

Publishable Summary

OPTIPOLYGEN developed information, technical, financial and investment guidelines for promoting polygeneration applications in the food industry.

Polygeneration is the use of multiple energy inputs to transform them into multiple energy outputs in useful forms.

Cogeneration of heat and Power –CHP- and tri-generation are more specific forms of polygeneration. Polygeneration includes also the generation and use of e.g. biogas or the combined use of solar energy with biogas and natural gas to provide the electricity, heat and cooling needed by an activity. OPTIPOLYGEN project has the goal to investigate the applications of polygeneration in the various food industry sectors and to built tools, data and guidelines needed to promote polygeneration applications in this specific industry sector.

Database

A database of successful polygeneration applications in the food industry has been built and successfully operate on the web. OPTIPOLYGEN database makes a step forward compared with existing similar databases; Is focused in the food industry sector and contains classified information concerning significant detailed data for every project together with operator contact details. In this way every interested can find polygeneration applications operating in similar processes together with technical and financial data and contact details of the operator. Thus the interested potential investor can gain input from the experiences of the existed polygeneration operators.

Data base is accessible free of charge in the website of the project at www.optipoygen.org

Technical issues and investigation of RES applicability in the various food sectors. Guidelines for applications. Technology gaps. Training and educational material.

All the currently available polygeneration technologies have been examined in terms of their suitability and applicability in the various sectors of the food industry. Several case studies in specific industrial plans have been prepared and presented showing to interested stakeholders the benefits and the problems which arise when polygeneration application is thought. Specific check lists and guidelines have been prepared and are ready for use by the interested bodies to help developing polygeneration in the food industry.

Training and educational material for polygeneration applications in the food industry has been also developed and used in the context of project dissemination in several dissemination and training events.

Interactive web-site. Calculation tools.

To serve the needs of project dissemination results, an interactive web-site has been developed and is maintained for use by the public. All project deliverables are available there for downloading. On top of this an interactive calculation tool is available there for initial estimation calculations for potential of polygeneration application in the various food industry sectors. With the help of this calculator the user can perform simple viability calculations by inserting operating parameters of a specific food plant. Thus initial estimations are possible before seeking for specialized advice.

Potential of Polygeneration applications in the European Food industry.

Although experiences of the existing polygeneration project operators which are accessible through the project database may be vital for a potential investor, the potential of polygeneration applications in the European area is of interest for other stakeholders like e.g. equipment and system manufacturers, contractors or policy makers. The technical potential of Polygeneration in the food industry of the EUR-15 states has been examined and presented. This part of the work has been exclusively focused on the examination of the technical polygeneration potential based on the currently available equipment and the size and energy needs of the food industry split by sector and country. Other parameters like e.g. electricity and power pricing policies etc have not been taken into account in this part of the work. All these other parameters can be however taken into account and specific guidelines have been set up in the subsequent project results.

Results show that about $73 \cdot 10^3$ GWh electricity per year can be polygenerated in the EUR-15 states. About $40 \cdot 10^3$ GWh el can originate from typical co-generation applications, $15 \cdot 10^3$ GWh el from tri-generation based systems which meet the cooling and freezing needs of the industry and about $16 \cdot 10^3$ GWh el can be produced if the waste streams of the by-products are to be used as biogas or biomass based electricity generation systems. Less than about 25% of this potential is currently exploited while the rest 75% is still unexploited. Details of the results of this part of the OPTIPOLYGEN work can be found in the project deliverables in www.otpipolygen.org.

This work shows that polygeneration can provide up to 70-80% of all the energy needed by the food industry in the EUR-15 countries. About 20% of this energy can originate from wastes originating from the process itself. More than 75% of this potential remains unexploitable. Emission savings by polygeneration application in the EUR-15 food industry can save up to 10.000 ktonnes of CO₂ per year. To harvest this potential policy measures are needed mainly in the energy and power pricing.

