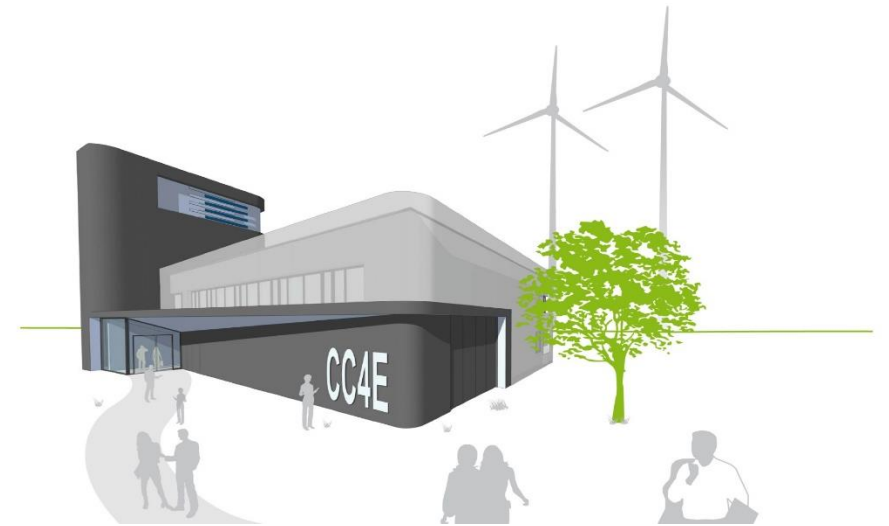


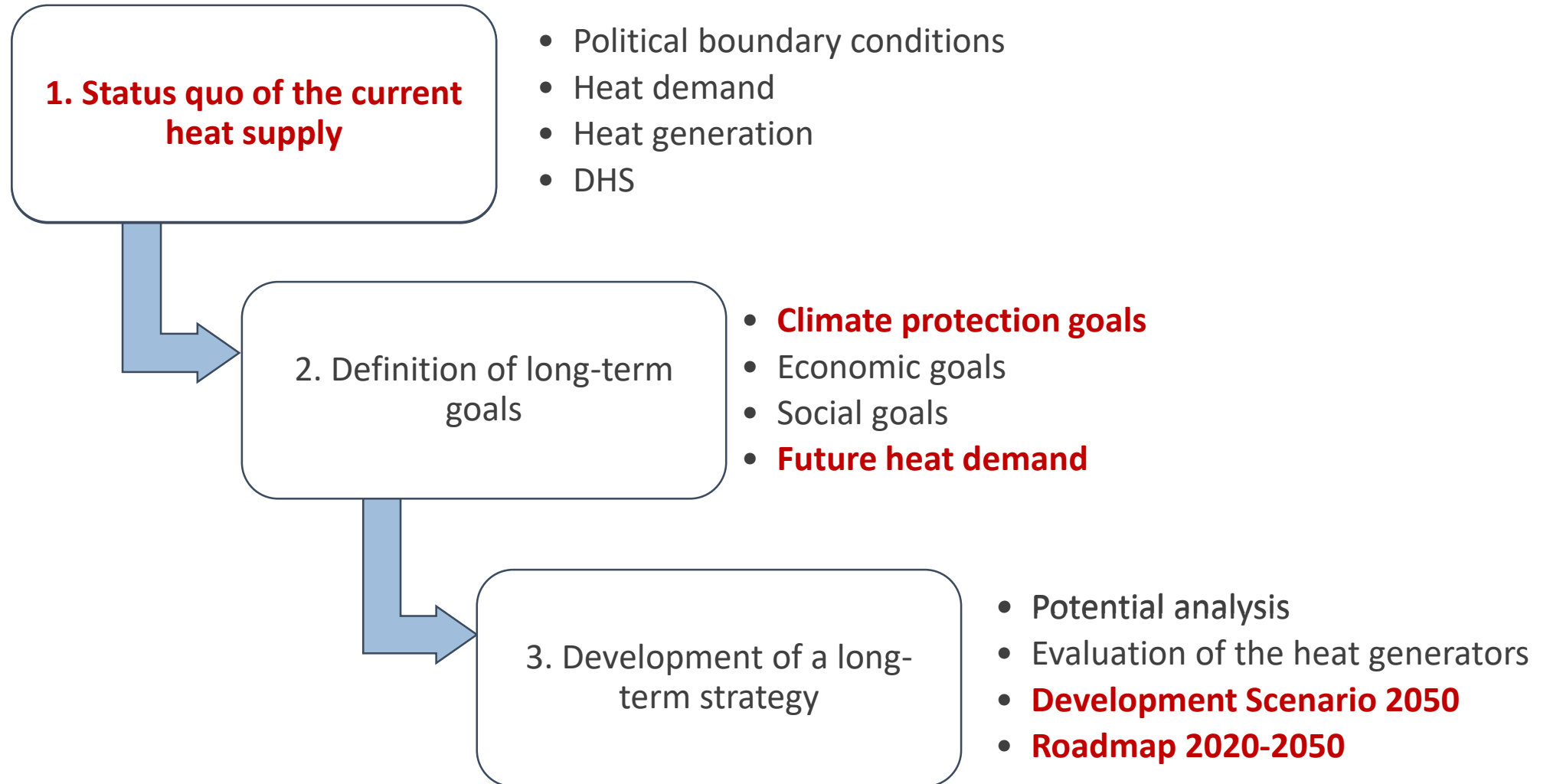
Nina Kicherer | 6th October 2020 | Smart Energy Systems Conference

