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A Fourth Generation WTE Facility Designed for Energy and Materials Recovery:
The Amsterdam AEB Waste-Fired Power Plant
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Summary

This paper describes a fourth generation WTE facility, the Waste-Fired Power Plant (WFPP®) owned and operated by the City of Amsterdam. This plant is designed with the Best Available Technologies (BAT) to achieve the lowest possible emissions to air, water and soil, thereby creating the lowest possible nuisance levels to neighboring residents, offices and industries. The plant is also designed to maximize electricity production, and to recycle and recover the maximum amount of materials which include ferrous and non-ferrous metals, sand and granulate to produce building products and gypsum and salt from fluegas.

In addition the paper describes the design features applied to achieve the world's best energy efficiency and includes a discussion on the life cycle economic advantages of BAT applications and the positive effect of BAT on Green House Gas emissions.



Introduction

The Amsterdam Waste & Energy Company (AEB) is owned by the City of Amsterdam and operated on a self-sustaining, for profit basis. AEB and its predecessors have been in the waste management business since the late 1800's and designed, built and operated Waste to Energy facilities since 1919. Details can be obtained from AEB's 2006 Annual Report and

the brochure "Value from Waste", at the websites referenced at the end of this paper.

Late last year AEB started its fourth generation WFPP®, so named because it is designed to produce electric power with a net efficiency of 30%, and an overall material recovery of 98%, leaving less than 2% of the initial MSW feed, to be landfilled. The 530,000 metric tons WFPP® capacity raised the total annual capacity of the AEB facility to 1.5 million tons, making it the largest single WtE facility in the world. Robust AEB designs result in an actual availability of the facilities of 94% and keep maintenance cost down. Consequently AEB's tipping fees are the lowest in The Netherlands.

AEB also operates one of the cleanest plants in the world with stackgas emissions below 20% of the maximum permissible levels by the EPA. This factor and the low "nuisance factor" of the original plant enabled AEB to plan and build the WFPP® without a single protest by the local community or by NGO's.

The result of the very high energy production and material recovery rates of the WFPP® is a reduction in greenhouse gas emitted. The balance of direct emissions, biomass input and avoidance effects of the energy and materials produced, amounts to a net avoidance (negative emission) of 215 kilograms CO₂ per ton of MSW. This issue will be addressed in detail by Marcel van Berlo of AEB in another paper presented at NAWTEC 16.

In this presentation we will start with the overview of the most important aspect of AEB's operation, the environment. Following this we will present details of the high energy efficiency design, an overview of bottom-ash treatment and material recovery system and close with a review of the life cycle economics of the WFPP® operations.