

# **Thermoeconomic and environmental analysis of district polygeneration systems with seasonal thermal energy storage and high solar fraction**

Reference ENE2010-19364

- **Funded by the Ministry of Science and Innovation – Energy National Program**
- **1 January 2011 - 31 December 2013**
- **Coordinated by:**

**Luis M. Serra and Miguel A. Lozano**

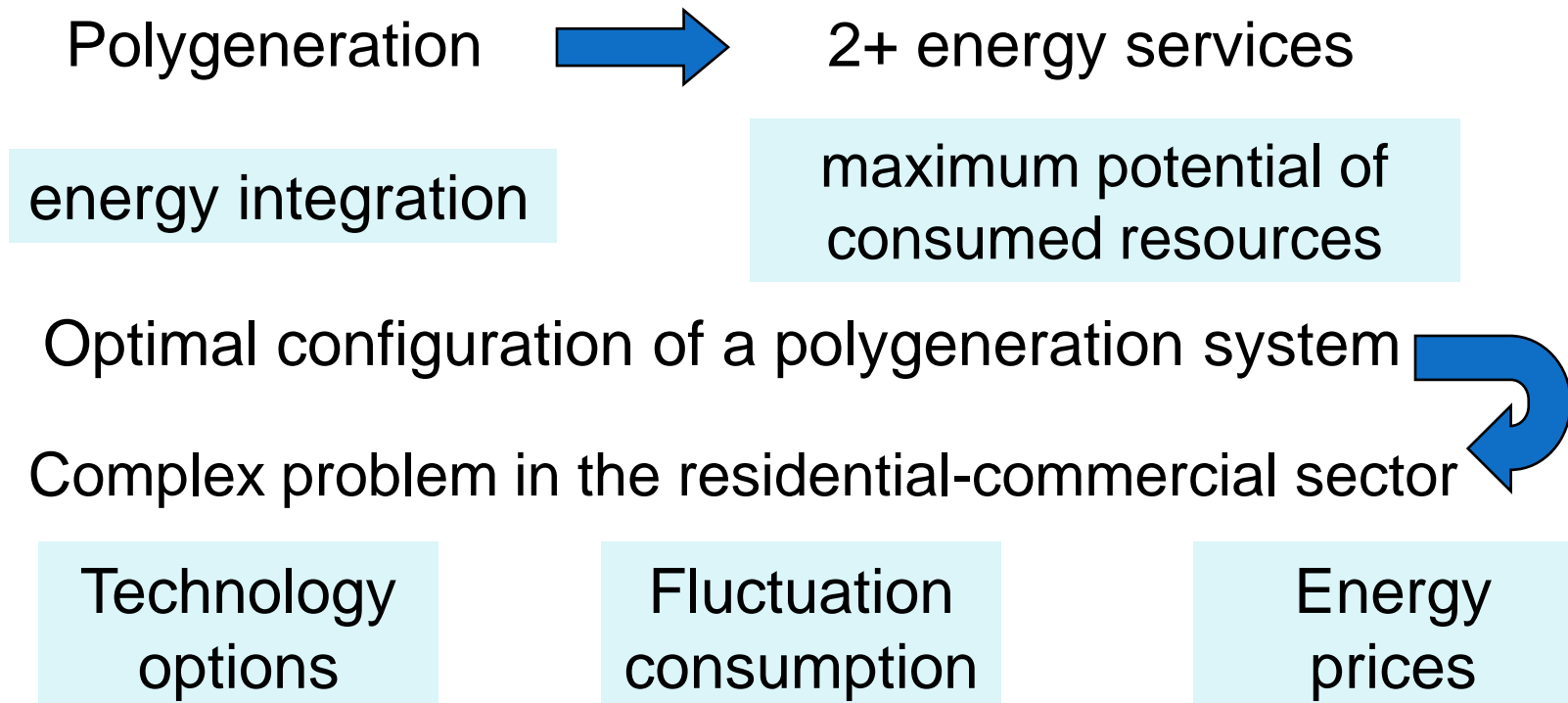
*Institute of Engineering Research I3A - Universidad de Zaragoza*

# Background

**Synthesis and design of polygeneration systems integrated with heat storage and solar energy in the tertiary sector**

**Project (ENE2007-67122)**

**Finished 31 December 2010**



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Thermoeconomic analysis

Optimization techniques (MILP)

Environmental impact assessment (LCA)

- 1) Proposal and selection of configurations
- 2) Identification of equipment
- 3) Elucidation of operational strategy
- 4) Allocation of costs among consumers

# Ongoing project

**Thermoeconomic and environmental analysis of district polygeneration systems with seasonal thermal energy storage and high solar fraction**      **Project (ENE2010-19364)**

**Started 1 January 2011**

## **Main objective:**

Proposal and design of **polygeneration district systems** that could be able of providing a **high solar fraction of thermal energy demand (>50%)**

These systems should be feasible since a technical viewpoint, economically acceptable and with a low environmental impact.

# Ongoing project

**Thermoeconomic and environmental analysis of district polygeneration systems with seasonal thermal energy storage and high solar fraction**

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## **Specific objectives:**

- Development of multi-objective analysis, synthesis and design criteria and procedures
- Study, transposition and application to the specific case of Spain of the experience gained in Europe about centralized district heating systems with seasonal storage. Determination of the conditions and criteria that would made interesting these systems in Spain in the mid-term considering different climatic areas
- Combination of different systems (solar thermal, cogeneration, thermal storage) with thermal cooling systems
- Study of opportunities of integration with some other non-conventional energy sources, such as biomass, waste valorization
- Study of different energy storage systems, including the possibility of utilization of Phase Change Materials

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## **Thank you for your attention**