

## Best Practice #7: Transition Roadmap in Munich

<b>Name:</b>	Transition Roadmap in Munich
<b>Geography:</b>	Germany, Munich
<b>Organization interviewed:</b>	DENA
<b>Organization interviewing:</b>	Trinomics
<b>Website:</b>	<a href="https://decarbcitypipes2050.eu">Microsoft Word - D4.4 Transition Roadmaps and Cross-City Synthesis (decarbcitypipes2050.eu)</a>
<b>Category:</b>	Planning / governance
<b>Description:</b>	<p>In 2020, a study on the future of Munich's heating sector was commissioned by SWM (<a href="https://www.stadtwerke-muenchen.de">Stadtwerken München</a>) in cooperation with the city of Munich (so-called "heat study"). The study develops a long-term concept to reach Munich's climate goals (the City of Munich declared to become a climate-neutral city by 2035, cf. The city council resolution of 18 December 2019), outlines transition paths with respective transition costs and proposes instruments and measures based on current barriers on the way to climate neutrality.</p> <p>The current outcomes are:</p> <ul style="list-style-type: none"> <li>• redesigning the strategic and city-wide H&amp;C planning with better cooperation between the municipal company and the city</li> <li>• using the H&amp;C plan to inform building owners and energy suppliers about the relevant options to make their building climate neutral</li> <li>• this plan helps to better coordinate activities of various stakeholders</li> <li>• a plan to transform district heating grid (densification, optimisation, extension)</li> </ul> <p>adopting neighbourhood approach as part of the key strategy to realize synergies and/or to save costs compared to either a building-by-building approach or a city-wide-only approach.</p>
<b>Questions:</b>	
	<p>1. Decarbonisation is about <b>renewable energy sources</b> and <b>energy efficiency</b>. Would you say the approach is well balanced between the 2 dimensions?</p>
	<p>In parallel to changes on the supply side, it is crucial that energy consumption in buildings is further reduced. After all, there are technical and economic limits in supplying large amounts of green heat in a big city like Munich. At the same time, the potential to increase the energy efficiency of the building stock is considerable: almost 60% of the residential buildings in Munich's have been built before the first federal heat ordinance in 1978. Given the potential for additional savings and favourable framework conditions (i.a. rising energy prices, federal funds) the heat study assumes an increase of both the rate and depth of renovation.</p>
	<p>2. <b>DHC</b> seems to have an important place in the decarbonisation, would you say it is the major (and possibly only) driver of switching to renewable sources?</p>
	<p>The share of district heating will increase (from ~35% in 2018, to about 50% in 2035, about, and 70% in 2050) in final energy consumption. In parallel, the decarbonization of district heating will unfold, thanks mainly to the very favourable conditions for deep geothermal energy.</p>

Up to two thirds of energy generation for district heating in 2035 will originate from this energy source, with an installed capacity in 2035 of up to 510 MWth (MW of thermal power) (including heat pumps for reheating at generation sites). Currently, only 80 MWth is based on deep geothermal energy.

By 2035, all existing CHP plants (and also heat plants) are assumed to switch to hydrogen as energy carrier and will only operate when national electricity demand cannot be covered by renewable energy.

To cover the remaining mid- and peak load in district heating, largescale electric heat pumps at generation sites will play an important role. Also, additional renewable heating capacity for peak load is likely to be necessary (based on biomass or power to heat). Overall, the transformation of the generation plants for district heating will lead to a much higher reliance on local renewable energy sources than today (70% in 2035, 56% in 2050).

While Munich has generally quite favourable conditions for district heating in terms of heat density, suitable buildings etc., district heating and the expansion of the district heating grid is not a suitable option in all parts of the city. In these other areas, oil and gas boilers will have to be replaced mainly by individual heat pumps and/or local heat grids.

3. What is the available **capacity** (expertise, knowledge, staff) of the city with regards to implementing the transition plan? Does the city rely on external resources? (technical expertise, finance)

A team of experts from various departments of the city administration is basically responsible for preparing and monitoring activities at the neighbourhood level and for aligning them with goals and demands of the city council. However, much of the day-to-day work at the neighbourhood level cannot be managed by them, especially at the implementation stage of the concepts and given the plan to scale the neighbourhood approach. Therefore, the setup of a new energy and renovation agency is necessary. Such an agency would be more agile and flexible than the city administration, but still be controlled and supervised by the city and supported by the city's climate budget. Currently, city officials examine whether the Munich Society for City Renewal (MGS) - currently still part of one of the municipal housing associations - can be turned into such an agency.

4. Can you list at least 3 key success factors that have made this project successful? And that support the uptake of renewable energy sources in H&C?

