



newsletter

Energy exploitation of non-recyclable urban waste in a sustainable waste-to-energy market "ENERGY-WASTE" (LIFE09/ENV/GR/000307)

The project

The core aim of the project is to study, develop and implement an advanced gasification concept for the energy exploitation of the non-recyclable stream of modern recycling factory. The whole process will be designed, implemented and monitored by W.A.T.T. S.A. and the Centre for Research and Technology Hellas / Chemical Process and Energy Resources Institute (CERTH/CPERI), with a major mobilization of the Region of Central Macedonia (RCM) that will disseminate the project's results and assess the business opportunities of waste energy utilization, together with the European Renewable Energies Federation (EREF).

The concept

European Directive 1999/31/EC aims to prevent or reduce the adverse effects of waste on the environment, by setting strict rules on the disposal of untreated Municipal Solid Waste (MSW) and forcing a reduction of the biodegradable quantities disposed off to landfills. The production and thermal utilization of SRF from non-hazardous bioresidues, could be a key element in an integrated waste management concept. The main premise of this project is to generate electricity from the non-recyclable fraction of urban waste, which otherwise is disposed at landfills.

The two predominant thermal treatment technologies for energy recovery from secondary waste derived fuels are waste incineration and the more advanced gasification technologies for higher efficiency and potential reduced costs for meeting environmental emissions regulations. The innovative aspects of the proposed project address two areas:

- a) Innovative integration of state of the art technologies (MSW recycling, waste gasification and potentially a biogas power plant) and
- b) Preparation of a classified Solid Recovered Fuel (SRF) from non-recyclable waste and its subsequent utilization with thermal treatment (gasification technology)

The challenge

Demonstrating the safe, efficient and sustainable exploitation of non-recyclable waste as a renewable energy source

Treating thermally a low quality waste fraction in a gasification facility, eliminating the need for its end-disposal and transport over long distances to end-users
Eliminating the need for gas cleaning, a process which has been the main problem that still hinders a widespread utilization even of biomass gasifiers, by evaluating the potential of direct combustion of fuel gas produced by the waste gasification in an existing electricity generation biogas plant.

Assessing the co-habitation of the gasification plant, the MSW recycling facility and the biogas plant to provide a controlled outlet for all disposal streams originating from the gasification and power cycle subsystems

Taking advantage of new opportunities and increased maturity at the institutional and entrepreneurial environment

The target

ENERGYWASTE by its completion aims to fulfill the following objectives:

- Mechanical treatment of the residual urban waste from W.A.T.T.'s factory towards the production of RDF/SRF, according to the standard EN/TC 343.
- Characterization and standardization of produced RDF/SRF according to the developing standard EN/TC 343.
- Development and erection of pilot scale gasifier and commissioning for gasification of RDF/SRF
- Gasification of the classified RDF/SRF to produce a combustible gas potentially used in the existing biogas collection network for electricity generation in Ano Liosia.
- Demonstration of the RDF/SRF energy exploitation technology, which meets serious difficulties for implementation in Greece, while being widely applied in other EU countries.

Environmental impact assessment of the proposed action and dissemination activities to promote the energy exploitation of urban waste and/or other residues. The replication potential of the proposed project in Greece and other EU countries will be investigated, as well.

The methods

Know-how transfer: Transfer of knowledge will be performed from other areas having applied innovative approaches for the electricity generation from waste recovered fuels and from relevant EC funded initiatives in the EU. Good practices will be identified, studied and their key issues will be applied in the organization of the whole waste exploitation chain from SRF production to electricity generation.

Public consultation and networking activities: These activities will ensure that aspects and particularities at local level are successfully addressed and that the proposed scheme achieves to get the maximum level of support from all interested parties – local stakeholders and municipalities – and the general public, to enable synergies and building consensus that will maximize the positive effects of the project. Furthermore, these activities will constitute the base on which the business

scenarios will be developed and integrated into one or more collaboration schemes. A strong European dimension is ensured by the participation of EREF.

