Affordable transition of industry and heating – An overview and a perspective from Germany

INTREPIDH webinar, September 15, 2026

Fraunhofer Research Institution for Energy Infrastructures and Geotechnologies IEG
Björn Drechsler, Cottbus (Germany)

Brief Introduction to the Speaker

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Short CV

- **2006 – 2018, LBD-Beratungsgesellschaft mbH, Berlin:** Senior Consultant & Project Manager for strategy and implementation projects related to the energy transition, working with municipal utilities, electric utilities, energy conglomerates, new entrants, industry, associations, and policymakers
- **2018 – 2020, ASG Spremberg GmbH, Industriepark Schwarze Pumpe:** Industrial park management, site development, economic development, and project management, as well as the development of the business and operating model for the start-up centre Dock3
- **Since 2021, Fraunhofer IEG, Cottbus:** Senior Researcher with the following responsibilities and R&D focus areas:
  - Head of "Energy System Analysis, Infrastructure & District Planning" (since May 2025)
  - Operational Manager of the Competence Centre „Flexibility Markets, Energy Industry & Regulation" (since 2021)

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Fraunhofer Research Institution for Energy Infrastructures and Geotechnologies IEG

We design the climate-neutral energy systems of the future.

~250 employees
2 directors

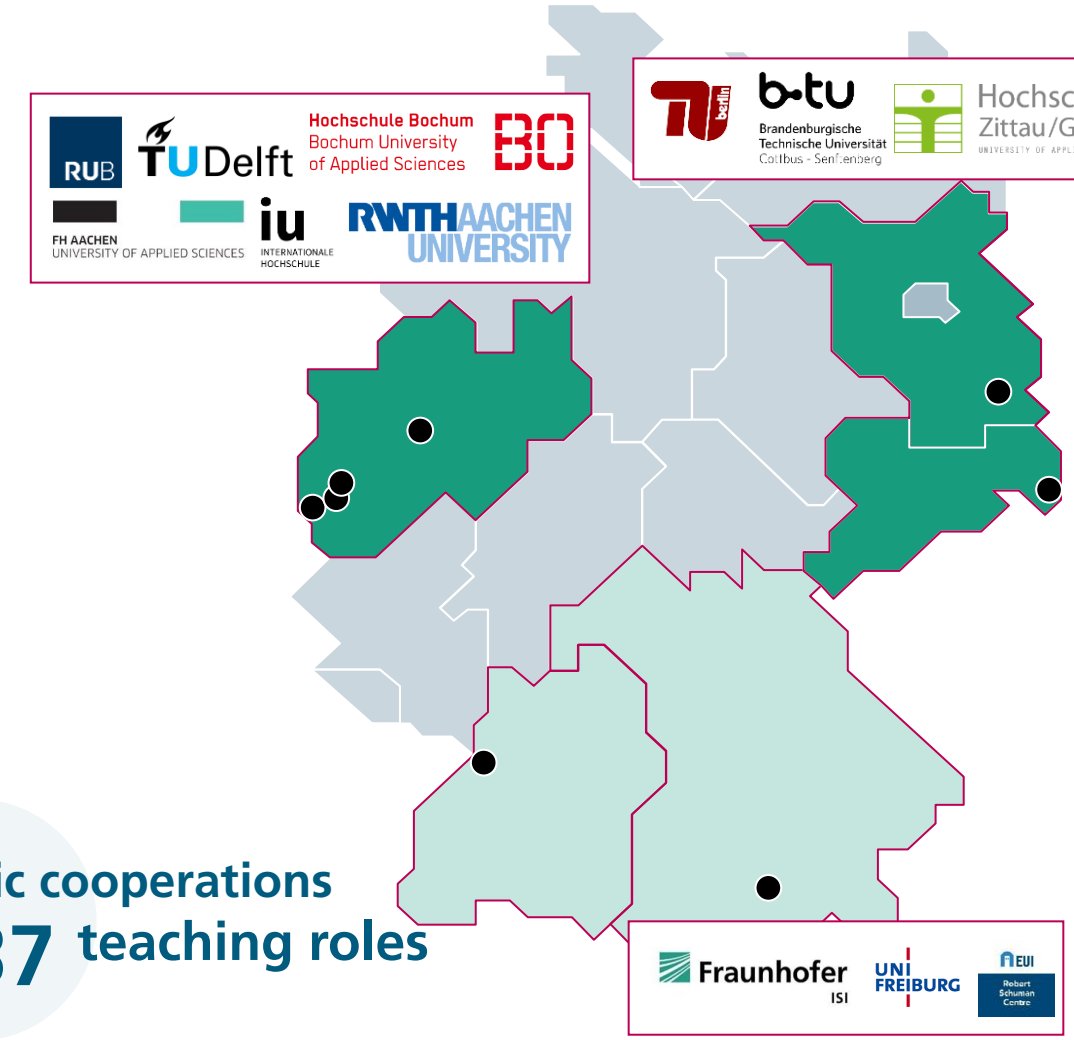
Founded on
01.12.2019

8 sites

22 scientific competence centers

7 business- & service units

15 academic cooperations
37 teaching roles



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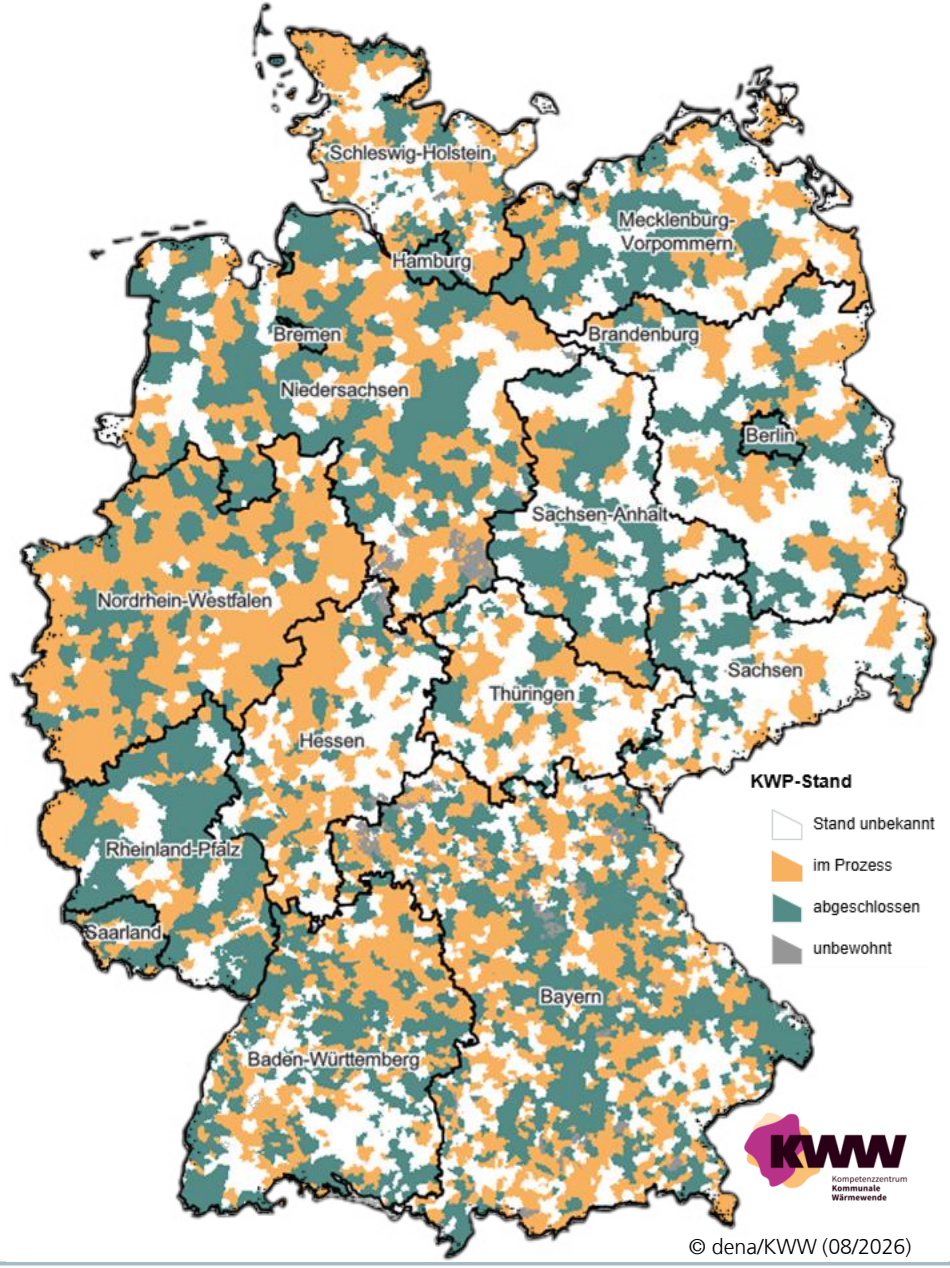
Municipal Heat Planning (KWP) in Germany

Status Quo as of August 2026

- **10,754 municipalities** in Germany
  - **3,602 (34%) have completed** their municipal heat planning (approx. 2/3 of Germany's population)
  - **3,458 (32%) have started**
  - Political target for completion: June 30, 2028
- **Huge support, a lot of work and even more information and data available from:**
  - Deutsche Energie-Agentur GmbH (dena)
  - Kompetenzzentrum Kommunale Wärmewende (KWW)
  - Energy agencies on state level



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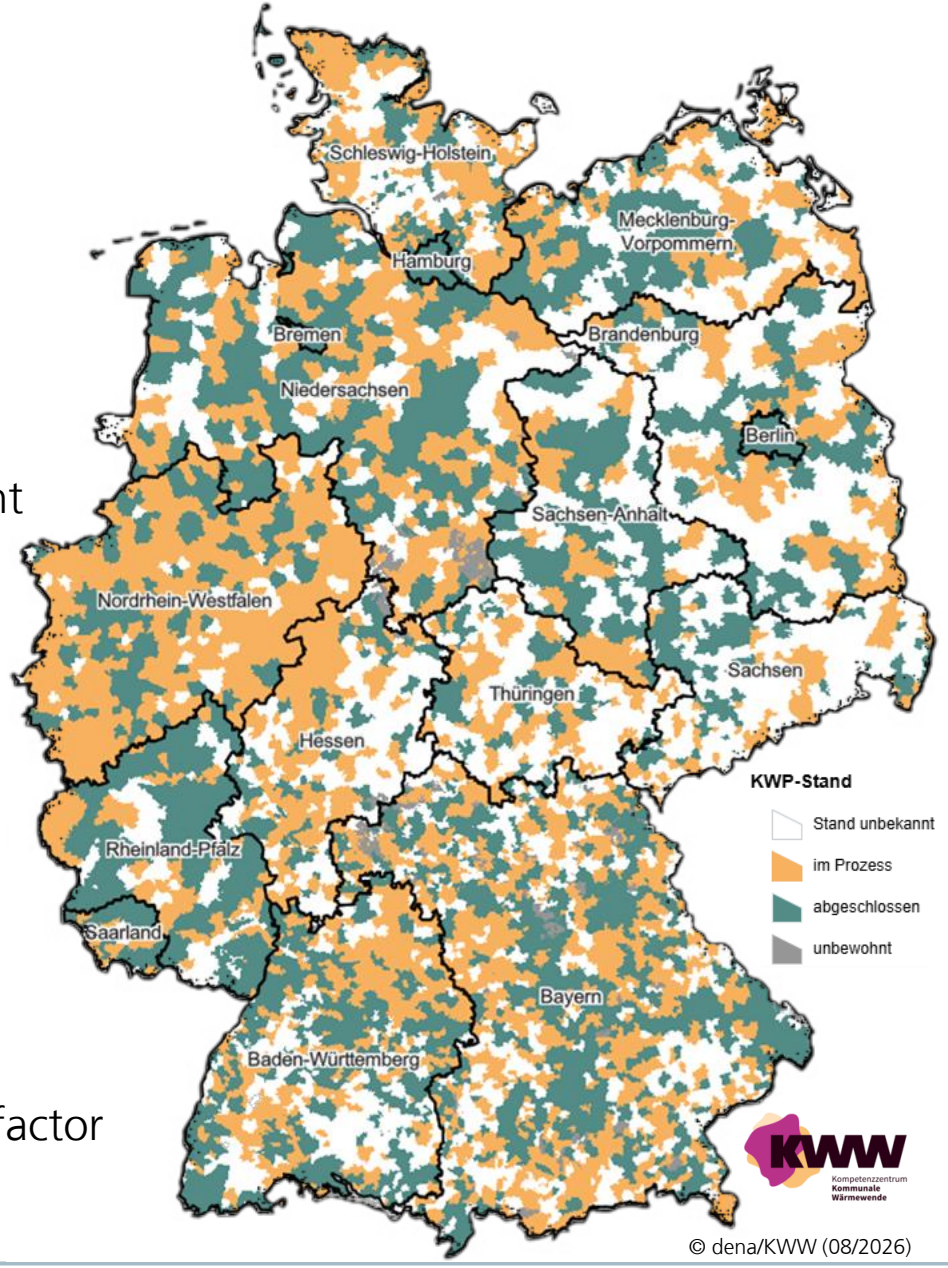
Municipal Heat Planning (KWP) in Germany

