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UrbanHeatOpt: A software framework for supporting municipal heat transition planning

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Abstract-

A transition in the heating sector – particularly for buildings – is essential to address climate change. Heating solutions will need to vary significantly depending on local conditions such as climate, building standards, and the availability of waste heat. Emerging generations of low-temperature district heating systems enable the integration of new waste heat sources, but identifying feasible, initial design heating concepts remains a time-consuming task. In this paper, we present UrbanHeatOpt, a user-friendly, modular software framework that streamlines the entire process — from generating high-resolution heat demand data to identifying potential community heating concepts. The tool supports both early-stage planning in municipalities and more in-depth analyses to inform policy-making in the heating sector.

Index Terms- Energy system modeling; District heating; Time series generation; Urban energy planning; Waste heat utilization

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