

# Status and roadmap of the implementation of RED and RED II for promoting and supporting the use of geothermal heat pumps in the EU

**WP5\_Milestone 4**

*Date:* 30/05/2024

*Author:* EGEC



Co-funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or CINEA. Neither the European Union nor the granting authority can be held responsible for them.

## Overview of EU regulatory policy for geothermal

### European Green Deal

The European Green Deal, approved in 2020, is a set of policy initiatives by the European Commission with the overarching aim of making the EU climate neutral in 2050. For this purpose, it is necessary to review each existing law based on its climate merits and to introduce new legislation.

### Fit for 55 Package

In order to deliver the Green Deal, existing legislation are revised, and new legislative initiatives put in place, under the 'Fit for 55' package, launched in 2021. The legislative proposals under the 'Fit for 55' package are intended to ensure the EU achieves the **-55% emission reduction target by 2030** compared with 1990 levels. In particular, the package launched the revision process of key legislation for the geothermal sector such as the Renewable Energy Directive (RED), the Energy Efficiency Directive (EED) and the Energy Performance of Buildings (EPBD).

### REPowerEU

The REPowerEU plan was launched in 2022 to stabilise EU energy supply and prices following Russia's invasion of Ukraine by phasing out Russian fossil fuels while reducing energy consumption and increasing renewable energy production. **The Recovery and Resilience Facility (RRF)** is at the heart of the REPowerEU Plan implementation, providing EU funding of close to €300 billion.

As part of the REPowerEU plan, the **EU Solar Energy Strategy** sets the target of tripling geothermal capacity by 2030. This is the first time a growth target has been applied to the geothermal sector. It sends a strong market signal.

Other key measures for the geothermal sector in REPowerEU include robust and transparent licensing and permitting rules as well as mandates on local authorities to produce heat transition plans based on local renewable resources and binding commitments on Member States to increase the share of renewables in national heating and cooling final energy consumption (RED). Furthermore, the plan sets binding targets for security of investment such as national financial risk mitigation frameworks for renewable heating.

### Renewable Energy Directive (RED)

To further accelerate the clean energy transition, the revised Renewable Energy Directive entered into force in 2023 setting binding overall EU renewable energy targets (Art. 3). The RES target for 2030 was increased from 32% to a binding 42.5% and an indicative 45%. There

is also an additional 5% target of innovative renewable energy technology. For renewable heating and cooling in particular, a target of 0.8% RES share increase by 2026 and 1.1% for the period 2026-2030 is set (Art. 23). Crucially for geothermal heating and cooling, these targets are binding.

For mainstreaming renewable energy in buildings, EU countries must map the areas necessary for national contributions towards the 2030 renewable energy target by May 2025 (Art. 15b). These include surface and sub-surface areas needed for renewable energy installations and storage facilities such as thermal storage. Member States will then adopt plans designating **renewables acceleration areas** (Art. 15c) by February 2026 in which permitting rules for renewable energy projects are further simplified. This is the first time Member States are required to adopt such plans. They shall designate sufficiently homogeneous land and water areas where the deployment of specific types of renewable energy is not expected to have significant environmental effects. They shall also establish rules for the designated acceleration areas, including on effective mitigation measures for the renewable energy plants, co-located storage facilities, and necessary connections to the grid, in order to avoid possible negative environmental impacts.

Within renewables acceleration areas, permit-granting processes should not take longer than one year for renewables projects, and two years for offshore renewables projects. For the **repowering of renewable power plants** and for new installations with an electrical capacity of less than 150 kW, co-located energy storage facilities as well as their grid connection, the processes should be limited to **six months, and one year if they concern offshore** wind energy projects.

Outside these acceleration areas, the permit-granting processes should not exceed two years, and three years for offshore renewables projects. The time during which the plants, their grid connections and necessary grid infrastructure are being built should not be counted within these deadlines.

