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PRODUCTION OF ELECTRICITY BY BURNING PLASTICS

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ABSTRACT

Electrical energy is aessential resources for any developing nation. To meet the growing demand for electricity. power generating plants of all types are being installed even then the gap between the supply and demand is continuously increasing due to depletion of natural resources. This paper deals with the burning of waste plastics to produce electricity .Open burning of waste will produce very high levels of toxic chemicals and particulates which may cause acute health problems. To overcome this a closed incinerator is used which mixes the waste upto 2000 degree F, then makes steam, which runs the turbine and produce electricity. So this paper presents a solution by converting waste to energy. If identifying plastic is not always possible so while there are some plastics that are supposed to be safe to burn so to overcome this a closed incinerator was developed it can burn any non biodegradable waste without letting the gas into the environment. So don't burn the plastic on open fires unless you know exactly what it is made up.

Keywords: Incinerator , Biodegradable, plastics ,organic compound.

I. INTRODUCTION

Plastic: Is a material consisting of any wide range of synthetic or semi synthetic organic compound that are malleable and so can be moulded into solid objects. plastics are typically organic polymers of high molecular mass, but they often contain other substance. They are usually synthetic most commonly derived from petro chemicals but many are made from renewable materials such as polylactic acid from corn or cellulose from cotton linters. They have already displaced many traditional material such as wood, stone, horn, bone, leather, paper, metal, glass and ceramic in most of their former uses.

Type of plastic: There are lot of different plastics and they will give off lots of different vapours when they decompose it could be just a simple hydrocarbon (or) it could contain cyamides (or) PCB's (or) lots of other substance without knowing what the plastic was. It could be difficult to know what are the likely volatiles it would be create volatiles given off from plastics in house fires are a major cause of death so, to conclude, it depends on the plastic then PLA plastic is it is claimed more toxic and safe to burn. Some oil based plastics like polythene are an efficient fuel and burns in the same way oil does, not pleasant exactly but not exactly dangerous either PCB's that's a dioxin and dioxin are nasty. So, it's a big no, if it's a halogenated plastics therefore one of those made from chlorine and fluorine.

Halogenated plastics include :

- Chlorine based plastics
- Chlorinated polyethylene (CPE)
- Chlorinated polyvinyl chloride (CPVC)
- Chlorsulfonated polyethylene (CSPE)
- Polychloroprene (CR) or chloroprene rubber, marketed under the brand name of Neoprene

PVC: Fluorine based plastics:
Fluorinated ethylene propylene (FEP)
There are good and bad plastics for example
PLA: are biodegradable plastics so they are good and if you find them are safe to work with for crafting.

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Fig 1

PC: is a bad plastic but isn't really something that could pretend to crafters unless they are architects but if u could like to know, it contains many harmful substance but it does not reach easily so it more of environment concern, since its not really biodegradable.

Fig 2

II. CAN PLASTIC BE USED TO GENERATE ELECTRICITY

Fig 3

Yes, offcourse Australian research had shown that method can be used to make cheap, strong, flexible and conductive .

So how plastic is conductive: plastic like polyethylene and polystyrene do not conduct electricity. However, if the polymer is polar. It has dipole moment which can cause it to be conductive. Non polar polymers are used as insulators but polar polymers are not highly suitable for being used as insulators

Kind of plastic used for conducting: intrinsically conducting polymers (CCP) are organic polymers that conduct electricity, while plastics can be electrically conductive, with a conductivity of upto 80ks/cm in stretch-oriented polyacetylene, they are still no match for most metals like copper which have conductivity of several hundred ks/cm, nevertheless this is a developing field.

