

COMPARATIVE EXPLANATION OF GASIFICATION AND INCINERATION

Introduction and Background

Biomass waste is a term for such material as agricultural and forest byproducts (rice hulls, cotton stover, sugar cane bagasse, wood bark and saw dust, etc.) and the sorted, non-toxic, burnable portion of municipal solid waste. These waste streams represent both an asset, when used as energy, or an environmental liability, when improperly or overly disposed. The energy potential represented by biomass waste is estimated at 2,740 quadrillion British Thermal Units (Btu's), while the total annual world consumption of energy from all sources is estimated at 340 quadrillion Btu's. At present, only about seven percent of the world's production of biomass is converted into energy. Disposition of these biological products in capacity-limited landfills creates a myriad of adverse environmental impacts; atmospheric pollutants from landfill decay, ground and surface water contamination and uncontrolled bacteriological and algae growth.

This paper will focus on the beneficial use of a single biomass waste stream, the burnable, non-toxic portion of municipal solid waste or MSW.

In reaction to the energy crisis of the mid-70's, several "trash to energy" facilities were constructed both in the United States and internationally. Most of these facilities were designed with an energy conversion process called "mass burn" or "mass trash". Under this approach, all the material, which is received from the route trucks that picked up the MSW, is dumped into a reaction chamber. The "mass trash", including potentially recyclable materials, is rapidly combined with air, or incinerated, within a single reaction chamber of differing design.

During the past several years, a global concern has been raised regarding the potentially harmful effects from the process of incineration. These warning flags of concern have been waved by such politically active groups as Green Peace, World Wild Life Association, the Audubon Society, etc. Perhaps, with a better understanding of the environmental pollutants, the chemical constituents, formation mechanism, methods