Geothermal energy integration in European DHC systems: The 100 good reasons initiative by Geothermal-DHC

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Geothermal District Heating and Cooling Day event - 20-10-2022

cost
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Funded by the Horizon 2020 Framework Programme
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Outline

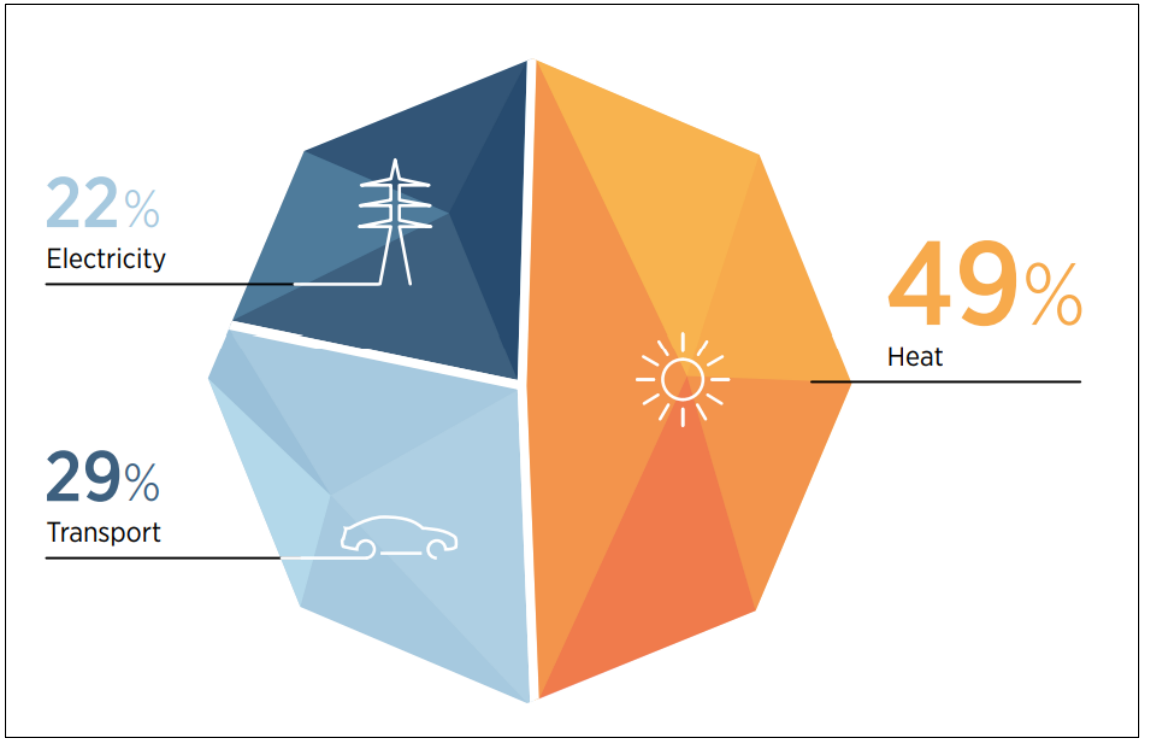
- Introduction
- Geothermal energy solutions for DHC systems
- Geothermal heat role in the Energy Transition
- CA18219 Geothermal-DHC activity
- The 100 good reasons initiative

Introduction

Status quo and challenges regarding the European HC sector

- Renewable share 22.1% in 2020 (source Eurostat)
- Space heating underestimated sector (~30% of final energy consumption @ RES share of 23%)
- Less flexibility given in the HC sector towards transformation than in other energy sectors
- Use of fossil fuels – climate & geopolitical dimension since 2022

Share of non-fossil energy sources as for 2018 (source: DGE ENER/C1/2018-494)



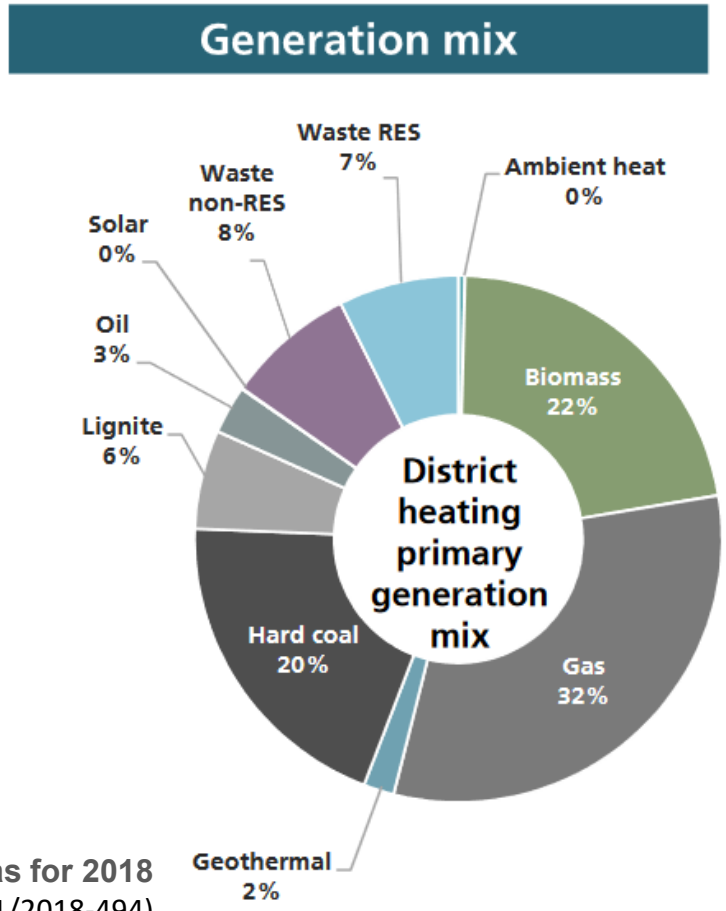
source: IEA, 2020a; IEA, 2020b.

