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"Gheorghe Asachi" Technical University of Iasi, Romania

REUSE AND VALORIZATION OF SILT FROM AGGREGATES CRUSHING OF ALLUVIAL GRAVEL AND SAND, FOR THE MANUFACTURING OF CEMENT BASED BUILDING ELEMENTS

Marco Migliore[1*], Giancarlo Paganin[2], Massimo Senini[3], Cinzia Talamo[1]

[1]Department of Architecture, Building Environment and Construction Engineering (ABC), Politecnico di Milano, via Ponzio 31, 20133 Milano, Italy
[2]Department of Architecture and Urban Studies (DASTU), Politecnico di Milano, via Bonardi 3, 20133 Milano, Italy
[3]Senini S.p.a., via Erculiani 192, 25018 Novagli di Montichiari, Italia

Abstract

The development of Multi-Energy Systems (MES) or District Energy Systems (DES) requires suitable design and operation optimization tools, in order to assess their feasibility and economic profitability. These tools can be helpful in choosing the proper technologies and also in the perspective of defining proper incentive or taxation schemes. A critical result of the analysis of MES is that, when optimizing their design, the operation strategy and the part load behavior of the units must be considered in the optimization model. This way, the model is to be formulated as a two-stage problem, where the design and the operation variables are optimized in the first and in the second stage, respectively. In order to guarantee the computational tractability, the scheduling/operation problem is solved for a limited set of typical and extreme periods. We have developed a Mixed Integer Linear Programming model to solve this design optimization problem, for which we have linearized the off-design and the size effects of performances and costs for the technologies considered in the case study. The model has been applied to optimize the design of a district energy system for the University of Parma Campus in Northern Italy.

Key words: carbon tax, design optimization, district energy systems, tri-generation

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[*] Author to whom all correspondence should be addressed: e-mail: marco.migliore@polimi.it; Phone: +39 02.2399.5172