How the plastic waste utilized in our daily life: yes, the plastic waste can be utilized in our daily life by burning a particular plastic in a specific manner to produce electricity now a days we all know that there is a lot of scarcity of electricity in many spaces due to rise of many small and large scale industries etc.However, we can reduce the plastic wasted which is dangerous to environment and also we can fulfill the scarcity of electricity.Is burning of plastics is safer: open burning of waste will produce very high levels of toxic chemicals and praticulates are present in the smoke may cause acute respiratory and other health problems in those breathing the smoke. Burning plastic can be especially problematic with PVC plastics in particular contributing to high vision of dioxin. So to overcome these problems. SD JOSEPH, a resident of kottivakkam has developed a closed incinerator at home by using a metallic cylinder with air tight doors and he claims that it can burn any non biodegrable waste without letting out the gas into the environment.

III. INCINERATOR

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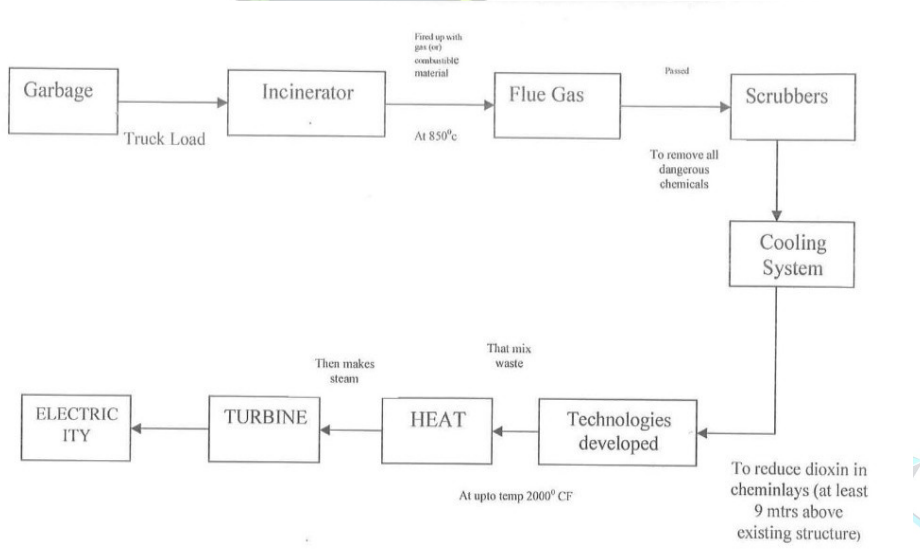
Fig 4

The first incinerator was built in Nottingham UK in 1874 by Manlove, Aliott and co. Ltd. Design of albert fryer.The first US incinerator was built in 1885 on governor's island in newyork. The first waste waste incinerator in Denmark was built in 1903 in Frederiksberg.

The first facility in the Czech republic was built in 1905 in Brno. Modern incinerator plants are nastly different from old years, some of them neither recoverrd energy nor matrials. Modern incinerator reduce the volume of the original waste by 95-96% depending upon composition and degree of recovery of materials such as metals from the ash for recycling.Incinerating reduces the need for landfill but does not eliminate it. It reduces the soild mass of waste by 80-85% the remaning ashes still have to be disposed off. Incinerators have electric effiencies of 14-28% in order to avoid losing the rest of the energy. It can be used for e.g. district heating(cogeneration) the total efficiencies of cogeneration incinerator are typically higher than 80%. Incineration plants must be design to ensure that the flue gases reach a temperature of atleast 850 degree celcius (1560 degree F) for 2 sec in order to ensure proper break down of toxic organic substances.

IV. METHODLOGY



Block diagram

A dump truck drops the municipal waste into warehouse sized pit. Then a giant claw grabs nearly a truckload of garbage and dumps into an incinerator.The incinerator is initially fired up with gas or other combustible material. The process is then sustained by waste itself complete waste combustion requires a temperature of 850 degree C foratleast two seconds but most plants raise it to higher temperature to reduce organic substance containing chlorine flue gases are then sent to scrubbers which remove all dangerous chemicals from them to reduce dioxin in the chimneys where they are normally formed, cooling system are introduced in the chimneys. Chimneys are required to be at least 9 them meters above existing structures. Technology developed, mixes the waste at temperature of up to 2000 degrees fahernheit, the heat then makes steam which runs turbine and produces electricity.

