency with address, Phone No, Email	Key Professionals of the organization proposed	Turnover / income of the company for the last 5 years	Number of Similar Projects		Total Quantity of waste proposed to be process
				India	Abroad	
38	M/S Velankanni Renevable Energy Pvt Ltd. # 43, Electronic City, Hosur Road Bangalore 560100 Ph : 8066145807/09	Ratnakar , Director projects				500 TPD

Site Proposed to be Processed	Reference certificates of successful completion of works	Technology Proposed				
		Type of Technology proposed	Plant capacity	By products	% of Residue	Envisaged O&M cost
Suitable Locations		Waste to energy/ Bio methanation ,		Bio gas & Biodegradable Materials		

Estimated capital cost in crores	Funding structure	Capital investment by the contractor	Concession period	BBMP		
				Time required for setting up plant	Area requirement	Tipping fee quoted per ton
					22 Acres,	

Suggestions / Recommendations
The technology and the company is 1st generation entry, not proven, hence not recommended.

EOI No	Name of Agency with address, Phone No, Email	Key Professionals of the organization proposed	Turnover / income of the company for the last 5 years	Number of Similar Projects		Total Quantity of waste proposed to be process
				India	Abroad	
39	Noble Exchange Environment Solutions Pvt Ltd. #402, Ishan, Sur No. 149/1A, ITI Banner road Aundh, Pune 411007 E-Mail : Shweta@nobleexchangesolutions.com	Nuriel Pezarkar , CEO	NEWCO	10	15	500 to 1000 TPD

Site Proposed to be Processed	Reference certificates of successful completion of works	Technology Proposed				
		Type of Technology proposed	Plant capacity	By products	% of Residue	Envisaged O&M cost
Kannahalli, Segehalli Cross,	Available on request	Waste to energy - Bio methanation ,Noiseless & odorless Plant Operation (Green Technology)	500 TPD Organic waste (250+250 TPD) two phase development	Bio gas & Organic Manure	NILL	Self Managed , BOO basis , Proposal Built Own Operate

Estimated capital cost in crores	Funding structure	Capital investment by the contractor	Concession period	BBMP		
				Time required for setting up plant	Area requirement	Tipping fee quoted per ton
Rs.75 Crores	Debt 70%:Equity 30%	100% BOO(Built Own Operate)	Nil	07 months for setting up of plant, additional)03 months for commissioning	25 Acres	Rs.1000/-

Suggestions / Recommendations
This technology is suitable for only fresh separated organic waste from bulk generation in BBMP, hence not recommended for 7 landfill sites

EOI No	Name of Agency with address, Phone No, Email	Key Professionals of the organization proposed	Turnover / income of the company for the last 5 years	Number of Similar Projects		Total Quantity of waste proposed to be process
				India	Abroad	
40	Shumgir Renewable Energy Pvy Ltd. # 137, 5th Main, 2nd Block, 3rd Stage, Basaweshwara Nagar, Bangalore - 560079	Aditya , Manager				200 TPD Segregated Organic (Bio-Degradable) Waste

Site Proposed to be Processed	Reference certificates of successful completion of works	Technology Proposed				
		Type of Technology proposed	Plant capacity	By products	% of Residue	Envisaged O&M cost
		Waste to energy – Bio methanisation				

Estimated capital cost in crores	Funding structure	Capital investment by the contractor	Concession period	BBMP		
				Time required for setting up plant	Area requirement	Tipping fee quoted per ton
					7 Acres,	

Suggestions / Recommendations
Insufficient information furnished by the company and also failed to furnish the information sought by e-mail, hence not recommended.

EOI No	Name of Agency with address, Phone No, Email	Key Professionals of the organization proposed	Turnover / income of the company for the last 5 years	Number of Similar Projects		Total Quantity of waste proposed to be process
				India	Abroad	
41	Khoday Group Of Industries 7th mile , Kanakapura Road Bangalore 560062					300 to 1000 TPD

Site Proposed to be Processed	Reference certificates of successful completion of works	Technology Proposed				
		Type of Technology proposed	Plant capacity	By products	% of Residue	Envisaged O&M cost
		Concord Blue Integrated Waste To Energy				

Estimated capital cost in crores	Funding structure	Capital investment by the contractor	Concession period	BBMP		
				Time required for setting up plant	Area requirement	Tipping fee quoted per ton

Suggestions / Recommendations
The technology is not suitable for 7 existing landfill sites. Using M/S concord blue technology. However independent private ventures needs to be further reviewed based on availability & condition of proposed land

EOI No	Name of Agency with address, Phone No, Email	Key Professionals of the organization proposed	Turnover / income of the company for the last 5 years	Number of Similar Projects		Total Quantity of waste proposed to be process
				India	Abroad	
42	How biomass, #27, 2nd Floor, 7th Cross, 2nd Main Indiranagar 1st Stage, Bangalore 560038 Ph: 080-41539321					500 TPD

Site Proposed to be Processed	Reference certificates of successful completion of works	Technology Proposed				
		Type of Technology proposed	Plant capacity	By products	% of Residue	Envisaged O&M cost
		Composting Technology Japan Joint Venture				

Estimated capital cost in crores	Funding structure	Capital investment by the contractor	Concession period	BBMP		
				Time required for setting up plant	Area requirement	Tipping fee quoted per ton
30 CR						

Suggestions / Recommendations
The technology requires only fresh waste (hence old dump in 7 existing locations is not required), it is not available in existing 7 landfill sites. Further the technology is not tested / proven in India, hence not recommended.

