

Strategic planning document for policy activities

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ETIP-DG

European Technology & Innovation
Platform on **Deep Geothermal**

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Objective

This Strategic document is intended to provide guidance to the Policy Working Group, by identifying a policy timeline as well as a list of actions to be undertaken.

Article 194 of the Treaty on the Functioning of the European Union (EU) provides that in the context of the establishment and functioning of the internal market and with regard to the need to preserve and restore the environment, Union policy on energy shall aim, in a spirit of solidarity between Member States, to:

- ensure the functioning of the energy market;
- ensure security of energy supply in the Union;
- promote energy efficiency and energy saving and the development of new and renewable forms of energy.

Such provisions entitle the EU to legislate on a number of issues which directly or indirectly affect both the shallow and deep geothermal energy sectors. An outstanding example is no doubt the legislative climate and energy package adopted in 2008 together with the so-called 20-20-20 targets (i.e. at least 20% in greenhouse gas emissions reduction compared to 1990 levels, 20% of the final energy consumption to come from renewable sources; an improvement of energy efficiency by 20% compared to projections).

Alongside EU-wide and national binding targets, a number of accompanying measures have been put in place to deliver the expected results by 2020. In this regard, the Renewable Energy (2009/28/EC) and the Recast Energy Performance of Buildings (2010/31/EU) directives as well as the Energy Efficiency Directive are key pieces of EU legislation for the promotion of geothermal energy in the EU. In fact, these Directives set a stable regulatory framework with a range of measures designed, inter alia, to overcome non-technical barriers and other market distortions.

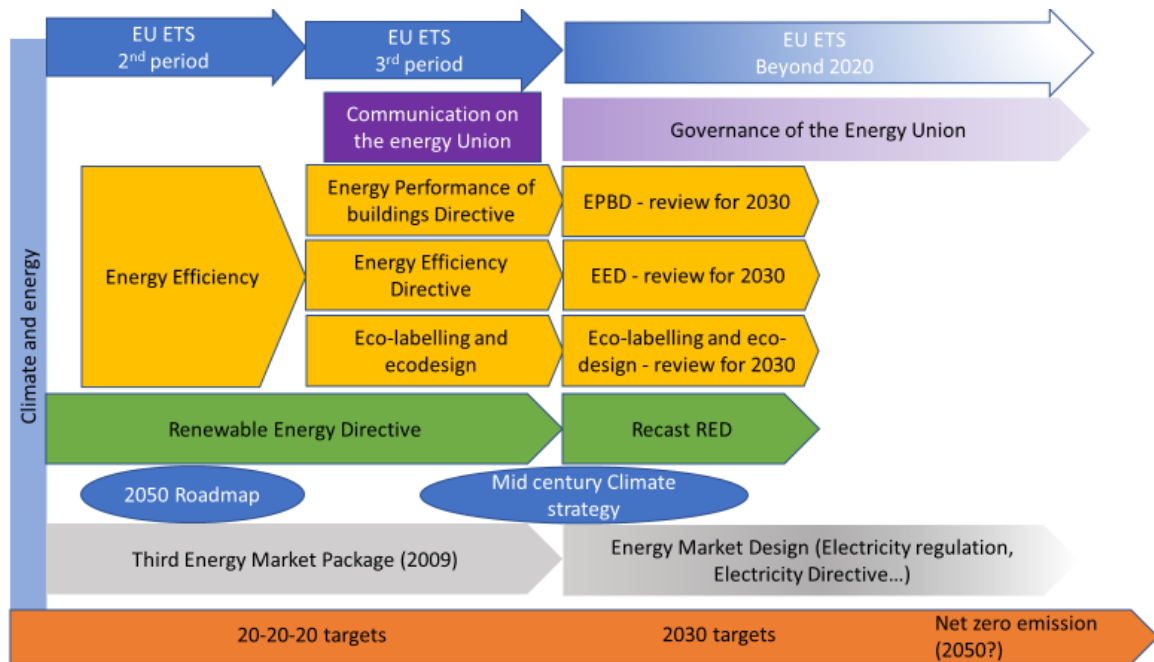
Finally, a series of directives aiming to preserve and improve the environment and the way they are implemented at national level may also have a relevant impact on geothermal energy.

Policy timeline

The 2020 Climate and Energy Package has been instrumental in spurring investment in the renewable energy sector across Europe. This policy framework has been built up progressively, over nearly a decade with the successive addition of different legislative pieces, such as for instance the ETS Directive (2003) setting the European carbon trading scheme, later followed by the first Renewable Energy Directive (2009), and then the Energy

Efficiency Directive in 2011. To lay out the 2030 climate and energy policies of the European Union, a much shorter timeline has however been selected, putting forward the argument of consistency across legislative texts and compliance with the “better regulation” principle.

