WELCOME

ECO SAVE SYSTEMS Pvt Ltd

WELCOME

Managing Task of Urban Solid Waste through Immediate, Medium term and long term measures

2nd May 2016

PROBLEM of Land Fills -> What Can be done

Presentation by Dr S.R.Maley

Agro Environment Scientist

ECO SAVE SYSTEMS Pvt Ltd

About Ourselves

1. Eco Save Systems Pvt. Ltd. Established by Dr.S.R.Maley Agro Environment scientist on 16th October 2000 for dedicated services to solves MSW problems.
2. Developed herbal and bio products for pollution control and bioconversion processes.
3. Played hand holding roles for Policy frame work at GOI and Consultancy cum Transaction Advisory services to State Nodal Agencies in UP, RJ, Kerala, J&K, Goa etc.+ over 30 ULBs in India and 12 in overseas.
4. Expert member of Technical Sub Group of Int.Ministrial Task Force-IPNM as per directive of Supreme Court in MOUD & PA – GOI.
5. Accredited Functional area expert and Coordinator for MSW and Soils by QCI (MoEF) GOI.
6. Crusader for Integrated holistic approach for MSW treatment and processing.
7. Pioneered and implemented Projects on Bio remediation of old dumpsites and bio-stabilisation of fresh waste, odor control as Interim measure in cities facing litigations.

ECO SAVE SYSTEMS Pvt Ltd

Subject Introduction

1. Urban Waste in Indian cities and towns is posing lot of challenges to City Administration.
2. Currently 38 million from 446 Class 1 ULBs urbanites are generating 170400 MT MSW per day @ 457 g/cap/.Annually this is 62.20 million MT.
3. The country is lagging behind by 37 years for regulatory mechanism as compared to western world. In US, first Clean Air Act was passed in 1963, in India MSW Rules in the year 2000.
4. Since enactment of MSW Rules, Scientific treatment and disposal facilities for 260000 MT/day facilities have been established. This is just 15.30% of total Qty. Yearly Progress is @ 1.00%
5. Success rate of processing & disposal technologies during last 20 years is 65% for Integrated Composting-RDF,3.4% for wte through Incineration,3.00%for Biomethanation and 1.00% for other technologies.
6. As of 2015 end, 84% of MSW is being disposed off as open land disposal.
7. The GOI's Swachchha Bharat Programme is just busy with Shauchalayas, neglecting the much needed MSW sector.

ECO SAVE SYSTEMS Pvt Ltd

8. Open land disposal is costing Rs 3900/- Per MT of MSW by exhausting 0.26 Sq M area every day, where land value is Rs 15000-Per Sq.ft. These sites will continue to pollute living environment, unless some treatment is adopted.
9. At the disposal site, besides pollution of soil, water and air have potential threat to the health of living beings mainly because of deterioration of of air quality and pathogenic invasions.
10. There are no more land fills. All these have now have become garbage hills & hillocks. Unable to take any more load, garbage vehicles are finding places along the highways and river bodies to empty the garbage loads. In city like Pune, garbage burial at farmers field was planned which was sabotaged by District Panchayat.
11. Ba disposal practices by ULBs have now encouraged all three syndromes viz. NIMBY(Not in My Backyard),NOTA (Not over there also) and LULU(Locally Unwanted Land use).
12. Forced with these syndromes, civil bodies are resorting to find long places of upto 65KM, that will lead to exorbitant transportation costs Rather than plans for reducing Carbon foot print.

ECO SAVE SYSTEMS Pvt Ltd

Major Areas of concern To public

- Foul smell & Malodors: From Putrefying Garbage heaps
- Increasing number of diseases : Breeding of pathogens in garbage heaps
- Mutations and Diseases : Mutations & Resistant Organisms
- Nuisance of flies : Swarm of flies affecting human and animal life
- Increasing cases of Leptospirosis : Rodents harboring at waste accumulation sites
- Allergic reactions from Bio-aerosis : Infection, Giddiness and other diseases
- Various troubles from Toxic gases : Ammonia, Hydrogen Sulphide & Marcaptans
- Methane menace as GHG : Smoke Fire, breathlessness & ozone layer disturbance
- Spreading of Acidic Leachates : Main source of ground & surface water contamination
- Land area getting exhausted : Land area scarce —further acquisition difficult

ECO SAVE SYSTEMS Pvt Ltd

Health risk caused by pathogens associated with city waste and other biosolid wastes:

1. Respiratory problems from bio aerosols
2. Lung infection and allergic reactions
3. Vomiting and giddiness
4. Eye burning and Conjunctivitis
5. Dermatitis, eczema, ascaris and skin infections
6. Dysentery, diarrhea and gastro entitis
7. Fever and headache
8. Food poisoning
9. Typhoid and Tuberclosis
10. Cholera and aseptic meningitis
11. Roto virus and hepatitis
12. Cold-cough-wheezing aggravated by Aspergillus fumigetus

