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Strategic heating and cooling planning

Perceptions of different stakeholders in Germany

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Motivation and Objective

Relevance of topic and background

- Strategic H&C planning has proven to be an effective tool to drive the decarbonisation of H&C.¹
- In Germany, H&C planning is still in its infancy. A national obligation to develop H&C plans was introduced in January 2024:
 - (1) municipalities with more than 100000 inhabitants must develop a plan until June 2026
 - (2) municipalities with fewer than 100000 inhabitants must develop a plan until until June 2028
- Existing literature and documents show that there is expertise in H&C planning.² However, as far as we know, there is a lack of empirical research on success factors, challenges and stakeholder perceptions.

Objective and research questions:

- What are success factors and key challenges of strategic H&C planning?
- What are the stakeholders involved thinking? Does the perception of different stakeholders differ and is this a problem?

1 Chittum and Østergaard 2014; 2 e.g. Nilsson and Mårtensson 2003, Weinand 2020, Chittum and Østergaard 2014, Harrestrup and Svendsen 2014, Johannsen et al. 2021, Büchele et al. 2019, Mathiesen, Bertelsen 2020, Peters et al. 2020

Data and Methodology

Data collection with survey

- An online survey was carried out, including 20 questions divided into five thematic blocks:

Block	Theme
(1)	General data (postal code, workspace, connection to H&C planning etc.)
(2)	Objectives and information sources used
(3)	Success factors of H&C plans
(4)	Challenging factors of H&C plans
(5)	Implementation measures and barriers

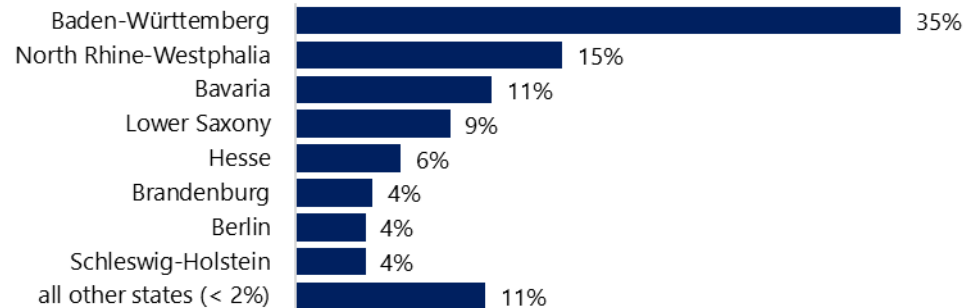
- Around 1300 participants were contacted directly and several thousand were contacted indirectly with mailing lists.
- Participation was possible from end of July until September 2024.
- The sample was analysed using descriptive statistics and a comparative analysis.



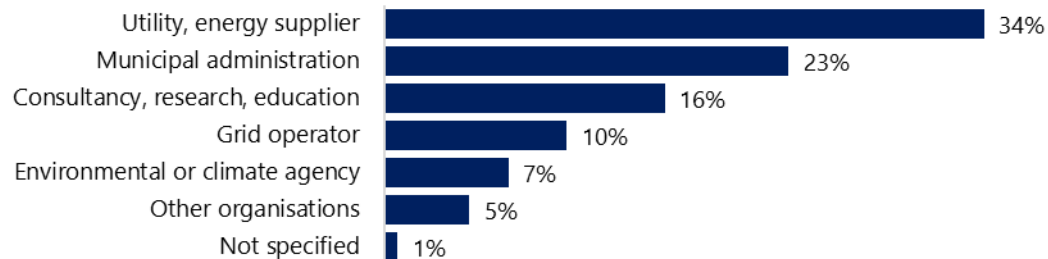
Data and Methodology

Outline of the sample

What is your postcode?



Where are you employed?



- We received **267 responses** to the online survey.
- Most of the respondents come from the federal state of Baden-Württemberg.
- Many of the respondents work at a utility or a grid operator, followed by the municipal administration.
- 21% of the respondents are responsible for H&C planning, while 40% are involved in H&C planning.
- The sample covers 1% of all municipalities in Germany, around 5% of the population and several big cities (Berlin, Hamburg, Munich, Cologne, etc.).

