Fonds Régional de Développement Européen
European Regional Development Fund

ICE
INTELLIGENT COMMUNITY ENERGY

Interreg
France (Channel Manche) England

EUROPEAN UNION

ICE PROJECT OUTPUTS DESCRIPTION

EXCEL GASIFICATION TOOL

MONTH YEAR

BRETAGNE DÉVELOPPEMENT INNOVATION
SDEF
TECHNOPÔLE BREST-IROISE
Technopole Quimper-Cornouaille
PÔLE MER
UNIVERSITY OF EXETER
PLYMOUTH UNIVERSITY
UEA University of East Anglia
marine

ICE report OUTPUT :

Excel gasification tool

Background information

Valorising Waste to energy is the last step, according to the European Union's "Waste Hierarchy", where a valorisation of waste is possible. Landfilling waste (in controlled landfill or not controlled dump) is the main waste treatment in the world, however, waste-to-energy valorisation is almost only performed by "high income" countries (Gross National Income > 11 k$/cap)[1].

In the particular context of isolated territories, fossil fuel is imported to produce electricity, while in the majority of the cases, waste are exported to be properly treated on the continent. These two aspects conduct to high cost for energy production and waste treatment.
The idea is to identify on isolated territory what is the share of waste that could be valorise on site, in order to evaluate the production of renewable electricity and heat, and to design the gasification unit and cogeneration.
In order to provide a solution suitable for big as well as for small territories, the technology selected is the downdraft fixed bed gasification reactor, which known a worldwide development during World War II, and is able to cover electricity production from few kWe up to 1MWe using 1 reactor. A set up in parallel of several reactors allows to reach any power desired.

The idea of the creation of the tool succeeded a study on the Ushant Island to assess the potential of waste wood collected locally and exported, which could be rather valorized on the island, in order to produce renewable energy (electricity and heat).

SYSTEM/TECHNOLOCY SPECIFICATIONS

The tool consists of an excel file, with the aim to provide a quick estimation of a waste-to-energy unit in terms of:

- Quantities of fuel
- Size of the unit
- Energy available : electricity and heat
- Needs in terms of preparation, residues
- Economical estimation (CAPEX, OPEX)

The user of the file need to enter as input data :

- **amounts of wastes, and quality: moisture, ash content, inert content**
- Needs in terms of energy availabity required : all year long or a defined period (e.g. only in winter)
- The characteristics of the territory :cost of importation, current cost of electricity, cost of waste treatment, cost of Full-Time Employee…

[1] D. Hoornweg, P. Bhada-Tata, and A. Joshi-Ghani, "What a waste: A global review of solid waste management," Washington, DC 20433 USA, 2012

ANTICIPATED AND/OR RECORDED IMPACTS/ BENEFITS

The anticipated benefits are :

- Increase knowledges for isolated territories of such technology to both valorise waste, and produce renewable electricity and heat.
- Provoke the emergence of local, small-scale unit in isolated territories
- Increase, in the end, the self-reliance of territories

ANTICIPATED AND/OR RECORDED CHALLENGES

The anticipated challenges are :

- Territories must have the will to take in charge this project
- On the renewable energy point of view : Valorising waste to energy is not as easy as installing photovoltaic plant or windmill, although it can produce energy regardless of the external conditions : night/day, winter/summer… as long as there are waste/biomass available.
- On the waste treatment point of view : Valorising waste to energy is sometimes considered as incineration, which requires high level of pollutants controls, which are expensive for a small unit, and for an isolated territories.