EOI No	Name of Agency with address, Phone No, Email	Key Professionals of the organization proposed	Turnover / income of the company for the last 5 years	Number of Similar Projects		Total Quantity of waste proposed to be process
				India	Abroad	
43	Vasavadatta Cements, Gulbarga					

Site Proposed to be Processed	Reference certificates of successful completion of works	Technology Proposed				
		Type of Technology proposed	Plant capacity	By products	% of Residue	Envisaged O&M cost
		Equipment for incineration - Hot Disk Reactor				

Estimated capital cost in crores	Funding structure	Capital investment by the contractor	Concession period	BBMP		
				Time required for setting up plant	Area requirement	Tipping fee quoted per ton
200 Crores						

Suggestions / Recommendations
Technology is not suitable for BBMP, as company demands door supply to Gulbarga, hence not recommended.

EOI No	Name of Agency with address, Phone No, Email	Key Professionals of the organization proposed	Turnover / income of the company for the last 5 years	Number of Similar Projects		Total Quantity of waste proposed to be process
				India	Abroad	
44	Bhavani Bio Organics Private Limited., Manjeera Heights, Phase - I, B Block, Flat No. 401, Chitra Layout, Saroor Nagar, Hyderabad 500 074, Andhra Pradesh, India. Mobile 092465 70369 Tel 040 65159369, Tel fax 040 40172369 Email ID: bhavanibio@gmail.com	N.L.V.J. Naresh Kumar Managing Director	2011-12 = 18.02 million 2010-11 = 12.94 million 2009-10 = 9.32 million 2008-09 = 13.13 million 2007-08 = 6.82 million	one	Two	250 to 1000 TPD

Site Proposed to be Processed	Reference certificates of successful completion of works	Technology Proposed				
		Type of Technology proposed	Plant capacity	By products	% of Residue	Envisaged O&M cost
All seven locations	Experience certificate attached	Bio mining	250 to 1000 TPD at each location under BBMP (pl. refer remarks column)	Organic Manure - fine & Corse, Recycle Plastic, RDF, Pavers etc. (pl. refer remarks column)	35 % - 45 % by weight (pl. refer remarks column)	Rs. 2000 per ton approx (pl. refer remarks column)

Estimated capital cost in crores	Funding structure	Capital investment by the contractor	Concession period	BBMP		
				Time required for setting up plant	Area requirement	Tipping fee quoted per ton
about 35cr to 45cr excluding cost of landfill (pl. refer remarks column)	Equity & Debt (pl. refer remarks column)	Capital and working capital shall be invested (pl. refer remarks column)	10 years (pl. refer remarks column)	6 months to 2 years (pl. refer remarks column)	Plant area required 1 to 5 acres (depending on site excluding of landfill area for residue) (pl. refer remarks column)	Rs. 2300 per ton approx excluding landfill cost (pl. refer remarks column)

Suggestions / Recommendations
Experience in Bio mining and open landfill stabilization in India. Recommended for Bio mining

EOI No	Name of Agency with address, Phone No, Email	Key Professionals of the organization proposed	Turnover / income of the company for the last 5 years	Number of Similar Projects		Total Quantity of waste proposed to be process
				India	Abroad	
45	Global Environmental Infrastructure Technology Solutions, 1st Floor, old No.47 New NO.87, R.K Mutt road, Mandavelli, Chenai.- 600028 officeadmin@geitsglobal.com, Ph No. +33645490849	Rakesh Nellore , CEO				4000 TDP

Site Proposed to be Processed	Reference certificates of successful completion of works	Technology Proposed				
		Type of Technology proposed	Plant capacity	By products	% of Residue	Envisaged O&M cost
mavallipura		Waste to energy - Gasification				

Estimated capital cost in crores	Funding structure	Capital investment by the contractor	Concession period	BBMP		
				Time required for setting up plant	Area requirement	Tipping fee quoted per ton
					100 Acres	

Suggestions / Recommendations
Technology not viable for BBMP and conditions of the company is not acceptable. 45 years concession period, 21% bottom ash & ash (18+3), Not tested & proven in India, hence not recommended.

EOI No	Name of Agency with address, Phone No, Email	Key Professionals of the organization proposed	Turnover / income of the company for the last 5 years	Number of Similar Projects		Total Quantity of waste proposed to be process
				India	Abroad	
46	Sree Eco Tech estates , S-314 , 3rd floor , Manipal Center , 47 Dickenson Road , Bangalore	Sridhar G				

Site Proposed to be Processed	Reference certificates of successful completion of works	Technology Proposed				
		Type of Technology proposed	Plant capacity	By products	% of Residue	Envisaged O&M cost
		Solar energy Augmented rapid bio degradation of MSW for fuel and power production.				

Estimated capital cost in crores	Funding structure	Capital investment by the contractor	Concession period	BBMP		
				Time required for setting up plant	Area requirement	Tipping fee quoted per ton

Suggestions / Recommendations
Not tested and proven in India, Hence not recommended for 7 landfill sites in BBMP.

EOI No	Name of Agency with address, Phone No, Email	Key Professionals of the organization proposed	Turnover / income of the company for the last 5 years	Number of Similar Projects		Total Quantity of waste proposed to be process
				India	Abroad	
47	Green Power Technology , Bangalore	Raghunath SB				500 TPD

Site Proposed to be Processed	Reference certificates of successful completion of works	Technology Proposed				
		Type of Technology proposed	Plant capacity	By products	% of Residue	Envisaged O&M cost
		Catalytic decomposing technology				

Estimated capital cost in crores	Funding structure	Capital investment by the contractor	Concession period	BBMP		
				Time required for setting up plant	Area requirement	Tipping fee quoted per ton
600 Crores				10 months of installation	15 acres	

Suggestions / Recommendations
This is only part of technology from plastic into fuel. Mobile unit is immediate as per proponent; the space required is too huge. Company asks for 20% support of capital investment of 120 crores. The proposal failed to furnish technical details to the committee, the remainder sent by e-mail is also not responded. Hence not recommended.