Introduction

Heat generation inside DH systems (2018)

- Share of fossil fuels 61%
- Share of geothermal ~2%
- First geothermal DH system? **1334: Chaudes Aigues, France**

Source: https://www.pays-saint-flour.fr/patrimoine-culturel/chaudes-aigues/



Heat generation mix inside district heating as for 2018
Source: DGE ENER/C1/2018-494)

Introduction

Distribution of DH systems inside the HC sector

source: Kavvadias et al. 2019)

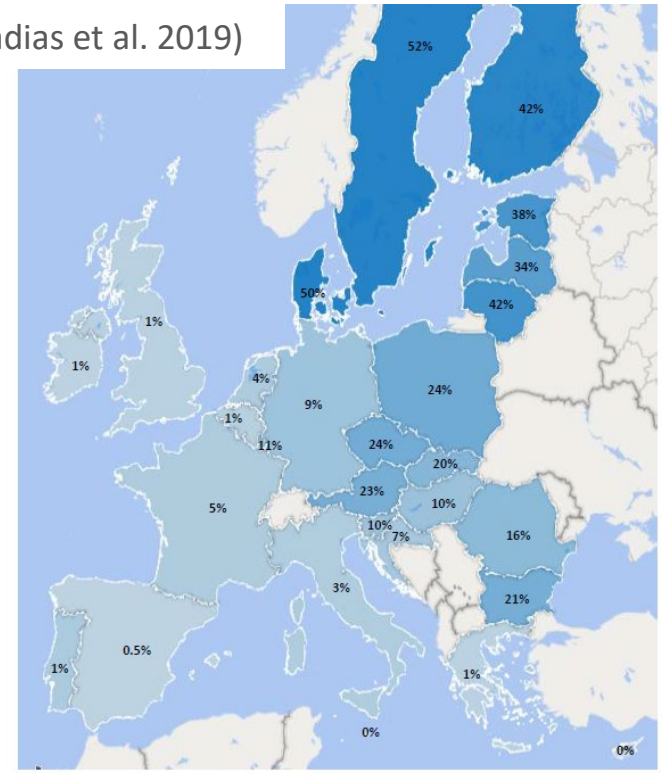
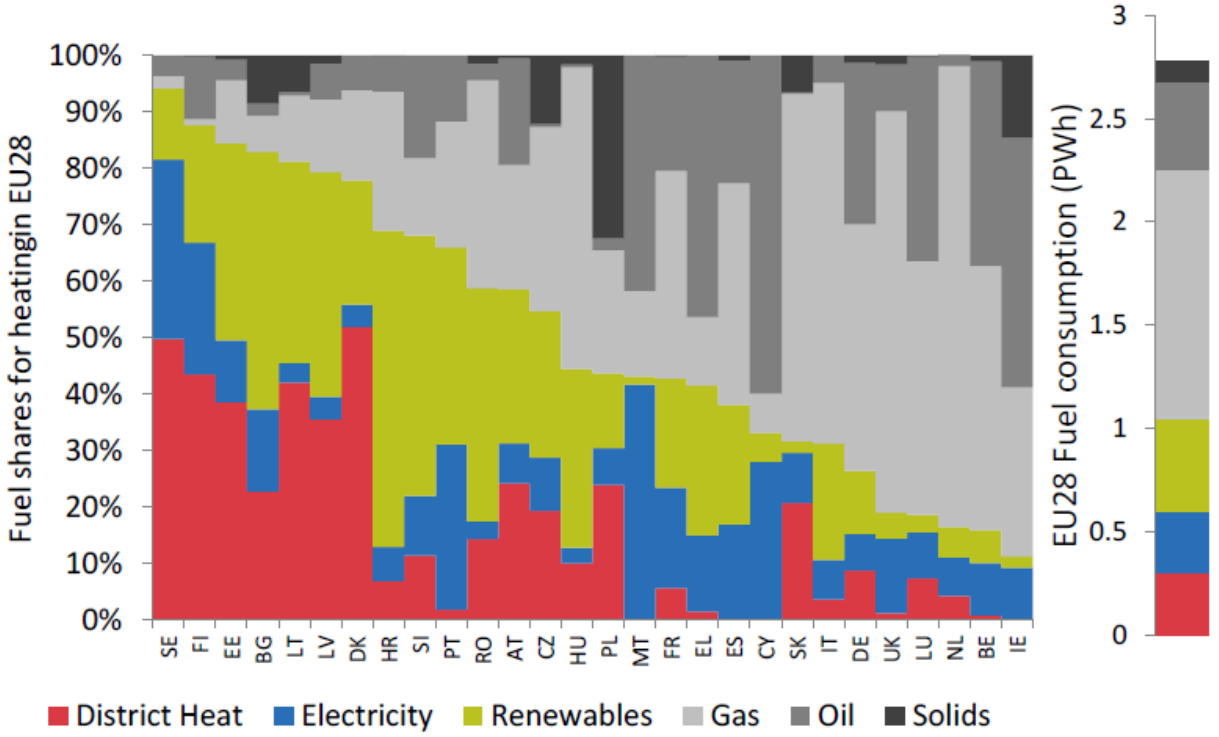


