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Waste management for power generation


Solid waste management SWM is one of the most significant challenges being faced by the world today. SWM hierarchy consists of reduction of waste volume, reuse, and reduction of the toxicity, recycle, recover energy; waste disposal in an environmentally sound manner. Waste incineration to heat is an effective conversion of large volumes of combustible waste, simple and robust process, consequently the heat produced can be recovered to generate steam or electricity. This leads to saving conventional fossil fuels. Good in densely populated urban areas where large sites suitable for landfilling are not available. Waste incineration suffers high capital cost and skilled operators are required (particularly for boiler operations), considering that some of the waste materials are non-combustible, and then supplemental fuel would be needed. Public disapproval of incineration with the risk imposed rather than voluntary. Solid waste composting is biochemical process where organic materials decompose into humus like material, with aerobic organisms in mechanical digesters with the presence of oxygen.

This would save land footprint that can be needed to separate waste. This study is aimed at identifying evolving technological trends, competitor's distribution and technological convergence pattern between ICTs and SWM technology. This paper is organized into several sections, starting with the literature review in Section 2. Section 3 provides the answers to the research questions through analyses and discussion. Finally, Section 4 presents summary of conclusions of the paper.

Speaker Biography

Essam E Khalil has obtained his DIC (1976) and PhD (1977) from Imperial College of Science and Technology, London University, UK. Currently he is a professor of Energy in Cairo University since June 1988. Over 46 years of experience in design and simulation of combustion chambers for terrestrial and aerospace applications. He has published 13 books in English and over 880 papers in journals and conference proceedings on combustion, energy and indoor air quality control. He is a Fellow ASME, Fellow ASHRAE, and Fellow AIAA. And he is also a ASME George Westinghouse Gold Award recipient 2009 along with a ASME Harry Potter Gold Award recipient in 2012. He is director at Large ASHRAE, USA.

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Household waste recycling in Helsinki metropolitan area Finland

The separate collection system for recyclable wastes in the Helsinki Metropolitan region was ranked the second best in a study comparing recycling schemes of European capitals (European Commission 2015). The collection system includes paper, cardboard, glass, metals, biowaste and plastic package. Residual waste is collected and used in energy production. The collection system, excluding paper, is managed by the Helsinki Region Environmental Services HSY, a public organization owned by four municipalities (Helsinki, Espoo, Kauniainen and Vantaa). Paper collection is handled by the producer responsibility scheme.

The efficiency of the collection system in the Helsinki region relies on a good coverage of door-to-door-collection. All properties with 10 or more dwelling units are required to source separate biowaste and cardboard. This covers about 75 % of the population of the area. The obligation is extended to glass and metal in properties with 20 or more dwelling units. Other success factors include public awareness campaigns and a fee system that encourages recycling.

The separate collection of plastic packaging in Finland begun in 2016 within the producer responsibility scheme. HSY is supplementing the curbside collection point system with door-

to-door-collection. Pilot operations begun in the spring 2016 and has continued since then. Currently over 5600 apartment buildings have ordered door-to door plastic package collection service on voluntarily basis. HSY launched a proposal for new regional waste management regulations. In the proposal, the number of dwelling units required to source separate wastes is lowered to 5 or more dwelling units. New regulations are planned to come into force in 2021.

This paper describes the current efficiency of recycling and estimations of increase of recycling rate of household waste due to new regulations as well as results of LCA for cardboard, plastics and biowaste.

Speaker Biography

Kouvo Petri has published tens of referred technical articles and other technical reports. His PhD. work investigated the modelling of heavy metal emissions during the co-combustion of biomass, peat and waste. In his current position as a director of the Waste Management Division of the Helsinki Regional Environmental Services Authority he is responsible for the waste management of nearly one million people and several commercial properties living and operation in the Metropolitan area. In addition, Kouvo works as an associate professor at the Lappeenranta University of Technology, Finland. Kouvo is Chairman of the Board of Finnish Solid Waste Association (KIVO). In 2010-2012, Kouvo was a Member of the Board of International Solid Waste Association, ISWA.

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