**1. Access to reliable data as starting point**

In 2022, the City of Munich and SWM started redesigning and reorienting strategic and citywide H&C planning. Originally, the city had its own energy planning system, the so-called energy use plan, with only limited integration of their energy and building data and analysis tools. Following the closer cooperation between the city and SWM during the development of the heat study, SWM decided to open up some of their data and tools to selected persons of the city for a better alignment of H&C planning in Munich. As a result, H&C planning now relies on more detailed and valid data sources as well as analysis tools that are easy to use and update. The main responsibility for H&C planning still lies within the city administration as H&C planning can be considered a service of general interest, but cooperation with SWM remains close.

## **2. SWM is a public company cooperating with the municipality**

Municipal utilities are often not purely interested in maximising profits, but frequently pursue other interests of the citizens through their close ties to the local community and extensive involvement in day-to-day municipal and local political business. Cooperation with the municipal energy supplier offers the municipality suitable resources, opportunities and capabilities. This is beneficial for both parties:

On the one hand, the planning capacities of the suppliers eliminate personnel bottlenecks on the municipal side and the recording and evaluation capabilities of the energy supply companies enable a clear view of the status quo as well as well-founded decisions for the future of urban development.

On the other hand, the municipality is not forced to build up its own capacities, which may only be required in the short to medium term, and can rely on a partner with local knowledge. For this reason, cooperation with a municipal utility company is often seen as a key success factor.

## **3. Engaging stakeholders**

Overall, H&C-planning serves to inform building owners, energy suppliers and other concerned stakeholders about suitable options on the way to a climate-neutral H&C-sector. At the same time, planning helps to better coordinate activities of various stakeholders and the respective interests and strategies in the H&C-sector. As a result, planning and investments of these stakeholders can be realized on a more reliable basis. Moreover, interacting and communicating with stakeholders on a regular basis ideally creates more trust and more support for Munich's ambitious journey towards climate neutrality. Finally, planning is meant to stimulate measures for implementation. The integrated neighbourhood approach is also a key strategy in this regard.

## **4. Accelerate DHC connections**

The restrictive federal tenant regulations are key to oblige/encourage final energy users (mainly buildings) to connect to existing DHC. Such densification will increase the share of DHC in total H&C supply (assuming that DHC is a key driver to increase RES in H&C).

## **5. Integrated neighbourhood approach**

The city council has decided that the integrated neighbourhood approach is a key strategy on the way to a climate-neutral and resilient Munich. The neighbourhood approach allows to realize synergies and/or to save costs compared to either a building-by-building approach or a city-wide-only approach.

- Compared to the building-by-building approach, advantages include the possibility to combine refurbishment activities or to integrate renewable energies or green infrastructure at larger scale, to intelligently couple the electricity and the heat market and to realize critical investments levels.
- Compared to the city-wide approach, it is easier, for example, to inform and activate citizens at the neighbourhood level, coordinate and align the various interests and to test new innovative approaches or technologies.

At the moment, there are several pilot integrated neighbourhood concepts (at various stages). It is planned to learn from these initial experiences and scale the approach in the coming years, so that about 20 concepts can be launched each year from 2025 onwards.

#### **6. Ad hoc business model – simplification of the model**

SWM is currently developing a new business field "decentralized heating". It is composed of two main product lines:

- M-Heat pump is oriented towards individual solutions for single buildings and includes both air- and groundwater-based heat pumps. SWM aims to develop standardized and all-inclusive service packages (selection of heat pump, installation, support in securing funding, electricity tariff, service and maintenance etc.).
- M-Local heat is aiming to set up local heat grids based on near-surface geothermal energy and other renewable energy sources both for new and existing buildings. While successful projects for new buildings already exist, viable solutions for existing buildings are more challenging.

#### **7. Strategic decision to phase out fossil**

SWM has recently made the strategic decision to continuously phase-out the sale of natural gas and to not provide further connections to the gas grid whenever compatible with national energy law. By contrast, customers will be offered an alternative heat supply, typically either district heating or decentralized renewable heat.

The heat study and the climate neutrality study have shown that maintaining the entire gas distribution grid to provide hydrogen to former natural gas customers is not a viable option given the cost and competing uses for hydrogen. Therefore, only the supply of hydrogen directly to CHP and heat plants is currently considered a potential option.

#### **8. Global acceptance**

The H&C transition is critically dependent on many factors beyond the control of the city. Notably, implementing widespread energy refurbishment and change of heating technologies relies on planners, energy counsellors and manufacturers. Moreover, the political, social and market acceptance of the H&C transition is very important, but not very well known and not easy to be sustained.