CONCLUSIONS AND RECOMMENDATIONS OF THE COMMITTEE

The technical committee constituted by Government of Karnataka vide GO: No. NA.AA.E/791/MNY/2012, Bangalore. Dated 07-12-2012, has evaluated all the responses received through the expression of Interest. The 47 applicants have submitted the company credentials, experience along with the proposed technologies.

The committee have called for presentations, clarifications and compiled the information for analysis through standardized format. Review and comparison of the same was carried out. The committee has met over seven meetings within 25 days time frame to meet the exigencies of selecting the appropriate solutions and its implementation at the earliest.

The committee has recognized the need for adopting the technologies that are actionable and several others which can meet the long term strategy /needs of BBMP.

Though there are a number of technologies available worldwide for processing and disposal of the waste, the technology or group of technologies suitable for the Indian conditions in particular to the Bangalore open land fill waste characteristics and context are the deciding factors in selection of such technologies.

These technical points recorded during the presentations, notes submitted have been the basis for formulating the recommendations by the BBMP. BBMP may utilize their technologies / services in the following category wise adoption:

- Short term measures for immediate implementation – Bio mining for existing seven landfill sites.
- Long term measures, suitable for existing and fresh future waste- Waste to energy for Anjanapura, Kannahalli and S.Bingipura.
- Equipment vendors / management solutions – committee felt that the equipment manufacturers may offer services / equipment to be utilized by BBMP by associating themselves with full capability companies for entire processing cycle**.**

ABSTRACT

Entities recommended for Bio-mining

Sl No.	EOI No.	Name Of the Company	Recommendations
1	3	Organic waste India Pvt Ltd	In view of the established unit at Sholapur and other places the technology may be utilized here also. Hence Recommended for long term.
2	4	IL&FS Environmental infrastructure & services Limited	70% Efficiency claimed by company & have operational experience at Mysore, Hence Recommended.
3	10	Satarem Enterprises (P) LTD.,	The Technology is viable for long term implementation. Hence recommended for long term only (20 years).
4	15	Sham Construction company ,	Company takes responsibility equipment, labour & methodology at small location. Hence Recommended for small landfill site for short term completion
5	22	VMB Enterprises.	Tied up with M/S Coramandal fertilizer, executed work at 3 locations in AP and Pondicherry. Hence Recommended
6	24	Karnataka Compost Development Corporation Ltd.	Technology is established. Infrastructure to be provided by BBMP, This requires decision of BBMP.
7	29	UPL Environmental Engineers Limited (UEEL)	Recommended for both short term & long term implementation. Company enclosed list of completed projects.
8	37	M/S Ecofil Technologies India Pvt Ltd	Well tested and proven in India at Mumbai & other places. Hence Recommended.
9	44	Bhavani Bio Organics Private Limited.,	Experience in Bio mining and open landfill stabilization in India. Hence recommended for Bio mining

ANNEXURE 1

1. The Entities interested in Bio mining are:

Sl No.	EOI No.	Name Of the Company	Technology Proposed
1	1	Ramky Enviro Engineers limited	Bio-mining and composting
2	3	Organic waste India Pvt Ltd	Bio-mining & composting
3	4	IL&FS Environmental infrastructure & services Limited	Integrated MSW Processing Facility which would comprise of: 1. Remediation of Landfill 2. Bio-mining 3. RDF Preparation
4	9	BVG INDIA LTD ,	Bio mining & composting
5	10	Satarem Enterprises (P) LTD.,	Bio-mining & composting
6	11	Connect infra research Pvt ltd ,	Bio-mining , RDF, Syngas, composting, Bio-Gas
7	15	Sham Construction company ,	Bio-mining
8	17	Pace power systems pvt ltd	Bio-mining , Equipment Vendors - for Waste to power and composting
9	22	VMB Enterprises.	Bio-mining, waste to energy and composting (Thermal Process, Pyrolysis & Plasma Arc gasification)
10	23	MB Global.	Bio mining, capping and waste to energy
11	29	UPL Environmental Engineers Limited (UEEL)	Bio Mining and capping
12	34	Pan Asia Project Consultancy Pvt Ltd.	Bio-mining
13	37	M/S Ecofil Technologies India Pvt Ltd	Bio-mining, Bioremediation/composting
14	44	Bhavani Bio Organics Private Limited	Bio-mining

2. Entities interested in Waste to energy:

Sl No.	EOI No.	Name Of the Company	Technology Proposed
1	2	Loro Envirno Power, Inc.	Air fed Gasification
2	4	IL&FS Environmental infrastructure & services Limited	Integrated MSW Processing Facility which would comprise of: 1. Remediation of Landfill 2. Bio-mining 3. RDF Preparation
3	6	Renew GenVentures India Pvt ltd	Waste to energy through Incineration.
4	10	Satarem Enterprises (P) LTD.,	Waste to energy
5	11	Connect infra research Pvt ltd ,	Waste to energy
6	17	Pace power systems pvt ltd	Equipment Vendors - for Waste to power and composting
7	20	Memios- India,	Waste to energy & Pyrolysis Conversion
8	21	Rochem Separation Systems, (India) Pvt Ltd.	Waste to Energy- non Incineration process using concord blue
9	22	VMB Enterprises.	waste to energy and composting (Thermal Process, Pyrolysis & Plasma Arc Classification)
10	23	MB Global.	waste to energy
11	26	Nippon I-Waste Management India Pvt Ltd.	Proprietary grate combustion system guaranteeing high durability in the proper treatment of municipal solid waste.
12	29	UPL Environmental Engineers Limited (UEEL)	waste to energy
13	30	Eco Mobil.	Waste to energy - Gasification

14	32	K.K Plastic Waste Management Ltd	Waste to energy - Pyrolysis method
15	46	Global Environmental Infrastructure Technology Solutions,	Waste to energy - Gasification

