

Policy and Regulation: Impact of the New European Framework on the Geothermal Sector

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ABSTRACT

This paper aims to assess the impact of the new framework for energy and climate policy after 2020 on the actors of the geothermal sector. To this end, it will detail upcoming regulatory changes, and provide an analysis of the opportunities and threats that this framework change represents, and what developments can be expected in the geothermal sector.

The European Union has pioneered the deployment of renewable energy through a set of targets on greenhouse gas reduction, renewable energy and energy efficiency to be reached in 2020. This framework justified the development of many support schemes for renewable energy sources, notably for geothermal, and spurred spending in renewable research and innovation that yielded many results for the geothermal sector. After 2020, a new framework is to come into force. This set of policies and regulation has been debated over the 2017 and 2018 period. Its stated objective is to create the regulatory framework for an energy system where renewable sources are at the centre of the energy system.

The 2030 framework is a set of Directive and regulations that were proposed jointly in November 2016 for the sake of consistency across the energy system. The legislative text that were reviewed include the Renewable Energy Directive, the Energy Performance of Building Directive, the Energy Efficiency Directive, the Electricity Directive and the Electricity regulation. Besides, a regulation on the Governance of the Energy Union was introduced to ensure the objectives laid out in the other texts are reached. This framework will affect the European geothermal energy sector in several ways, and this paper aims to provide an assessment of upcoming changes and their effect on the sector.

While many existing provisions remain in force after 2020, and existing plants will not see their obligations change significantly, the set of legislative proposals introduces many changes that will affect new geothermal projects. Moreover, the introduction of specific provisions for the penetration of renewables in

heating and cooling will lead an increased focus on renewable heat solutions such as geothermal.

1. INTRODUCTION ON THE EU 2030 CLIMATE AND ENERGY FRAMEWORK

1.1. The Clean Energy Package and the 2030 targets

To establish the EU climate and energy policy and regulatory framework for the period 2020-2030, the European Commission proposed a set of legislative proposals that aimed at consistency across the different segments of the energy system, ranging from buildings to electricity markets. The legislative texts adding up to the Clean Energy for All European Package are:

- Renewable Energy Directive: setting the RES target to 2030 and the measures to attain it;
- Energy Efficiency Directive: setting the 2030 energy efficiency target and measures to attain it;
- Market Design: a set of legislative texts governing the electricity market after 2020;
- Energy Performance of Building Directive: a review of the current EU framework on buildings to integrate new provisions and technologies;
- Governance Regulation: setting the rules to guarantee the EU's climate and energy targets are met in 2030.

The different legislative proposals adding to the so-called Clean Energy Package were the subject of extensive debates, negotiations and compromises over the course of two years of policy making between November 2016 when the legislative bundle was proposed, and the end of 2018 when a final agreement was reached on the electricity market rules.

A key outcome of the Clean Energy Package is to set the ambition trajectory for the deployment of renewable energy between 2020 and 2030. The adopted set of targets are:

- At least 32% binding target on renewable energy by 2030 at the European level, with a possible upward review in 2023;
- 32.5% target of energy efficiency improvement at the European level to 2030;
- At least 40% of greenhouse gases emission reduction by 2030 at the European level.

For the geothermal energy sector, these targets represent an opportunity, as they are consistent with current market trajectory, and suppose a significant

deployment additional renewable capacity, and in particular additional efforts in the heating and cooling sector. The high penetration of variable renewable supply in the electricity sector highlight a more vivid need for flexibility resource, which may be an opportunity for geothermal electricity due to its production profile.

1.2. A new governance framework

A key change in the 2030 framework compared to the ongoing 2020 EU Climate and Energy policies is the shift away from national binding targets, which made up the backbone of the governance framework for the deployment of renewable energy and energy efficiency improvement between 2009 and 2020. These targets were notably setting legally binding objectives at the national level to each EU Member State. Instead, the 2030 framework establishes a new governance framework which is based on contributions determined at the national level, which should add up to the EU level targets on greenhouse gases, RES, energy efficiency.

These contributions are produced by the EU Member States in the form of National Energy and Climate Plans (NECPs). In these plans, the Member States first propose their different objectives, and outline the set of policies to achieve them. It should be noted that the trajectory for renewable energy deployment should be nearly linear (18% of the objective should be met in 2022, 43% in 2025, 65% in 2027). This deployment trajectory should be a factor of market stability for geothermal and other RES developers and investors in the coming decade.

