

# **Demystifying natural gas distribution grid decommissioning: An open-source approach to local deep decarbonization of urban neighborhoods**

Open-source modeling

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In this paper, deep decarbonization in an urban neighborhood in Vienna, Austria is proposed focusing on decommissioning of the gas distribution grid for heat supply rather than trying to feed in "green" gas in the future. The core objective is to demonstrate that alternative network infrastructures and energy technologies ensure not only an adequate but also an even superior provision of local heat energy services. Two different deep decarbonization pathways are studied, namely, electrification of almost all energy services and expansion of the district heating network. In addition, future district cooling service supply is considered. The method applied couples and extends two open-source models offering a complete analysis toolkit covering a high spatial and temporal resolution. The results show that deep decarbonization of local multiple-energy carrier systems is possible, without being dependent on the existing gas network infrastructure. Possible stranded assets (also at the gas end-user level) must not play a decisive role, especially since the trade-off analyses in this work show that alternative scenarios of lower/zero-emission energy service provision are even more economical in the longer term since the CO<sub>2</sub> price is expected to increase in the next decades. Future work may focus, among others, on the energy generation technology mix feeding into the district heating grid, the local mobility service needs, and a higher granularity to improve the assessment of the on-site (building-integrated) renewable generation potential associated with the emergence of energy community concepts.

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