3. Entities interested in Composting.

Sl No.	EOI No.	Name Of the Company	Technology Proposed
1	1	Ramky Enviro Engineers limited	Bio-mining & composting
2	3	Organic waste India Pvt Ltd	Bio-mining & composting
3	9	BVG INDIA LTD ,	Bio mining & composting
4	11	Connect infra research Pvt ltd ,	Bio-mining , RDF, SYNGAS, Composting, Bio-Gas
5	15	Sham Construction company ,	Bio-mining and composting
6	24	Karnataka Compost Development Corporation Ltd.	Composting
7	29	UPL Environmental Engineers Limited (UEEL)	Waste to energy, composting
8	42	How biomass	Composting Technology Japan Joint Venture
9	44	Bhavani Bio Organics Private Limited	Bio-mining and composting

4. **Entities interested in Equipment vendors.**

Sl No.	EOI No.	Name Of the Company	Technology Proposed
1	7	JK Engineering works,	Machinery / equipment for Bio mining
2	13	Eclean spectron Environment Private limited	Equipment vendor - Rapid Composting system
3	16	Pat pert teknow Systems	Equipment vendors - Waste to Fuel technology (Catalytic Gasolysis technology)
4	19	Akson's solar Equipments pvt ltd.	Equipment vendors Waste to energy - Bio gas based power generation capacity Compressed gas and fertilizer plant.
5	25	Adithya Recycling	Equipment vendors for composting/separators
6	36	Atman Info Solutions	Equipment Vendor - Swatcha Garbage Disposal Machine of 1.5 ton (Suitable for ward level)

5. **Entities interested in new facilities:**

Sl No.	EOI No.	Name Of the Company	Technology Proposed
1	14	MSGP Infra tech Pvt Ltd	a. Composting facility 500 TPD, b. Others 250 TPD (RDF, Landfill) for new facility only
2	41	Khoday Group Of Industries	Concord Blue Integrated Waste To Energy

ANNEXURE 2

BRUHAT BANGALORE MAHANAGARA PALIKE

Office of the Chief Engineer, SWM-2, N.R. Square,
Bangalore - 560 002.

No. CE/SWM-2/EOI/PR/213/2012-13 Date : 05-11-2012

EXPRESSION OF INTEREST

Ref: Even No. Dated : 18.10.2012.

BBMP owns Waste Management Site at the following Locations:

1. Mandur North
2. Mandur South
3. Mavalli Pura
4. Anjanapura
5. Cheemsandra
6. Kannahalli
7. S. Binglpura

Where 1 Lakh to 10 Lakh MT of unprocessed Municipal solid waste is available. EOI is invited from interested parties to propose suitable technology like ;

- Bio-mining
- Bio-methanisation
- Composting
- Waste to energy

Further to this, interested Firms/Organisations may apply to this office with details of land requirement, Technology involving process parameters and financial commitment needed from BBMP Per tonne basis **on or before 20.11.2012.**

The sites can be inspected before submission of EOI. The processing should be in conformity with MSW RULES 2000.

For further information you may contact vide Email : ceswm2@gmail.com and Phone No. 94806 83513 / 94806 83039 or Visit BBMP website on www.bbmp.gov.in

Sd/- Chief Engineer, Solid Waste Management-2

The Times of India 6/11/2012

ANNEXURE 3

Government Orders

ಕರ್ನಾಟಕ ಸರ್ಕಾರದ ನಡವಳಿಗಳು

ವಿಷಯ: ಬೃಹತ್ ಬೆಂಗಳೂರು ಮಹಾನಗರ ಪಾಲಿಕೆಯ ವ್ಯಾಪ್ತಿಯಲ್ಲಿ ಘನ ತ್ಯಾಜ್ಯ ನಿರ್ವಹಣೆಗೆ ಸಂಬಂದಿಸಿದಂತೆ ಅಸಕ್ತ ವ್ಯಕ್ತಿ/ಸಂಸ್ಥೆಗಳಿಂದ ಸ್ವೀಕೃತವಾಗುವ ಪ್ರಸ್ತಾವನೆಗಳನ್ನು ಪರಿಶೀಲಿಸಿ, ಸೂಕ್ತ ಶಿಫಾರಸ್ಸು ಮಾಡಲು ತಾಂತ್ರಿಕ ಸಮಿತಿಯನ್ನು ರಚಿಸುವ ಬಗ್ಗೆ.

ಓದಲಾಗಿದೆ:

1) ಸರ್ಕಾರದ ಆದೇಶ ಸಂಖ್ಯೆ: ನಅಇ 575 ಎಂಎನ್‌ವೈ 2010, ದಿನಾಂಕ 06–08–2010.
2) ಸರ್ಕಾರದ ಆದೇಶ ಸಂಖ್ಯೆ: ನಅಇ 202 ಜಿಇಎಲ್ 2012, ದಿನಾಂಕ 15–06–2012.
3) ಬಿ.ಬಿ.ಎಂ.ಪಿ. ಆಯುಕ್ತರ ಪತ್ರ ಸಂಖ್ಯೆ: ಮುಖ್ಯ/ಘನ/2/08/2012–13, ದಿನಾಂಕ: 06–11–12.
4) ಬಿ.ಬಿ.ಎಂ.ಪಿ. ಆಯುಕ್ತರ ಪತ್ರ ಸಂಖ್ಯೆ: ಮುಖ್ಯ/ಘನ–2/ಪಿ.ಆರ್/08/2012–13, ದಿನಾಂಕ: 21–11–12.
5) ನಗರಾಭಿವೃದ್ಧಿ ಇಲಾಖೆಯ ಪ್ರಧಾನ ಕಾರ್ಯದರ್ಶಿಯವರ ಅಧ್ಯಕ್ಷತೆಯಲ್ಲಿ ದಿನಾಂಕ 04–12–2012ರಂದು ನಡೆದ ಸಭೆ ನಡವಳಿಗಳು
6) ಬಿ.ಬಿ.ಎಂ.ಪಿ. ಆಯುಕ್ತರ ಪತ್ರ ಸಂಖ್ಯೆ: ಅಆ(ಘ.ತ್ಯಾ.ನಿ)/ಪಿ.ಆರ್/523/2012–13, ದಿನಾಂಕ: 04–12–2012.