Data and Methodology

Outline of the sample

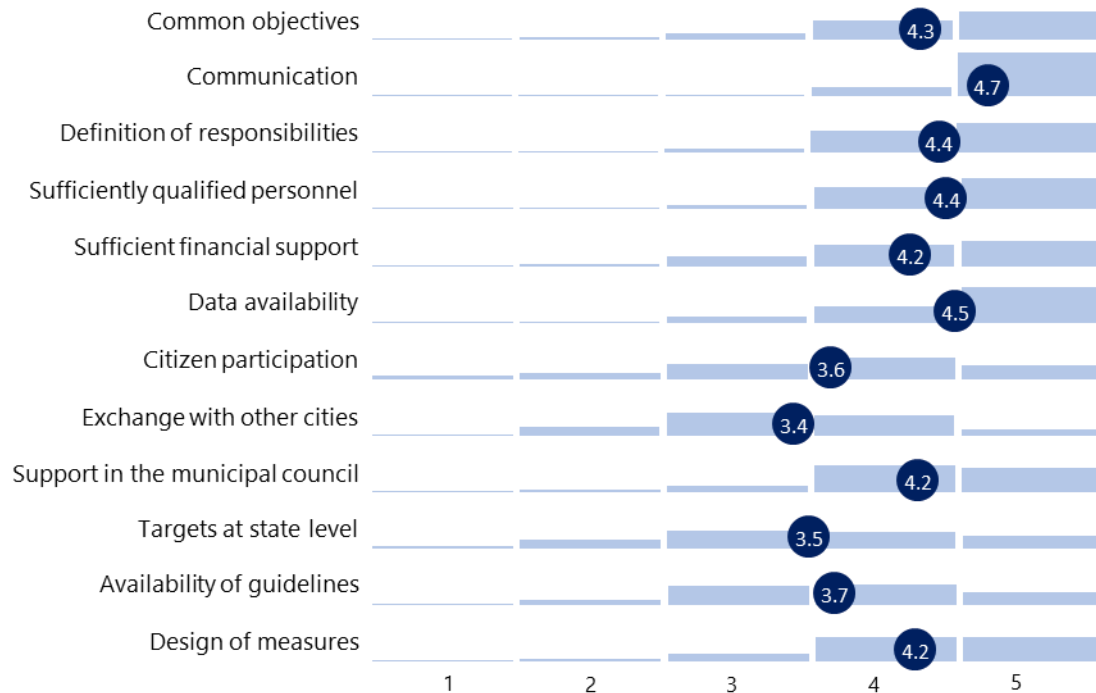


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Results of the survey

Success factors

In your opinion, how important are the following aspects for successful heat planning?



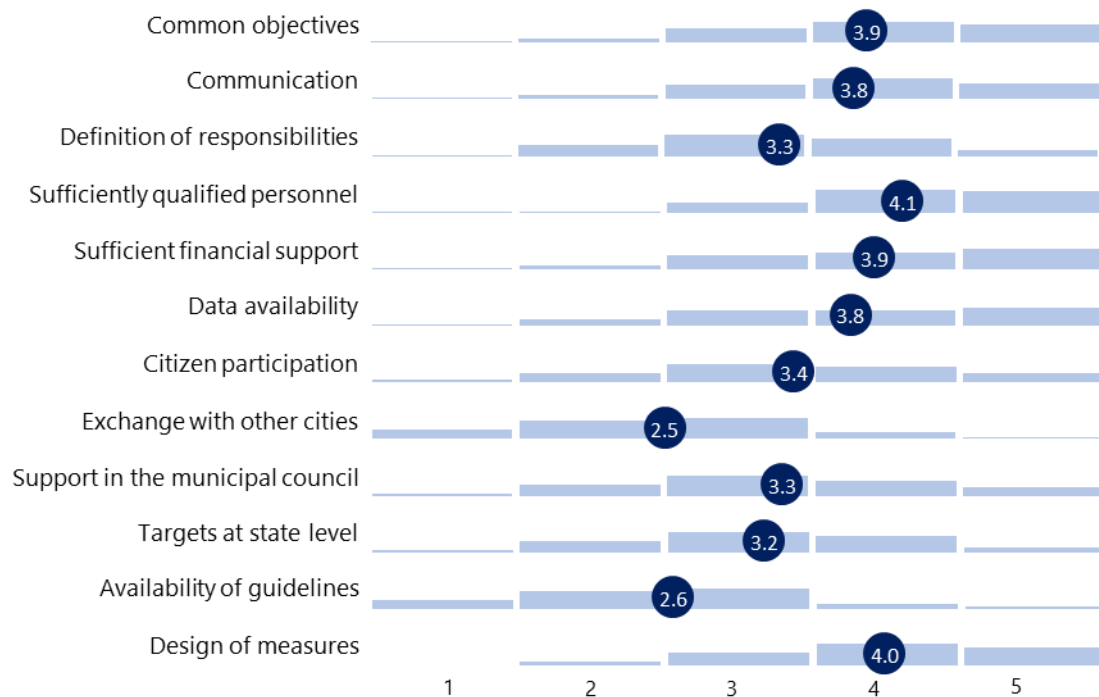
Graphic shows distribution and weighted average of responses