Major Opportunity for the Transformation of District Heating

- **1st phase – Learning:** minimal requirements, ambitious assumptions, scarce data, immature market, skepticism, and even rejection
- **Good planning and positive communication** are particularly important in times of limited resources and shrinking social acceptance.
- **2nd phase – Mainstream and matter of course:**
  - Integrated, cross-sector energy system planning and optimization
  - Digital tools to professionalize analysis and planning processes
  - Reduction in effort required for data collection and analysis
  - Understanding municipal heat planning as an ongoing process with regular updates and revisions
  - Recognize qualified staff in municipalities and utilities as a key success factor



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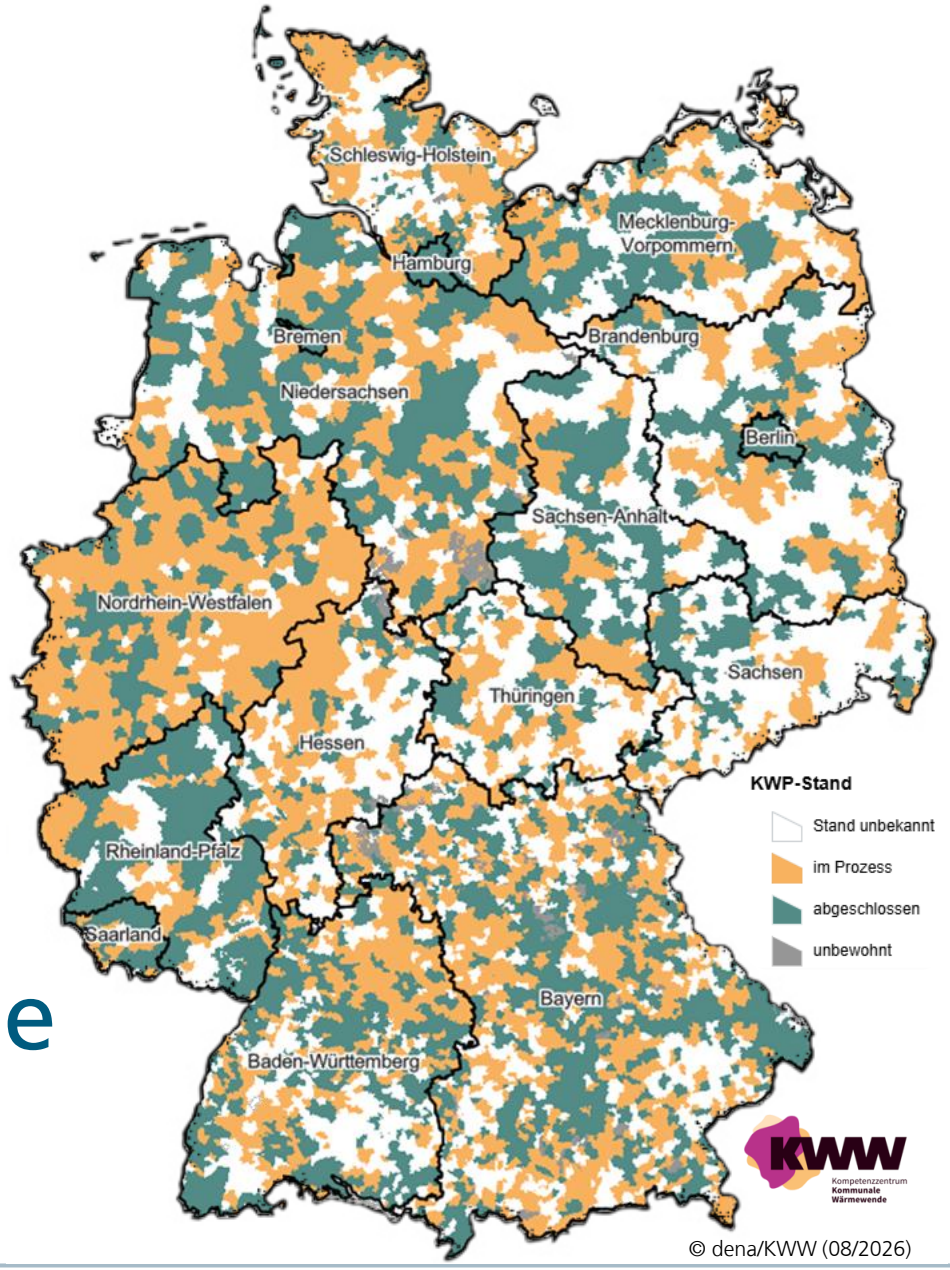
Mapping the Energy World:

Municipal heat planning is, for the first time and on a nationwide scale, raising widespread awareness and establishing the fundamental data foundation for a sustainable heat transition in Germany.