# Design of a District Heating Roadmap for Hamburg

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# 1. Methodology



## 2. Status quo

### The municipal DHS in Hamburg

- Bought back from a private owner in 2019
- Subject to Hamburg's climate policy

#### Current supply:

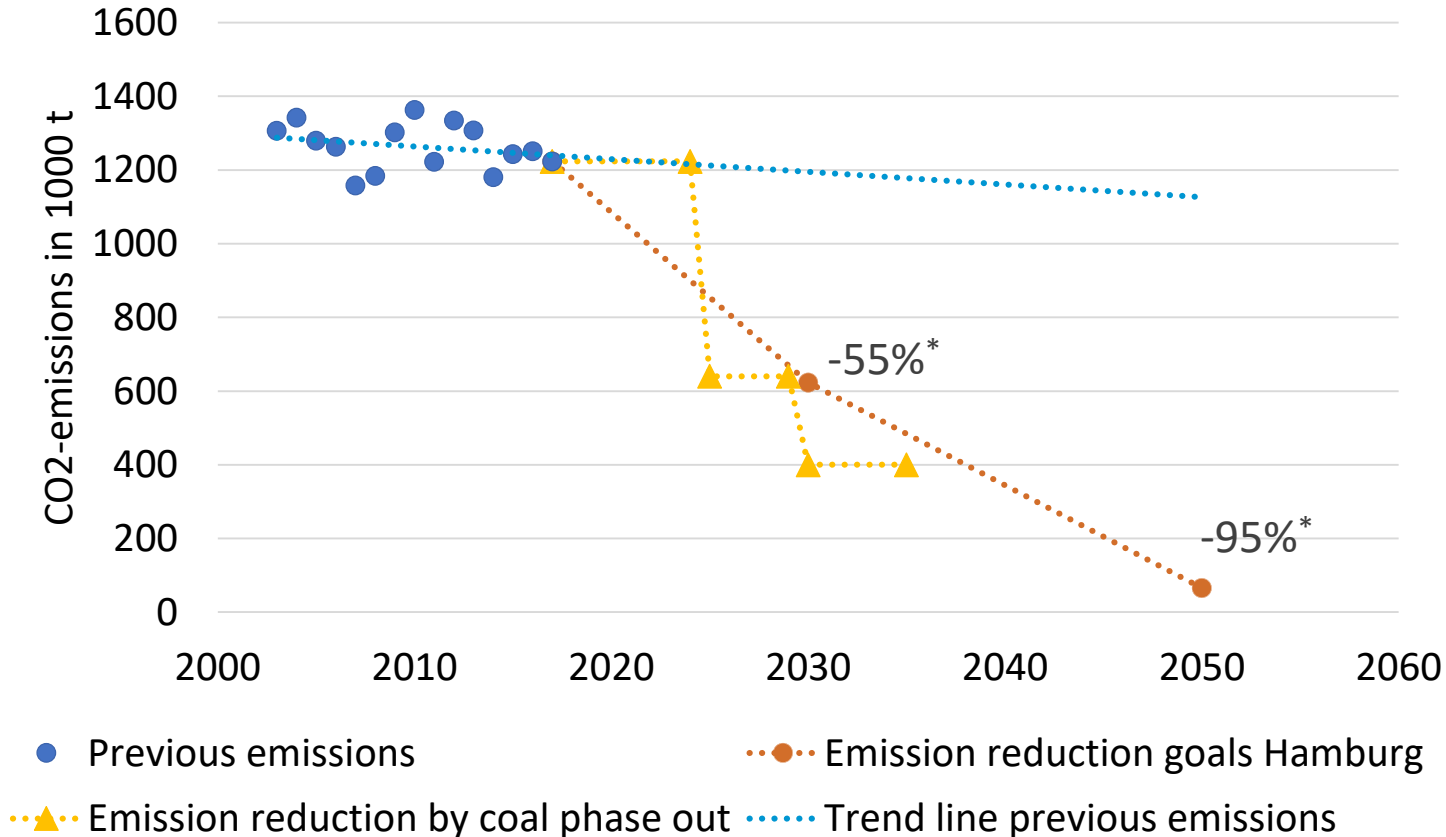
- Heat demand: 4.000 GWh/a
- Temperatures of up to 130°C
- Centralized generation
- Mainly fossil (66% hard coal, 14% non-organic waste, 6% natural gas)



