

Waste Challenge Title
*Standardization of Renewable Energy Solutions for Quarters
to speed-up the Heat Transition in Cities*

Introduction

The City of Munich has the aim to be climate neutral until 2035. The Energy Transition in Cities, especially the transition of covering the heat demand, is one of the keys to reach this goal. This became even more important since the security of energy delivery and the independence from imports are in the focus nowadays. Now, the City is developing a heat transition plan. One key element of it is expanding and decarbonizing the district heating network. However, this will cover not at all the whole heat demand of the city. Up to half of the cities heat demand must be covered by decentral energy supply, mainly using efficient heat pump systems or waste heat solutions. Hence, at locations without a connection to the district heating system, house owners should change their heating system to e.g. heat pumps. Nevertheless, the most impact is seen in providing independent energy solutions for Quarters, for instant by so called 5th generation grids, small grids running with low temperatures providing heat and cooling for the quarter. These grids are in general very individually designed and need a lot of planning effort. But to reach climate goals and heat transition aims a fast and successful implementation of such grids in the city is necessary, so this process should be speed-up and simplified.

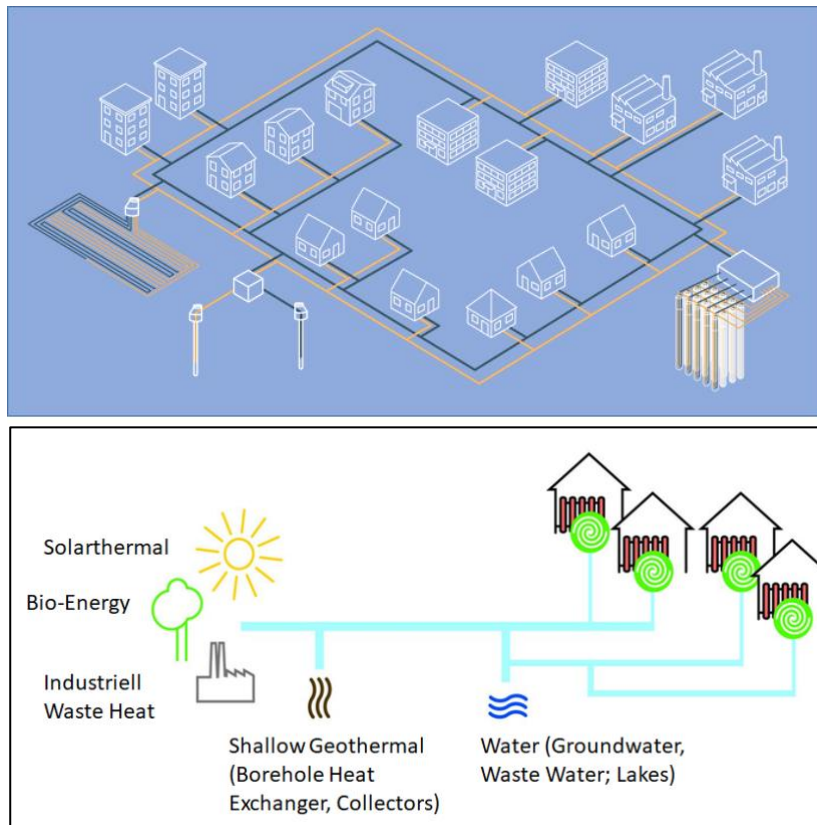


Figure: 4/5th generation grids as renewable energy solutions for quarters.

Problem Definition:

To reach the climate goals of the city and the heat transition, fast heat transition is needed. Therefore, implementation of climate-friendly energy solutions for quarters in cities must be pushed on. This could be reached by i) a simplification and standardisation of installation procedures of 5th generation grids and of house refurbishments. Some activities in this directions already exist but no satisfying solutions are there. In practice the individual design of such energy supplies for quarters need a long time for planning and implementation which slow down the energy transition.

What is the waste challenge?

The first step in this activity is to evaluate renewable energy solutions for quarters, especially 5th generation grids (low temperature grids) and work out similarities and differences. The challenge is to take this analysis and develop a tool or guideline for an easy-to-implement standardization of such solutions for 'serial implementations', considering also city requirements and with a maximum of CO₂-savings to push the energy transition in Cities.

Key questions on this challenge are:

- Is it possible to simplify good practice renewable energy solutions for quarters for a fast implementation?
- Are low temperature grids also possible for the building stock?
- How much is the potential loss of CO₂ savings for such 'serial solutions' and is this acceptable?
- Could a stepwise implementation without a strong negative aspect for the investors be a reasonable way?
- How can a standardized renewable energy solution for quarters be implemented in energy action planning tools?

Who is behind this challenge?

The Geothermal Group of the Chair of Hydrogeology works in the field of renewable energy, especially on geothermal energy supply and search beyond others for good practice implementation of shallow geothermal low temperature grids. In this field, we develop tools for energy action plans including geothermal potential and participate in several municipal and regional heat transition activities, like the Munich heat transition planning. Here we work strongly together e.g. with the department of climate and environment of the City of Munich, the Stadtwerke München, the Environmental Agency of Bavaria, the Company Enanio, with planners and other stakeholders on different levels.

Topic domain of challenge: Cities, Energy or Consumption

The topic domain is strongly linked to Cities and Energy.

Desired Impact of Challenge:

[tell us the change that should occur as a result of a planned intervention and the story, experiences and/or feelings of people or society as result of change]

As result Cities, here the City of Munich and planners, like the Stadtwerke München, are able to accelerate the heat transition in the city. The use of the huge potential of efficient low temperature grids will be considerably fostered by integrating low temperature grid solutions in energy planning tools. Relevant stakeholders will be informed of the existence of such solutions and advised to implement low temperature grids.

Skills needed/recommended

In general, the knowledge of renewable energy technology and climate friendly construction work is an advantage for this challenge

Relevant considerations for the challenge / theme:

It would be good to evaluate existing renewable energy solutions for quarters and low temperature grids and find out similarities and differences. For this activity it is recommended to gather information of research projects or examples from Associations like Bundesverband Wärmepumpe, Bundesverband Geothermie etc. and planners (Baugrund Süd, Geoenergie Konzept, ...).

Relevant links:

<https://www.energynet.de/2018/01/17/kalte-nahwaerme/>

<https://ee-ip.org/de/article/was-ist-kalte-nahwaerme-5862>

<https://www.durchblick-energiewende.de/wissen/energie/kalte-nahwaerme-waermenetze-der-zukunft>

<https://www.geothermie.de/bibliothek/lexikon-der-geothermie/n/nahwaerme-kalte.html>

<https://www.waermepumpe.de/>

<https://blog.paradigma.de/grundlagenwissen-waermenetz-teil-4-was-ist-ein-kaltes-waermenetz/>