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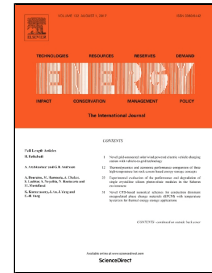
A novel solar-geothermal district heating, cooling and domestic hot water system:
Dynamic simulation and energy-economic analysis

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1 **A novel solar-geothermal district heating, cooling and domestic hot water**
2 **system: Dynamic simulation and energy-economic analysis**

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9 **ABSTRACT**

10 In this paper a novel low temperature district heating and cooling system based on renewable
11 energy sources is investigated by means of a dynamic simulation model and an energy-
12 economic analysis. A novel solution consisting of geothermal, solar and biomass energy
13 sources integration is considered. Low enthalpy geothermal well, evacuated solar collectors
14 and auxiliary wood-chip boiler are used to supply the district heating system during the winter
15 season. During summer, an adsorption chiller is activated in order to provide district cooling,
16 while during all year, the system produces domestic hot water for the district users.

17 The case study is developed for the district area of Monterusciello, near the city of Pozzuoli,
18 in Southern Italy. For the case study under investigation, a geothermal source is available at
19 about 55°C with typical irradiance conditions of Mediterranean climate. A rehabilitation of
20 the buildings located in the considered district area is considered.

21 The proposed system is modelled in TRNSYS environment, where a novel and detailed
22 control strategy is implemented in order to manage the system operation and to match the

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