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https://www.grosswaermepumpen-info.de/

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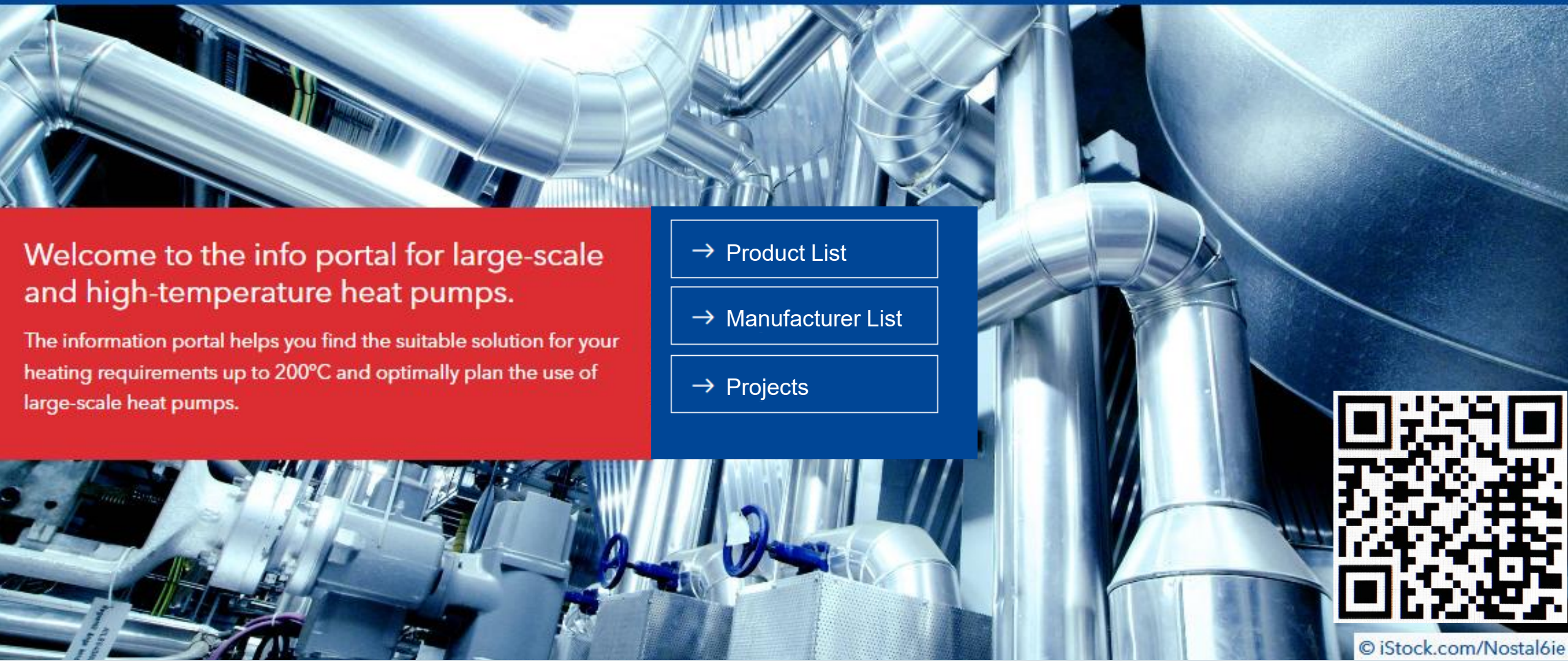

Reference: LEA Hessen, Fraunhofer IEG (2026), available at: https://www.grosswaermepumpen-info.de/ (last accessed: 17.06.2026)

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Clear search

State

All

State or region where the project is located.

Flow Temperature Heat Pump [°C]

≤ 20 | 20 - 150 | ≥150

Forward temperature of the heat pump in °C.

Thermal Capacity [kW]

≤ 10 | 10 - 1000000 | ≥1000000

Heating capacity of the project in kW.

Refrigerant category

All

Category of the refrigerant, e.g., HFC, natural.

Source category

All

Category of the source medium, e.g., fluid, gas.