Figure 2-5. District heating share in final energy demand for space heating and domestic hot water in EU-28 in 2015. Data from [1]



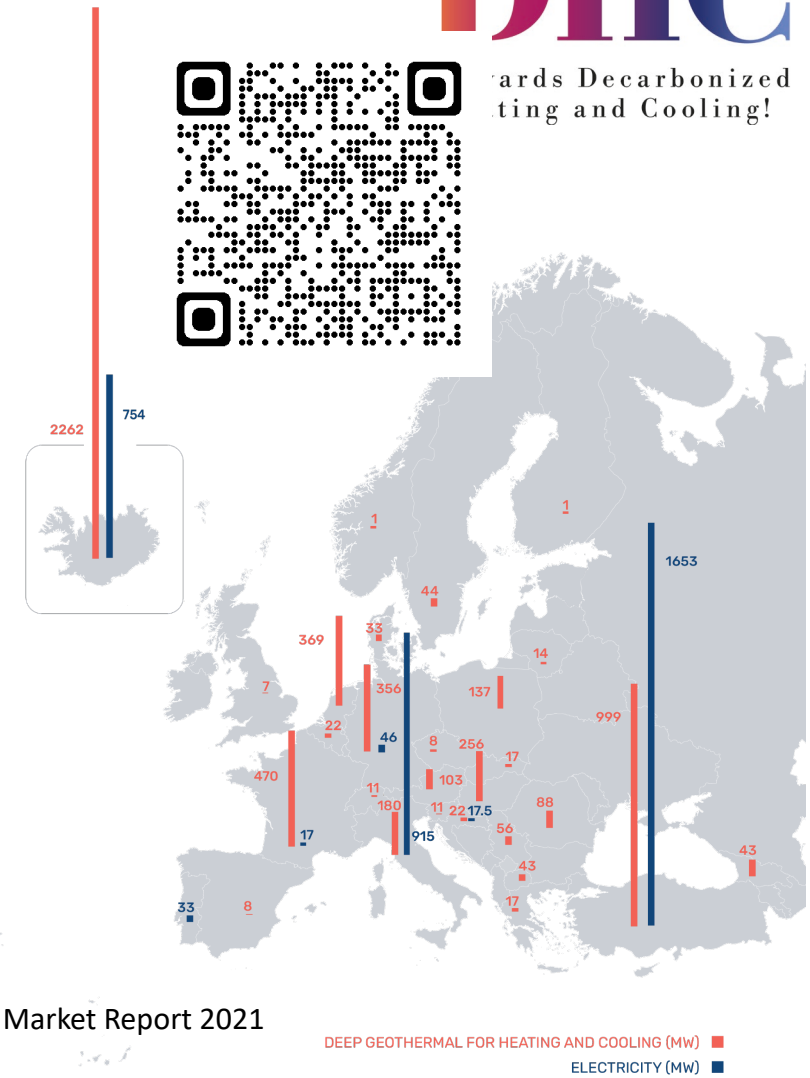
Fuel consumption for space heating in the EU in 2015
Source: Kavvadias et al. 2019