The conversion of non-recyclable urban waste to a fuel ready form for energy recovery: Based on the coordinating beneficiary's previous experience, the non-recyclable waste will be transformed to a Solid Recovered Fuel (SRF), the properties of which will be harmonized according to EN/TC 343. Towards that direction, the expertise of CERTH/CPERI's personnel through its participation in the CEN Technical Committees will be explored.

The design, construction, commissioning and initial testing of the gasification unit: Using the vast experience of the coordinating beneficiary on construction projects of real renewable energy applications, a gasification unit will be built. Related infrastructure, such as flue gas cleaning systems and measurement equipment will also be installed.

Pilot testing and evaluation of gasifier's performance: The coordinating beneficiary assisted by the CERTH/CPERI operates the gasification unit and monitor all operational data and emitted pollutants values. The tests will run for a significant period of time (at least 100 hours of operation). The collected results will be analysed and evaluated in terms of the proposed scheme sustainability and environmental benefits.

Development of a review and sustainability analysis to form guidelines for the continuation of the plant operation and the development of new collaboration schemes after the project execution. CERTH/CPERI will have the leading role to assess the sustainability of the proposed scheme under technical, environmental, economic and social terms. Impacts on CO2 emissions with regard to the EU 20-20-20 target will be evaluated. Furthermore, a replication guide will be produced which will address all aspects, constraints and indicators needed for an effective application of the acquired knowledge into other areas of Greece and Europe in general.

Dissemination activities for the facilitation of the project execution and the diffusion of project results: A project website will be developed that will provide access to all project reports and deliverables. Project dissemination activities also include the organisation of workshops and round table discussions, the presentation of the project in major national and international conferences and exhibitions and the organisation of three major dissemination events half way and towards the end of the project.

Project management activities which will ensure the proper execution of the project in terms of actions, financial resources and time-wise. W.A.T.T. is the coordinator, while CERTH/CPERI will assist the technical coordination.

The team

WATT S.A. Waste Applied Technologies and Transport (former ΕΠΑΝΑ SA) is a company active in every step of the procedure of the treatment of non-toxic, non-hazardous solid waste. The main activity is the processing of municipal packaging waste deriving from

the blue bin of the Greek Green Dot Company (EEAA SA), and commercial and industrial non-hazardous waste. The procedure entails the sorting of collected waste, such as paper, plastic, metal and glass packaging and containers, according to each category, by using special equipment for material recovering. The next stage is the forwarding of the materials for reuse and recycling to the final recipients, according to the guidelines of the EU statutes.

Centre for Research and Technology Hellas / Chemical Process and Energy Resources (CERTH/CPERI), a research institute which is the main organization for the energy exploitation of solid fuels and their by-products in Greece. CERTH/CPERI's role will mainly concern the classification of SRF and the technical assistance in the design, erection, operation and monitoring of the gasification plant. Its expertise in solid fuel thermal treatment technologies is essential for the successful implementation of SRF production and gasification project.

The **Region of Central Macedonia** which has major experience in the implementation of research projects focused on the environment, technology, human resources and other areas. The Region of Central Macedonia will mainly be responsible to investigate the replication potential of the proposed project in Thessaloniki, meeting in parallel the demands for the SRF specifications according to the local waste properties. The Region of Central Macedonia will also act as the main liaison between the stakeholder responsible for the waste processing and the potential users, such as the local Municipalities. The Region of Central Macedonia will also have a key role in the dissemination of the project to the general public. What's more its role will be essential in the exploitation of the project results and its continuity after LIFE program funding.

The **EUROPEAN RENEWABLE ENERGIES FEDERATION (EREF)**, a federation of associations from EU Member States, which are working in the sector of energy produced from renewable sources, such as small hydro, wind, tidal, wave, bio-energy, solar and geothermal sources. EREF represents at present approximately 17,000 MW of installed capacity in RES electricity in the EU and is representing a growing share of renewable energies in heating and cooling and in the transport sector. EREF has taken on the task to support the renewable energy industry by legal action in the European institutions as well as in Member States.

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