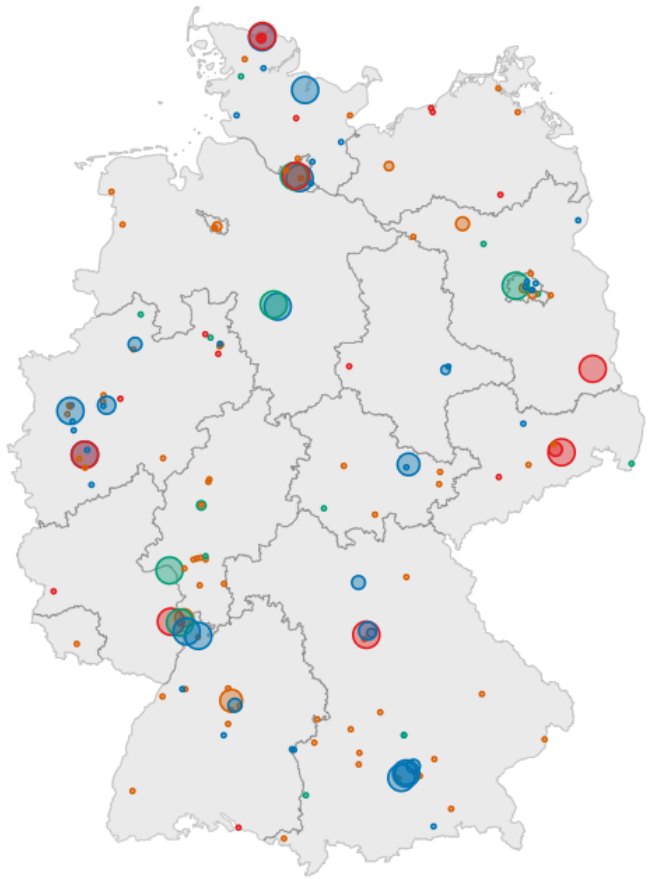
Commissioning Status

All

Status of the commissioning.

Projects

ⓘ Infos



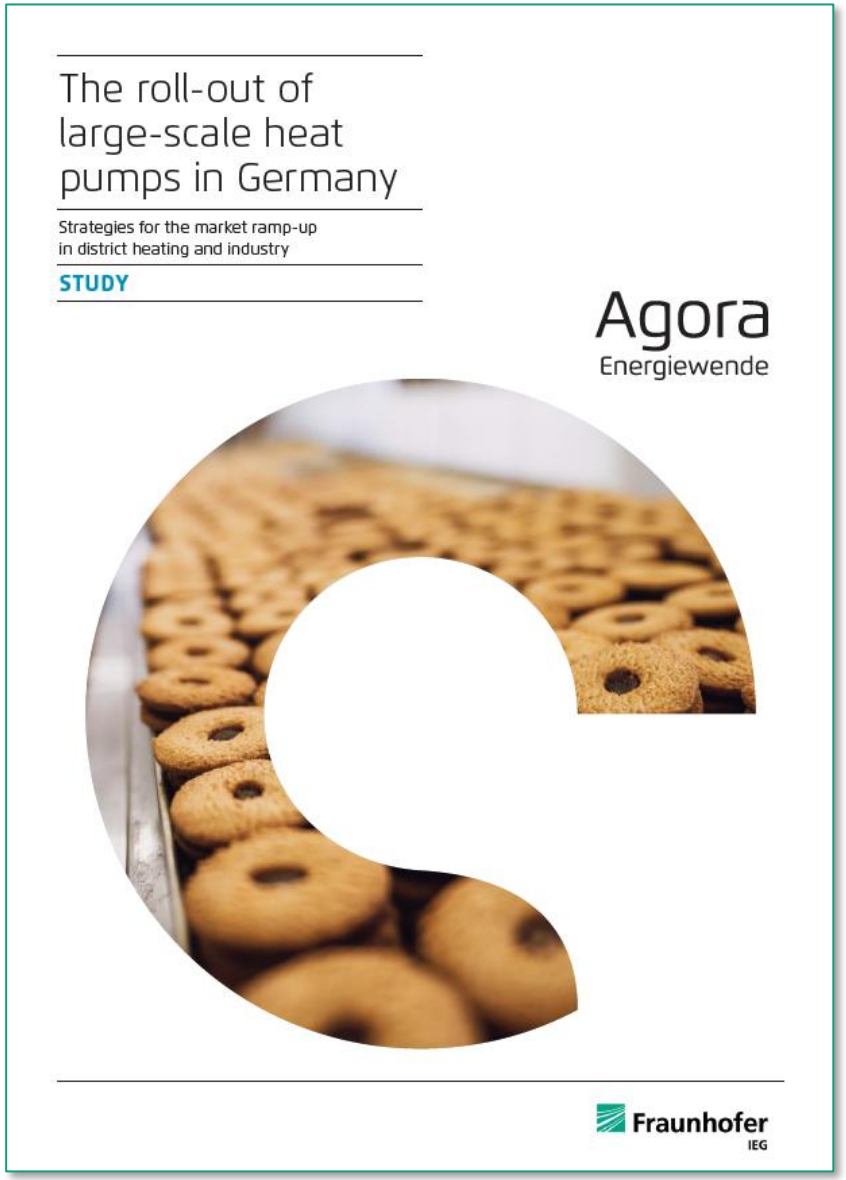
Reference: LEA Hessen, Fraunhofer IEG (2026), available at: https://www.grosswaermepumpen-info.de/en-us/projects/ (last accessed: 17.06.2026)

Roll-out of large-scale heat pumps in Germany

Strategies for the market ramp-up in district heating and industry

Study by Fraunhofer IEG and Agora Energiewende (June 2023)

- The current role of large-scale heat pumps in Germany and a look at Europe
- Development scenarios for heating networks and large-scale heat pumps to achieve climate goals by 2045
- Potential and prerequisites of the most important heat sources
- State of the art, core components, key metrics, and outlook
- Products and manufacturers in the large-scale heat pump market
- Regulatory and economic framework, incentives, and subsidies
- Planning and development of large-scale heat pump projects from the perspective of district heating providers
- Areas of action for the rollout of large-scale heat pumps in district heating and industry