Introduction

Market perspective

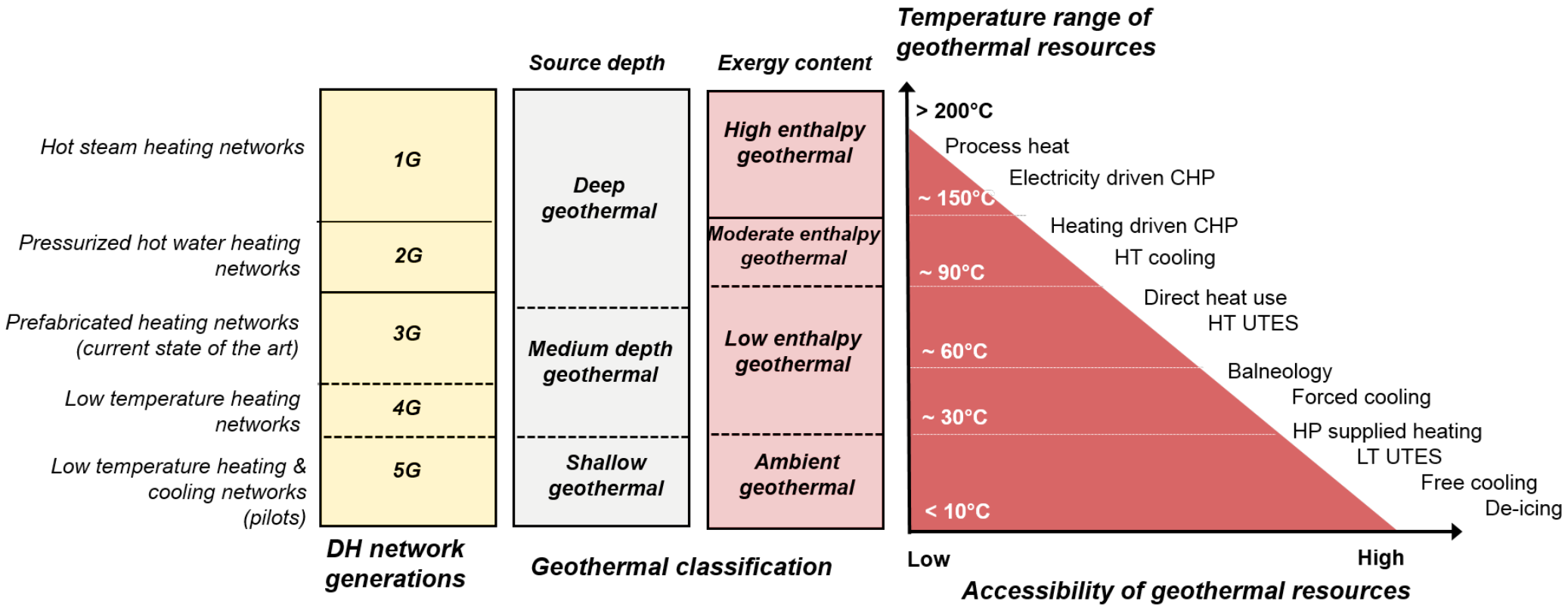
Europe:

- 350 **geothermal direct use systems** in operation +232 projects (40% in construction phase) in development (EGEC, 2021)
- 40 to 50 geothermal **low temperature DHC grids** existing in Europe (Buffa et al., 2019)
- 142 **geothermal electricity plants**, with 6 new in 2021: 3,4 GWe installed and more than 19 TWh produced
- >2 million **GHSPs**: ~ 20 GWth capacity
- Uneven share per country



