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Ways to Improve the Efficiency of Waste to Energy Plants for the Production of Electricity, Heat and Reusable Materials

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Abstract

Up to now the emissions of waste-to-energy plants have been of major concern for the operators of waste incineration plants and the public. In Germany the emission standards for waste incineration plants have been very strict for more than 10 years, more stringent than for coal fired power plants, for example. Now the member states of the European Union are following suit with the same standards in accordance with European directive 2000/76/EC on the incineration of waste. Within a couple of years all European waste incineration plants will have to comply with the emission limits of directive 2000/76/EC. There is also legislation in the pipeline restricting landfilling of untreated waste.

In view of the discussions about CO_2 reductions the efficiency of today's Waste to Energy (WTE) plants should be improved, even though – or rather because – waste is regarded to some extent as "green power". With the same goal in mind the recovery rate of reusable materials from the incineration of waste or flue gas treatment should be improved. This will make it possible to reduce the amount of CO_2 generated by the production of these materials from natural resources and to conserve natural resources.

Goals of waste management in Germany and Europe

First of all, waste should be avoided. So when creating a new product one should already bear in mind how it can be produced without generating too much residual waste and also without using too much energy in the production process, which could cause contamination of the environment. And it should also be designed in such a way that the different materials used can be separated easily and thus recycled at the end of the product's lifetime.

Secondly, clean materials such as glass, paper, leather, scrap metal etc. should be collected separately in the home or within companies to enable these materials to be recycled easily without much effort to separate them from a mixture of different waste types.

Thirdly, waste that cannot be avoided should be treated in such a way as to produce RDF (residue derived fuel) or the waste should be incinerated directly.

From the year 2005 onwards landfilling will only be allowed for pretreated, inert waste to avoid leachates into the ground water or emissions of toxic gases into the atmosphere.

The ultimate goal for sustainable development will be no more landfill!

To fulfill these goals in Europe, a group of experts is working for the European Council on defining and describing the 'Best Available Technology'. The Waste to Energy plant MVR at Rugenberger Damm in Hamburg, Germany, is one of the examples of the state of the art of modern WTE plants [1, 2].

Description of MVR facility

The plant with a nominal annual capacity of 320,000 metric tonnes went into service in 1999. It was designed to comply with the following guidelines:

- Implementation of state-of-the-art technology
- Maximum energy utilization by cogeneration of electricity and heat