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Special Report - Municipal Solid Waste: Using Our Refuse

Report Overview

Subjects addressed:

- Opportunities & Benefits of MSW Resource Recovery and Materials Re-Use
- Environmental, Economic, and Policy Drivers
- MSW Disposition Methods
- Technology Description and Economics of Material Recovery and Refuse Derived Fuel (RDF) production from MSW
- Bio-Based Technologies & Economics to Utilize MSW or RDF for Energy, Fuels or Chemicals Production

Municipal Solid Waste (MSW) is a ubiquitous problem for society, but also represents a tremendous resource. While some progress has been made in resource recovery, power production by burning combustibles in MSW, and composting putrescible fractions, most MSW is still landfilled in the U.S. and other developed economies. Landfills generate multiple problems, including greenhouse gas emissions and water pollution risks, in addition to depleting valuable land resources. Thus, it becomes important to build efficient methods for recovering valuable resources from MSW as well as to develop better methods for MSW disposition.

It is well recognized that for key metals like aluminum and steel that require large energy inputs to mine and refine their ores, transport them, and produce the primary metal, separation from MSW and reuse is a very attractive alternative. Recycling processes are more efficient and less polluting than producing these materials from their original form found in nature. Accordingly, aluminum and steel have high recycling rates, as do PET and HDPE plastics. The report presents detail technology description and economics for recovering valuable recyclables from MSW streams.

As crude oil prices have been nearing \$100 a barrel, it is driving research and development efforts into bio-based chemical and polymer products. However, these bio-based renewable fuels and chemicals have their own societal push-back in that they are often seen as competing with food production. Also, they are challenged by the high costs of sugar, starch, or even biomass feedstocks to compete with the incumbent petrochemical-based commodities. Nexant has had much to say about less costly feedstock alternatives such as the organic, mostly paper, fraction of MSW. These materials, when separated from the metals, plastics, glass, and wet food and yard wastes, in bulk or pelletized, have been used to

supplement fossil fuels in boilers, but as discussed in this report, RDF from MSW is now increasingly being explored as feedstock in various bio-renewables processes.

Such RDF can potentially feed gasification, pyrolysis, fermentation, chemical treatment, or hybrid routes in excellent substitution for virgin lignocellulosic resources at much lower, or even negative costs.

Nexant has undertaken a new study that explores the opportunities for using RDF to less expensively replace conventional carbohydrate or lignocellulosic crops and wastes as feedstocks for chemicals and fuels. This report describes and analyzes the technologies and model and analyze the economics of recovering various material and energy resources from MSW. It also looks at utilizing MSW's organic fractions as biomass resources for producing energy, biofuels, and renewable chemicals in a variety of key ways. Nexant also reviews policy and market trends that are affecting the composition of the waste stream.

Nexant's report, ***"Municipal Solid Waste: Using Our Refuse"***, is a comprehensive study investigating and evaluating a wide spectrum of aspects of MSW and separating and using its valuable components.

This report is useful to firms or agencies aiming to reduce the carbon footprint of their wastes or to replace more expensive biomass feedstock with easily available MSW feedstock for producing renewable fuels and/or chemicals. The report investigates and evaluates issues, statistics, technologies, and economics involved with MSW resource recovery, including:

- Opportunities and benefits of resource recovery from MSW and materials re-use – metals, plastics, and cellulose
- Environmental, economic, and policy drivers
- Composition and disposition of MSW and trends – life styles, packaging, increased plastics use, waste-to-energy
- Technology Description and Economics of Material Recovery and Refuse Derived Fuel (RDF) production from MSW
- Bio-Based Technologies & Economics to Utilize MSW or RDF for Energy, Fuels or Chemicals Production – thermochemical, enzymatic, chemical, and hybrid

For information regarding ***"Municipal Solid Waste: Using Our Refuse"*** report, please contact STMC@nexant.com.

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