The proposed NECPs submitted by the Member States are reviewed and commented by the European Commission to ensure consistency of the plans with the EU level objective, and whether the country's proposal is in line with its resources and what should be its quote part of the common EU effort accord to "objective criteria" such as GDP per capita, structure of the energy system, etc. It is important for the geothermal sector to be able to establish clearly the potential at the national level for geothermal energy deployment at the 2030 horizon to feed into the process of setting these national objectives, in order to ensure the political ambition, which usually underlines the quality of financial, technical and regulatory support, is at the right level.

Finally, replacing the legal accountability at the national level, the Governance framework established by the Clean Energy Package sets barriers to guarantee the targets are met. Should the observed deployment trajectory not be consistent with the one outlined in the planning at the European level, the European Commission can incite Member States to increase the impact of their support framework to renewable energy, notably for the deployment of RES-HC. In addition, the European Commission is to establish a Financial instrument tasked with investing in renewable energy project at the European level.

For the geothermal energy sector this new framework may be considered as a source of uncertainty, and specific attention should be provided to:

- The deployment trajectories for geothermal energy in the NECPs, and the proposed support policies and regulations;
- The parameters of the schemes established at the European level, and their compatibility with the requirements of geothermal energy project development.

2. NEW OPPORTUNITIES FOR THE GEOTHERMAL SECTOR IN THE 2030 FRAMEWORK

Beside establishing a new governance framework, and setting new targets, the EU 2030 framework engages a transformation of the policy and regulatory framework for EU renewable energy projects. A paramount example of this regulatory shift, which may be considered as an acknowledgement of the upcoming central role of RES in the energy system, is the suppression of feed-in-tariffs, except for small scale installations or demonstration projects. Acknowledging the different characteristics of renewable energy sources, the new framework however does allow for a technology specific allocation of financial support. This later provision is particularly valuable for geothermal energy, for instance geothermal electricity which can provide services that may not be directly reflected on a EUR/MWh basis, most notably for the production of heating and cooling, or providing grid services in the electricity market. Representing an opportunity to the geothermal sector, these two topics – heating and cooling and flexibility – are among the policy priority of this new policy and regulatory framework.

2.1. Increased focus on heating and cooling

2.1.1. A Renewable heating and cooling objective

Among the key new provisions of the Renewable Energy to 2030 are an article on "Mainstreaming Renewables in Heating and Cooling", and one on "District Heating". Both articles are of particular interest for the geothermal industry, which remains in Europe primarily structured around the supply of heating and cooling, either in deep or in shallow projects. The sector can therefore expect significant opportunities from the new ambition laid out at the European level for the sector.

The article of the Renewable Energy Directive on mainstreaming renewables in heating and cooling provides that EU Member States "*shall endeavour to increase the share of renewable energy in that sector by an indicative 1,3 percentage points as an annual average calculated for the periods 2021 to 2025 and 2026 to 2030, starting from the share of renewable energy in the heating and cooling sector in 2020.*"

This means that Members States, while not faced with an obligation to deliver on this "1.3 percentage point annual increase" in the share of renewables in heating and cooling must nonetheless put in place a set of policy

and regulations that can justifiably allow them to strive to this objective. In the words put forward by the European Commission, it is an “obligation on means”.

Regarding the ambition of the proposal, it should be noted that the average deployment rate for the share of renewables in the heating and cooling sector amounts to 0.8 percentage point. Even considering a reduction in the heating and cooling demand, resulting from energy efficiency improvement, the 1.3 percentage point figure would represent a noticeable acceleration of deployments for thermal renewables.

For the geothermal sector, this obligation is a major opportunity, which will however require the right policy and support framework to be established at the national level to allow the right level of delivery. Indeed, there are extensive examples of the sensitivity of the geothermal sector to a stable support framework, and to the details of the design of the support schemes, notably relating to competing technologies. Conversely, there are also significant examples of very rapid scaling of geothermal energy under the impulsion of the right policy framework.

