Effective Industrial Waste Utilization Technologies towards Cleaner Environment

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Abstract

An estimated 60 percent of all hazardous industrial waste in the United States is disposed of with a method called deep well injection. With this technique, liquid wastes are injected into a well located in a type of rock formation that keeps the waste isolated from groundwater and surface water. Other underground burial methods are also used for hazardous industrial waste and other types of dangerous waste. Hazardous wastes are disposed of at specially designed landfills and incinerators. This paper highlights the various sources of industrial wastes and its consequences on environment degradation. This paper also highlights latest developments in utilization of industrial wastes in different parts of the world.

***Keywords**: Hazardous waste, Potential hazards, Toxicity, Gasifier, Renewable biogas*

Introduction

The global waste management industry will witness unbalanced growth over coming years. Growth in developed nations will be strong as these countries have access to advanced information systems, waste management technologies and instruments. In Brazil, Chile, Argentina and Mexico, demand for air pollution control and water / wastewater management systems is expected to be particularly strong. In these regions, industry growth is slowed by the need for better collection and segregation systems to treat wastes at source, and the shortage of land for dumping. Moving forward, industry growth will be reliant upon creating awareness as to the importance of appropriate disposal of urban solid waste. [Simpi Basavaraja, Hiremath S.M., Murthy KNS]. In Brazil, Chile, Argentina and Mexico, demand for air pollution control and water / wastewater management systems is expected to be particularly strong. In these regions, industry growth is slowed by the need for better collection and segregation systems to treat wastes at source, and the shortage of land for dumping. [Mondal, M.K., Rashmi and B.V. Dasgupta]. The global waste management industry is characterized by a high degree of fragmentation, and competition in this sector is intense, with significant entry barriers to the market. Governments are under pressure to ensure adequate waste reduction and recycling are provided for, and that the amount of space used for landfills is limited so as to reduce the threat of encroaching on valuable natural resources. Waste-to-

energy technology is seeing increased levels of interest and investment, with private equity investments acting as significant growth drivers in the industry. [John Pichte]

Waste Management: Fact Sheet

** Worldwide figures for municipal wastes vary considerably due to inconsistent statistics and definitions. Municipal solid wastes (MSW) in general constitute about 14-20 percent of all wastes generated worldwide, with other waste types including construction and demolition wastes (30%), manufacturing (20%), mining and quarrying (23%), and others.

** Per capita generation of waste varies with a high of 5.3 kg/day for OECD countries to less than 0.8 kg/day in developing countries. But changing life styles, ineffective policies, lack of awareness, etc. may mean that this rate will increase exponentially over the next decade.

** UNEP's publication GEO-3 shows the MSW generation in Asia and the Pacific in 2032, using four scenarios - Market First, Policy First, Security First and Sustainability First - is expected to vary between 1.8 (for Sustainability First) and 2.5 (for Market First).

** Much of the wastes generated worldwide (57 to 85%) were primarily disposed in landfills, including open and engineered landfills. [Ramachandra, T.S., Shruthi B.V.]

Common Industrial Waste Sources

Some of the common industrial waste sources include:

• Chemical production
• Electric power generation
• Fertilizer and agricultural chemical production
• Food production and related by-products
• Iron and steel manufacturing
• Leather and leather product manufacturing
• Nonferrous metal manufacturing and foundries
• Plastics and resin manufacturing
• Pulp and paper manufacturing
• Rubber and miscellaneous rubber products manufacturing
• Stone, glass, clay, and concrete products production
• Textile manufacturing

Some Novel Initiatives

***** Gasification plant producing bio-fuel for transport in Sweden***

Valmet's indirect gasification plant developed by the Austrian company Repotec is the first of its type in the world had been commissioned in 2013 and gasifies forestry wastes and wood pellets. In this process, the gasification takes place in a separate reactor and heat is transferred from a combustion chamber by

circulation of hot bed material. Biomass is fed into the gasifier, where, on contact with the hot bed material, it undergoes thermo chemical decomposition.

***** Upgraded residential recycling facility in Canada***

The Cowichan Valley Regional District (CVRD) facility in Canada provides residents with access to one of the most innovative residential recycling facilities which accepts hundreds of products for recycling, mostly free of charge, as well as a 'Free Store' where items that are in good or repairable condition can be taken away free of charge.

***** Producing renewable fuels and chemicals from biogas and natural gas in Houston***

Houston, Texas based Waste Management (NYSE: WM) Waste Management's East Oak site in Oklahoma has formed a joint venture company to produce renewable fuels and chemicals from biogas and natural gas using smaller-scale Gas-to-Liquids (GTL) technology.

***** Waste wood pyrolysis plant to produce bio-oil in Finland***

Finnish sustainable energy company, Fortum had commissioned in Joensuu in Finland a new facility fast pyrolysis technology, in which wood biomass is rapidly heated in oxygen-free conditions produce around 50,000 tonnes per year of bio-oil from waste wood.

Conclusions

Many companies from various industries, including mining, manufacturing, and metallurgical and construction, generate plenty of waste materials that cannot be recycled, neither consumed. Because these large corporations operate at a wide scale, they produce massive amounts of liquid waste and other waste by-products. Therefore, it is extremely important for these companies to handle all disposal processes accordingly in order to prevent any further degradation of our planet and the environment. In addition to that, these giant corporations need to protect humans from dangerous contamination and even exposure to contaminants.

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