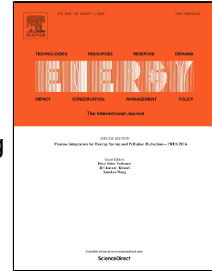


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The impact of global warming and building renovation measures on district heating system techno-economic parameters



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1 **The impact of global warming and building renovation measures on district heating system**
2 **techno-economic parameters**

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9 **Abstract**

10 Due to changing weather conditions caused by the global warming and building renovation measures
11 triggered by new building energy efficiency policies, building heat demand in the future is likely to decrease.
12 This effect could consequently impact the techno-economic parameters, feasibility and environmental
13 performance of district heating (DH) systems.

14 The main goal of this study is to evaluate the impact of global warming and building renovation on
15 operational (heat generation) and economic parameters of district heating systems. As a case study, a
16 prototypical district was created based on the district of St. Félix, which is located in Nantes (France). Weather
17 and building renovation scenarios were developed for the 2010-2050 period, with a ten-year time step. Heat
18 demand for all scenarios was calculated with a model based on thermo-electrical analogy, previously
19 developed and validated by the authors, while the network techno-economic parameters were calculated using
20 a tool developed by Veolia Research and Innovation for the internal corporate use.

21 The results indicated that the decrease of heat demand proved to be the highest after the first year of
22 renovation (2020), decreasing by 52% of the reference value (2010). Accordingly, DH linear heat density
23 decreases below the profitability minimum for traditional district heating networks. The participation of
24 natural gas peak boiler in heat production increases over the studied period, while the participation of base
25 load biomass boiler decreases, due to the fact that the number of hours with heat demand below the technical

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