ECO SAVE SYSTEMS Pvt Ltd

Micro-organisms and diseases in human beings

Sr No	Disease	Pathogenic micro organism
1.	Diarrhea	Escherichia coli(E.coli)
2.	Dysentery	Shigella spp.
3.	Amoebiasis	Entomoeba hystolytica
4.	Gastro enteritis	Gastroenteritis epidemic
5.	Tuber closis	Mycobacterium tubercoli
6.	Food poisoning	Salmonella spp.
7.	Cholera	Vibro cholarae

ECO SAVE SYSTEMS Pvt Ltd

8. Conjunctivitis	Adeno virus
9. Vomiting and food poisoning	Staphylo coccus
10. Respiratory Disorders	Entero viruses
11. Round worm	Ascaris lumbricoides
12. Lung and kidney problems	Aspergillus fumigatus

“ And another- 13 diseases

ECO SAVE SYSTEMS Pvt Ltd

At a glance — issues and Tasks:

(a) Scientific and Technical: Comply with as :duty"

(b) Legal aspects: Old MSW Rules 2000(25th Sept 2000) got into revision mode in July 2013, got-re-drafted in June 2015 have now been finally notified in 8th April 2016

(c) Policy Frame Work: Highly discouraging with just 20% VGF form GOI + 6.66% from State, Expecting Pvt Sector to Invest 73.34% Capex and burden of O&M. No-SWM policy by State Govt?

(d) Attitude: Great change needed in both democratic and beurocratic set ups, as no where in the world garbage mgmt happens without Capex-Opex support from Govt.

(e) Citizens Involvement: This is very important, let corporate citizens take a lead for betterment of cleanliness drive.

ECO SAVE SYSTEMS Pvt Ltd

SWM — Measures: Immediate Actions

A. Need for citizens and ULB's working together:

1. For bin less and litter free habitations: Door to Door Collection holds key of success
2. Organise the above action through service out sourcing of NGOs, SHGs, RAWs and Youth Enterprise. One MT Solid Waste is job for 3 man days.
3. Strong Education & Awareness drive against:

   littering, throwing and burning of waste.

   Prohibition on pushing waste into drains, nallahs, rivers etc.
4. Citizen forums to identify filthy spots and get them cleaned up through 18 hour helpline(to be operated by Service provider)
5. Remove all obs-o-lete system of Masonary bins, dhalaos, unmovable bulky bins of 4.50 and 8.00 cu.m. sizes.

ECO SAVE SYSTEMS Pvt Ltd

1. Hot-humid conditions necessitate spot treatment of all Putrescible waste thru- herbal de-odorant & sanitisers to ensure stink free habitations
2. Sanitization treatment will also bring down env. Related diseases and fly nuisance
3. Both decentralized and centralized SWM efforts needs to work in synchronization with each other for handling of category wise waste streams eg.

   (a) Nutrient rich food waste for: Biomethanation as green energy

   (b) Generally all biodegradables for: Aerobic Composting as lifeline for soil health

   (c) All Combustibles for : Fuel Pelletisation as alternate energy source

   (d) All kind of plastic (except Chlorinated PVC): For reprocessing

   (e) Metals & Glass: For recovery

   Note: Construction debris to be handled separately under new rule)
4. There is no magic solution to treat above with Single technology incl. landfilling and / or incineration.

ECO SAVE SYSTEMS Pvt Ltd

Bio-stabilisation process can be of Immediate relief to all ULBs and bulk waste generators

Objectives :

(a) To make waste stink free

(b) Control of flies and pathogens

(c) Weight/ Volume reduction

(d) Make biodegradable waste non-bioreactive

Process Involves:

(a) De-odorisation and sanitation

(b) Microbial inoculation to achieve temp. range of 58 to 65° C

(c) Turning and aeration 5 to 7 days interval x 3 times

(d) Moisture maintenance for ease of bioconversion

ECO SAVE SYSTEMS Pvt Ltd

Process sophistication:

Biostabilisation can be achieved in:

4 days through Dano type rotating drums @ 1rpm Or

14 days through forced aeration on cubical cells Or

21 days as windrows on concreted pad under covered roof

What can be achieved : **Compliance of SWM Rules upto 70% level**

Freedom from Methane related dump site fires

Space saving thr. Vol. reduction by 45%

Furtherance of Composting Cycle.