Source: EGEC Geothermal Market Report 2021

Geothermal Energy Solutions for DHC-Systems

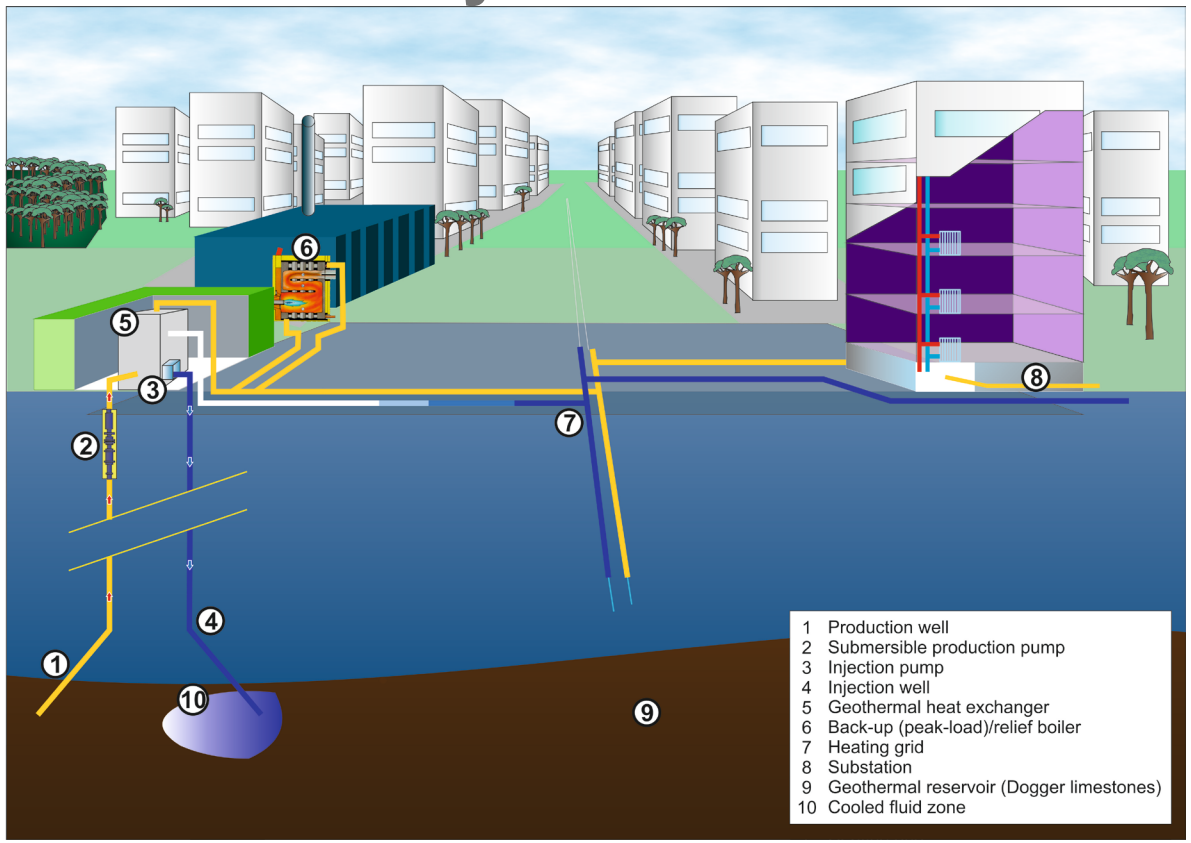


Source: CA18219 Geothermal-DHC

Geothermal Energy Solutions for DHC-Systems

Additional components for Geothermal energy integration in DHC systems

- Peak load supply / back-up system
- DHC network (pipelines)
- Energy conversion (heat pumps, CHP, high temperature cooling)
- Operational control units



Sourcehttp://geodh.eu/wp-content/uploads/2012/07/GeoDH3.jpg

Geothermal heat role in the Energy Transition

- The ‘Fit for 55’ Package acknowledges the need for increasing the renewable energy share in the H&C sector, otherwise the targets are not met
- The ‘European Green Deal’ highlights the important role of geothermal energy in the future clean energy transition
- CA18219 Geothermal-DHC has the main objective of paving the way to further integrate geothermal solutions in the H&C sector, both individual and/or communal solutions

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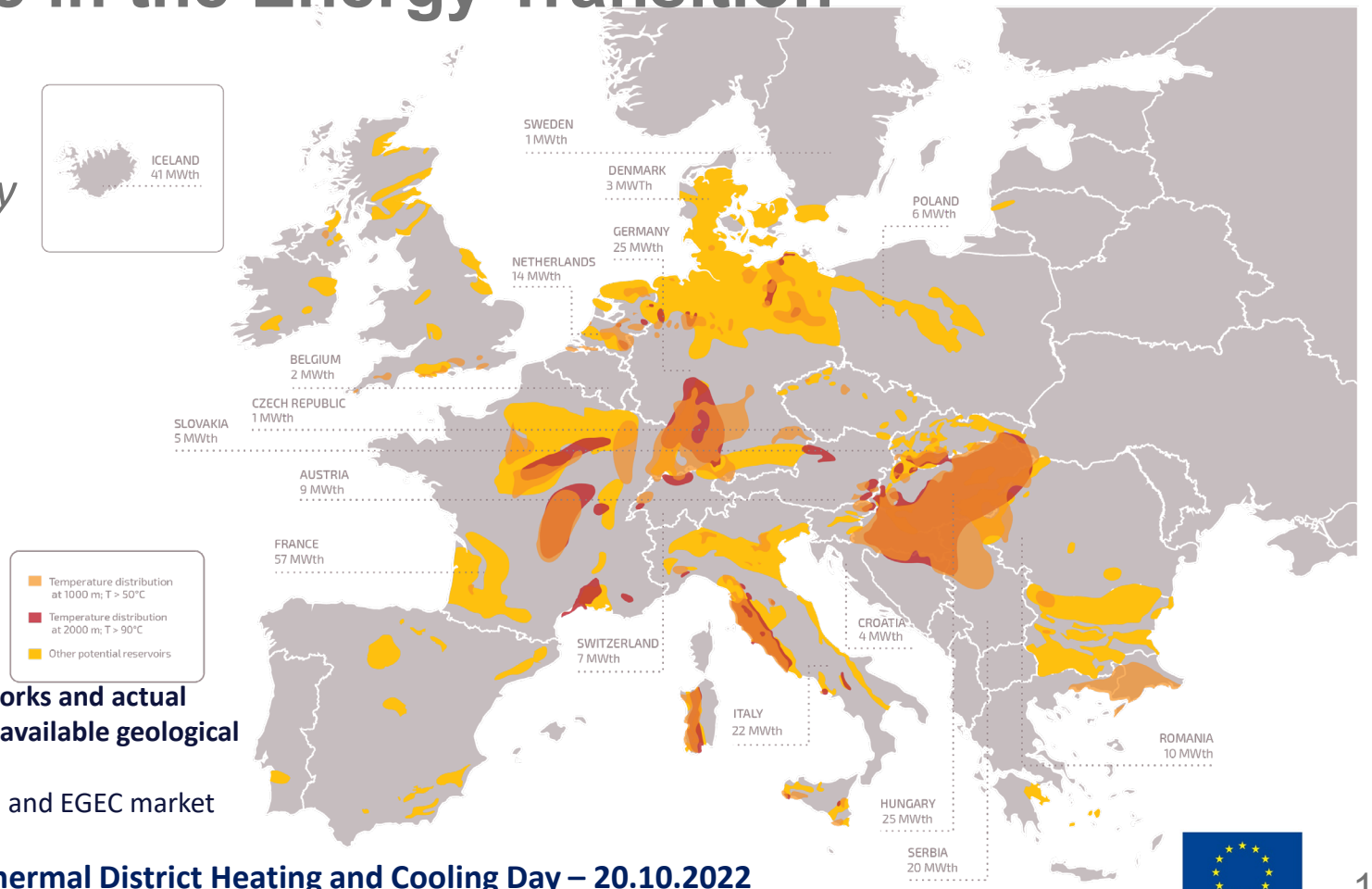
Geothermal heat role in the Energy Transition

