



Mapping of state-of-the-art cooling systems

Cooling Down Day 2025

Tackling the Cooling Demand for Urban Heat Islands, Grids and Data Centers

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Proposal number: 101077140 | Call: LIFE-2021-CET

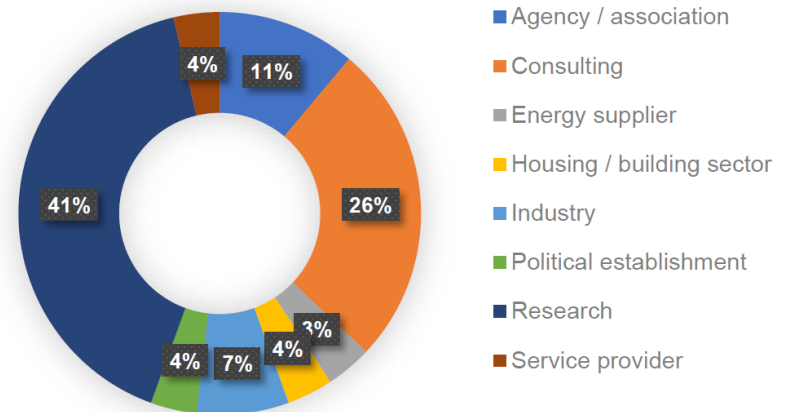


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Mapping and technological assessment of cooling technologies

Key-Aspects for future cooling systems

- Assessment through a survey within project consortium + webinar participants
- Addressed aspects:
 - Technological application and role in future cooling systems
 - Operational/economical and sustainability aspects



Participants: 27

Key-Aspects

- Highest importance for electricity-driven systems
- **Passive cooling systems** dependent on climatic conditions
- Especially **long-term storage solutions** of high importance
- **5th Generation Grids**
- Integration of **heat and electricity from renewables** of utmost importance
- Cooling system **efficiency** (COP, SEER, water consumption, etc)
- CO₂-Emissions / **Market availability** and low values of LCO_C
- **Low-maintenance and fail-safe operation**

Results summarized in project report

https://gogeothermal.eu/wp-content/uploads/2024/05/D2.1_Report-on-cooling-technologies_v2_20240430-1.pdf

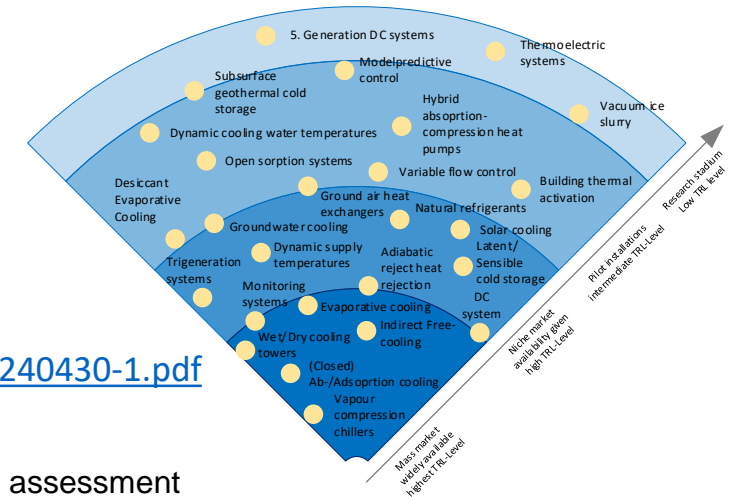
Mapping and technological assessment of cooling technologies

Key-Aspects for future cooling systems

- Assessment through a survey within project consortium + webinar participants
- Adressed aspects:
 - Technological application and role in future cooling systems
 - Operational/economical and sustainability aspects
- Evaluation finalized in June 2023
- Results summarized in project report

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Technology radar on cooling technologies and technological aspects

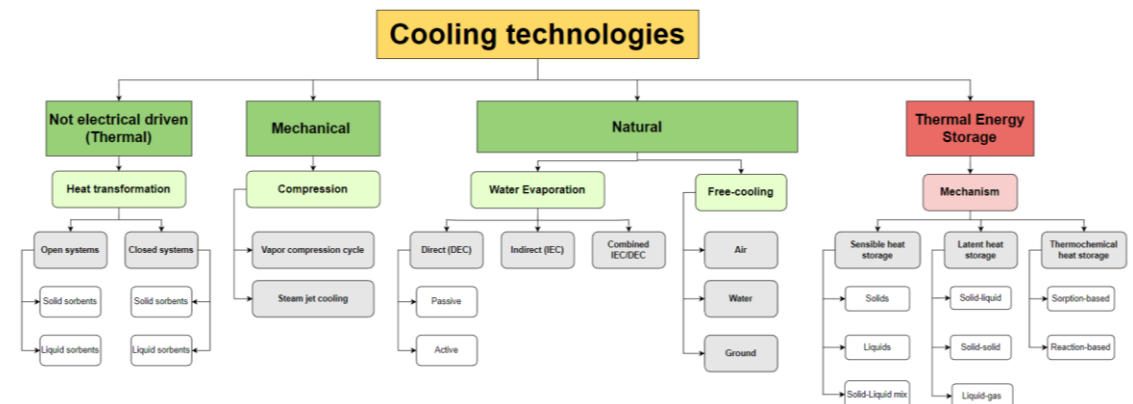


Technology portfolio

- Development of a technological overview for main cooling technologies and storages
- Technological, operational aspects as well use of refrigerants, limitations, etc.

Results summarized in project report
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Mapping and technological assessment



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State-of-the-art cooling systems based on RES and recommendations

Integrated cooling systems based on renewable energy sources (RES)

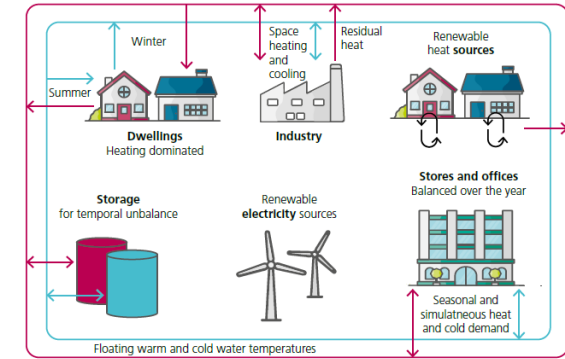
- Integration of cooling applications into the heating and the electricity sector
- Cluster definition for various cooling systems
- For each cluster a representative case study was selected and analysed in detail to identify:
 - System set-ups and operation strategies
 - Chances and challenges in the planning and implementation
 - Critical phases and difficulties
 - Involved stakeholders
 - Key learnings

Outcomes and recommendations

- Importance of incorporating cold storages in highly renewable energy systems
- Success dependent from consistent project management across all phases (from planning to operation)
- Intelligent control systems, communication systems and databases are essential for optimizing the use of renewable energies
- Support from local and public authorities of particular importance
- Need for additional economic incentives (e.g. more flexible electricity price or grid fee orientation)

Results summarized in project report

https://gogeothermal.eu/wp-content/uploads/2024/05/D2.1_Report-on-cooling-technologies_v2_20240430-1.pdf



source: Fraunhofer IEG,
ROADMAP
OBERFLÄCHENNAHE
GEOTHERMIE

Co-production of Heating
and Cooling – Electricity-
driven Cooling

5th Generation District
Heating and Cooling
→ Heerlen (NL)

Case study

Electricity Grid Integration
– Joint supply of cooling
and grid balancing service

Portfolio of large-scale
cooling application
exploiting variable
electricity prices
→ EUREF-Campus Berlin

Case study



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