Renewable District Heating for Munich
One of the major challenges in achieving energy transition is heating.
Renewable District Heating for Munich

District heating networks are the backbone of renewable heating systems in cities.

- Big cities will continue to require a centralized heating supply due to limitations of decentralized solutions.

- District heating grids already exist in many big cities. This infrastructure is the basis for the energy transition of heating systems in cities as they enable the distribution of renewables.

- In cities, district heating networks are turning out to be the solution with the lowest costs.
Going renewable with power, heating and cooling: The Munich Way
SWM: Supplying climate-friendly electricity, heat, transportation & mobility solutions in Munich

- 1.5 million residents
- 1.2 million customers
- Electricity grid: 12,000 km
- District heating grid: 800 km
SWM as a designer of a comprehensive energy transition

100 % Renewable Electricity: Renewable Energy Expansion Campaign

100 % CO2 neutral District Heating: District Heating Vision 2040

Comprehensive Energy Transition

MUNICH AND THE SURROUNDING REGION
- 13 hydroelectric power plants
- 1 windmill power plant
- 5 geothermal plants
- 1 biogas power plant
- 24 photovoltaic power plants

GERMANY
- 3 offshore-windfarms (North Sea)
- Onshore-windfarms (Brandenburg, North Rhine-Westphalia, Rhineland Palatinate and Saxony-Anhalt)
- 2 solar farms (Bavaria and Saxony)

EUROPE
- 1 offshore-windfarms (United Kingdom)
- Onshore-windfarms (Belgium, Finland, France, Croatia, Norway*, Poland, Sweden)
- 1 solar thermal power plant (Spain)
Vision 2040: 100% CO2 neutral district heating

- By 2050, the city of Munich aims to become CO2 neutral.

- SWM’s district heating vision will have a significant impact on achieving the city’s goal to reduce CO2 emissions of Munich’s heating sector by 70% until 2040, compared to 2014.

- SWM’s district heating vision builds on deep geothermal energy + CO2 neutral coverage of peak load.
Vision 2040: SWM focusses on deep geothermal energy

North-South profile of the alpine upland

- Deep geothermal energy has the potential to provide renewable heat to entire cities.
- Deep geothermal energy is an important factor for security of supply thanks to its baseload capacity.
- Deep geothermal energy can be the heat source with the lowest production costs – providing heat grids already exist.
The path for the geothermal expansion in Munich

Geothermal energy plants and district heating grid

- **Riem**: In operation since 2004, Thermal capacity: 13 MW
- **Sauerlach**: In operation since 2014, Electric capacity: 5 MW
- **Freiham**: In operation since 2016, Thermal capacity: 12 MW
- **Dürrnhaar/Kirchstockach**: In operation since 2017, Electric power: 10MW
- **HKW Süd**: Commissioning 2020, Thermal capacity: 50 MW
Renewable District Heating for Munich

The path for the geothermal expansion in Munich

Geothermal energy plants and district heating grid

- **Reduction of temperature level**
- **Adaption of supply temperature to feed in heat from geothermal energy plants.**

- **Conversion of existing steam network**
  To feed in renewable heat, the network has to be converted to hot water.
Conclusion
A stable framework is needed to make the heating transition a success.

- Due to the longevity of plants and networks, early-stage political decisions and a long-term framework are essential.

- In Germany, a comprehensive framework for the energy transition of heating is still missing.

- **CHP Law (Grid)**
- **Marktanreiz-programm/ KfW** (investment subsidy for heat generation)
- **Research programs (GRAME, GEOMARE)**
- **EU Renewable Energy Directive**
- **Renewable Energy Law**
Reliable funding and a stable framework are critical to take full advantage of the local potential for renewable heating.

**Grids**
- Focus on the modernization and transformation of heating grids
- Maintain a stable framework for CHP as a basis for the transformation process to renewable heating

**Production**
- Provide a stable funding framework for the production of renewable heat
- Give priority to solutions with the lowest costs

**System**
- Create a level playing field for climate friendly/district heating systems compared to fossil solutions (carbon pricing)
- Considerate special requirements of big cities in tackling the heating transition
Thank you for your attention.