- ***More than 25%*** *of the EU population lives in areas directly suitable for geothermal district heating* (source: EU project GeoDH project, 2014)
- Estimated **degree of exploitation** ~ 10% to 15%



Map of areas suitable for geoDH networks and actual geoDH installed capacity according to available geological data
Source: ETIP-DG, adapted from GEODH and EGEC market report

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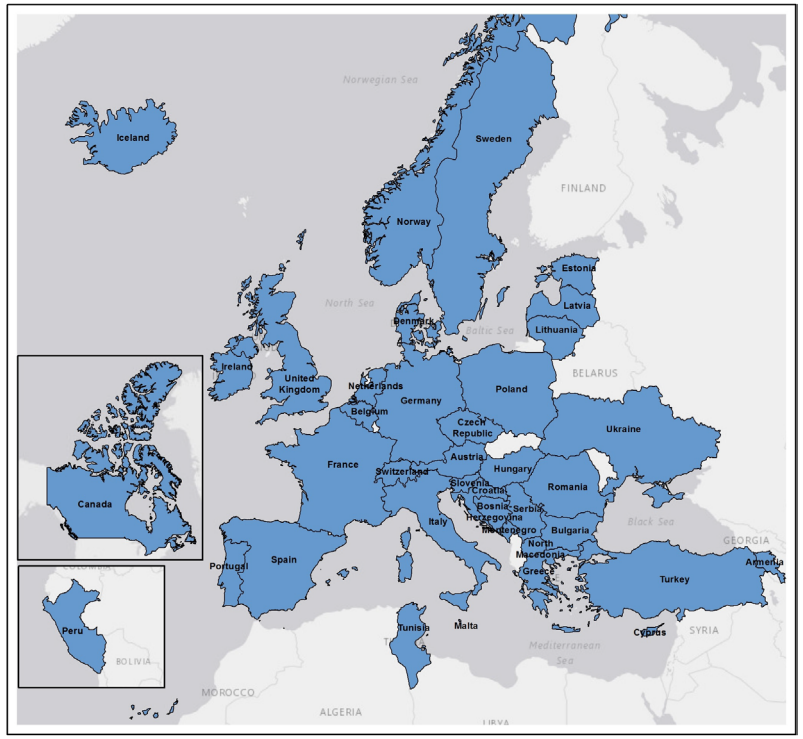
CA18219 Geothermal-DHC activity

„Research network on the integration of geothermal energy in decarbonized heating and cooling networks"

- Operating period November 2019 – October 2023
- Currently ~140 researchers from 35+ countries
- Open access network – financial support for traveling, dissemination and organizing events
- Chairs: **Gregor Goetzl (Austria), Dejan Milenic (Serbia)**



CA18219 participating countries

Visit https://www.geothermal-dhc.eu/JoinIn for entering the COST Action

CA18219 Geothermal-DHC activity

„Research network on the integration of geothermal energy in decarbonized heating and cooling networks"

- Focusing on creating fact sheets on geothermal solutions to be fit into DHC systems and how to integrate them, as well as environmental and socio-economic issues
- Organizing meetings, events, webinars, and training schools
- Funding opportunities: Short Term Scientific Missions, Virtual Mobility, Dissemination (conferences), ITC conference support

PWG1 - Technology

PWG2 – Outreach & communication

PWG3 – Promoting young careers

PWG4 – Uptakes and capitalization

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The 100 good reasons initiative