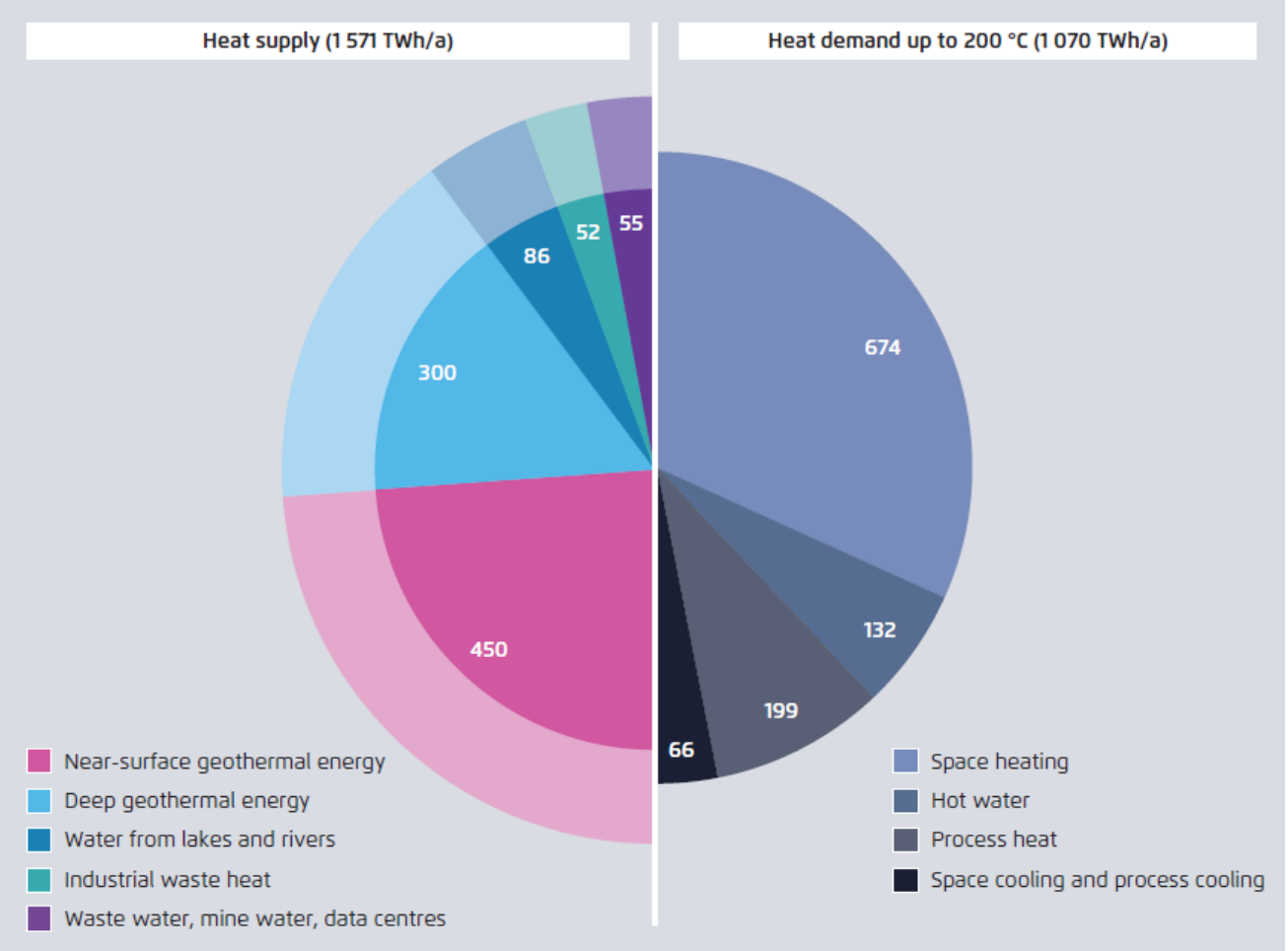


Suggested citation:
Agora Energiewende, Fraunhofer IEG (2023): The roll-out of large-scale heat pumps in Germany. Strategies for the market ramp-up in district heating and industry.

In the long term, it would theoretically be possible to meet all of Germany's heating requirements up to 200 °C using heat pumps.

Comparison of the potential heat supply from heat pumps and the heat demand up to 200 °C in Germany (excluding ambient air)

- Just under two-thirds of heating demand is accounted for by space heating.
- Heating requirements up to 200 °C account for three-quarters of Germany's gas consumption and over a quarter of Germany's emissions. (2021)
- These requirements can be met entirely by heat pumps.
  Calculation: Energy from the heat source (dark colours) plus drive energy (transparent colours), assuming an average COP of 2.5.
- Excluding air as a heat source, near-surface and deep geothermal energy offer by far the greatest potential.

