

Geothermal energy’s contribution to the REPowerEU plan

Geothermal energy can replace **22.5 bcm** of Russian gas imports by 2027 through geothermal heat pumps as well as district heating & cooling systems. Furthermore, it also provides baseload renewable power generation and hydrogen as well as providing natural resources such as lithium.

Both are already the most cost-effective and efficient heating and cooling systems according to the International Energy Agency¹ and ADEME², the French energy agency. Industries, local authorities, public buildings and households are turning towards geothermal solutions already with current limited levels of political and regulatory visibility.

The urgency of the need to replace Russian gas requires much greater support for geothermal, in terms of short-term frontloading as well as medium to long-term mass deployment to meet the EU’s climate neutrality targets.

The four main elements required from the REPowerEU plan are:

1. An Ambient and Geothermal Heat Pump Accelerator (AGHA)
2. Digitalisation of the permitting process at pre and post mining law depths
3. An EU-wide risk mitigation framework
4. A European strategy for geothermal energy

1. Accelerator for geothermal and ambient heat pumps

Proposed text
<p>For the Heat Pump Section</p> <p>“Ambient & Geothermal Heat Pump Accelerator.”</p> <p>“Geothermal energy will produce 22.5 bcm of Russian gas imports reductions through 6 GW_{th} installed capacity by 2022, 36 GW_{th} by 2025 and 44 GW_{th} by 2027”.</p>
Justification

¹ IEA (2021) [Renewables 2021](#).

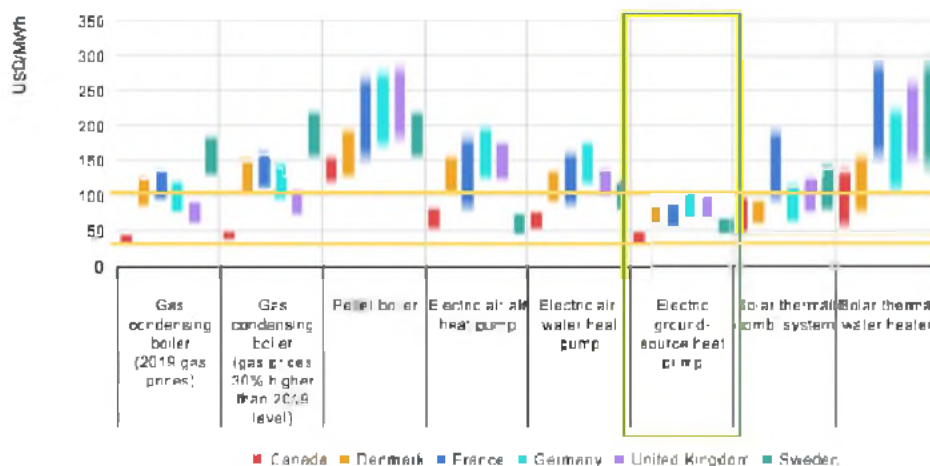
² ADEME (2019) [CCLUTS DES ENERGIES RENOUVELABLES ET DE RECOMPENSATION EN FRANCE](#)

→ **Technology specific:** The words “heat pumps” are almost exclusively perceived to represent “air-source” technology. This undermines geothermal heat pumps used in buildings and district heating systems.

The Renewable Energy Directive 2018/2001 (Article 2 Definitions) recognises ambient **and** geothermal heat pumps. It classes the most efficient heat pumps as “renewable heating and cooling” solutions (Directive 2018/2001/EC Annex VII). Geothermal heat pumps have real-life performance factors around 3.5-5.

Therefore, such a high-profile initiative must reflect both ambient and geothermal technologies. Furthermore, geothermal heat pumps (sometimes referred to as Ground-Source Heat Pumps (GSHP) are the most cost-effective and reliable solution compared to gas and other renewable heating solutions as the IEA graph below indicates.

Figure 1 – Geothermal is the cheapest source of heat



Source: International Energy Agency – [Renewables 2021](#)

It is therefore vital that geothermal is included in the title of this initiative.

→ **GW_{th}:** Geothermal heat pumps come in small (25 kW), medium (50 kW) and large (100 kW – 40 GW_{th}) sizes. A large heat pump can provide heating and cooling needs for an entire office block, retail stores, residential tower blocks and public building such as the NATO headquarters in Brussels, the Bundestag in Berlin or Sant Pau’s Hospital in Barcelona. They also provide

Measuring units sold must be complemented by a capacity matrix using GW_{th} to capture the scale of bcm reductions geothermal energy provides.

2 (a). Permitting for geological data at pre-mining law depths

Proposed text

For the Heat Pump Section

"Member States will publish all geological data, up to a depth where national mining law applies, and make it publicly available in digital format, in all regions, by the end of 2022.

The data must **clearly indicate 'go-to areas' in green which require an automatic approval through simple notification;** orange areas where there may be multiple subsurface usage and therefore a permit is required; and red areas where geothermal drilling is forbidden with transparent reasoning behind each zone".