To ensure faster installation **heat pumps**, the permit-granting process for heat pumps below 50MW should be less than one month, in case of ground-source heat pumps three months (Article 16e). In addition, the procedures for grid connection must also be simplified for small heat pumps. Member States agreed to apply the faster permitting rules for ongoing permit requests as well.

To immediately benefit from a simplified permitting procedure, renewable energy plants, their connection to the grid and to energy storage are considered to be of **overriding public interest** starting from February 2024 (Art. 16f). Member States need to inform the Commission if they restrict the application of this article.

## Energy Efficiency Directive (EED)

The update of the Energy Efficiency Directive, initially introduced in 2012, was adopted in September 2023 setting a binding target for the reduction of overall energy consumption of 11,7% in 2030 for Member States.

An important provision for geothermal district heating is the **local authority mandate on renewable heating and cooling planning** (Article 25). In municipalities with 45 000 and more inhabitants, local authorities will be required to prepare plans for heating and cooling networks. This is a key market driver for geothermal, especially for heat networks.

The EED outlines a definition of **efficiency for district heating and cooling systems** (Article 26), introducing new criteria that emphasize the increasing use of renewable energy, especially geothermal, waste heat, and high-efficiency cogeneration over time. The target is a 50% renewable energy share in heating and cooling systems by 2027 which progressively increases to 100% by 2050. The directive also sets specific targets for renewable energy, waste heat, and high-efficiency cogeneration in DHC systems with an alternative definition based on CO<sub>2</sub> emissions per kWh of heat produced being provided as well. Moreover, all new or refurbished DHC systems by 2030 should phase out fossil fuels, with the exception of natural gas. As district heating investments are planned over a long period of time provide clear and strong signals to operators and investors to integrate renewables is crucial for the geothermal sector as well.

New measures for cogeneration state that support for new high-efficiency cogeneration units using fossil gas, connected to district heating within the current definition of efficient district heating and cooling systems, will only be allowed until 2030. Geothermal energy can provide both electricity and heat in combined heat and power plants beyond this period.

Furthermore, the revised EED introduces an obligation for the monitoring of the energy performance of data centers. An EU-level database will collect and publish data, which is relevant for the energy performance and water footprint of data centers with a significant energy consumption. This is an opportunity for increasing geothermal use in data centers as it can supply active cooling, free cooling, heating, hot water, underground thermal storage of waste heat and electricity base load supply.

## Critical Raw Materials Act (CRMA)

The CRMA was proposed in 2023 with the aim to enhance the EU's capabilities and strengthen the resilience of its critical raw material supply chains and has not yet been adopted. The act provides a lists of strategic raw materials, which are crucial for strategic technologies used for the green, digital, defense and space applications. The list includes **lithium**, essential for batteries, which is being extracted from geothermal brines in European regions such as the Upper Rhine Valley.

The Act sets benchmarks for the diversification of the EU supplies to reach by 2030:

- at least 10% of the EU's annual consumption for extraction

- at least 40% of the EU's annual consumption for processing
- at least 15% of the EU's annual consumption for recycling
- no more than 65% of the EU's annual consumption from a single third country

The Act will **simplify permitting procedures** for critical raw materials projects in the EU, reducing administrative burdens while maintaining high social and environmental standards. An important step for the uptake of the extraction of geothermal lithium and other raw materials. Additionally, selected strategic projects will receive support for access to finance and benefit from shorter permitting timelines—24 months for extraction permits and 12 months for processing and recycling permits. EU countries will also be required to develop national programs for exploring geological resources and to establish one-stop-shops for permit granting.

## Net Zero Industry Act (NZIA)

The NZIA aims to scale up the manufacturing of clean technologies in the EU that have a strategic role in reaching net-zero in order to strengthen competitiveness and make the energy system more secure. Its aim is for the manufacturing capacity of strategic net-zero technologies to meet at least 40% of the EU's annual deployment needs by 2030. The act entered into force in 2024.