- Assessment with Likert scale:
(1) not at all important
(5) very important
- The majority of factors are perceived as important.
- Communication and data availability are rated as particularly important.
- In comparison, exchange with other cities/municipalities and targets at state level are rated as less important.

Results of the survey

Challenges

In your opinion, how challenging are the following aspects for successful heat planning?

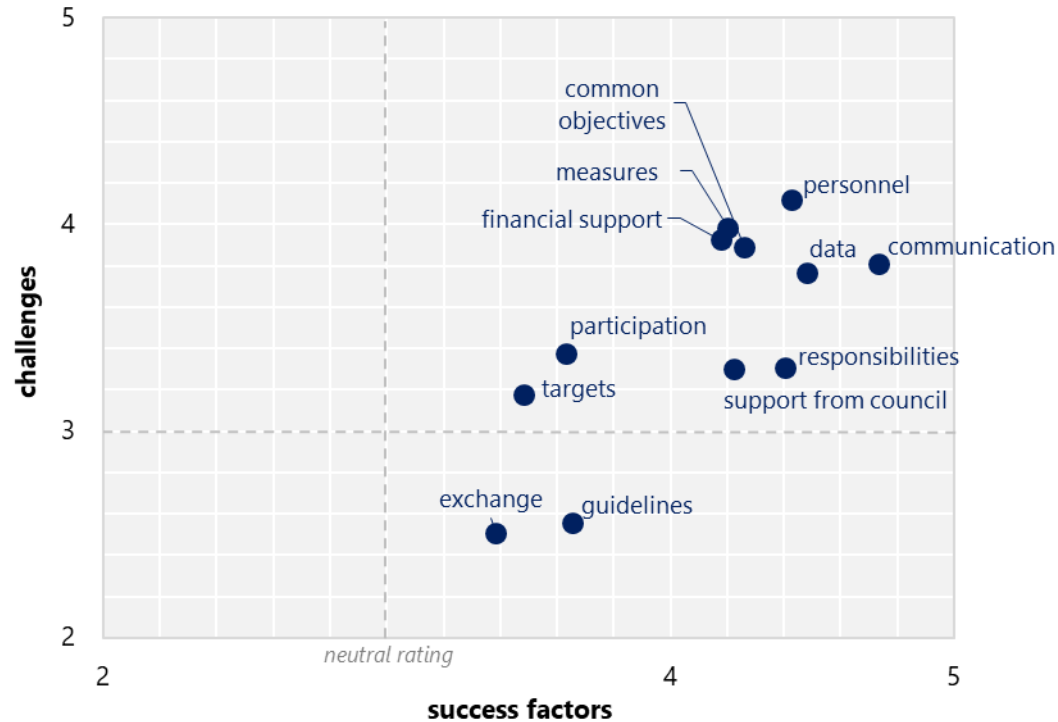


Graphic shows distribution and weighted average of responses

- Assessment with Likert scale:
(1) not at all challenging
(5) very challenging
- The majority of factors are perceived as challenging.
- Sufficiently qualified personnel and the design of policy measures are rated as particularly challenging.
- In comparison, exchange with other municipalities and availability of guidelines are rated as less challenging.

