

WASTE TO ENERGY

USING

MUNICIPAL SOLID WASTE

AS THE FUEL

Municipal Solid Waste (MSW) commonly known as trash / garbage / refuse / rubbish is a waste consisting of everyday items that are discarded by the public. "Garbage" can also refer specifically to food waste, as in a garbage disposal; the two are sometimes collected separately.

The composition of municipal solid waste varies greatly from municipality to municipality and changes significantly with time. In municipalities which have a well developed waste recycling culture, the waste stream consists mainly of intractable wastes such as plastic film, and un-recyclable packaging materials. In developed municipalities without significant recycling activity it predominantly includes food wastes, market wastes, yard wastes, plastic containers and product packaging materials, and other miscellaneous solid wastes from residential, commercial, institutional, and industrial sources.

Municipal Solid Waste may contain any or all of the following items.

No	Refuse Component	C	H	O	N	S	Ash
1	Newspaper	49.14	6.10	43.03	0.05	0.16	1.52
2	Brown Paper	44.90	6.08	47.84	0.00	0.11	1.07
3	Trade Magazine	32.91	4.95	38.55	0.07	0.09	23.43
4	Corrugated Paper Boxes	43.73	5.70	44.93	0.09	0.21	5.34
5	Plastic Coated Paper	45.30	6.17	45.50	0.18	0.08	2.77
6	Waxed Milk Cartons	59.18	9.25	30.13	0.12	0.10	1.22
7	Paper Food Cartons	44.74	6.10	41.92	0.15	0.16	6.93
8	Junk Mail	37.87	5.41	42.74	0.17	0.09	13.72
9	Vegetable Food Wastes	49.06	6.62	37.55	1.68	0.20	4.89
10	Citrus Rinds And Seeds	47.96	5.68	41.67	1.11	0.12	3.46
11	Meat Scraps, Cooked	59.59	9.47	24.65	1.02	0.19	5.08
12	Fried Fats	73.14	11.54	14.82	0.43	0.07	0.00
13	Leather Shoe	42.01	5.32	22.83	5.98	1.00	2.86
14	Heel And Sole Composition	53.22	7.09	7.76	0.50	1.34	30.09
15	Vacuum Cleaner Catch	35.69	4.73	20.08	6.26	1.15	32.09
16	Evergreen Shrub Cuttings	48.51	6.54	40.44	1.71	0.19	2.61
17	Balsam Spruce	53.30	6.66	35.17	1.49	0.20	3.18
18	Flower Garden Plants	46.65	6.61	40.18	1.21	0.26	5.09
19	Lawn Grass	46.18	5.96	36.43	4.46	0.42	6.55
20	Ripe Tree Leaves	52.15	6.11	30.34	6.99	0.16	4.25

Municipal Solid Waste can't be segregated on a daily basis to get individual component analyzed. Waste comes in all sizes, contains anything and everything discarded by household. Furthermore it contains lot of moisture too. Normally the following system is deployed:

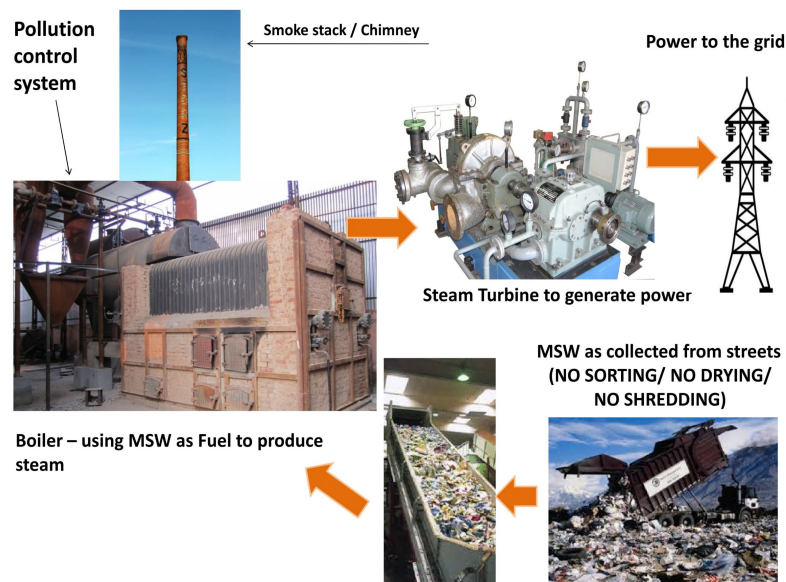
- The Sorter to remove metals, bottles and non volatile materials.
- The Dryer to remove moisture. The MSW by an average contains 60% moisture.
- The Shredder to cut the waste in to less than 20 mm in size.

These equipment require huge track of land for installation and consume high amount of power to operate.

Hence the consultants include three equipment to process the waste prior to incinerating.

WE DON'T

Savings gained by eliminating these equipment is elucidated elsewhere in this presentation.



Brain storming sessions, contacting experts around the world for their opinion on the execution of any idea is discussed and finally a solution is found to improve the performance of steam boiler, steam turbines, heat exchangers, gearboxes, etc. Municipal Solid Waste has become a contagious problem all around the world. The waste occupies large track of land after devouring landfill areas. The open space is shrinking, the garbage has created mountains and the stench has become unbearable. Many cities are reeling under epidemic caused by bacteria and virus from the garbage. The consultants around the world suggest sorters, shredders and dryers making power generation projects very expensive and requiring more open land to stock the sorted non volatile materials

Our team has succeeded in designing a furnace to devour anything and everything dumped into it.

Thus our steam boilers accept **Municipal Solid Waste “As Collected from Streets”** - **Unsorted, with Moisture and of all sizes, thus saving on investment, land and time.**

The following pages describe various projects to incinerate **Municipal Solid Waste** to generate 10 KW, 24 KW, 50 KW, 100 Kw and 500 KW power generation.

1400 Kg of Municipal Solid Waste incinerated every hour produces **1,500 Kg of 190C Hot, Dry and Super Heated Steam at 10.5 BarG Pressure.**

This 1,500 Kg of Steam is capable of driving a steam turbine coupled to a 125 KVA / 100 KWe Alternator 24/7 to deliver you 100 KW of 380 Volts, 3 Phase Power at 50 Hz Frequency.

Requirement of Space and Waste

Power Plant	Waste* Kg per hour	RDF^ Kg per hour	Land Sq. Meters	Captive Consumption
15 KVA 12 KWe	92	22	50	5 KW
30 KVA 24 KWe	185	44	50	7 kW
63 KVA 50 KWe	644	154	100	12 KW
125 KVA 100 KWe	1400	350	200	30 KW
625 KVA 500 KWe	5500	1350	500	100 KW
1250 KVA 1000 KWe	11000	2700	1000	200
1500 KVA 1200 KWe	14,000	3,500	1200	250
1875 KVA 1500 KWe	27,000	4,000	1500	300

Notes

(*) MSW from Streets 700 K. Cal / Kg

(^) Sorted and Dried (30% Moisture) 3000 K. Cal / Kg