2.1.2. Enabling regulatory provisions

For the newly introduced renewable heating and cooling obligation to have a significant effect on the geothermal sector, other provisions of the Clean Energy Package on heating and cooling must be well applied at the national level:

- Objective of decarbonisation of the building stock by 2050 listed in the EPBD;
- Intensification of building renovation rates (and depth of renovation) promoted by the EPBD and the EED;
- Renewable heating and cooling included in the local planning (Renewable Energy Directive);
- Disclosure of the share of RES in district heating network and incentives to operators to increase it;
- Minimum level of renewable energy in buildings;
- Information to consumers on alternative to fossil fuels for heating and cooling.

The above listed provisions consistently aim, in principle, at avoiding locking in fossil emission, and at providing the planning and the long-term perspective required to develop projects such as geothermal for heating and cooling.

2.2. A market design that puts a greater value on flexibility

The other major policy area shaping the 2030 European Climate and energy policies is the new regulatory framework for the electricity system. At the core of the debate, the proposals put forward by the European Commission focused on preparing a system where variable renewable technologies (wind, PV...) are a major component – if not the main one. From this perspective, two priorities emerge:

- 1) Integrate renewable power producers to the electricity market so that they adapt their behaviour to market conditions;

- 2) Incentivise the development of sufficient flexibility resources to cope with increased variability of production.

Symbolising this policy shift, priority of dispatch and priority access to the grid are not the rule anymore for renewable electricity projects, including for geothermal. From 2020 onwards, only renewable electricity projects that are smaller than 400kW capacity or that are demonstration projects for innovative technologies will be eligible for priority of dispatch and exempted from balancing responsibilities. Plants already benefiting from priority of dispatch continue to so.

On the other hand, the new regulatory framework opens the possibility for electricity producers to gain revenue from the services they may be providing to the grid in terms of balancing or flexibility reserves through Capacity Remuneration Mechanisms. In either case, geothermal power plants would be eligible to participate and receive compensation for the grid services they may provide.

For geothermal power plants, the post-2020 electricity framework may have different impact according to the type of technologies that are developed. For EGS projects in the coming years, it is likely that they remain eligible to priority of dispatch, owing to the status of EGS as an innovative energy technology. However, within a decade, as EGS and geothermal electricity in general is more widespread throughout Europe, then the projects would likely not benefit from priority of dispatch anymore. Likewise, new conventional geothermal power plants would not be eligible either.

While the new EU electricity market framework is less beneficial for geothermal electricity deployment, the rules for market curtailment remain in favour of renewable sources, hence geothermal. Altogether, the increased focus on flexibility resources to balance the intermittency of some renewable electricity production can represent an additional opportunity for geothermal power producer to participate in balancing markets, capacity remuneration mechanisms or receive other types of compensation for grid services.

3. A CHANGING FRAMEWORK FOR INNOVATION

3.1. Horizon Europe and the 2021-2027 programming period

Horizon Europe, which will follow in the wake of the successful reception of its predecessor H2020, will be the main tool for financing R&D in renewable energy technologies, including geothermal, at EU level during the next 7-year programming period 2021-2027. With a proposed budget of 100 Billion EUR, the 9th reiteration of the EU Framework Programme for Research and Innovation, won't be a complete do-over, but rather an improvement of H2020, with a few targeted changes.

In keeping with the previous programme 3 pillar structure, HE is set to dedicate over 52 billion EUR to Global Challenges. Of those, 15 Billion will be devoted to the cluster on Climate, Energy and Mobility, signalling the EC intention of having a more transversal approach to funding. The multiannual Work programmes and calls for proposal will be decided through a new Strategic Planning Process aimed at improving the collaboration between the Commission departments, Member States, the European Parliament and stakeholder.

Another significant change from the past FP will be the introduction of R&I Missions to ensure the effectiveness of research and innovation funding in selected critical areas. Said Missions will consist of a portfolio of actions intended to achieve bold and inspirational as well as measurable goals within a set timeframe, with impact for science and technology, society and citizens that goes beyond individual actions. A potentially formidable tool to focus the efforts towards overarching energy challenges.

Additional opportunities will be provided through the establishment of the European Innovation Council. Replacing the very successful SME Instrument, the EIC will support innovations with breakthrough and disruptive nature and scale up potential that are too risky for private investors. Its supporting schemes won't be limited to SMEs.