Results of the survey

Success factors and challenges



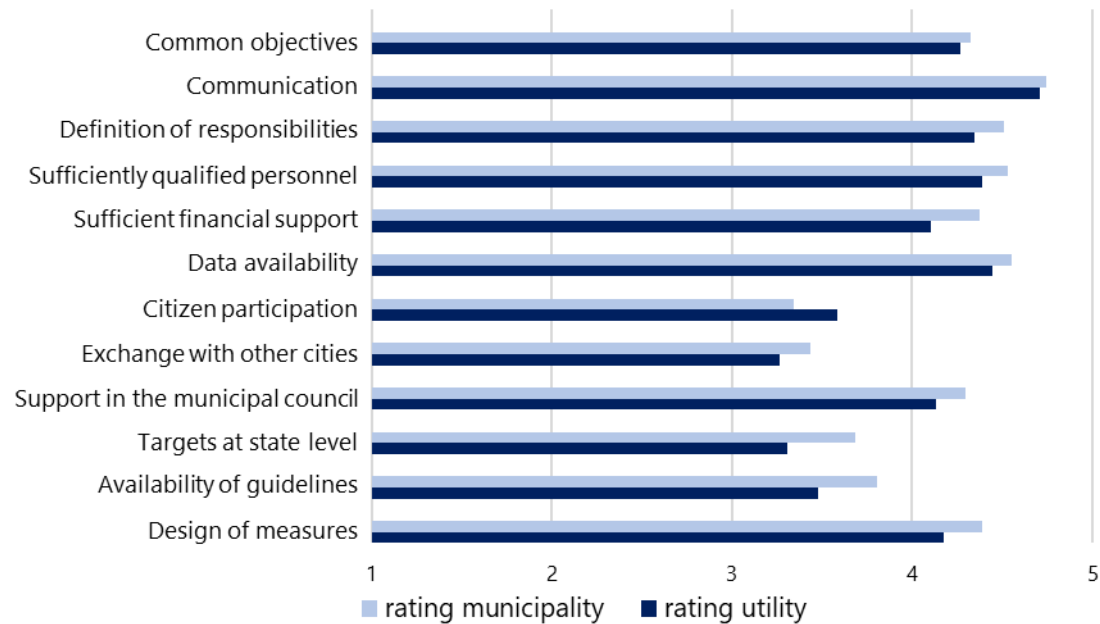
Graphic shows weighted average of responses

- Sufficiently qualified personnel and communication are rated as particularly challenging and particularly important for the success of H&C planning.
- In comparison, exchange with other municipalities and availability of guidelines are rated as less challenging and less important for the success of H&C planning.

Results of the survey

Differences in the perception of success factors

In your opinion, how important are the following aspects for successful heat planning?



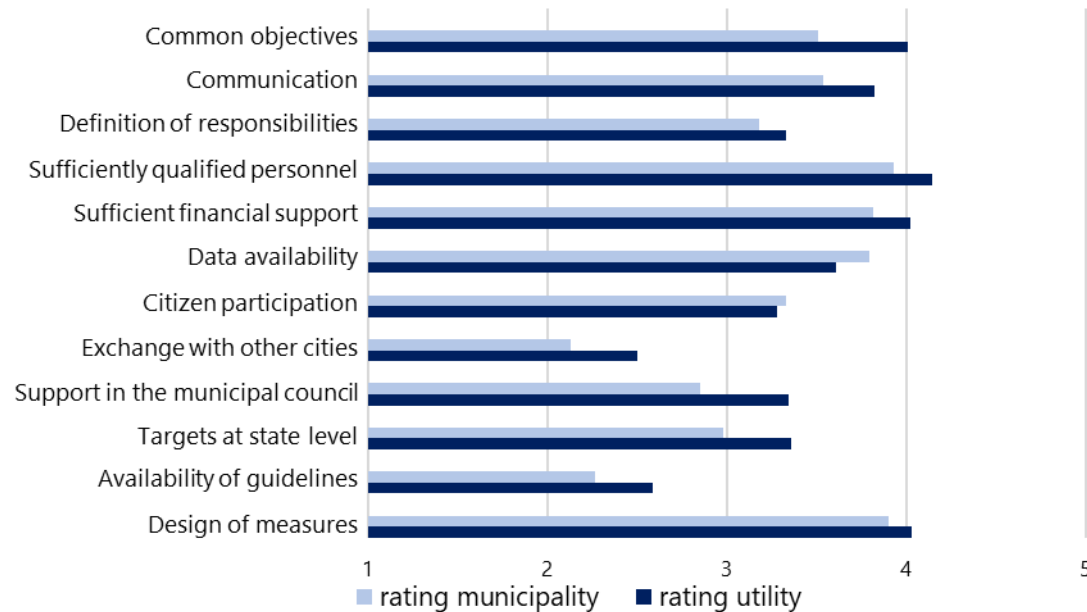
Graphic shows weighted average of responses

- Group comparison between different actors:
 - Group (1): utilities, energy suppliers, grid operators
 - Group (2): municipality, administration, authority
- Group (2) – **municipalities** – considers almost all factors to be more **important** for success.
- Success factors that are perceived by the municipalities as (significantly) more important:
 - Availability of guidelines (*p-value 0.01 and effect size 0.18*)
 - Design of measures (*p-value 0.01 and effect size 0.19*)

Results of the survey

Differences in the perception of challenges

In your opinion, how challenging are the following aspects for successful heat planning?