„100 good reasons to use geothermal energy in heating and cooling networks“

***Our ambition**: collecting at least 100 case studies and create a persistent web tool*

- Raise awareness among stakeholders not familiar with geothermal energy
- **Aim**: Collect, characterize and display geothermal heating and cooling networks in Europe
- **Planned product**: Self-sustaining web GIS application to promote geothermal based H&C networks

Cooperating partners

EGEC GEOTHERMAL

Geothermie-Allianz Bayern

CROWDTHERMAL

The 100 good reasons initiative

Roadmap

Survey based data collection

31/09/2022 initial collection date

Data checks and summaries

Elaboration of web tool

20/10/2022 Side event at EGC2022 (Berlin)

Launch of the tool & dissemination of the initiative

Partnership to maintain the operation of the tool

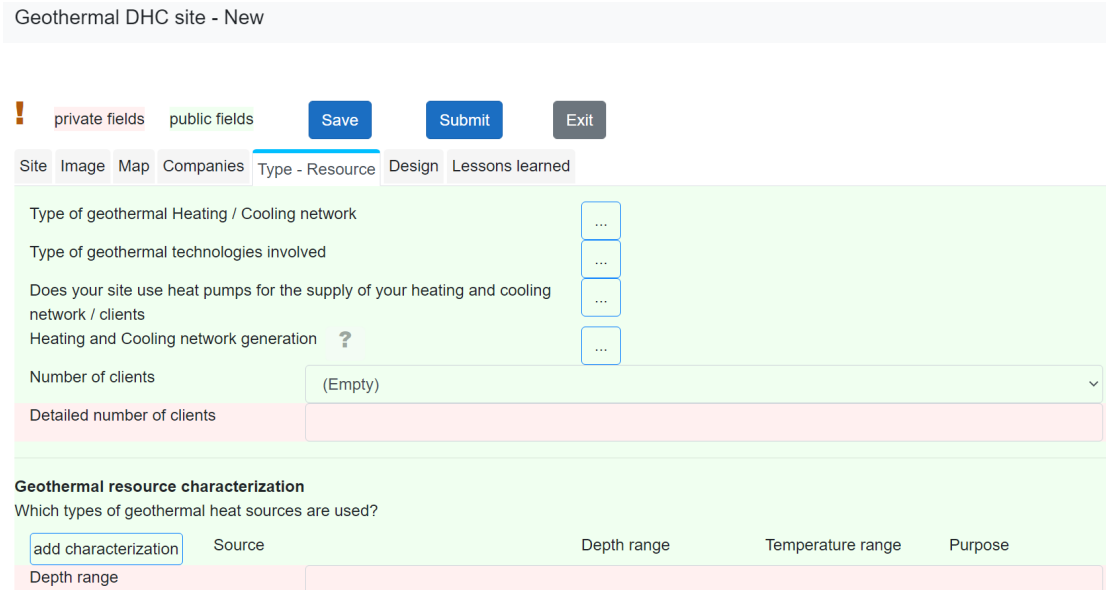
Operation of permanent tool

Information campaigns, dissemination materials

Submitting your geothermal project

Users have full control over their provided data

- After registering at the platform, users are guided through a couple of questions characterizing their project
- For most questions, no exact numerical values are needed, but rough bandwidths will be sufficient
- Data can always be updated/changed in the future
- Users always have the possibility to delete their project