Reference: [1]

### 3. Long-term goals and future heat demand

#### Emission reduction goals



\*as compared to 1990

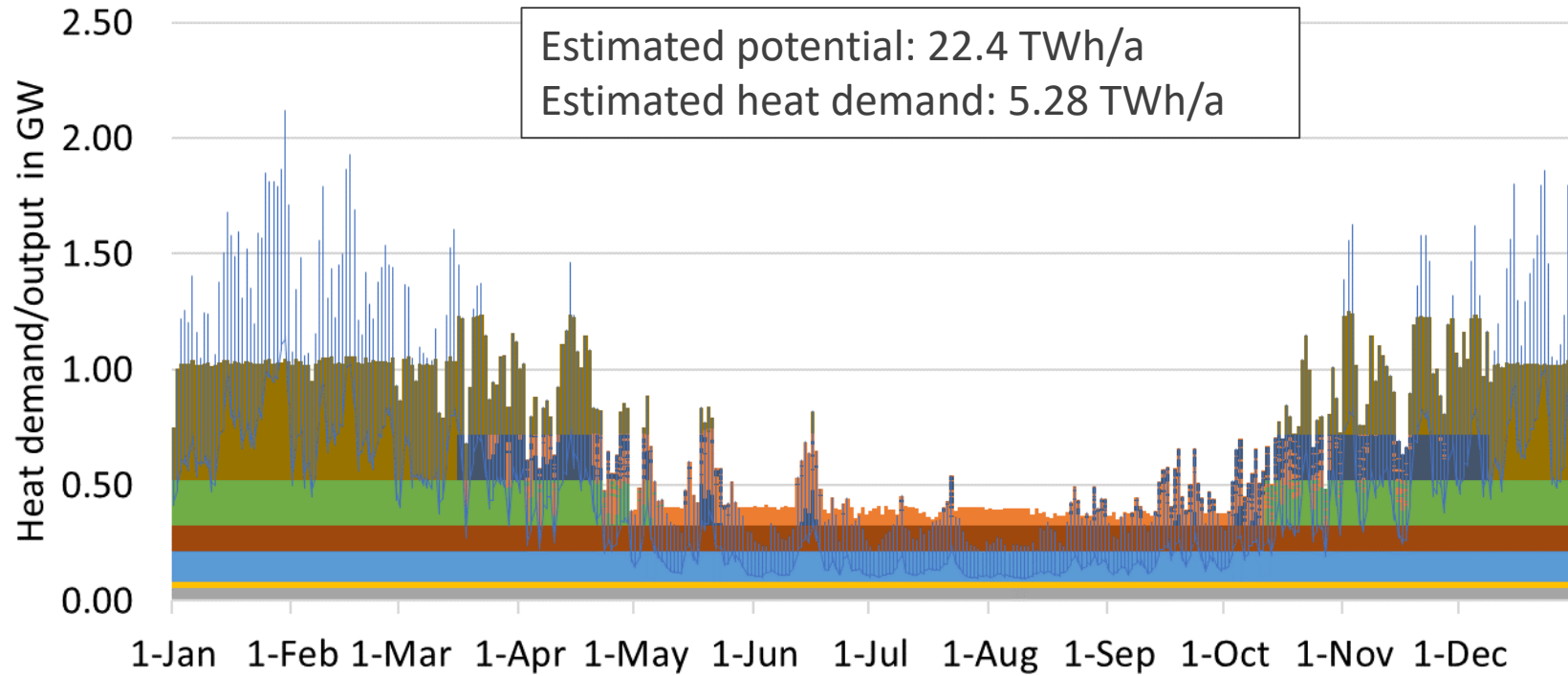
Previous and future emissions in Hamburg's DHS, Reference: Own illustration according to [2,3,4]

#### Future heat demand

- Former prognosis mostly incorrect (too high renovation rates, too little expansion of DHS)
- Prognosis based on most recent study and DHS expansion plans
- Assumption: constant share of municipal DHS in overall DH supply (compared to today)
- Result: 5.280 GWh/a in 2050

