

Interplay Between Different Regulatory And Policy Instruments For The Buildings Sector Relevant To Geothermal Technologies Sector

Thomas Garabetian

EGEC, Place du Champ de Mars 2, 1050 Bruxelles, Belgium

t.garabetian@egec.org

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ABSTRACT

This paper aims to assess the impact of the new framework for energy and climate policy after 2020 on geothermal energy supply in the building 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.

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. On heating and cooling, these new regulations are completed by the regulations on Energy label and eco-design. 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 building 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

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 from Wind and Photovoltaic in the electricity sector highlight a more vivid need for flexibility resource, which may be an opportunity for geothermal electricity and heating and cooling (h&c) due to its production profile and storage capacity.

2. THE EUROPEAN UNION 2030 CLIMATE AND ENERGY FRAMEWORK: FUEL SWITCH TOWARDS RENEWABLES

2.1 The Recast Renewable Energy Directive: RES a Feature of the Energy Sector

The Renewable Energy Directive is among the major parts of the European climate and energy regulatory framework for the 2020-2030 period. Through a thorough rework of the Renewable Energy Directive initially adopted in 2008, the European framework on renewables now aim to bring these energy technologies closer to market maturity, as they are increasingly becoming a central feature of the European energy system (indeed, renewables already provide 17.5% of the energy consumption in the EU-28). The recast renewable energy directive also aims to address a major segment of the energy sector that was largely overlooked in the previous framework: heating and cooling. Indeed, despite the fact that heating and cooling represent nearly half of the energy consumed in the EU, and that it remains dominated at 81% by fossil fuels in 2017, heating and cooling was the core focus on most policies aiming to increase the use of renewable energy in Europe. As we will see later in this publication, the recast renewable energy directive aims to “mainstream” renewables in heating and cooling.

One of the major changes introduced by the recast Renewable Energy Directive is a modification of the framework for support schemes to renewable energy. From 2020 onwards, support to renewable projects need to be allocated as a premium on top of market price. Meanwhile, Member States can decide to support specific renewable technologies through technology specific tenders, notably to ensure the security of supply or the diversification of the energy supply. This provision is quite important for the geothermal sector, allowing for the design of tenders that better account for the specificities of geothermal energy benefits, such as the dispatchability and flexibility of energy production. Besides the new rules for support schemes to renewables allow for specific provisions to be set in favour of innovative technologies, notably regarding demonstration projects. Another major change is the policy framework for renewable energy support schemes is an increase security for investors, as retroactive changes in support schemes is forbidden, and upcoming changes to a support framework should be announced well in advance.

The new renewable Directive also sets a new framework for community energy projects, making it easier for such projects be developed. This provision is also directed at local authorities, which are more encouraged to take part in the development of the energy sector – and local authorities are a major actor in enabling geothermal project development. Moreover, the Directive promotes the development of Corporate sourcing of renewable energy in Europe, which has been an ongoing trend in the geothermal sector, one that may be accelerated through this new framework.

2.2 A New Electricity Market Framework Looking for Participation of Consumers

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 new generation of technologies such as EGS projects, 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.

2.3 The New EU Governance Framework to meet the Climate and Energy Targets

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.

3. DECARBONISATION BY 2050? EU POLICIES AND THE BUILDING SECTOR

3.1 Heating and Cooling Acknowledged as a Priority for Long Term Climate and Energy Objectives

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, in particular to provide heating and cooling to the building sector. The sector can therefore expect significant opportunities from the new ambition laid out at the European level for the sector.

The acknowledgement of the importance of renewables in heating and cooling announces a shift in policies for the building sector starting in the coming decade, away from the "efficiency only" focus that was prevalent thus far, towards a more integrated approach that aims to maximise energy efficiency while using renewable energy for all the building's energy needs.

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.

3.2 The Energy Efficiency Directive: Continuity of the Framework

Up until the revision of the framework in view of 2030, the energy transition in the building sector was primarily tackled through energy efficiency. This made the Energy Efficiency Directive an important component of the policy framework for the building sector.

The Energy Efficiency Directive sets for 2030 an indicative target at the EU level to reduce energy consumption by 32.5% compared to a baseline scenario. In practice, this amount 1 273 Mtoe of primary energy and/or no more than 956 Mtoe of final energy in 2030. Much as in the case of the Renewable Energy Directive, there are no national binding targets, but Member States define their contribution to this objective in their NECPs.