https://gis.geothermal-dhc.eu/

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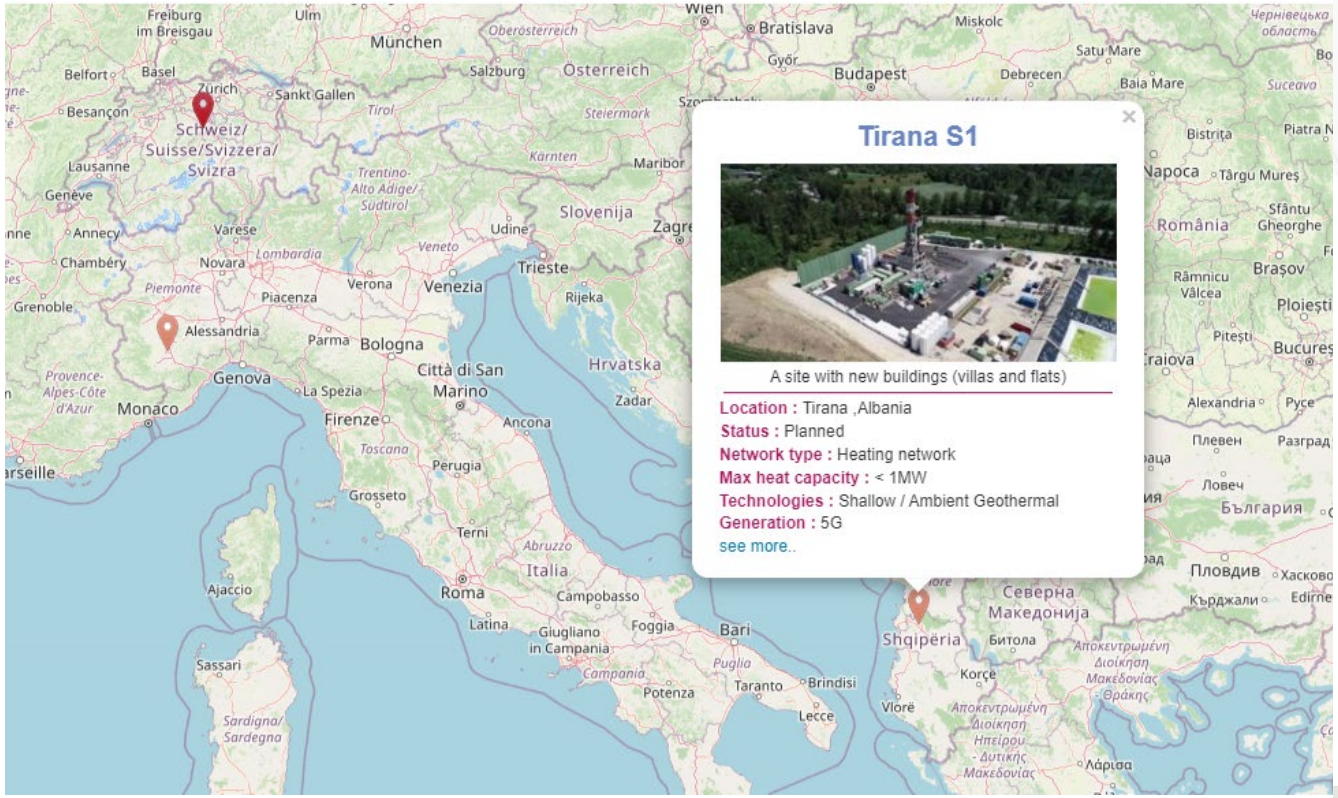
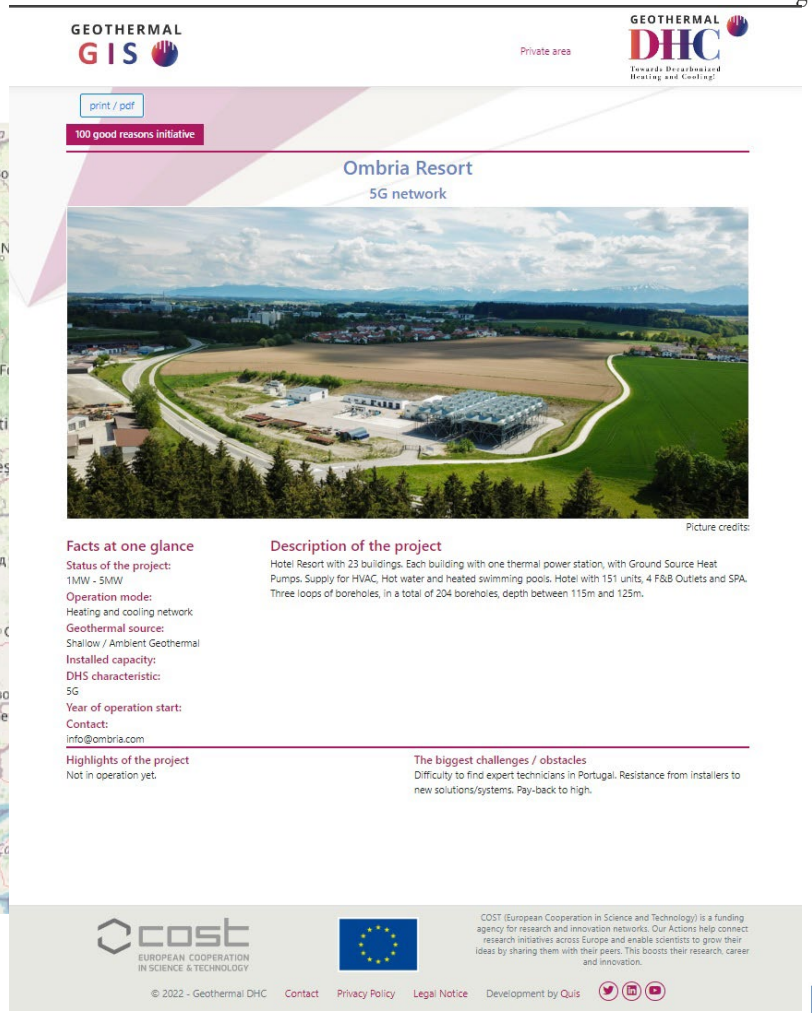
GIS application





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Thank you

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Acknowledgements

This article/publication is based upon work from COST Action **Geothermal-DHC**, supported by COST (European Cooperation in Science and Technology).

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