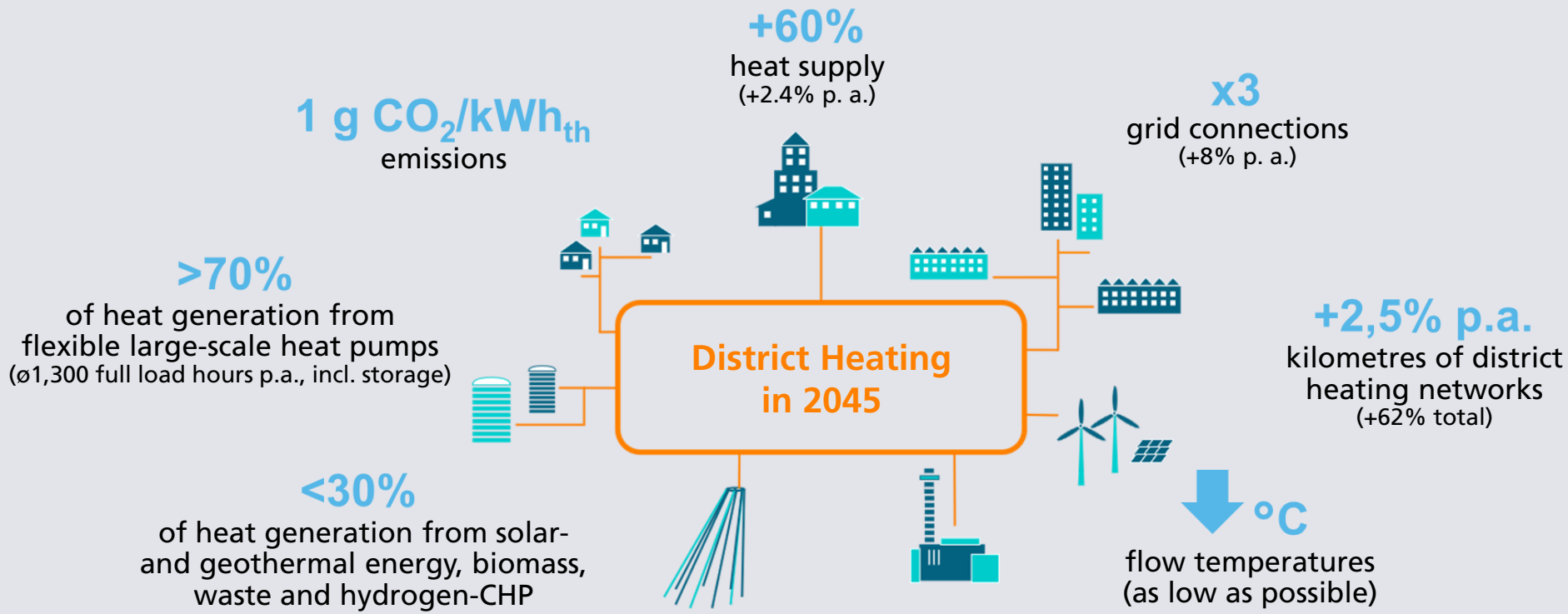


Fraunhofer IEG (2023) based on Born et al. (2022), Bracke et al. (2022), Kammer (2018), Gerhardt et al. (2019), Fritz and Pehnt (2018), Wolf (2017), Stobbe et al. (2015), AGEB (2022)

The average district heating network in a German city in 2045 …

How does it need to change compared to the German average of the year 2020?

The typical district heating system of a German city in 2045 (compared to 2020)



Fraunhofer IEG based on Fraunhofer ISI et al. (2022); numbers based on the long-term scenarios III of BMWE (Fraunhofer ISI et al. 2022b)

Chosen R&D projects of Fraunhofer IEG in the field of district heating, process heat and large-scale high-temperature heat pumps

FernWP: District heating and process heat supply using heat pumps instead of coal combustion

© HKW Cottbus

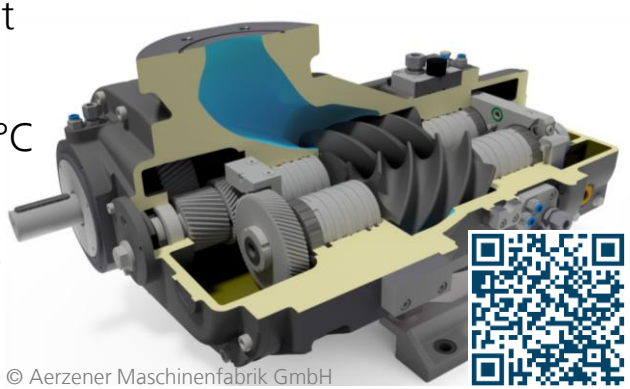
Scope:

- Systematic addressing of grid-related aspects
- Identification of suitable refrigerants
- Further development of structural components
- Identification of suitable renewable heat sources
- Operating strategies to improve cost-effectiveness

SteamScrew: Development and upgrading of a screw compressor for steam compression and the construction of a high-temperature heat pump demonstration plant

Key features:

- Sink temperatures: 140–200°C
- Sink capacity: 500 kW
- Water as a refrigerant (R718)



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PUSH2HEAT: Pushing forward the market potential and business models of waste heat valorisation by full-scale demonstration of next-gen heat upgrade technologies in various industrial contexts

Key features: 4 demo sites for heat upgrade

- Heat Pump & Mechanical Vapour Recompression (MVR)
- Compression Heat Pump
- Absorption Heat Transform
- Thermochemical HP (test site)

Push2Heat

© Push2Heat

HP4INDUSTRY: Development of efficient, scalable, and sustainable heating and cooling solutions tailored to industrial applications by integrating renewable and alternative heat sources, including industrial waste heat, solar thermal energy and geothermal energy.

Focus on three energy-intensive sectors:

- Food and beverage
- Pulp and paper
- Chemical industry

HP4INDUSTRY

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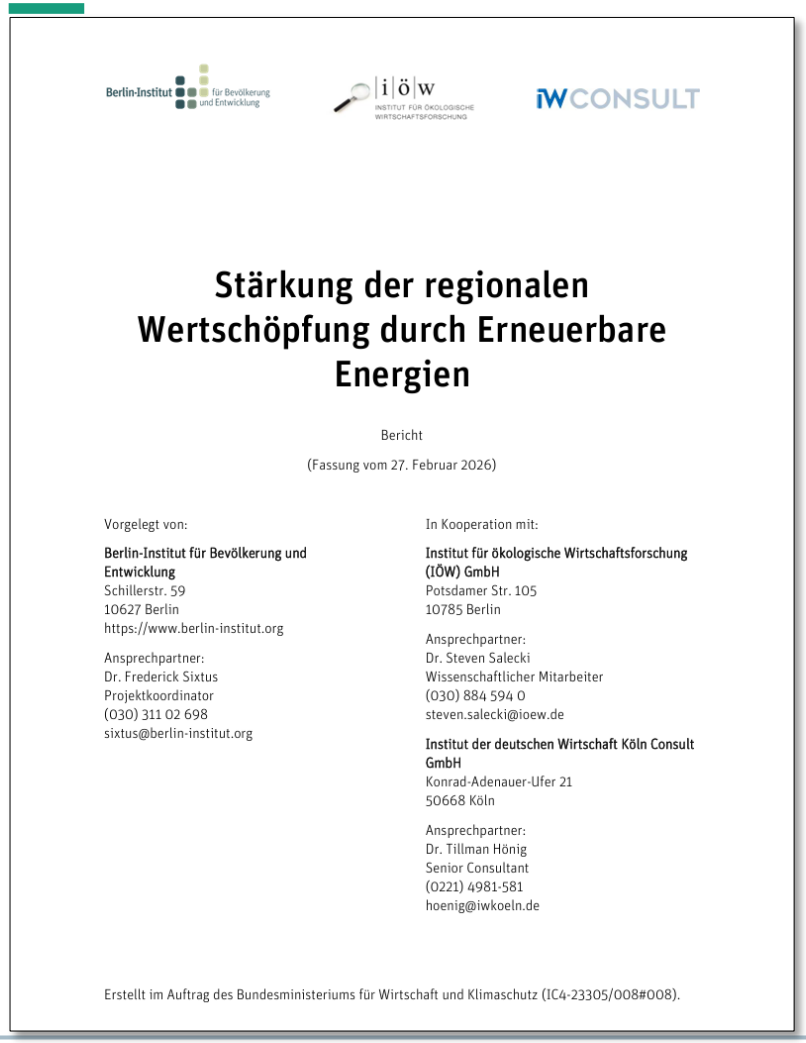
The energy transition and industrial transformation as drivers of greater regional value creation and a more resilient economy and society.



Berlin-Institut für Bevölkerung und Entwicklung | i|ö|w Institut für ökologische Wirtschaftsforschung | IW CONSULT

Stärkung der regionalen Wertschöpfung durch Erneuerbare Energien

Bericht

(Fassung vom 27. Februar 2026)

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Erstellt im Auftrag des Bundesministeriums für Wirtschaft und Klimaschutz (IC4-23305/008#008).

Report on 'Strengthening regional value creation through renewable energies' by the Berlin Institute, IÖW & IW Consult on behalf of the BMWK (as at 22 July 2025, published: 27 February 2026).

Contents:

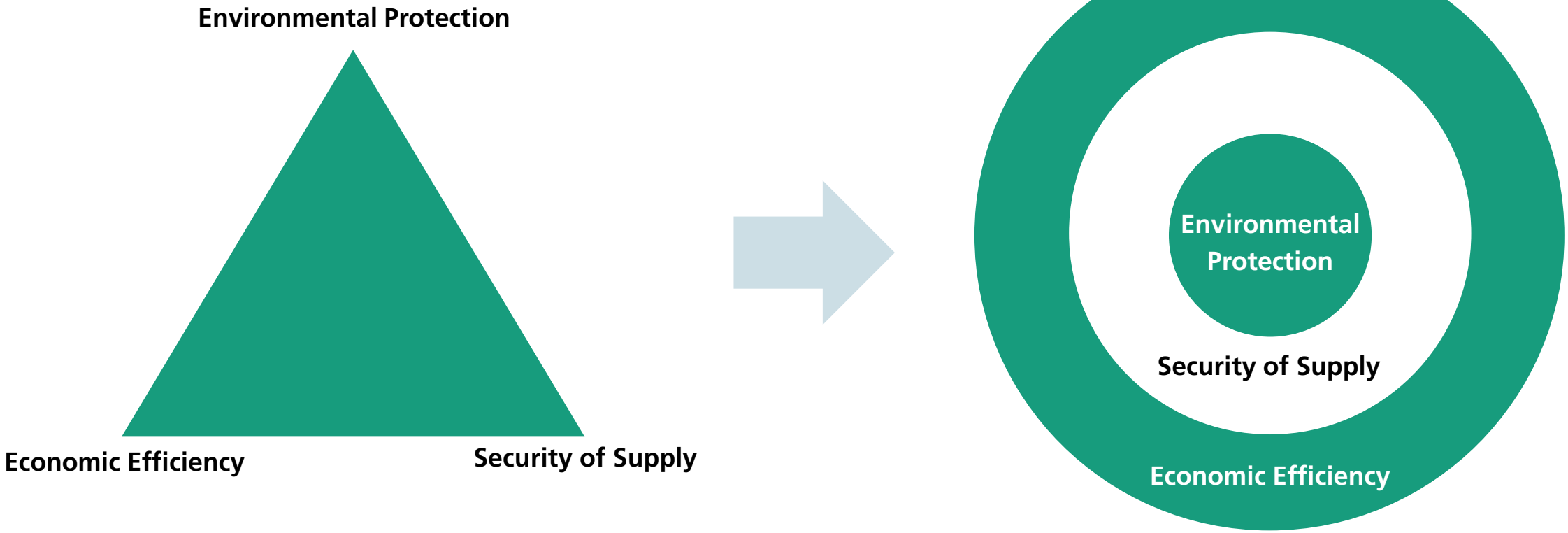
- Potential for regional value creation and employment through renewable energy
- Focus on the value creation and employment effects associated with the planning, construction and operation of wind and solar power plants
- Macroeconomic and regional effects, in particular increased attractiveness for businesses to locate in the area and a rise in local tax revenue
- Indirect effects on public services, i.e. how revenue remains within the regions – and how this strengthens the quality of the location, living conditions and the local community

- **And now let's imagine just how much more local authorities, local businesses and the local population could benefit from the transformation of district heating networks, the decarbonisation of process heat and the associated mechanical and plant engineering.**

Reference: Berlin-Institut, IÖW, IW Consult (2025); Bullet points based on: https://www.ioew.de/publikation/staerkung_der_regionalen_wertschoepfung_durch_erneuerbare_energien (last accessed: 01/06/2026)

Last but not least: The Energy Policy Triangle is miseading!

Much more sensible: **The Golden Circle (by Simon Sinek)**



Thank you for your attention!

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