Municipal solid waste organic fraction management: A multicriteria analysis for societal performance

Anne-Lise Fevre-Gautier, Philippe Wavrer, Pascale Michel

Municipal solid waste organic fraction management: A multicriteria analysis for societal performance

A.-L. Gautier, BRGM, Ph. Wavrer, BRGM.

Abstract

The results presented here derive from the work conducted for an ongoing two-year research project funded by the French Ministry of Environment and started in 2011.
In 2007, 14% of French municipal waste collected by public services were going through organic valorization, when more than 60% of municipal residual waste (representing 153 kg of household residual waste per inhabitant and per year) could still undergo an organic treatment. To fulfill European and national commitments though, French biological treatment capacities for municipal solid waste should be doubled by 2015. This can be achieved via home composting, municipal waste organic fraction biological treatment (composting or anaerobic digestion) or mechanical biological treatment (MBT).
The deployment of these treatment capacities should however take into account local and territorial specificities in order to reach a sufficient level of waste management global performance, regarding economic, environmental and societal sustainability French and European commitments.

This project aims at performing a comparative assessment of scenarios including different biological treatment processes for municipal solid waste management in France. This assessment is focused on the global performance of the scenarios, in order to understand which organic fraction management mode, under which local or global conditions, can achieve the best performance for society. The objective is therefore to assess scenarios performance regarding environmental, economic, social and societal aspects of waste management sustainability challenges.

This analysis is based on a set of waste management scenarios for municipal residual solid waste, including biological treatment for the organic fraction. This set of scenarios also includes a reference scenario representing a usual way of managing municipal solid waste in France without any type of biological treatment. These scenarios are designed according to representative French waste management modes and include: private individual or collective composting, separate collection and biological treatment of organic fraction (composting or anaerobic digestion) and mechanical biological treatment of mixed wastes (MBT). They include a set of parameters used to perform sensitivity analysis in order to estimate the scenarios' global performance dependency on technical and contextual conditions, regarding for example: municipal waste composition, sorting efficiency, biological process performance, opportunities and constraints for process products valorization, treatment installations capacity, public services organization, etc.
The comparative assessment of scenarios is conducted via a multicriteria analysis built on a set of specific sustainability and performance indicators for waste management scenarios. These indicators aim at covering subjects such as energy efficiency (treatment processes, transports), health and ecology (natural resources consumption, emissions, effects of organic matter supplies to soils, etc.), economic equilibrium, quality of life, territory development, etc.

Expected results of this ongoing project should highlight the fact that the global performance of biological treatment doesn't only rely on technical process performances, but also on the adequacy level between waste composition, territorial organization for municipal solid waste treatment and local specificities regarding societal aspects of households waste production, sorting, collection and treatment.Therefore one of the conclusions should be that waste management scenarios including biological treatment should be designed according to territorial specificities in order to optimize its global performance, and national waste policy should consider global performance targets recommandations instead of process implementation requirements.