

# Options for the treatment of principal fractions of the municipal waste considering the local framework

## Introduction

It is a common practice and part of the concept to achieve a sustainable environmental management to plan the management of waste taking the local framework, present conditions and state with regard to waste management, formulated waste management objectives and the (technical) options available to achieve them as the main basis. Programmes and strategies which were developed for environmental protection and the waste sector at national level oftentimes provide the necessary information and entrance points for this task. The information tool presented here aims to support planners and decision makers in their search for the procedures and technical options available to design an integrated waste management system and realise the collection, transportation, utilisation and disposal of the waste in the most efficient and cost-saving manner. The information provided over this tool contain practical tips and remarks concerning the applicability of a certain process or technology in view of specific local requirements and limitations that might be imposed on them from certain regional particularities.

To obtain an overall picture and cover most of the aspects a good waste management planning would have to incorporate, some additional statements have been added on cost recovery issues and financing possibilities, possible measures to prevent the generation of waste and to optimize treatment needs and recycling. Application areas and suitability of approved technologies and equipment with regard to the management of different waste streams and existence of certain framework conditions are characterized at the entrance to the technical descriptions contained in each fact sheet. However, technologies and equipment are just parts of an overall system whose effectiveness and success needs to be guaranteed under varying environments and for a multitude of different waste material and sources of generation. It is therefore the greatest challenge in planning to come to a selection of the individual technical elements appropriate to achieve given waste management targets vis a vis the local conditions and needs and to fit them together to obtain a complete, integrated and functional management solution for all the different waste streams

generated by society in a certain area. A waste management system deriving from such an approach would not only set a good example for the intelligent combination of information as provided in this documentation but should have all chances to be well accepted and successful in meeting the ambitious environmental objectives of a modern waste management policy.

## Treatment options for the different fractions of the municipal waste stream

With examples of purposefully assembled waste management solutions that draw from the technologies and details described in the individual fact sheets and other technical sections, users are given more than just a pool of information from which the most interesting details can be chosen by them and set into a context to each other. The examples shall demonstrate how the data provided can be used in designing an integrated waste management system. A first step towards this goal is that different single options for the handling of the various waste fractions of the municipal solid waste are being explained whereby the incorporated technical components may get affirmed through links to the respective technologies.

The objectives and basic directions of the waste management legislation in Europe (see section on “[Guiding principles of European waste policy](#)”) provided the principal orientation for selecting these technical options. They stand for European best practices in municipal waste management and the commitment of Germany and the EU member states to depart from the conventional route of waste disposal through landfills as the worldwide most widely availed waste management solution until to date. The wider spectrum and variability of *options* for one and the same fraction of municipal waste shall illustrate the existence of various alternatives to handle a waste and the possibilities this entails to make consideration of local conditions and particularities in the planning process. The necessity to dispose of different treatment options derives from the rising complexity of the waste at global scale and the ultimate goal that our natural resources must be saved and waste more effectively be collected and utilised for this. It is a very important fact in this respect that also the waste generated in the yet less developed regions of the world, including those in remote and very rural areas, tends to show material compositions and concentrations of hazardous substances now which have so far been typical for urban dwellings only. What however remains at the same time

are the badly developed infrastructure and conditions for a proper waste management in these areas which obstruct the possibility for adequate reactions and precautions and lead to even new forms of environmental risks and destruction. When defining the different options for the treatment of different types of waste, a particular attention was paid on the material separation at source. In that way a good amount of awareness shall be created for the fact that waste separation at source is very often a pre-condition to avail of different treatment options and that already existing forms of waste diversion and material recovery still have their meaning and should be maintained and enhanced even where a modern waste management system is going to replace a rather outdated or traditional model of waste management.

The presentation of the different treatment *options* is taking its start from the main fractions which make up the municipal solid waste stream. By following this approach, the available alternatives within the scope of one specific waste stream, such as packaging waste can be described. A separate collection and transportation of each single material fraction in the municipal waste as the beginning of a material specific treatment won't be a feasible model though. While separate treatment schemes might indeed be applicable to specific waste fractions, one has to consider that a single technical option can serve different waste fractions at once and in this way most efficiently be employed. Waste incinera-

tion and mechanical-biological waste treatment are illustrative examples for this. Both technologies allow treating mixed household waste and bulky waste at the same time. Obtaining a profound knowledge of each treatment option is thus one part of the planning job. The other part is to get a complete picture on waste generation and develop a holistic view on the entire municipal solid waste stream and for the useful matching of the various options available to have this stream including its different components managed in the most efficient and environmentally-benign way. To facilitate both, treatment options for the different fractions of the municipal waste are first illustrated individually whereas examples of their useful combination to obtain integrated, all embracing waste management systems adapted to different local environments make up another section of this information tool.

The compilation of these overall *scenarios* for an integrated waste management can be regarded as a final synthesis of the information provided over this tool. To follow the logic behind this synthesis it will be useful that users first make themselves acquainted with the description of technical options for the treatment of the single waste fractions of municipal waste. The links to these descriptions can be found in the last column of the following table and have been further integrated in the scenarios as appropriate.

Table 1: Overview of main technological options available for the treatment of municipal waste fractions

Waste fraction	Management options		Option
	Collection mode	Way of treatment	
Household waste	collected as mixed residual waste	sent to mechanical-biological treatment	<u>1</u>
	collected as mixed residual waste	sent to incineration	<u>2</u>
	collected as mixed residual waste	sent to mechanical-biological treatment via waste transfer station	<u>3</u>
	collected as mixed residual waste	sent to incineration via waste transfer station	<u>4</u>
	separate collection of the dry (recyclable) components and of the (wet) remainder	dry components sent to a sorting facility, remainder is forwarded to mechanical-biological treatment or to incineration	<u>5</u>
Organic/bio waste	collected separately at source	sent to a composting facility	<u>6</u>
	collected separately at source	sent to a facility for biodigestion	<u>7</u>
Packaging waste	collected in a mix separately at source	sent to a sorting facility for the segregation and recovery of recyclables	<u>8</u>
	different material components collected separately at source	sent to different sorting facilities for a refining and processing for recycling	<u>9</u>
Bulky waste	collected in a mix separately at source	sent to incineration	<u>10</u>
	collected in a mix separately at source	sent to a sorting facility for the segregation and recovery of recyclables	<u>11</u>
	collected in a mix separately at source	sent to mechanical-biological treatment	<u>12</u>
C&D waste	collected in a mix separately at source	sent to sorting facility for segregation and generation of usable material fractions	<u>13</u>
	different material components collected separately at source	partly on-site processing and utilisation, remainder sent to external recyclers	<u>14</u>