The list includes the following strategic technologies (Art. 4):

- Solar photovoltaic and solar thermal technologies
- Onshore and offshore renewable technologies
- Battery/storage technologies
- **Heat pumps and geothermal energy technologies**
- Electrolysers and fuel cells
- Sustainable Biogas/Biomethane technologies
- Carbon Capture and Storage (CCS) technologies
- Grid technologies

They are selected based on the three criteria: technology readiness level; contribution to decarbonisation and competitiveness; and resilience of the energy system.

The key NZIA provisions for geothermal focus on simplifying regulation, channeling investment into strategic technologies, skills and fostering innovation. The regulatory environment for geothermal, heat pumps and the other strategic technologies will be simplified through **streamlined administrative and permit-granting processes** giving priority status to net-zero strategic projects (Art. 5). This includes single points of contact, online accessibility of information, maximum duration of permitting processes.

To **boost investment** in strategic technologies, **non-price criteria** are introduced in public procurement procedures and auctions (Art. 19-22). Auctions to deploy new renewable sources must prioritise investment in technologies that provide multiple services such as dispatchable

or baseload renewable electricity, heating and cooling or sustainable critical raw material extraction and seasonal storage. Geothermal is able to provide all these services.

The NZIA aims to **enhance skills and create quality jobs** in net-zero technologies (Articles 23-25), by establishing dedicated training programmes, so called Net Zero Academies (to train 100,000 workers within 3 years). Moreover, **net-zero regulatory sandboxes** will allow for the development, testing and validation of innovative net-zero technologies (Art. 26).

The **Strategic Technologies for Europe Plan** (STEP) is an initiative to financially support the NZIA. It seeks to reinforce, leverage and steer EU funds – existing and new – to investments in deep and digital, clean and bio technologies in the EU, and in people who can implement those technologies into the economy. STEP also introduces the Sovereignty seal – the EU quality label for sovereignty projects.

## Electricity Market Design (EMD)

As part of the Green Deal Industrial Plan, the European Commission proposed a reform of the electricity market rules to accelerate the adoption of renewables, better protect consumers, and enhance industrial competitiveness. The new EMD was adopted in May 2024.

The key new provisions to strengthen the resilience of the EU energy market are long-term contracts, like power purchase agreements (Art. 19a), and the structuring of investment support with two-way contracts for difference. **Power purchase agreements** (PPA) are long-term contracts between an energy producer and a buyer, who agrees to purchase electricity at a fixed price. As they provide stable prices and predictable revenue for investors, they support the development of renewable energy projects. Contracts for difference (CfD) (Art. 19d) are the main way in which governments can now finance new electricity generation capacity in a few technologies. In **two-way contracts for difference**, governments guarantee a stable price for energy producers. If the market price is below the agreed price, the government pays the difference, if it is above, the producer pays back the excess, ensuring price stability and encouraging investment in renewable energy.

New rules also make it easier to integrate renewables into the system with **flexibility and storage**. The Agency for the Cooperation of Energy Regulators (ACER) estimated that the electricity system in Europe will require more than twice the current flexibility resources by 2030. Member States have to assess their flexibility needs at national level for at least 5-10 years (Art. 19e) and design adequate support schemes for flexibility such as energy storage, including underground thermal storage, or dispatchable power generation (e.g. geothermal). Other instruments include transmission networks, or demand management.

## Trans-European Networks for Energy (TEN-E)

The aim of TEN-E is to support the EU's energy infrastructure across Member State borders. A revision of the regulation was adopted in 2022 to better align it with the Union's climate targets. This includes an obligation for all projects to meet sustainability criteria and strengthened cross-sectoral energy infrastructure planning.

TEN-E introduced the so called '**Projects of Common Interest**' (PCI) and '**Projects of Mutual Interest**' (PMI), infrastructure projects which have a significant impact on the EU electricity and gas systems and help ensure that renewable energy and emission reduction goals are met.