ಪ್ರಸ್ತಾವನೆ:

ಮೇಲೆ (1)ರಲ್ಲಿ ಓದಲಾದ ದಿನಾಂಕ 06–08–2012ರ ಆದೇಶದಲ್ಲಿ ರಾಜ್ಯದ ನಗರ ಪ್ರದೇಶಗಳಲ್ಲಿ ಘನತ್ಯಾಜ್ಯ ವಸ್ತುಗಳ ಶೇಖರಣೆ, ಸಾಗಾಣಿಕೆ ಮತ್ತು ವಿಲೇವಾರಿಯಲ್ಲಿ ಎದುರಿಸುತ್ತಿರುವ ತೊಂದರೆಗಳನ್ನು ನಿವಾರಿಸುವ ಸಲುವಾಗಿ ಸಮಗ್ರ ಪರಿಹಾರ ಕಂಡು ಹಿಡಿಯಲು ಸರ್ಕಾರದ ಅಪರ ಮುಖ್ಯ ಕಾರ್ಯದರ್ಶಿ/ಪ್ರಧಾನ ಕಾರ್ಯದರ್ಶಿ, ನಗರಾಭಿವೃದ್ಧಿ ಇಲಾಖೆ, ಇವರ ಅಧ್ಯಕ್ಷತೆಯಲ್ಲಿ ಒಂದು ಅಧಿಕಾರಯುಕ್ತ ಸಮಿತಿಯನ್ನು ರಚಿಸಲಾಗಿತ್ತು.

ಮೇಲೆ (2)ರಲ್ಲಿ ಓದಲಾದ ದಿನಾಂಕ 15–06–2012ರ ಆದೇಶದಲ್ಲಿ ಪೌರಾಡಳಿತ ನಿರ್ದೇಶನಾಲಯದ ವ್ಯಾಪ್ತಿಯಲ್ಲಿ ಬರುವ ಸ್ಥಳೀಯ ಸಂಸ್ಥೆಗಳಲ್ಲಿ ಘನತ್ಯಾಜ್ಯ ವಸ್ತು (ವ್ಯವಸ್ಥಾಪನೆ ಮತ್ತು ನಿರ್ವಹಣೆ) ನಿಯಮ 2000 ಹಾಗೂ ಕರ್ನಾಟಕ ರಾಜ್ಯ ನೀತಿ/ಶಿಫಾರಸ್ಸುಗಳನ್ನು ತಾಂತ್ರಿಕ ಬೆಂಬಲದೊಂದಿಗೆ ಪರಿಣಾಮಕಾರಿಯಾಗಿ ಜಾರಿಗೊಳಿಸಲು ಪೌರಾಡಳಿತ ನಿರ್ದೇಶನಾಲಯದ ಆಯುಕ್ತರ ಅಧ್ಯಕ್ಷತೆಯಲ್ಲಿ ತಾಂತ್ರಿಕ ಸಮಿತಿಯನ್ನು ರಚಿಸಲಾಗಿದೆ.

ಬೃಹತ್ ಬೆಂಗಳೂರು ಮಹಾನಗರ ಪಾಲಿಕೆಯ ವ್ಯಾಪ್ತಿಯ ತ್ಯಾಜ್ಯ ವಿಲೇವಾರಿಯ ಬಗ್ಗೆ ಹಾಗೂ ಈ ಸಂಬಂಧ ರಾಜ್ಯ ಉಚ್ಚ ನ್ಯಾಯಾಲಯವು ರಿಟ್ ಅರ್ಜಿ ಸಂಖ್ಯೆ: 24739–40/2012 ಕ್ಕೆ ಸಂಬಂಧಿಸಿದಂತೆ ನೀಡಿರುವ ಮಧ್ಯಂತರ ಆದೇಶದಲ್ಲಿ ನೀಡಿರುವ ನಿರ್ದೇಶನಕ್ಕೆ ಸಂಬಂಧಿಸಿದಂತೆ ದಿನಾಂಕ: 04–12–2012ರಂದು ಪ್ರಧಾನ ಕಾರ್ಯದರ್ಶಿ, ನಗರಾಭಿವೃದ್ಧಿ ಇಲಖೆ ಇವರ ಅಧ್ಯಕ್ಷತೆಯಲ್ಲಿ ನಡೆದ ಪರಿಶೀಲನಾ ಸಭೆಯಲ್ಲಿ ತಾಂತ್ರಿಕ ಸಮಿತಿಯನ್ನು ರಚಿಸಲು ಕೂಡಲೇ ಪ್ರಸ್ತಾವನೆಯನ್ನು ಸಲ್ಲಿಸುವಂತೆ ಆಯುಕ್ತರು, ಬಿ.ಬಿ.ಎಂ.ಪಿ. ಇವರಿಗೆ ಸೂಚಿಸಲಾಗಿತ್ತು.