Justification

- **Transparency:** This data is already collected by geological surveys in all Member States. It allows an easy simplification of permitting, replicating best practices from some Member States.
- **Accessibility:** Some Member States provide this data publicly. They tend to be the mature markets for geothermal. Making this data available in all regions is central to frontloading geothermal heat pumps. Below is an example from Hessen in Germany. This data is available all across Germany, Vienna, Tuscany as well as regions in France and Slovenia, etc.

Übersichtskarte

Hydrogeologische und wasserwirtschaftliche Standortbeurteilung für die Errichtung von Erdwärmesonden in Hessen

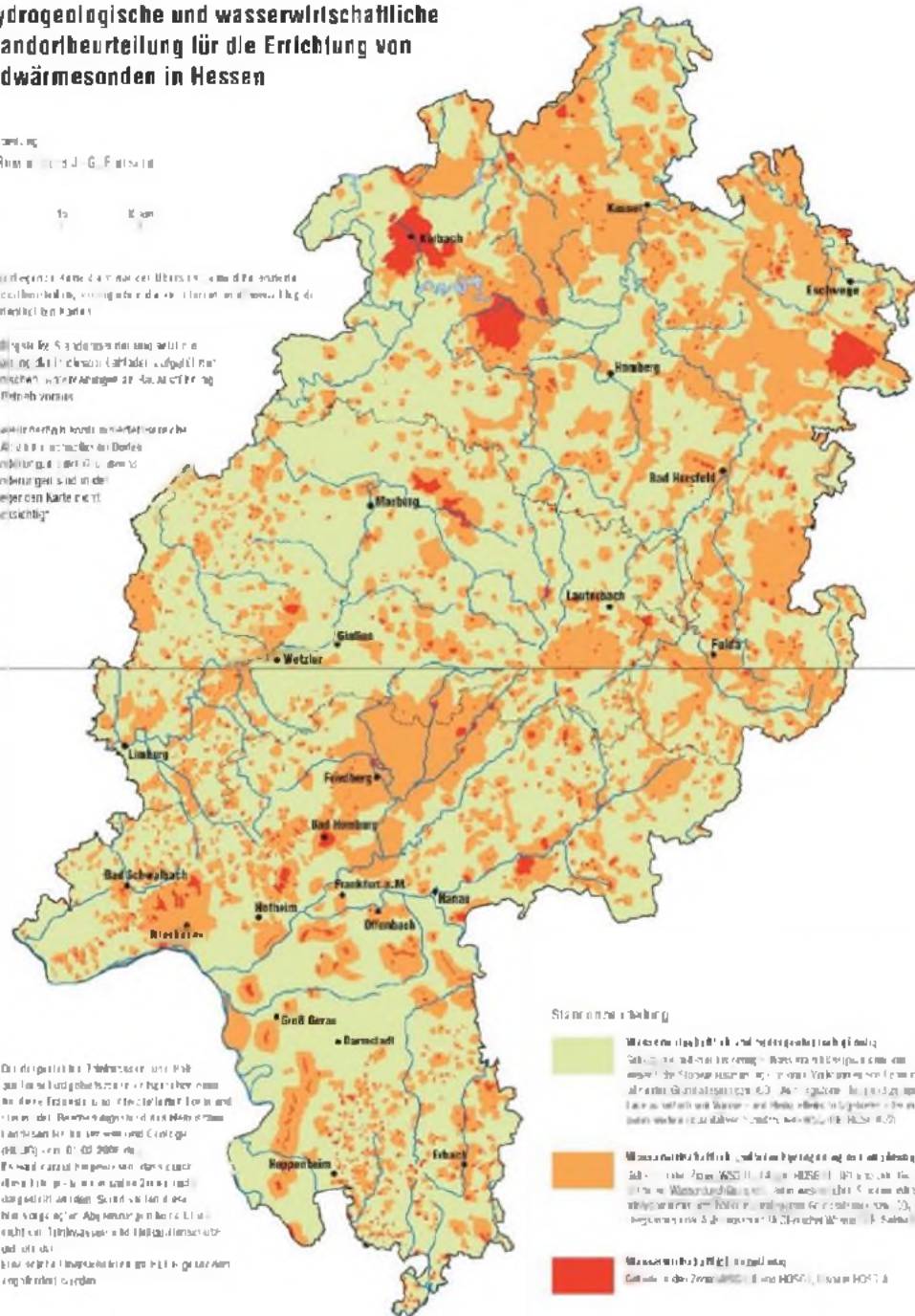
Bearbeitung:
 S. Rühlwieser, J. G. Fritzsche

4 10 20 km

Dieser Lageplan zeigt die hydrogeologischen und wasserwirtschaftlichen Standortbeurteilung, die für die Errichtung von Erdwärmesonden in Hessen erforderlich ist.

Die Karte zeigt die hydrogeologischen und wasserwirtschaftlichen Standortbeurteilung für die Errichtung von Erdwärmesonden in Hessen. Die Karte ist in drei Zonen unterteilt: Zone 1 (grün), Zone 2 (orange) und Zone 3 (rot).