Moreover, the Energy Efficiency Directive also includes an annual objective to decrease the amount of energy sold in each Member States. This so-called "Energy Savings Obligation" provides that "Member States shall achieve cumulative end-use energy savings

at least equivalent to new savings each year from 1 January 2021 to 31 December 2030 of 0,8 % of annual final energy consumption”. In practice this framework is very much in continuity of the current European energy efficiency legislative framework.

Historically, a major emphasis has been put at the European level on the building sector for the achievement of energy efficiency objectives defined in the EED – although the EU Member States are generally not on track to achieve their 2020 national energy efficiency targets. The Energy Efficiency Directive also allows Member States to “exclude from the calculation of the amount of required energy savings, 30 % of the verifiable amount of energy generated on or in buildings for own use as a result of policy measures promoting new installation of renewable energy technologies”, meaning that in cases where additional energy savings would not be cost-effective, renewable energy – in addition to the eventual savings they may bring – can be considered as contributing to the ESO. This provision can be beneficial especially in the case of retrofit of buildings where the decarbonisation of the building stock may only be achieved through fuel switch towards renewable (as the existing building limit the EE actions that can be deployed, notably cost-effectively).

3.3 Building Regulations: the Framework Defined by the EPBD

The Energy Performance of Building Directive is the main EU legislative piece dedicated to reducing the consumption of energy in the building sector. Along the Clean Energy for All European Package, setting the EU Climate and Energy Framework to 2030, the EPBD has been reviewed to better reflect the new energy challenges of the building sector. One of the main focus of the revision of the Directive notably was the inclusion of various provision to facilitate the uptake of electric vehicles and to increase the penetration of smart technologies in buildings.

The overall objective of the updated EPBD, stated in one of the Directive’s recital is the decarbonisation of the EU building stock by 2050. To do so, the Directive requires all new or deeply renovated building to be so-called Nearly Zero Energy Buildings.

The EPBD notably includes “renewable energy sources supplied through the energy carrier and renewable energy sources that are generated and used on-site” as a factor of the energy performance of a building. This provision for instance means that geothermal energy, either produced on site or carried through electricity or district heating network may account towards the energy performance of the building, in particular considering the energy savings in represents – notably in terms of primary energy.

Moreover, renewable energy sources are also a factor contributing to the “smart readiness” of a building, notably by contributing to “the ability to maintain energy performance and operation of the building through the adaptation of energy consumption for example through use of energy from renewable sources”.

3.4 Enabling De-carbonization Through Innovation: Horizon Europe

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 EUR 100 Billion, 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. In particular “decarbonised cities” have been identified as one of the overarching missions to be pursued by the programme.

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.

4. REVISION OF THE ECODESIGN FRAMEWORK FOR SHALLOW GEOTHERMAL SYSTEMS

The Ecodesign framework is a major factor in the EU internal market, by setting a consistent framework across Member States for the energy performance and other such requirements of a wide array of equipment. Among the equipment falling within the scope of this regulation are shallow geothermal systems (geothermal heat pumps typically), which need to comply with requirements set by the Ecodesign regulation.

Although the Ecodesign framework addresses a broad range of individual heating and cooling equipment, for geothermal heat pump technologies, a major imbalance is embedded in the current framework. Indeed, while air sourced heat pumps are tested according to conditions aiming to represent the three major EU climate zones (cold, temperate, warmer), in the case of shallow geothermal systems, the only testing conditions considered in the ecodesign framework corresponds to Nordic countries conditions. Although a large part of the installed stock is indeed present in Nordic climate, limiting the standard testing conditions to such a narrow representation of European climate creates a barrier to the competitiveness of shallow geothermal systems against other technologies that are tested in conditions more representative of real world markets.

The Ecodesign framework is under revision at the European level, and this issue of the different framework for geothermal heat pumps has become a major imbalance to be corrected for the European geothermal industry and the European heat pump industry alike.

5. 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 an acknowledgement of the importance of renewable energy as an industry for Europe's economy the Clean Energy Package to 2030 only is a first step toward the necessary decarbonisation of the European economy by 2050. Pursuing this objective, which while not out of reach is quite far yet, requires today's policies to strive to that goal. For instance, European policies and investments in the heating and cooling sector today should already prevent any fossil fuel lock-in effects. This means that public financing must not invest in any fossil fuel assets, as these would still stand in 2050 and induce demand for fossil energy. The integration of the cost of carbon should also reflect the impact of fossil investments in heating and cooling. And first and foremost, the subsidies to fossil energy should stop right away.

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