ಮೇಲೆ (3), (4) ಮತ್ತು (6)ರಲ್ಲಿ ಓದಲಾದ ಪತ್ರಗಳಲ್ಲಿ ಆಯುಕ್ತರು, ಬೃಹತ್ ಬೆಂಗಳೂರು ಮಹಾನಗರ ಪಾಲಿಕೆ ಇವರು ಪಾಲಿಕೆಯಿಂದ ಒಂದು ಲಕ್ಷದಿಂದ ಹತ್ತು ಲಕ್ಷ ಮೆಟ್ರಿಕ್ ಟನ್ ಸಂಸ್ಕರಿಸದ ಪೌರ ಘನ ತ್ಯಾಜ್ಯ ವಿಲೇವಾರಿಗೆ ಸೂಕ್ತ ತಂತ್ರಜ್ಞಾನಗಳನ್ನು ಪ್ರಸ್ತಾಪಿಸಲು ಆಸಕ್ತ ವ್ಯಕ್ತಿಗಳಿಂದ ಸಲಹೆಗಳನ್ನು ಆಹ್ವಾನಿಸಲಾಗಿ ಈ ಕುರಿತು 37 ಸಂಸ್ಥೆಗಳು ಅರ್ಜಿಗಳನ್ನು ಸಲ್ಲಿಸಿದ್ದು, ಇವರುಗಳ ತಂತ್ರಜ್ಞಾನವನ್ನು ಕೂಲಂಕಷವಾಗಿ ಪರಿಶೀಲಿಸಿ, ಪಾಲಿಕೆಯ ಘನತ್ಯಾಜ್ಯ ನಿರ್ವಹಣೆಯನ್ನು ಪೂರ್ಣ ಪ್ರಮಾಣದಲ್ಲಿ ಮಾಡಲು ಸೂಕ್ತ ತಂತ್ರಜ್ಞಾನವನ್ನು ಅಳವಡಿಸಬೇಕಾಗಿರುವುದರಿಂದ ಈ ಉದ್ದೇಶಕ್ಕಾಗಿ ಘನತ್ಯಾಜ್ಯ ನಿರ್ವಹಣಾ ತಾಂತ್ರಿಕ ಸಮಿತಿಯನ್ನು ರಚಿಸುವಂತೆ ಸರ್ಕಾರವನ್ನು ಕೋರಿ ಪ್ರಸ್ತಾವನೆಯನ್ನು ಸಲ್ಲಿಸಿರುತ್ತಾರೆ.

ಬೃಹತ್ ಬೆಂಗಳೂರು ಮಹಾನಗರ ಪಾಲಿಕೆಯ ವ್ಯಾಪ್ತಿಯಲ್ಲಿ ಉತ್ಪತ್ತಿಯಾಗುವ ಘನತ್ಯಾಜ್ಯ ವಸ್ತುಗಳನ್ನು ನಿಯಮಾನುಸಾರ ಹಾಗೂ ವೈಜ್ಞಾನಿಕವಾಗಿ ವಿಲೇವಾರಿ ಮಾಡಲು ಸೂಕ್ತ ತಂತ್ರಜ್ಞಾನಗಳನ್ನು ಅಳವಡಿಸಿಕೊಳ್ಳುವ ಬಗ್ಗೆ ಬೃಹತ್ ಬೆಂಗಳೂರು ಮಹಾನಗರ ಪಾಲಿಕೆಯಲ್ಲಿ ಆಸಕ್ತ ವ್ಯಕ್ತಿ/ಸಂಸ್ಥೆಗಳಿಂದ ಸ್ವೀಕೃತವಾಗುವ ಪ್ರಸ್ತಾವನೆಗಳನ್ನು ಪರಿಶೀಲಿಸಿ, ಸೂಕ್ತ ಶಿಫಾರಸ್ಸುಗಳನ್ನು ನೀಡಲು ಘನತ್ಯಾಜ್ಯ ವಿಲೇವಾರಿಯಲ್ಲಿ ಪರಿಣಿತರಾದ ಅಧಿಕಾರಿ ಹಾಗೂ ತಜ್ಞರನ್ನೊಳಗೊಂಡ ಒಂದು ತಾಂತ್ರಿಕ ಸಮಿತಿಯನ್ನು ರಚಿಸಲು ಸರ್ಕಾರವು ನಿರ್ಧರಿಸಿ, ಈ ಕೆಳಕಂಡಂತೆ ಆದೇಶಿಸಿದೆ.

ಸರ್ಕಾರದ ಆದೇಶ ಸಂಖ್ಯೆ: ನಅಇ 791 ಎಂಎನ್‌ವೈ 2012,
ಬೆಂಗಳೂರು, ದಿನಾಂಕ 07-12-2012

ಪ್ರಸ್ತಾವನೆಯಲ್ಲಿ ವಿವರಿಸಿರುವ ಅಂಶಗಳ ಹಿನ್ನೆಲೆಯಲ್ಲಿ, ಬೃಹತ್ ಬೆಂಗಳೂರು ಮಹಾನಗರ ಪಾಲಿಕೆಯಿಂದ ಒಂದು ಲಕ್ಷದಿಂದ ಹತ್ತು ಲಕ್ಷ ಮೆಟ್ರಿಕ್ ಟನ್ ಸಂಸ್ಕರಿಸದ ಪೌರ ಘನ ತ್ಯಾಜ್ಯ ವಿಲೇವಾರಿಗೆ ಸೂಕ್ತ ತಂತ್ರಜ್ಞಾನಗಳನ್ನು ಪ್ರಸ್ತಾಪಿಸಲು ಆಸಕ್ತ ವ್ಯಕ್ತಿ/ಸಂಸ್ಥೆಗಳಿಂದ ಸ್ವೀಕೃತವಾದ ಪ್ರಸ್ತಾವನೆಗಳನ್ನು ಪರಿಶೀಲಿಸಿ, ಬೃಹತ್ ಬೆಂಗಳೂರು ಮಹಾನಗರ ಪಾಲಿಕೆಗೆ ಸೂಕ್ತ ಶಿಫಾರಸ್ಸುಗಳನ್ನು ಮಾಡಲು ಅನುವಾಗುವಂತೆ ಈ ಕೆಳಕಂಡ ಅಧಿಕಾರಿ ಹಾಗೂ ತಜ್ಞರನ್ನೊಳಗೊಂಡ ತಾಂತ್ರಿಕ ಸಮಿತಿಯನ್ನು ರಚಿಸಲಾಗಿದೆ.

