

Gasification of organic wastes

By Ostrand Corporation



Organic wastes such as MSW, sewage, sludge, medical wastes, waste tires, waste plastics, and so on.

How can we manage and utilize them effectively?

Answer is C-POWER plant !!

Carbon-free pyrolysis of organic wastes for the recovery of energy and resources.

C-POWER can change organic waste to energy effectively.

C-POWER Plant

Image of a typical commercial plant



Photo 1 Gasification Plant in Iwaki City

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Technical description

C-POWER plant consists of a hopper, feeder, rotary kiln, condenser, gas refiner, oil (gas) storage tank and dual fuel engine generator.

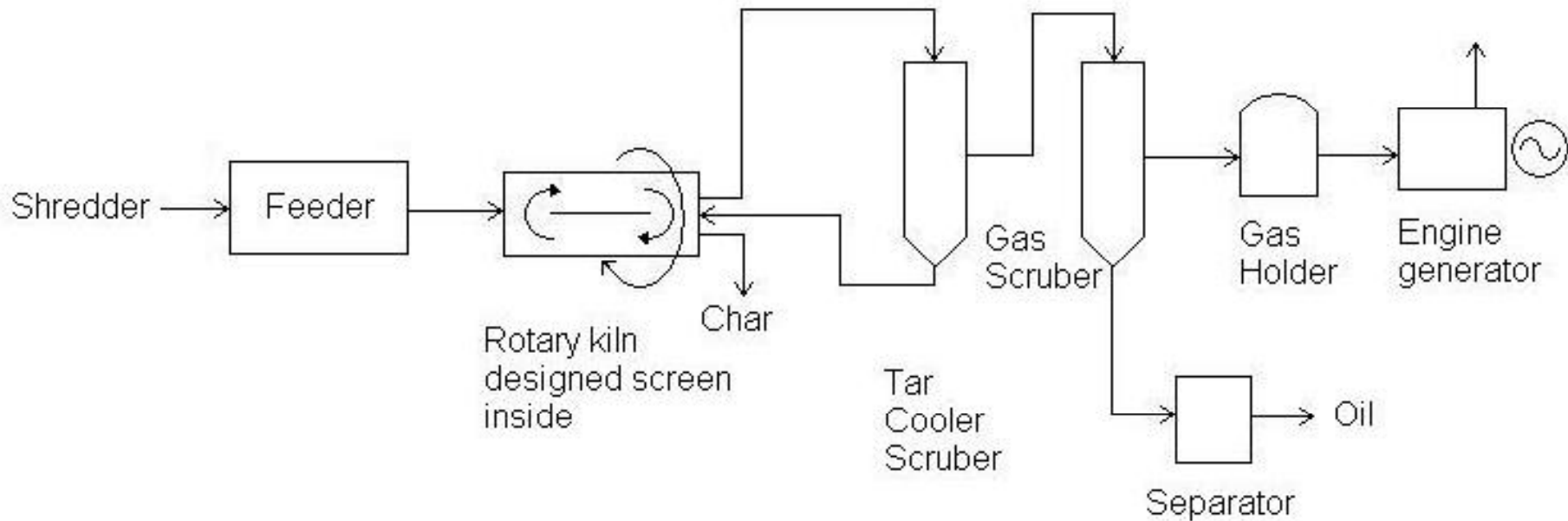


Figure 1 Schematic diagram of a typical plant

Rotary kiln for thermal decomposition



Condenser head for tar





Gas holder

A power generation facility is installed behind the gas holder.

Generator(Dual fuel type)



When we get fuel gas by thermal decomposition,
we get liquid(tar) at same time.

Liquid can be used as fuel by direct burning of course.

But

If the organic contains S,N,Cl:toxic element,
some part of toxic goes to liquid oil.

When you burn the oil as fuel,
The exhaust will contain the toxic gas;SO_x,NO_x,HCl,DXN.

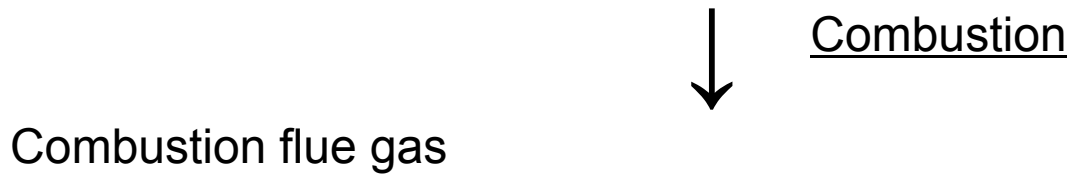
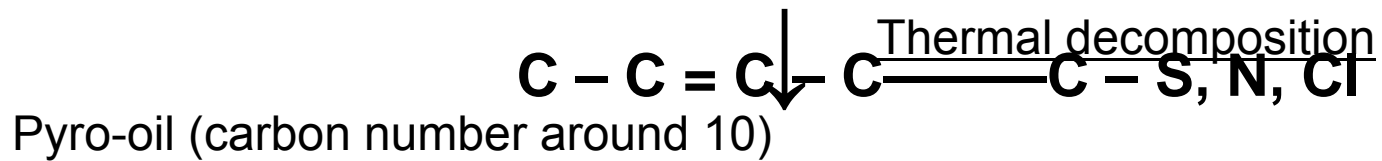
But