# 4. Scenario 2050

## Result for an exemplary generation mix

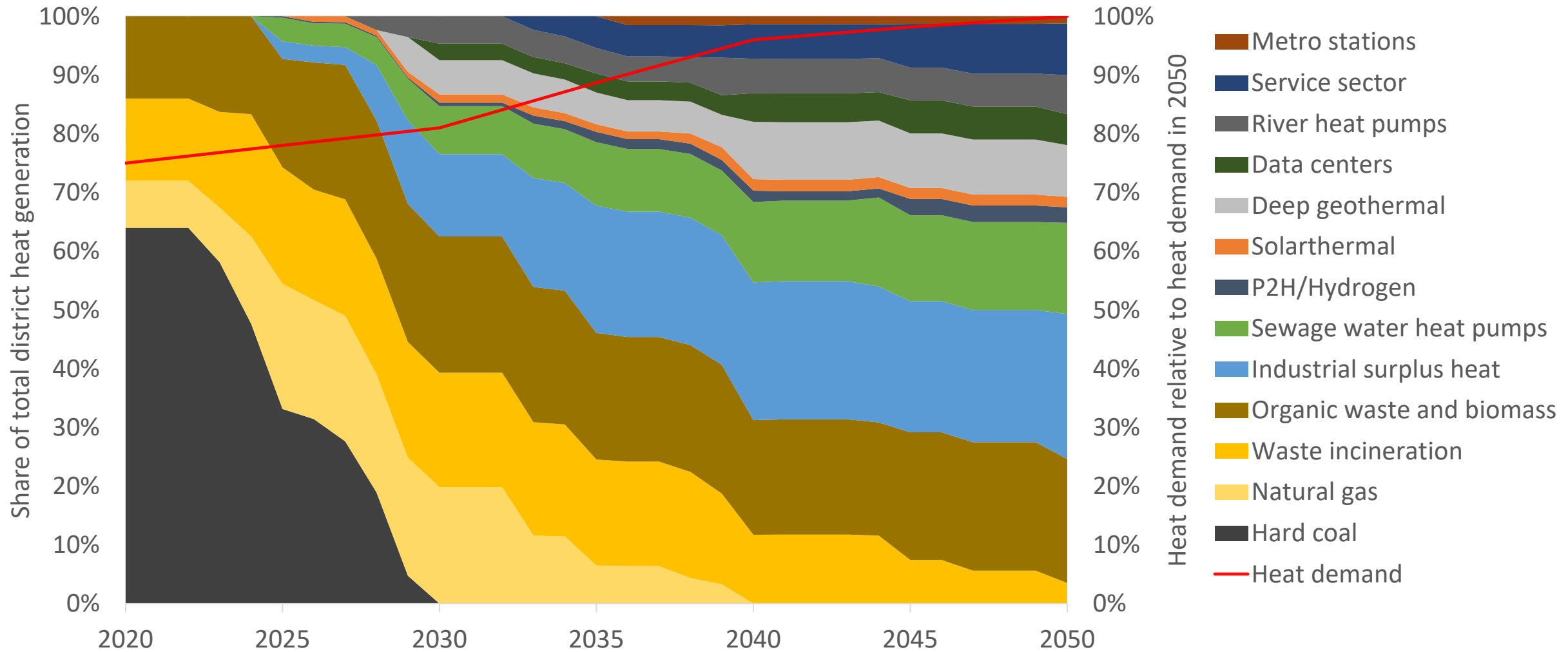


- Short term storage can be used to reduce maximum peak load from 2 GW to up to 1.4 GW
- Maximum temperature:
  - 94°C for simple mix
  - 110°C with cascading heat generators

Reference: Own illustration

# 5. DH Roadmap for Hamburg

## Exemplary transformation path



Reference: Own illustration

## 6. Discussion and outlook

- Dependency on assumptions and future development of boundary conditions
- Data uncertainties and inadequate data availability for estimation of demand and generation potential
- Consideration of economic efficiency/cost effectiveness
- Detailed simulation of heat supply still to be developed
- Presented scenario uses only small share of estimated potential

General recommendations for municipalities:

1. Establish reliable database
2. Determine long-term goals for strategic heat planning
3. Institutionalize municipal heat planning
4. Develop comprehensive long-term strategy for the heat supply in the municipality

# References

- [1] Wärme Hamburg GmbH. *Erzeugungsanlagen & Netz*. 2019. url: <https://waerme.hamburg/ueberuns/unternehmensprofil> (besucht am 25. 10. 2019)
- [2] Hendrik Tietje und Shira-Lee Teunis. *Energiebilanz und CO<sub>2</sub>-Bilanzen für Hamburg 2017*. Statistisches Amt für Hamburg und Schleswig-Holstein. 2019.
- [3] Wärme Hamburg GmbH. *Die Südleitung - Energiepark Hafen*. 2020. url: <https://energiepark-hafen.hamburg/die-suedleitung/> (besucht am 29. 01. 2020)
- [4] Behörde für Umwelt und Energie. *Erste Fortschreibung des Hamburger Klimaplan*s. 2019. url: <https://www.hamburg.de/contentblob/13287332/bc25a62e559c42bfaae795775ef1ab4e/data/d-erste-fortschreibung-hamburger-klimaplan.pdf> (besucht am 03. 12. 2019)



# Thank you for your Attention!

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