

SMART POLYGENERATION GRID: CONTROL AND OPTIMIZATION SYSTEM

Maximiliano Bozzo
bozzo.gm@alice.it

Francesco Caratozzolo
francesco.caratozzolo@unige.it

Alberto Traverso
alberto.traverso@unige.it

ThermochemicalPower Group (TPG) – DIMSET, Università di Genova, Genova, Italy

ABSTRACT:

This study aims at the development of a software tool for supply and demand matching of electrical and thermal energy in an urban district.

In particular, the tool has been developed for E-NERDD, the experimental district that TPG-DIMSET is going to build in Savona, Italy.

E-NERDD is an acronym for Energy and Efficiency Research Demonstration District. It is one of the districts that will be used within the project to demonstrate how different software tools and algorithms perform in thermodynamic, economic and environmental terms.

The software tool originally developed for and implemented in this work, called *E-NERDD Control System*, is targeted on enabling the operation of the hardware, when connected in a district mode.

Supply and demand are matched to reach a thermoeconomic optimum. An optimization algorithm is organized into two different levels of optimization: a first level that resolves a constrained minimization problem in planning power supply for each generator on the basis of day-before forecasting; and a second level that distributes among the different machines the gap between planned and real-time demand.

The algorithm developed is demonstrated in four test cases in order to test it in different working conditions.