



LIFE EMaRES - Enhanced Material Recovery and Environmental Sustainability for Small Scale Waste Management Systems

LIFE12 ENV/IT/000411



[Project description](#) [Environmental issues](#) [Beneficiaries](#) [Administrative data](#)  
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Contact details:

Project Manager: Francesco DI MARIA  
Fax: 390755853703

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Project description:

Background

Waste management is a complex activity involving economic, political, social, health care and environmental aspects. The environmental aspects are related to solid, liquid and gaseous emissions, as well as natural resource depletion. Biodegradable waste components can produce large amounts of greenhouse gases (GHG), such as CO<sub>2</sub> and CH<sub>4</sub>. In the EU, gaseous emissions from waste landfills are responsible for 3-13% of the Member State anthropogenic GHG emissions.

If properly managed, however, biodegradable waste can also be an important resource for renewable energy production. Depending on specific features (such as moisture content), it may be possible to exploit it as a fuel in anaerobic digestion facilities of waste-to-energy plants, or as a fuel for transport/collection vehicles. In both cases, the biochemical potential of the biodegradable waste can be converted into renewable energy, making an important contribution to the reduction of global GHG emissions. Furthermore, if correctly managed, bioreactor landfills can also be an efficient and sustainable solution for reducing negative impact on the environment. With an alternating sequence of aerobic/anaerobic phases, it is possible to reduce GHG from landfills, as well as increase energy recovery efficiency from the landfill gas.

Another relevant area of waste management is the reuse and recycling of the different waste materials. After waste prevention, reuse and recycling are the main objectives of the Waste Framework Directive 2008/98/EC.

## Objectives

The EMaRES project focuses on the problem of waste management in those areas that have no incineration facilities, and where residual waste is managed mainly by mechanical biological treatment (MBT) and landfill. The aim is to demonstrate the potential to increase material recycling and recovery, while reducing landfill needs through innovative concepts in waste collection, mechanical sorting, biological treatment and landfill management. Project activities involve the whole waste management system, including source segregated (SS) collection, recycling, MBT and final disposal. Sustainable landfill management can be efficiently pursued if the amount of recycled and recovered waste material is maximised and if the residual disposed waste fraction is compatible with an optimal sustainable landfill management concept.

Specific objectives are to:

- Increase the amount and quality of waste collected in a SS way, reducing the environmental impact collection;
- Increase material recycling by improving the selection efficiency and effectiveness of the mechanical sorting section of an existing MBT plant;
- Improve the aerobic biological section of an existing MBT plant by introducing preliminary anaerobic digestion treatment;
- Decrease the environmental impact of landfill and the amount of waste disposed.

Expected results: Source Segregate collection: 1. Increased the quality of SS collected waste by reducing the amount of impurities from the current 9% to no more than about 5%. 2. Increased glass recycling to almost 90%. 3. Improved paper and cardboard quality for direct use in the paper industry. 4. SS collection of 80% of used cooking oil to be used as fuel. 5. Development of an energetic, environmental and economic tool able to support policy decisions in waste management.

Mechanical Sorting efficiency: 1. Increase of at least 20% in the amount of recyclable materials. 2. Improved the MS section dedicated to the treatment of mixed residual waste by achieving an increase of at least 20% in the recycled and recovered fraction from residual waste.

Biological treatment section: 1. A self-sustainable energetic biological treatment section. 2. Energy consumption of the existing aerobic treatment section reduced by 15%. 3. A 20% increase in the amount of high-quality organic fertiliser produced.

Bioreactor landfill: 1. Mass of waste disposed per unit volume increased by 50%. 2. Biogas and biomethane production period reduced by 50%. 3. Leachate-polluting load reduced by 50%. 4. Sustainable emissions level for landfill sites achieved in seven years.

## Results

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Environmental issues addressed:

Themes

Waste - Waste reduction - Raw material saving

Keywords

waste management, waste collection, separated collection, raw material consumption, residual waste

Natura 2000 sites

Not applicable

[Top](#)

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Beneficiaries:

Coordinator	Università degli Studi di Perugia - Dipartimento di Ingegneria Industriale
Type of organisation	University
Description	The University of Perugia's Department of Industrial Engineering consists of 35 research staff, including professors, associate professors and assistant professors (researchers), as well as 30 temporary researchers. Research is mainly focused on machine design and construction, turbo and volumetric machine analysis, energy conversion systems based on fossil and renewable energy sources, energetic exploitation of biomass, and waste management.
Partners	Gestione Servizi Nettezza Urbana GESENU Spa, Italy Comune di Magione, Italy Trasimeno Servizi Ambientali TSA Spa, Italy Regione Umbria, Italy

[Top](#)

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Administrative data:

Project reference	LIFE12 ENV/IT/000411
Duration	02-DEC-2013 to 01-JUN -2016
Total budget	1,352,107.00 €
EU contribution	657,258.00 €
Project location	Umbria(Italia)

[Top](#)

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Project web site [Project's website](#)

[Top](#)

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[Project description](#) [Environmental issues](#) [Beneficiaries](#) [Administrative data](#)  
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