Toxic element of liquid oil can be decomposed thermally
and be changed to H₂S,NH₃,HCl.

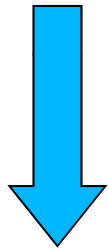
We can remove them easily.

Liquid fuel production and hazardous flue gas formation upon combustion

Organic waste (carbon 10,000)



Gasification of organic wastes and clean flue gas upon combustion



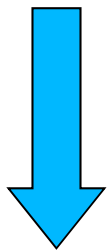
Thermal Decomposition

Pyro-oil (carbon number around 10)

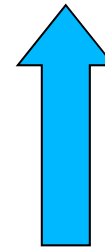


Clean pyro-gas

H₂, CO, CH₄, C₂H₄ etc



Further decomposition



Gas cleaning; Easy removal of potential Hazardous components

**Fuel gas component; H₂, CO, CH₄, C₂H₄
and other hydrocarbons**
Potential hazardous components; H₂S, NH₃, HCl



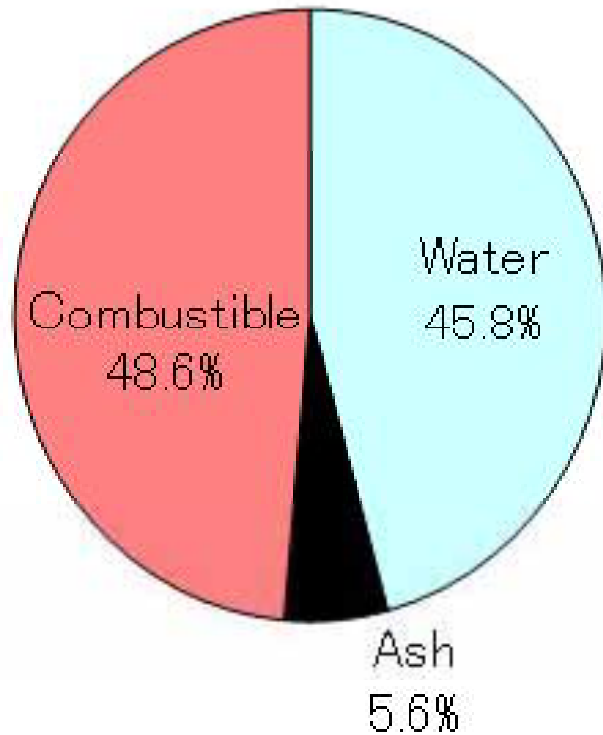




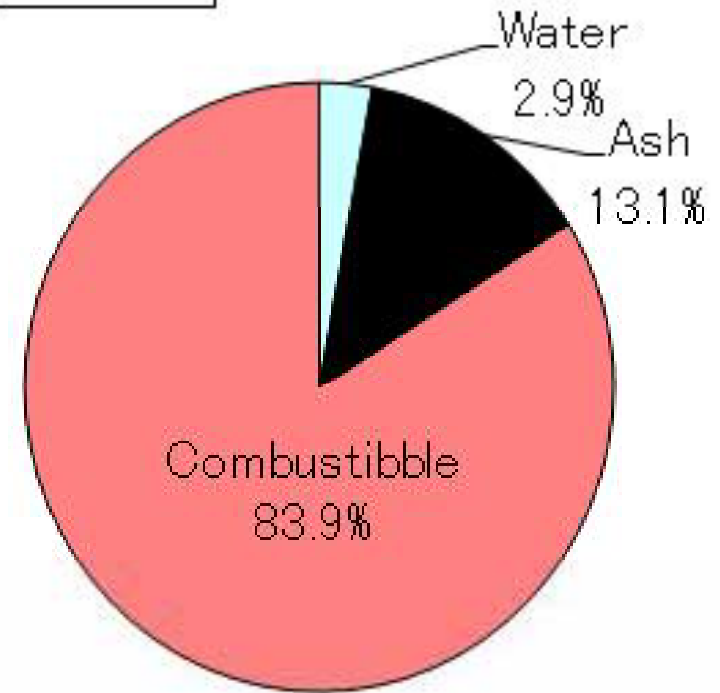


Properties of MSW

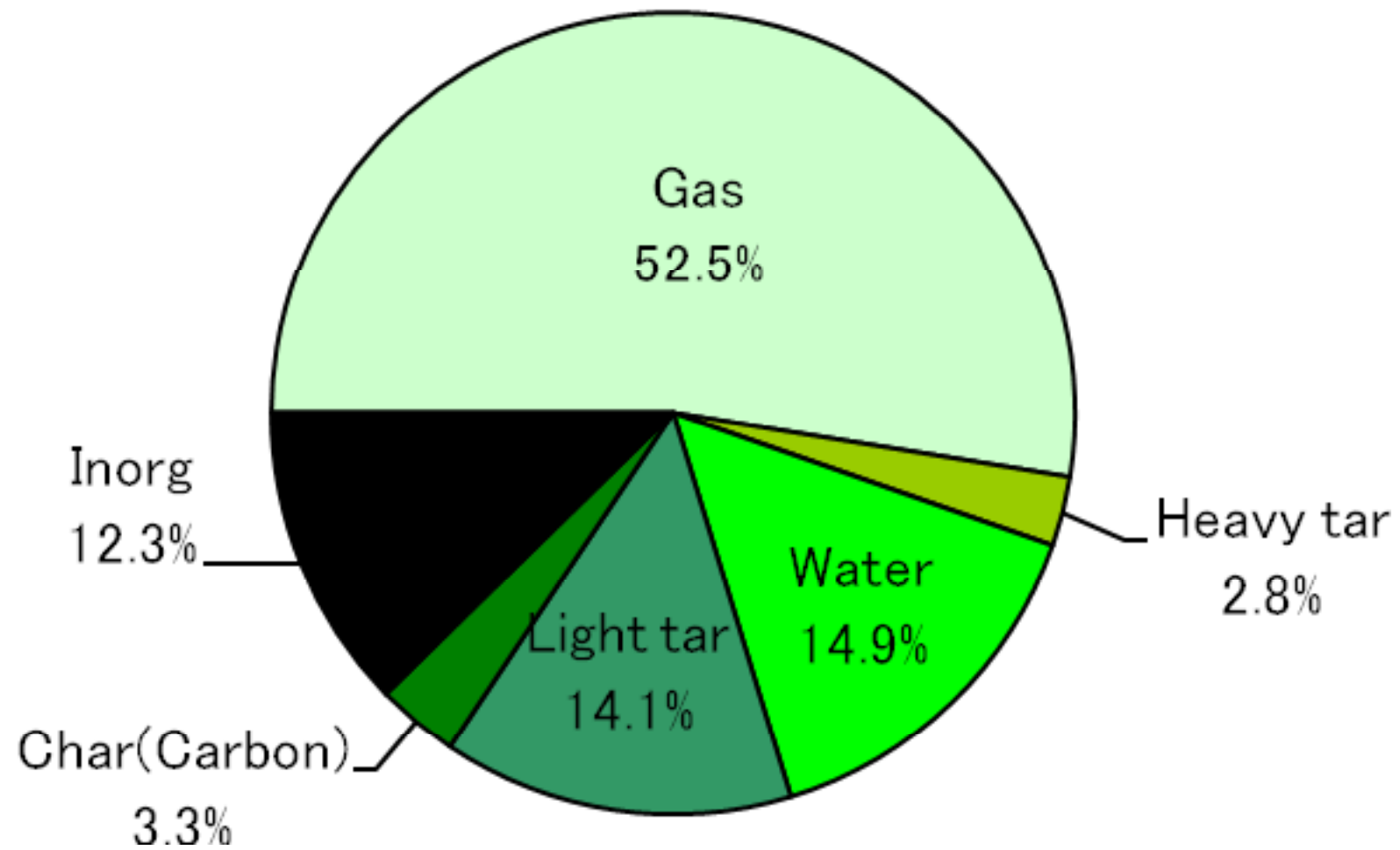
MSW 11,700kJ/kgwb



RDF 20,000kJ/kgdb



Product



Performance of pyrogas production

Raw material 200 kg/h
Mixture of plastics (30.7%),
biomass (60.8%) and others (8.5%)

Products

Gaseous products 80 to 100 Nm³/h
5000 to 6000 kcal/Nm³
20 to 25 MJ/Nm³

Tar 30 to 40 kg/h

Char 20 to 30 kg/h

MSW treatment capacity and performance

Dryer capacity	Gasification capacity	Power generator capacity	Electricity to generate
100-ton MSW/day	55.8-t RDF/day	2.2 MW	16.9 GWh/year
500-ton MSW/day	279-t RDF/day	11.2 MW	86.1 GWh/year