

21st August 2013

European Reference Model on Municipal Waste Management
Call for Information: Waste Treatment Systems

Dear Sir/Madam,

DG Environment at the European Commission, working with the European Environment Agency (EEA), has commissioned the development of a reference model of municipal waste generation and management for all EU Member States. The work is being led by Eunomia Research & Consulting, with support from the Copenhagen Resource Institute and Satsuma Media. The model will be used to develop scenarios to inform national and European impact assessments, and will be used to support Member State planning. Further information is given on the project website www.wastemodel.eu or the broad introduction to the wider work at http://ec.europa.eu/environment/waste/target_review.htm.

We have now gathered data from the greater proportion of Member States, consulting with the relevant Ministries of Environment, Environmental Protection Agencies and other Member State contacts who hold information of relevance to the modelling. There are certain areas where the data gathering from these sources was incomplete, and hence, the need for this wider information request. We would be glad to receive information in the form of completed responses to this questionnaire, or by providing us with relevant documents in electronic form. Please email all responses to info@wastemodel.eu by the 23rd September 2013.

Here, we are interested in receiving information on the **costs and performance of municipal waste treatment systems** operated in different Member States around the EU. If you operate a waste treatment facility, or have specific knowledge on treatment systems operated in any Member State, we would very much like for you to tell us about it.

We include the following waste treatment systems in the model:

- **For source segregated organic waste:**
 - Open air windrow composting;
 - In vessel composting;
 - Anaerobic digestion, with biogas used for:
 - Electricity generation only;
 - Combined heat and power generation;
 - Supply of gas into the gas grid / distribution network;
 - Supply of gas for use as vehicle fuel.
- **For mixed residual waste:**
 - Landfill;
 - Incineration with steam used for:
 - Electricity production only;
 - Combined heat and power generation;
 - Supply of heat only.
 - Mechanical and biological treatment (MBT), designated by type (all of which have some material recovery):
 - MBT1: Aerobic stabilisation, outputs to landfill;
 - MBT2: Aerobic biodrying to produce a solid recovered fuel (SRF);
 - MBT3: Aerobic biodrying to produce an SRF but also with plastics recycling;
 - MBT4: AD based facility;
 - MBT5: Basic sorting operation only with disposal of residues.

Before answering the questions below, please give your name, the organisation for which you work, and the country (or countries) about which you are giving information.

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For which countries are you giving evidence regarding municipal waste treatment systems?

Your contribution is intended to inform the modelling. It is not necessary to place the information in the public domain. If the information you are providing should be treated as confidential, please indicate whether this is the case below:

For the following questions, if you have information on different treatment facilities, please provide separate responses for each type of treatment.

Which treatment, and in which country, are you providing information about?

What is the capacity (in tonnes of waste per annum) of the facility about which you are providing information?

In which year did the facility commence operation?

What was the capital cost associated with the facility?

While costs for the construction of a Waste-to-Energy plant vary widely, the following is a typical range for the cost of a turnkey plant. For a plant built in Europe with typical layout and level of process automation. This excludes any specific architecture elements, costs of land or permitting of the plant, which can vary widely by location and project concept. The technology employed in these plants is fully proven, has a very high availability. All requirements regarding safe and efficient operation have been taken into consideration.

The capital cost range is between 500-1000€ per tonne per year of installed capacity.

Smaller plants will be on the higher end of this range or even beyond it, while larger ones have better economies of scale. But economies of scale cannot be utilised for all plants, as capacity is a function of local waste quantities, authority approval and other considerations respectively restrictions.

What is the cost of treating one tonne of waste in the facility you are providing information about, taking into account costs of operating the facility, any revenues from energy or material sales, the costs of treating / disposing of residues (including taxes on disposal / treatment), and repayment of the capital costs? If the costs you are reporting exclude any of these components, please indicate what the costs cover.

Are you able to provide a breakdown of the costs reported above? If you are able, please identify separately any revenues received for material or energy sales, any taxes paid or subsidies received, and any costs for disposal of residues?

Are the costs reported above affected by financial support offered through Regional Development Funding? If so, please describe the way in which they are affected?

If you are providing information about incineration, can you indicate the efficiency (net) of generation of electricity and generation of heat?

Waste-to-Energy plants are pushed by the R1 Formula to optimise their internal energy efficiency and seek the most efficient use for the energy they can make available externally. Unlike other technologies requiring energy-consuming waste pre-treatment or continuous addition of fuels, modern Waste-to-Energy plants can treat any residual waste, operate normally without extra fuels and have boiler efficiencies typically over 80%.

A typical new plant to be built, if it can be located where heat can be used, will have around 50% year-round efficiency. When less demand exists, cogeneration is usually applied and the ratio between electricity and heat varies.

Under the favourable conditions found in Northern Europe, where plants are connected to District Heating demand with high and long-lasting heat demand, or when connected to industrial heat consumers, new Combined Heat & Power or Heat-only plants recovering energy after the boiler can reach net thermal efficiencies of over 90%.

For electricity-only plants applying Best Available Techniques, new plants to be built under favourable circumstances can reach 25% gross electricity production efficiency. Internal electricity consumption being minimised, such a plant will put about 22% of the energy, contained in waste, as electricity on the grid. This electricity is supplied 24 hours a day and 7 days a week, with reliability and availability of over 90%.

While some new plants can have even better electrical performances, it is possible that other ones are built with lower parameters due to restraining factors such as size or location of the plant, which nevertheless have priority (e.g. limiting plant size to accommodate decreasing waste quantities) over energy production.

What is the source of your information to the above questions, and how has it been compiled?

ESWET Members' knowledge. The technology supplied by the ESWET Members is found in about 95% of Waste-to-Energy plants in operation in Europe and, via agreements, in the bulk of plants operating worldwide.

Are you aware of any specific studies, or reviews, on the costs of municipal waste treatment in the country, or countries you refer to? Do you have any relevant documents you can share with us, or link us to, that would help further inform us?

If you have other information of relevance that is not specified above, please provide this here:

Thank you for your time and support in strengthening this important work. As indicated above, all responses and documentation should be sent to info@wastemodel.eu. We apologise in advance that we cannot respond directly to all enquiries, but value your submission and will seek to use it to improve the work.