

# BACKGROUND DOCUMENT

INFORMAL MEETING OF ENERGY MINISTERS

## PLENARY SESSION I – THE ROLE OF GEOTHERMAL ENERGY IN THE EUROPEAN ENERGY MIX

15 - 16 JULY 2024, IN BUDAPEST

The European Union committed to reduce its net greenhouse gas emissions by at least 55 % by 2030. The European Council of 17-18 April, in its Conclusions<sup>1</sup> called for achieving a genuine energy union, by securing the supply of abundant, affordable and clean energy that serves the dual objective of pursuing European energy sovereignty and climate neutrality. This will require ambitious electrification using all net-zero- and low-carbon solutions, flexibility, and substantial deployment of clean technologies and investment in grids, storage and interconnections. In order to progress towards this objective and to pursue a just and fair transition, the European Union needs to harness the potential of all clean technologies. This will require greater contributions from all renewable energy technologies. In this regard, while geothermal energy still represents a minor share of the EU's renewable energy production, it holds significant untapped potential, as a stable, reliable and local energy source, which could make an important contribution to reduce greenhouse gas emissions, to increase the EU energy sovereignty and energy security by replacing imported fossil fuels.

The European Parliament Resolution of 18 January 2024 on geothermal energy<sup>2</sup> – supported by a vast majority of its Members – also underlined that geothermal energy can contribute to increasing the production of clean energy and diversifying energy supplies and have potential to provide reliable and affordable electricity and heat to industries and businesses, particularly to SMEs, strengthening their competitiveness and also to citizens.

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<sup>1</sup> <https://www.consilium.europa.eu/en/press/press-releases/2024/04/18/european-council-conclusions-17-and-18-april-2024/>

<sup>2</sup> [https://www.europarl.europa.eu/doceo/document/TA-9-2024-0049\\_EN.html](https://www.europarl.europa.eu/doceo/document/TA-9-2024-0049_EN.html)

Geothermal energy is a locally available source of renewable energy that can provide, in a cost-effective way, dispatchable electricity, heat or a combination of both and has great potential both for heating and cooling and for the power sector, providing baseload energy combined with stability, storage and flexibility services, as well as sustainable production of raw materials, like lithium. The EU's Solar Energy Strategy<sup>3</sup> also states that the proportion of the energy demand covered by solar heat and geothermal must increase at least threefold if the EU is to meet its 2030 climate and energy targets.

The recently adopted Electricity Market Regulation listed geothermal energy amongst the technologies crucial for the decarbonisation of the energy system as a non-fossil source for new electricity generation which, in case of direct support, should be supported by way of two-way contracts in order to guarantee the revenue of the investments. Still, there is a need to ramp up private investments, especially to overcome drilling risks and to reduce upfront investment costs.

Currently more than half of the final energy consumption in the residential sector for space heating is covered by fossil fuels while the greatest potential of geothermal energy use lies in heating and cooling. The heating and cooling sector accounts for nearly half of the EU's overall energy consumption and contributes up to 35% of the greenhouse gas emissions related to energy use. The heating and cooling sector has a significant role to play in reaching the EU's energy and climate goals. According to the International Energy Agency, the heating sector and especially district heating offers great decarbonisation potential, which, however, is largely untapped at EU level. Therefore, there is a clear need to unlock the significant potential of renewable energy sources for the decarbonisation of the heating and cooling sector.

More efficient utilisation of geothermal energy plays a key role in the decarbonisation of the heating and cooling sector. Commerciality of geothermal developments in the sector however requires public funding and government incentives. Non-financial obstacles in the deployment of geothermal energy include the visibility of the subsurface potential, access to local geological data and the lack

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<sup>3</sup> <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2022%3A221%3AFIN&qid=1653034500503>

of public awareness, including by industry, of the benefits of a renewable and locally available energy source.

Geothermal energy, shallow or deep, is available in all Member States. Shallow geothermal developments (heat collectors or ground source heat pumps) are characterized by relatively low investment expenditures and are free from geological type of investment risks. On the other hand, they can provide relatively low energy production capacities compared to deep geothermal. Deep hydrothermal installations – depending on the temperature and yield of the thermal water used – may satisfy heat energy needs of smaller settlements, towns, city districts or even of whole cities.

Deep geothermal investments require high upfront expenditures and face implementation risks associated with geological factors. Initial investment costs, as well as subsurface uncertainties and risks negatively impact projects' commerciality which often dissuade investors from these types of investments. In order to remove the commercial obstacles, Member States may explore financial de-risking solutions appropriate to the maturity of the local geothermal industry, such as grants, loans that are convertible to grants, state-backed guarantees, exploration insurance and hedging mechanisms. There are already a handful of good practices in some Member States (like France, the Netherlands, Denmark, Germany, Poland and Croatia).

An important driver of geothermal energy is the promotion of its demand. The modernisation and expansion of district heating and cooling networks is a key driver for geothermal, with challenges related to planning, the financing of the infrastructure and the appropriate remuneration of services provided by these networks to the electricity system (e.g. flexibility). Geothermal also has multiple applications in the industry where awareness on the technology, business models and types of contracts are key.

Besides the commerciality barrier, capacity gaps are also to be filled. Drilling rig and material manufacturers, drilling and drilling service providers, surface facility constructors, equipment suppliers as well as qualified geoscientists, drilling engineers and skilled technical workforce are on shortage. Significant capacity

building efforts are needed. Without interventions the competition for scarce resources will result in the increase of manufacturing, service and supply costs which further challenge the commerciality of geothermal development projects.

Deep geothermal exploration starts with the assessment of the subsurface data. Public and online availability of geoscience data, information and maps are essential to estimate the geothermal potential, to evaluate the subsurface geological risks and to quantify the initial expenditures. Investors, such as local energy communities, must have access to subsurface data to enable them to connect the geothermal potential with heat market needs.

Despite of the clear benefits of geothermal energy utilisation, public acceptance remains a challenge for deep geothermal projects. Environmental concerns such as impacts of exploration activities (seismic surveys and drilling), possible interference with ground water, non-condensable gas emissions, over-exploitation of thermal water resources and seismic activity are also identified. Prudent regulation reflecting a sustainable life-cycle assessment approach, transparency of field operations, greater stakeholder engagement and involvement of local communities in the planning and implementation phases can serve as an efficient way of addressing public concerns and overcoming distrust. Guidance on standardising definitions and environmental impact assessment criteria is needed to provide clarity to both project developers and permitting agencies, as well as to meet the highest environmental standards. Cooperation between project promoters, investors, local and national authorities and communities to build trust and create mutually beneficial relationship may help.

**Ministers are invited to share their views on the following questions:**

1. What measures could be implemented to improve the commercial viability of geothermal investments in general, and in the district heating and cooling sector? What do you see as the blockages in leveraging private capital into geothermal investments, and indistrict heating and cooling systems more broadly?

2. What measures are needed to raise public awareness for geothermal energy, to address public concerns, and at the same time accelerate the permitting process across the European Union?
3. What kind of incentives, cooperation between Member States and/or European level actions would be necessary related to heating and cooling and electricity to maximise the utilisation of our geothermal potential in these sectors?
4. Should deep geothermal energy be particularly promoted in former coal regions as the available data and skillset of coalminers could be utilised for geothermal energy production?

*Please limit your interventions to 3 minutes.*