ಕ್ರ.ಸಂ	ಹೆಸರು ಮತ್ತು ಪದನಾಮ	ಪದನಾಮ
1	ಶ್ರೀ ಎಂ.ಆರ್.ವೆಂಕಟೇಶ್. ಮುಖ್ಯ ಅಭಿಯಂತರರು,ಬಿಬಿಎಂಪಿ	ಅಧ್ಯಕ್ಷರು
2	ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು (ಘನತ್ಯಾಜ್ಯ ನಿರ್ವಹಣೆ) ಪೌರಾಡಳಿತ ನಿರ್ದೇಶನಾಲಯ, ಬೆಂಗಳೂರು.	ಸದಸ್ಯರು
3	ಶ್ರೀ ಅಶೋಕ ಜೈನ್, ಪ್ರಧಾನ ವ್ಯವಸ್ಥಾಪಕರು, (ಯು.ಎ) ಕರ್ನಾಟಕ ನಗರ ಮೂಲಭೂತ ಸೌಕರ್ಯಗಳ ಅಭಿವೃದ್ಧಿ ಹಣಕಾಸು ನಿಗಮ, ಬೆಂಗಳೂರು.	ಸದಸ್ಯರು
4	ಅಧ್ಯಕ್ಷರು, ಕರ್ನಾಟಕ ರಾಜ್ಯ ಮಾಲಿನ್ಯ ನಿಯಂತ್ರಣ ಮಂಡಳಿ ಇವರಿಂದ ನಾಮ ನಿರ್ದೇಶನಗೊಂಡ ಪ್ರತಿನಿಧಿ	ಸದಸ್ಯರು
5	ಶ್ರೀ. ಪರಮೇಶ್ವರಯ್ಯ ಆರ್.ಎಲ್. ಡೆಪ್ಯೂಟಿ ಚೀಫ್ (ಯೋಜನೆ) ಡಿಜಿಎಂ ಹುಡ್ಕೊ ಬೆಂಗಳೂರು	ಸದಸ್ಯರು
6	ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು (SWM-II) ಬಿಬಿಎಂಪಿ.	ಸಂಚಾಲಕರು

ಮೇಲ್ಕಂಡ ತಾಂತ್ರಿಕ ಸಮಿತಿಯ ಕರ್ತವ್ಯ ಮತ್ತು ಪ್ರಕಾರ್ಯಗಳು ಈ ಕೆಳಕಂಡಂತಿರುತ್ತದೆ.

1) Technology proposed for the project

(a) Suitability of the waste treatment technologies for treating the municipal solid waste generally encountered in India.
(b) Land requirements for the technology
(c) Plan for monetizing the by-products from waste
(d) Strategy for managing the Technology for Waste Management
- Details on R&D, Patenting, and Licensing of technology etc.
- Equipment manufacturing/sourcing
(e) Any other issue related to use of technology

2) O&M Plan for the project

(a) Manpower staffing for the project including details of manpower requirements (skilled and unskilled and plans for sourcing such manpower locally for the project.

3) Assessment of the key risks perceived by the private entity on the project:-

(a) Possible risk mitigation mechanisms
(b) Expectations of the private entity from BBMP

4) Cost Criteria, Environmental Capability, Time bound execution, History, Strength, Experience in India & Abroad, Financial Capability etc.

The private entities may at their discretion provide any supporting documents which enhances the clarity of the project and technology management strategy.

5) ಘನತ್ಯಾಜ್ಯ ನಿರ್ವಹಣೆಗೆ ಸಂಬಂಧಿಸಿದಂತೆ ತಂತ್ರಜ್ಞಾನವನ್ನು ಅಳವಡಿಸಲು ಆಸಕ್ತ ಅರ್ಜಿದಾರರು/ಸಂಸ್ಥೆಗಳಿಂದ (E.O.I) ಸ್ವೀಕೃತವಾದ ಪ್ರಸ್ತಾವನೆಗಳನ್ನು ಕೂಲಂಕಷವಾಗಿ ಪರಿಶೀಲಿಸಿ, ಸೂಕ್ತ ಸಲಹೆ/ಶಿಫಾರಸ್ಸುಗಳನ್ನು ಬೃಹತ್ ಬೆಂಗಳೂರು ಮಹಾನಗರ ಪಾಲಿಕೆಯ ಆಯುಕ್ತರಿಗೆ ಸಲ್ಲಿಸುವುದು.

6) ಮುನ್ಸಿಪಲ್ ಘನತ್ಯಾಜ್ಯ ನಿರ್ವಹಣೆಯ ಕ್ಷೇತ್ರದಲ್ಲಿ ಹೊಸ ತಾಂತ್ರಿಕತೆಯ ಬಗ್ಗೆ ಪರಿಶೀಲನೆ ನಡೆಸಿ, ಅದನ್ನು ಆಳವಡಿಸುವ ಬಗ್ಗೆ ಬಿಬಿಎಂಪಿ ಆಯುಕ್ತರಿಗೆ ಸೂಕ್ತ ಶಿಫಾರಸ್ಸು/ ಅನುಮೋದನೆ ನೀಡುವುದು.

7) ಮುನ್ಸಿಪಲ್ ಘನತ್ಯಾಜ್ಯ ನಿರ್ವಹಣೆಯ ಕ್ಷೇತ್ರದಲ್ಲಿ ಹೊಸ ಪರಿಕಲ್ಪನೆಯ ಬಗ್ಗೆ ಆಯುಕ್ತರಿಗೆ ಶಿಫಾರಸ್ಸು ಮಾಡುವುದು.

8) ಮುನ್ಸಿಪಲ್ ಘನತ್ಯಾಜ್ಯ ವಸ್ತು ಸಂಸ್ಕರಣೆ ಮತ್ತು ವಿಲೇವಾರಿಯ ಸಂಬಂಧ ಪ್ರಚಲಿತವಿರುವ ಸಾಂಪ್ರದಾಯಿಕ/ಆಧುನಿಕ ತಂತ್ರಜ್ಞಾನದ ಬಗ್ಗೆ ಬಿ.ಬಿ.ಎಂ.ಪಿ. ಆಯುಕ್ತರಿಗೆ ಕಾಲ ಕಾಲಕ್ಕೆ ಸೂಕ್ತ ಮಾಹಿತಿ ಹಾಗೂ ಮಾರ್ಗದರ್ಶನ ನೀಡುವುದು.