Die Karte zeigt die hydrogeologischen und wasserwirtschaftlichen Standortbeurteilung für die Errichtung von Erdwärmesonden in Hessen. Die Karte ist in drei Zonen unterteilt: Zone 1 (grün), Zone 2 (orange) und Zone 3 (rot).



- Standortbeurteilung
- Zone 1 (grün):** Keine wesentlichen hydrogeologischen oder wasserwirtschaftlichen Standortprobleme. Die Errichtung von Erdwärmesonden ist in der Regel möglich. (Standortbeurteilung nach § 10 Abs. 1 Nr. 1 des Wasserhaushaltsgesetzes (WHG))
 - Zone 2 (orange):** Mäßige hydrogeologische oder wasserwirtschaftliche Standortprobleme. Die Errichtung von Erdwärmesonden ist in der Regel möglich, jedoch sind zusätzliche Vorkehrungen erforderlich. (Standortbeurteilung nach § 10 Abs. 1 Nr. 2 des Wasserhaushaltsgesetzes (WHG))
 - Zone 3 (rot):** Hohe hydrogeologische oder wasserwirtschaftliche Standortprobleme. Die Errichtung von Erdwärmesonden ist in der Regel nicht möglich. (Standortbeurteilung nach § 10 Abs. 1 Nr. 3 des Wasserhaushaltsgesetzes (WHG))

→ **Digitalisation:** Making the data available in digital format speeds up the processing of permitting from one-stop-shops and therefore enables geothermal heat pumps to be frontloaded. Frontloading Russian gas replacements will be undermined if this data is not readily available in digital format.

- **Depth:** National mining laws apply from different depths across the EU. For example, this threshold is 400 meters in Germany, 200m in France and 300 meters in Austria. Therefore, the data prior to the application of national mining law creates a uniform baseline for application across the Single Market.
- **Minimum criteria:** If there is a need, EGEc and Eurogeosurveys – the European association for national geological surveys - can provide detailed minimum criteria to prepare this geological data in digital format.

2 (b). Permitting for geological data at mining law depths

Proposed text

For the Heat Pump Section

“By 2023 Member States should publish, in accessible digital format, geospatial data of public land and other data where public financial support was provided for geospatial activities, at depths covered by mining law.”

Justification

- **Geothermal applications from 2022 onwards:** This administrative solution will significantly speed up project development of large-scale geothermal district heating systems access to geospatial data at depths suitable for the construction of geothermal district heating and cooling projects, which are able to replace significant volumes of imported Russian gas.
- **Precedent:** The German Law on the access to digital geospatial data (2009) is an example of this proposal. The key feature of this law is that it ensures data is made available in digital format allowing multiple entities access to the development of projects. The same law, to differing degrees, is applied in Belgium, France and Northern Italy, for example.
- **The EU works:** These developments came in response to the EU's INSPIRE legislation (Directive 2007/2/EC and subsequent reforms). Additional focus on digitalised geospatial data in the REPowerEU plan

3. EU-wide Risk Mitigation Framework

Proposal
<p>For the Heat Pump Section</p> <p>“A Task Force, managed by the Clean Energy Industrial Forum (CIEF)/Renewable Heating & Cooling Alliance, will design the structure and operation of an EU risk mitigation framework to accelerate private capital flows into renewable resources and associated infrastructure deployment for heating and cooling solutions. This will be implemented, by a Commission Decision, by March 2023. The framework will outline a) specific solutions for different risks; b) the operation and management of de-risking tools; c) governance by Member States, the European Commission and financial entities.”</p>
Justification
<ul style="list-style-type: none">→ The proposal to amend the Renewable Energy Directive (Article 23.4 of COD 2021/0218) calls on Member States to create national risk mitigation frameworks. This undermines the operation of the Single Market. Pooling risk reduces overheads and opens many markets to geothermal and other technologies.→ The Renewable Heating & Cooling Alliance, an industry initiative endorsed by the Clean Energy Industrial Forum (CIEF) is best placed to manage input from relevant stakeholders and outline the operational structure and governance of the risk management framework.→ The Task Force will organise public input, with full transparency, to aid effective design prior to incorporation into a Commission Decision.

4. A European strategy for geothermal energy

Proposal
<p>For the Heat Pump Section</p> <p>“The Commission will issue a European strategy for geothermal energy and associated sustainable raw material extraction by 2023. This will unlock geothermal energy’s potential as a major renewable energy source across the internal market and neighbouring countries. It will focus on identifying barriers; proposing measures to accelerate deployment; including heating & cooling infrastructure; the effective maintenance of high environmental</p>

standards; de-risking of private investments; sustainable mineral extraction and crowding-in financing to frontload a pipeline of projects that can help deliver on the EU's new 2030 climate and energy targets, the REPowerEU plan as well as climate neutrality by 2050."

Justification

- 150 leading businesses and companies called upon the Commission to prepare a [European strategy for geothermal energy](#).
- This gives **geothermal equal status** to the solar, offshore and hydrogen strategies recently produced by the Commission.
- Geothermal energy can supply over 100 million times more than today's power, heating and cooling consumption. It is vital that the EU taps into this local, abundant, reliable and baseload renewable energy resource.

Further information.



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