3.2. The Innovation and Modernisation Funds

The Emission Trading Scheme is one of the central climate and energy policies of the European Union. It establishes a market in which large European polluters trade carbon allowances. Part of these allowances have been auctioned on behalf of the NER300 fund during the past decade, the revenue of which was used to finance innovative low-carbon energy projects, notably for geothermal energy, as this fund was for instance responsible for the deployment of the first geothermal electricity plant in Hungary. Funding was awarded in the form of grants, repayable in case the project was not successful.

After 2020, the NER300 is replaced by an Innovation Fund and a Modernisation Fund. The former is set to continue the purpose of its predecessor, financing low-carbon energy projects. The latter has been introduced to help European industries to invest in the decarbonisation of their processes, notably through innovative technologies. There, geothermal energy projects could benefit as well.

These funds, like the NER300 are managed by the European Investment Bank. The Innovation Fund is set to be financed with the revenue from the sale of 500 million allowances (a two third increase from its predecessor). The total size of the fund will however be dependent on the overall carbon price reached in the ETS.

In order to maximise the impact of the Innovation and the Modernisation funds, the European Investment

Bank is likely to provide support to innovative low-carbon technology projects through a different mechanism than the repayable grant approach used thus far. For the geothermal sector, while the loss of grant-based financing possibilities may appear like a threat, the format of the NER300 was not quite suited to the risk profile of geothermal projects. Indeed, the fact that the grant has to be repaid in case of project failure makes leveraging private financing through this public support difficult, as it does not lower the financial risk linked to the geothermal resource risk. A more flexible Innovation or Modernisation fund could provide financing through mechanisms more relevant to lower the investment risk in innovative geothermal energy projects.

4. A CONTINUED FOCUS ON ENVIRONMENTAL PROTECTION THROUGH REGULATIONS

The European Union has continuously been at the forefront of environmental regulation, setting environmental protection standards that must be respected across the 28 EU Member States.

Geothermal energy, as defined in the Renewable Energy Directive, is subjected to a wide array of environmental legislations that minimise the possible environmental impacts linked to the development of an industrial activity such as developing geothermal resources.

The European, national and regional regulations about geothermal energy technologies aim to avoid environmental impacts for any segment of the value chain, from drilling to f-gas used in heat pumps for individual geothermal heating systems. These regulations can be laid out at the European level, through directive or regulations, and may be monitored by the European Environmental Agency. Enforcement usually happens at the local level where national and regional authorities and agencies play a key role of advising new projects, monitoring existing installations and enforcing regulations in case of infringement.

Negative environmental impacts associated with geothermal energy are minor, especially if compared with conventional fossil fuels and nuclear power plants in a lifecycle analysis. However, as for every industrial activity, some potential and adverse effects exist such as some forms of gaseous emissions, induced seismicity, ground subsidence, noise during the construction phase, and temperature anomalies in the subsurface and the groundwater. These potential impacts vary depending on the geological settings as well as on the size and type of application. In all circumstances they can be avoided thanks to sound practice, technology developments, and compliance with environmental regulations.

For the geothermal sector, the most relevant EU directives are the following:

- Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment (EIA Directive);

- Directive 2001/42/EC of the European Parliament and of the Council of 27 June 2001 on the assessment of the effects of certain plans and programmes on the environment (SEA Directive);
- Directive 2000/60/EC establishing a framework for Community action in the field of water policy. This legislative text is undergoing a review during the year 2019, aiming to update the different texts composing the EU legislative framework on water. For the geothermal sector, this review is important as it sets the legislation on ground water (notably groundwater contamination), although the focus is mainly on the quality of surface water and drinking water.

CONCLUSION

For the geothermal energy sector, the 2030 Climate and Energy policy and regulatory framework is a bundle of opportunities and threats. On the one hand, the overall framework for the deployment of renewables is less robust than the national binding targets in place until 2020. This reduces the perspective of sound policies to support the emergence of renewable energy technologies at scale, which is what the geothermal energy sector requires. Moreover, the trend outlined by the European policy framework seems to be one where support to renewable energy is more diffused, threatening the emergence of a geothermal industry in new market.

On the other hand, through an ambition level that signals a acknowledgement of the importance of renewable energy as an industry for Europe's economy

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