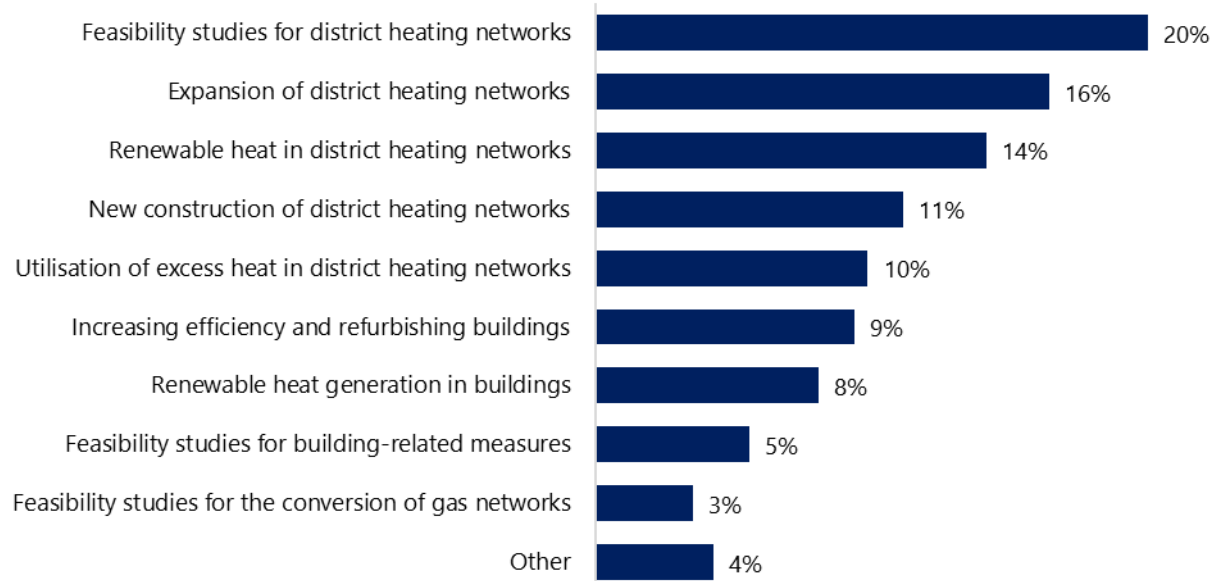
Graphic shows weighted average of responses

- Group (1) – **utilities** – considers almost all factors to be more **challenging**.
- Factors that are perceived by the utilities as (significantly) more challenging:
 - Common objectives (*p-value 0.004 and effect size 0.21*)
 - Support in the municipal council (*p-value 0.004 and effect size 0.21*)
- **Inversion effect:** municipalities see almost all factors as more important, and utilities see almost all factors as more challenging.

Results of the survey

Projects and measures

What projects and measures from the heat plan are already being implemented?

