‘Geothermal energy in district energy systems: the cheapest heat source in Europe?’

Philippe Dumas, Secretary General
Geothermal heating and cooling technologies

- District heating and cooling
- Underground thermal storage
- EGS and cogeneration
- Heat pumps
- Industrial uses: e.g. in agro-industry
1. Geothermal market trends
Some key figures-2019

- 130 Geothermal electricity plant, with sustained deployment driven by the Turkish Market
- The EU passes the 2 GWth threshold for geothermal heating systems (DH,...)
- More than 2 million geothermal heat pumps in Europe at the end of 2019
Geothermal district heating & cooling systems in operation and under development

![Geothermal district heating & cooling systems](image)
Geothermal heat pumps stocks and sales (2018)
Development in geothermal heat
Geothermal district heating & cooling

Average depth of geothermal district heating wells in meters

- Wide disparity in the average depth of geothermal district heating and cooling wells from one country to another.
Average size of geothermal heat pump systems per country
More than 25% of the EU population lives in areas directly suitable for geothermal district heating

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
In 2019, there was about 200 coal power plants operating in 21 Member States, with a total capacity just above 150 GW.

The average age of a coal power plant in the EU is 35 years.

New plants continue to be put online in the EU.

Geothermal can cover much of this supply, but specific frameworks are needed to allow a fair and rapid transition.
2. Costs comparison
The competitiveness of geothermal heat

LCoE of heating in large buildings, comparison with gaz boilers (France, 2019)

Source: ADEME
LEARNING CURVE AND POTENTIAL COST REDUCTION: BEYOND THE LCOE APPROACH

Source: SET PLAN IWG DG
3. Innovation and Technological trends
About the Vision

This VISION looks toward **the future of Deep Geothermal energy development** by 2030, 2040, 2050 and beyond, and highlights the great potential of untapped geothermal resources across Europe. After an **Introduction & Overview** the document briefly describes the **Actual Status of geothermal development** and the VISION’s aim for

- Unlocking geothermal energy
- Increasing the Social welfare in Europe
- Novel technologies for full and responsible deployment of geothermal potential
Unlocking Geothermal Energy: Heat development

- Operative temperatures of the DHC network can be reduced
- By demand site management or by thermal energy storage it will be possible to balance heat demand and supply in a DH network.
- Cascade applications
- CHP

Evolution of power generation and district heating
Visualising smart sectoral integration for geothermal energy
TECHNOLOGICAL CHALLENGES

- Develop innovative solutions for refurbishing existing buildings with systems that are easier to install and more efficient at low temperatures.

- Develop geothermal District Heating systems in dense urban areas

- Contribute to the decarbonisation of the industry by providing competitive solutions for H&C.
Characteristics of smart thermal grids

- Flexible and adapting
- Intelligent
- Efficient
- Integrated
- Competitive
- Sizable
- Securing Energy Supply
4. Business models
Challenges

- Demand for Heat supply
- Firmness of electricity supply
Risks in investments
From subsidies to auctions

Support schemes for Geothermal adapted to technology maturity

- Convertible grants for seismic exploration, slimholes, and the 1st well
- Public Risk insurance
- Feed-in Tariff
- Public or Private Risk insurance
- Feed-in Premium
- Public or Private Risk insurance
- Grid Premium
- Private Risk insurance

MARKET MATURITY vs COSTS
The case of Risk Insurance
2020

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#GeothermalDecade begins...