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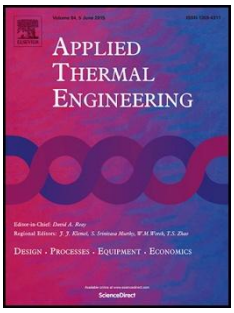

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THERMO-ECONOMIC OPTIMIZATION OF A REAL POLYGENERATIVE DISTRICT

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Highlights

- We model real polygenerative district through an original thermoeconomic approach
- We analyze enhancements and strategy for an optimal exploitation of CHP units.
- Exploiting CHP generators waste heat could produce significant energy savings
- These investments are not so profitable due to their high capital costs

Abstract

This paper presents a real smart polygenerative grid, designed to satisfy energy demands of the University of Genoa, Campus of Savona (Italy). The plant is made up by different generators: conventional boilers, combined heat and power (CHP) units, electrical and thermal storages and renewable generators.

The analysis of this polygenerative smart-grid is performed exploiting a software developed by the Authors' research group, which allows for the time-dependent multi level thermo-economic optimization of polygenerative energy systems. In the models the experimental off-design curves of the real devices installed were used in order to increase the reliability of the simulation results and to allow model validation to be easily obtained. The grid was simulated considering the time dependent nature of the demands throughout the whole year, finding best thermo-economic operational strategy.