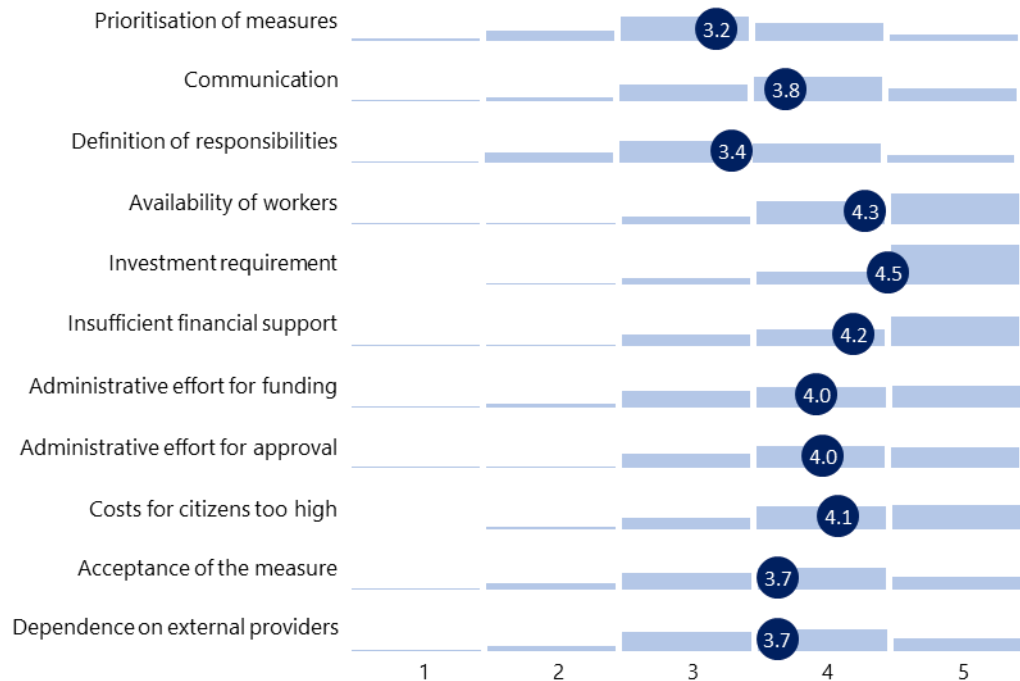


- 35% of respondents stated that projects and measures are already being implemented in their municipality.
- 44% of respondents stated that no measures have yet been implemented in their municipality.
- Feasibility studies for district heating networks are the most frequently implemented measure according to the respondents.

Results of the survey

Barriers to projects and measures

In your opinion, how challenging are the following aspects when implementing projects and measures from heat planning?



Graphic shows distribution and weighted average of responses

- Assessment with Likert scale:
(1) not at all challenging
(5) very challenging
- The investment requirements of the measure and the availability of workers are rated as the greatest challenges.
- In comparison, the prioritisation of measures and the definition of responsibilities are rated as less challenging.

Results of the survey

Barriers to projects and measures

Reasons given in an open questions as to why no measures have been implemented:

- Reluctant administration
- Network operator's own plans
- Lack of personnel
- There are no implementers and therefore no financiers
- Uncertainty regarding legislation at state level
- No urgency seen
- Financial feasibility of district heating expansion
- Because citizens are reluctant to take action
- Interests of municipal utilities/gas suppliers are under threat
- Lack of awareness of the problem
- Lack of expertise
- Administrative overload
- ...



Conclusion

Key takeaways

- **Success factors and challenges:** Sufficiently qualified personnel and communication between the stakeholders involved are seen as important success factors and also as major challenges for H&C planning.
- **Group differences** between municipalities vs. utilities:
 - Availability of guidelines and implementation measures are perceived as more important by municipalities.
 - Common objectives/vision and support from the local council are perceived as more challenging by utilities.
- **Implementation:** Investment requirements and the availability of workers are rated as the greatest challenges for implementing measures from the H&C plans.



Further literature

Reports, paper and co.

- Billerbeck, Anna; Fritz, Markus; Oberle, Stella (2025): Umfrage zur Kommunalen Wärmeplanung. Einschätzungen zu Erfolgsfaktoren und Hemmnisse. Kurzbericht. Karlsruhe. Fraunhofer CINES. → Report with survey results will be published soon (beginning of march) on the following website: <https://www.cines.fraunhofer.de/de/angebot/waerme/kommunale-waermeplanung.html>
- Fritz, Markus; Billerbeck, Anna; Cloos, Fabian; Aydemir, Ali; (2024): From policy to action: assessing the effectiveness of heating and cooling plans - a case study on heating and cooling plans of municipalities in Baden-Württemberg, Germany. <https://publica.fraunhofer.de/entities/publication/bc0223ff-1dff-464f-90b1-1ee8b8424719>
- Fritz, Markus; Billerbeck, Anna; Aydemir, Ali (2024): Wärmeplanung: Viel heiße Luft oder effektive Maßnahme? Blogbeitrag. <https://www.isi.fraunhofer.de/de/blog/2024/kommunale-waermeplanung.html>
- Fritz, Markus; Billerbeck, Anna; Aydemir, Ali (2021): Wärmeplanung: Motor für die Wärmewende. Blogbeitrag. <https://www.energie-klimaschutz.de/waermeplanung-motor-fuer-die-waermewende/>
- Friedmann, Annabel; Stella, Oberle; Wietschel, Martin (2024): Was bewegt die regionalen Energieversorger? Eine Marktanalyse von Strom-, Gas- und Wärmenetzbetrieben. Zeitschrift für Energiewirtschaft. <https://link.springer.com/article/10.1007/s12398-023-0935-z>





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Thank you for your attention!

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