Mobilisation Period: **30 days**

Costs Involved: **Rs 300 to 500 Per MT as Per provision of material handling equipment from ULB.**

ECO SAVE SYSTEMS Pvt Ltd

For Medium term SWM Measures: Adopt the Process of Bio-Remediation

1. **Objectives: (a) To minimise or Stop Polluting effects of old accumulated MSW dump sites**
   (b) To reclaim major land area for its re-use or public utilities
2. **Legal Aspects: Prescribed under SWM Rules 2016, Article 15 Cl(Zj) and (Zk) and Article 20 Sr.No.11.**
3. **Citizens**
   Intervention: Oppose wrong approach of Capping & Closure thereby wasting public money and no-use of buried land for betterment of public utility.
4. **Start up time: 2 months (Pre requisite: Volume estimates through contour survey)**

ECO SAVE SYSTEMS Pvt Ltd

5. Completion time: Bioremediation Treatment process, Completion @ one ha Per two months, with waste heaping of 12 to 15 M.
6. Extent of land area : Upto 80% of the total.

   reclamation
7. Process Involves: Establishment of right biological phase, pathogen control and mechanical segregation of usable streams
8. Costs: Appx Rs 250 to 350 Per Cu.m., depending upon the scale of economy and terrain conditions
9. What is achieved: Redressal of public complaints and abidance of court orders.

ECO SAVE SYSTEMS Pvt Ltd

Long term Solid Waste Management through multiple processing technologies:

A. **Encourage and support decentralized efforts by value chain of waste pickers-handlers-recyclers (ref.SWM Rules 2016 Article 15(h) and (v)**

B. **Plan Execute and operationalize solid waste processing facilities for optimum utilization of waste streams through the process of :**

(a) i) Biomethanation

ii) Microbial Composting

iii) Vermi composting

iv) An aerobic digestion

v) Any other appropriate processing for bio-stabilistaion of bio degradable wastes

"NGT Orders : Wet waste shall no be burnt directly"

ECO SAVE SYSTEMS Pvt Ltd

(b) 1. Waste to Energy process: Including preparation of Refuse Derived Fuel(RDF) from Combustibles Or supply as feed stock to Solid Waste based power plants Or cement kilns.

2. SWM Rules 2016 Article 21(1): Land Filling of combustible waste having C.V. of 1500 k.cal/kg is prohibited

3. SWM Rules 2016 Article 21 (2) and (3): Waste having C.V. of > 1500 kg should be used for Co- processing in cement kilns Or thermal power plants.

4. SWM Rules 2016 Article 18 : Industrial units located within 100 KM distance from SWM facilities to use/ replace at least 5.00 % of their fuel requirements from RDF.

5. SWM Rules 2016 Article 15 Cl.(x): ULB's to make provision of funds for capital investment as well as O&M of the facility in the annual budget on priority before allocation

ECO SAVE SYSTEMS Pvt Ltd

1. Plastics is a growing menace in Urban Waste(more so at places of tourism, recreation and now in rural settings also)
2. This covered under separate rule Plastic Waste Management Rules 2016
3. However in order to tackle this problem, centralized waste processing Facility should have

   (a) Plastic separation- recovery - baling and /or

   (b) Plastic agglomeration or granulation plant or

   (c) Plastics to liquid hydrocarbon Fuel (Furnace Oil) through slow speed Pyrolysis
4. Choice at Sr No 3(c) is preferred , as it provides end to end solution for plastic disposal
5. Usual units are available in 3 to 10 tpd modular sizes both Indian as well as imported.

ECO SAVE SYSTEMS Pvt Ltd

Target achievement of Min. 90% rate of recycling as following:

1. **Biomethanation to recover Methane gas as Fuel:**
   can utilize 8 to 12% Protein- Carbon rich food waste stream - system under closed bioreactor hence least pollution problem through high end Skada central process
2. **(a) Microbial Composting: Of almost all short term & medium term biodegradable(green-wet) waste that are present 52 to 62 % in urban waste**
2. **(b) The process is bacteria (enzyme) induced leading to quick thermophilic temp range of > 58° C within 2 days. Feed stock on cemented platform under covered roof with leachate & odor control systems in place. Hence no environment problems**
3. **Fuel Pelletisation or RDF : To take care of light weight- high C.V. materials present 15 to 25 % in the urban waste**
4. **Plastics left out after waste picker's is 4 to 7% in the urban waste. This is to be recovered and converted into usable products.**
5. **Thus the above 4 processes can ensure 90% rate of waste recycling.**

ECO FRIENDLY WASTE MANAGEMENT

MAXIMISE UTILISATION OF WASTE STREAMS

CONSERVE RESOURCES

&

SAVE COSTLY URBAN LAND FROM WASTE DUMPING

Thank You

ECO SAVE SYSTEMS PVT LTD MUMBAI