9) ಒಮ್ಮೆ ಆಯುಕ್ತರು ಯೋಜನೆಗಳ ತಾಂತ್ರಿಕ ಕಾರ್ಯಸಾಧ್ಯತೆ ಬಗ್ಗೆ ಅನುಮೋದನೆ ನೀಡಿದ ನಂತರ ಕಾಮಗಾರಿಯನ್ನು ಪ್ರಾರಂಭಿಸಲು ಪ್ರಸ್ತುತ ಜಾರಿಯಲ್ಲಿರುವ ನಿಯಮಗಳನ್ವಯ ಇತರೆ ಪ್ರಕ್ರಿಯೆಗಳನ್ನು ಜರುಗಿಸತಕ್ಕದ್ದು.

10) ಈ ತಾಂತ್ರಿಕ ಸಮಿತಿಯು ಘನ ತ್ಯಾಜ್ಯ ನಿರ್ವಹಣೆಯ ಸಂಸ್ಕರಣಾ ಘಟಕ/ ಕೇಂದ್ರಗಳ ಬಗ್ಗೆ ಆಗಿಂದ್ದಾಗ್ಗೆ ಸ್ವೀಕರಿಸಲಾಗುವ ಇತರೆ ಎಲ್ಲಾ ಪ್ರಸ್ತಾವನೆಗಳ ತಾಂತ್ರಿಕ ಕಾರ್ಯಸಾಧ್ಯತೆಯ ಬಗ್ಗೆ ಪರಿಶೀಲಿಸುವುದು

ಕರ್ನಾಟಕ ರಾಜ್ಯಪಾಲರ ಆಜ್ಞಾನುಸಾರ
ಮತ್ತು ಅವರ ಹೆಸರಿನಲ್ಲಿ,

(ಎಸ್.ಚಂದ್ರಪ್ಪ)
ಸರ್ಕಾರದ ಅಧೀನ ಕಾರ್ಯದರ್ಶಿ
ನಗರಾಭಿವೃದ್ಧಿ ಇಲಾಖೆ

ಇವರಿಗೆ:

1. ಮಹಾಲೇಖಪಾಲರು, ಕರ್ನಾಟಕ, ಬೆಂಗಳೂರು.
2. ಮಾನ್ಯ ಮುಖ್ಯಮಂತ್ರಿಯವರ ಪ್ರಧಾನ ಕಾರ್ಯದರ್ಶಿ, ವಿಧಾನಸೌಧ, ಬೆಂಗಳೂರು.
3. ಆಯುಕ್ತರು, ಬೃಹತ್ ಬೆಂಗಳೂರು ಮಹಾನಗರ ಪಾಲಿಕೆ, ಬೆಂಗಳೂರು.
4. ಆಯುಕ್ತರು, ಪೌರಾಡಳಿತ ನಿರ್ದೇಶನಾಲಯ, ವಿ.ವಿ.ಗೋಪುರ, ಬೆಂಗಳೂರು.
5. ಅಧ್ಯಕ್ಷರು ಹಾಗೂ ವ್ಯವಸ್ಥಾಪಕ ನಿರ್ದೇಶಕರು, ಹುಡ್ಕೋ, ಹುಡ್ಕೋ ಭವನ, ಇಂಡಿಯಾ ಹ್ಯಾಬಿಟೇಟ್ ಸೆಂಟರ್, ಲೋದಿ ರೋಡ್, ನವದೆಹಲಿ–110003
6. ಎಲ್ಲಾ ಸದಸ್ಯರುಗಳಿಗೆ – ಬಿ.ಬಿ.ಎಂ.ಪಿ., ಆಯುಕ್ತರ ಮುಖಾಂತರ.
7. ವಿಶೇಷ ಆಯುಕ್ತರು (ಯೋಜನೆ), ಬಿ.ಬಿ.ಎಂ.ಪಿ. ಬೆಂಗಳೂರು.
8. ಅಧ್ಯಕ್ಷರು, ಕರ್ನಾಟಕ ರಾಜ್ಯ ಮಾಲಿನ್ಯ ನಿಯಂತ್ರಣ ಮಂಡಳಿ, ಪರಿಸರ ಭವನ, ಚರ್ಚ್ ಸ್ಟ್ರೀಟ್, ಬೆಂಗಳೂರು.
9. ಅಧ್ಯಕ್ಷರು/ವ್ಯವಸ್ಥಾಪಕ ನಿರ್ದೇಶಕರು, ಕರ್ನಾಟಕ ನಗರ ಮೂಲಭೂತ ಸೌಕರ್ಯಗಳ ಅಭಿವೃದ್ಧಿ ಹಣಕಾಸು ನಿಗಮ, ಬೆಂಗಳೂರು.
10. ಸರ್ಕಾರದ ಪ್ರಧಾನ ಕಾರ್ಯದರ್ಶಿಗಳ ಆಪ್ತ ಕಾರ್ಯದರ್ಶಿ ಹಾಗೂ ಜಂಟಿ ಕಾರ್ಯದರ್ಶಿಗಳ ಆಪ್ತ ಸಹಾಯಕರು, ನಗರಾಭಿವೃದ್ಧಿ ಇಲಾಖೆ, ವಿಕಾಸಸೌಧ, ಬೆಂಗಳೂರು.
11. ಶಾಖಾ/ಹೆಚ್ಚುವರಿ ಪ್ರತಿ/ಇಲಾಖೆಯ ಅಂತರಜಾಲ ತಾಣ.