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***Sustainable Energy, Grids and Networks***  
*Research Paper*

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Dear Reviewers, dear Associate Editors,

Please find attached our manuscript "*Disclosing the heat density of centralized heat networks in Austria 2050 under the 1.5°C climate target*", which we would like to submit for publication in your journal *Sustainable Energy, Grids and Networks*.

This work has been developed in the course of a research stay at the Institute of Applied Systems Analysis (IIASA) as part of the Young Scientist Summer Programme (YSSP). We downscale different European decarbonization scenarios of the heating sector to the Austrian municipal level, using tailor-made downscaling techniques accounting for infrastructure requirements of renewable heat sources and the topology of centralized heat networks. We demonstrate that allocating district heating networks as part of the downscaling from national results to a local resolution is crucial for a cost-effective and efficient decarbonized heat supply in Austria in 2050. Nevertheless, most of the identified networks do not reach the heat density required for economic and technical efficiency from today's techno-economic perspective and industry benchmarks. We conclude that the decarbonization leads to centralized heat networks with lower heat densities.

We believe that with this work, we can contribute to your journal's agenda, as our focus lies on the theoretical development and planning of energy systems infrastructure, the modelling and assessment of heat networks focusing on their topology, and comparison/discussion of centralized heat networks under the climate targets.

We would like to propose the following researchers as reviewers:

Marie Münster ([maem@dtu.dk](mailto:maem@dtu.dk)) from Technical University of Denmark (DTU), Martin Wietschel ([martin.wietschel@isi.fraunhofer.de](mailto:martin.wietschel@isi.fraunhofer.de)) from Fraunhofer Institute for Systems and Innovation Research (ISI), and Agne Toleikyte ([agne.toleikyte@ec.europa.eu](mailto:agne.toleikyte@ec.europa.eu)) from Joint Research Centre (JRC).

The manuscript is original; no part of this work has been published before nor is it under consideration for publication in another journal. The authors declare that there are no conflicts of interest regarding the publication of this paper. The paper has been professionally proofread.

The corresponding author is Sebastian Zwickl-Bernhard. The contact details can be found above.

I am looking forward to your reply and thank you in advance for your consideration.

Yours sincerely,



Sebastian Zwickl-Bernhard