HOWEVER NOT ALL GOOD NEWS:

The ashes are toxic and so need further treatment. As such they are cause for concern however "Ash from modern incinerators is vitrified at temperatures of 1000^0c (1830^0F) to 1100^0c (2010^0F) reducing the leachalility and toxicity of residue. As a result, special landfills are generally no longer required for incinerator ash from municipal waste streams"The gases too need to be "cleaned" of pollutants before they are dispersed into the atmosphere proponents of the technology claim that the flue scrubbers are up to the job while many other feel there is cause for concern.

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V. CAN INCINERATORS HELP MANAGE INDIA'S GROWING WASTE MANAGEMENT PROBLEMS?


The plant has been controversial right form the beginning, with residence companying soul swell and fly ash.WTE plants have come up due to sheer necessity. India is no different and it is planning a series of such projects around the country. India generates nearly to 70 million tons of municipal solid waste of a year of which about 80 percent is dumped without precautions in landfills. These land fills are toxics places the spew gases like dioxins and the green house gas methane for a long time. Land is getting scarce as well while waste generation is increasing rapidly.

A few years ago, the national Task force on waste to energy estimated a potential of 439 MW of power from 32890 tones per day of waste (12 million tones a year) the committee estimate that India's municipal waste production will be 165 million tones a year by 2031 & 436 tones by 2050. India has no waste land to fill with such enormous amount of waste. Neither does it. Or anybody else, have the ability to segregate & recycle all its waste. Composting hase for not worked in India because of poor segregation & other reasons, although it has several advantages. In the long run, the world has no alternative to stop creating waste.

Since this is hard, in the short to medium term, OTE plants seem to be the only alternative to take care of what cannot be reared or recycled or composted. This is why incretion becomes as safe as possible.However, for non-organic and mixed waste incineration the only way out. This is the logic that is followed in developed countries. "It is always a comparison between alternatives". Says RanjitAnnepu, who studied India's waste problem at Columbia University. "the problems with the waste to energy plants come down to how the operator is operating the plant & how they are regulated.

As early as 1984, a plant was set up in Delhi with technical help from Denmark. This was closed down dee to administrative and technical reasons, selco set up a plant in Hyderabad in 2002 &srisam energy set up another plant in the same year near Guntur in Andra Pradesh. Both of them closed down due to financial reasons. Jindals was set up in 2007 & it has met with opposition none of these means that the idea does not work.National Environmental Research Institute, "We cannot say that the technology does not work".Kumar is a waste-to energy researcher & is convinced that it is a good way of using up waste that cannot be disposed of in other ways. WTE plants in developed countries are located in heart of cities & they operate without significant public opposition. Opposition in India boils down to a few key issues. Smell, pollution, low calorific value of was be … experts say that none of these should really matter in a well – run plant. But if not well run, WTE can become dangerous device.

Smell usually comes from the waste during transportation & is one of the easiest problems to handle. In developed countries, waste is always transported in closed containers or underground & hence does not smell pollution comes from burning & current technology allows bringing it down to low linnets. High temp above 850^0c – ensure that cancer – causing dioxins & furans are no produced & a scrubbel prevents the fly ash from going through the smoke stack. Some fly ash need to be disposed to safely, but it reduces the landfill requirements by abut 90%. Indian waste is of low calorific value because of the high moisture content, and some energy goes towards removing the water from the waste. Western technology cannot deal with this waste well, and it is why Chinese technology is popular among Indian companies. Says Sastry: "The Chinese have optimised the technology for high moisture content."Ramky is among the companies building new waste-to-energy plants around the country. Such plants will be a key part of the country's waste manage .

VI. CONCLUSION

The burning of plastics from the above process gives raise to a effective electrical energy with an efficiency of 14%, which is equivalent to solar cells efficiency, with long life of about 80 years.The closed type recycling process gives a pollution free generation,suitable for developing countries just like India where can

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have maximum population. Also the identification of plastic material for burning process can make the important thing for open fires.

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