Figure 1: Development of EU climate and energy policies



In 2016, the European Commission published a “[Clean Energy for All European Package](#)”, which corresponded to a bundle of 8 legislative proposals aiming to propose a consistent climate and energy framework for the EU after 2030.

This Package includes a review of the key legislative proposals that enable the pursuit of the 20-20-20 objectives. It also lays out the objectives for renewable energy deployment, energy efficiency improvements and carbon emissions reduction to 2030. In that regard, the review of the different energy efficiency legislative pieces is rather an update. The Renewable Energy Directive meanwhile is entirely redrafted, to account for the changing realities of the renewable energy sector, and to better acknowledge renewables for heating and cooling. The new text lays out the criteria for awarding support to renewable energy projects. Alongside these proposals, the European Commission proposes to add to the effort to set up the Internal Energy Market, introducing several proposals to define the functioning of the electricity market after 2020. This proposal for instance aims at better integrating higher variable production and allowing the value of flexible electricity production (e.g. geothermal electricity) to be captured. Encompassing all these policies, the Energy Union Governance

Framework should come to replace the national binding targets after 2020, setting rules for Member States to set their targets and report on progress, so that the EU level binding objective is met.

These simultaneous proposals, as they define European energy policies after 2020 are a priority strategic area. The final version of the legislations should be adopted at the end of the second trimester of 2018.

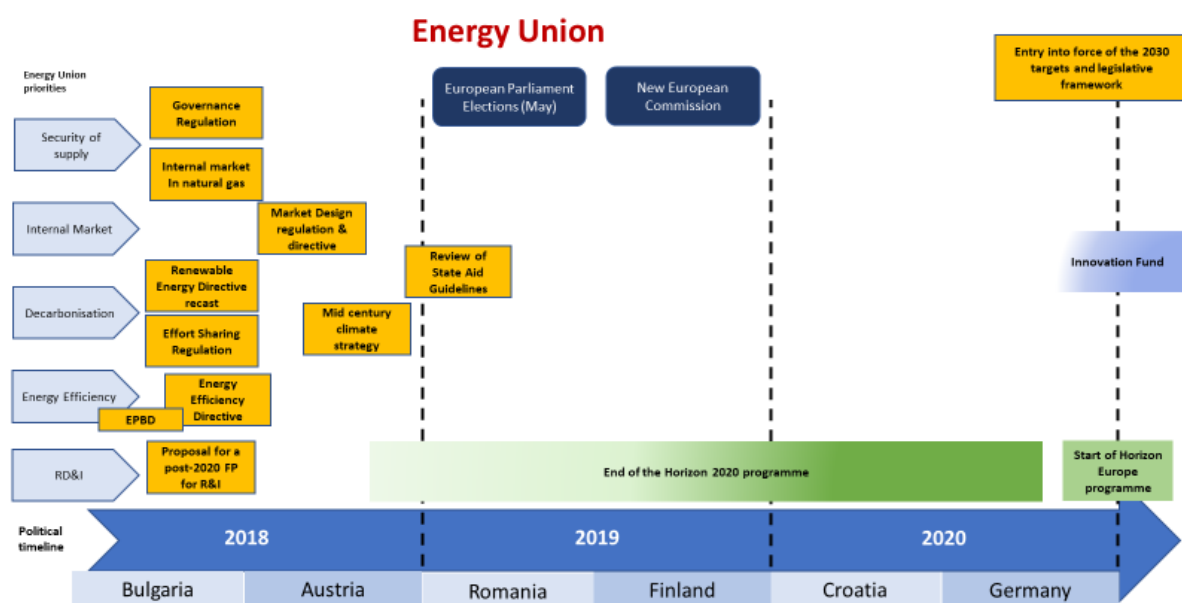
List of actions

On 30 November 2016, the European Commission unveiled the EU “Clean Energy for All Europeans” package, including its proposals for the review of all sectorial legislation. Additionally, currently several regulations are revised (e.g. The EC Energy Statistics Regulation, Water framework directive) and new programmes will be defined (e.g. the Innovation Fund, Horizon Europe). In 2017-18, the most relevant files on “policy and regulation” for deep geothermal include the following:

Renewable Energy Directive Recast
Review of the Energy Efficiency Directive
Review of the Directive on Energy Performance of Buildings including Smart Finance for Smart Buildings initiative
Electricity Market Design- Directive and Regulation
EU Innovation Fund (replacing the NER300)
Review State Aid Guidelines post-2020
Revision EU ETS Directive
Review Eco-design and Energy Labelling Regulation
New Effort Sharing Decision (including in buildings)
Integrated Energy Union research, innovation and competitiveness strategy / post-2020 framework: Horizon Europe
Horizon 2020 (WP2018-20)
EIB review lending policy for energy projects
Review Water quality legislation
NORM legislation
Reform VAT Directive
Other environmental regulations (F-Gas, Air quality, drilling, etc)
Multi-annual financial framework post-2020
EU Climate Strategy (to 2050)

The political timeline of the Energy Union, the policy to build a European single energy market, which rests on five pillars (security of supply, decarbonization, energy efficiency, internal market and RD&I), is structured around the adoption of the different legislative proposal that make up the Clean Energy Package. Indeed, the political agenda that govern legislative work is dependent on the result of the European Parliament elections in May 2019, and of the European Commission college to be appointed thereafter. From 2019 onwards, the priorities will be determined by the new European Commission.

Figure 2: Timeline of the Energy Union 2018-2020



List of policy priorities for the ETIP-DG non-technical EG (version March 2018)

1. Policies & regulations

Policies and regulations play a tremendous role in driving developments in deep geothermal RD&I by acting as a top down factor, setting targets to reach, rules to follow and providing opportunities for public funding of research and development. Regarding policies and regulations, especially the ones developed at the European level, the following are the main policy priorities of the ETIP-DG non-technical working group:



- Need of a levelled playing field at European level so that subsidies and/or taxation do not befog the overall consistency of the vision for geothermal energy in Europe.
- Need of a clear understanding of the specific agenda of the different countries (depending on their own situation), and the common core.
- Need of a dedicated policy for the desired share of low carbon/carbon free technologies in the mix of energies produced.

Associated research topic:

- P&R 1: Developing a welfare analysis of the increase of deep geothermal energy in the energy mix through a comprehensive assessment of the impact of geothermal energy on economic growth, social welfare, employment, environmental benefits, trade balancing...
- P&R 2: Screening and mapping EU policies and regulation relevant for RD&I in deep geothermal energy.

2. Public acceptance

There are many public acceptance concerns surrounding the development of geothermal energy projects. Among them, a chief concern often is linked to the environment. The specific aspect of environmental concerns will be explored and addressed by the mean of an Environmental workshop.

The main policy priorities regarding public acceptance include:

- Information gap between geothermal experts and public, and lack of access to knowledge.
- Scarcity of social engagement and inclusive geothermal projects. Need for a true public participation to geothermal planning.
- Diverse strategies for societal engagement are being implemented worldwide, however, such learnings are not easily accessible, so others can profit from them.
- The potential socio-economic and cultural impacts of a distributed power generation, and the role of new social actors like the prosumers, are still uncertain.

Associated research topic:

- PA1: Sociological analysis of expectations and fears regarding energies, and specifically geothermal energy, in order to identify technological RD&I able to bring effective answers to the concerns and expectations identified (deepening of LCE 21-2017)
- PA2: Definition of guidelines for systematic information activities.
- PA3: Education and information campaigns about geothermal energy technologies and developments.
- PA4: Definition and test of strategies and practices of public engagement in the geothermal realm
- PA5: Development of a—permanent and constantly updated—trans-European observatory on engagement strategies adopted in the field of renewable energy technology, including geothermal

- PA6: Furthering research and establishing new methodologies to assess the socio-economic and cultural impacts of a distributed power generation identifying the interrelations between these impacts and technology, investments and regulations.

3. Competitiveness

The issue of competitiveness is crucial for the European geothermal sector. It affects its capacity to export beyond the European borders, but the competitiveness against other technologies is also important to attract investments. Below are listed some elements that can contribute to defining the competitiveness of geothermal energy in the European energy mix:

- Beyond LCOE: cost of intermittency, value of flexibility, full life-cycle costs, life-cycle green-house gas emissions...;
- Use value of geothermal according to different purposes (alternative business models);
- Heat produced to be set equal to electricity, because of higher efficiency in resource use and lack of alternatives for sustainable heat production;
- Heat to be included in calculations of levelized cost (LCOH...);
- Market models.

Associated research topics:

- C 1: Research of alternative criteria to LCOE, more representative of the value for the energy consumer, enabling a level playing comparison of renewable energies.
- C 2: Research on the impact of existing sustainable market model designs for renewable energy on geothermal energy (enabling a legitimate return on investments in a context of zero or next to zero marginal costs energy, while ensuring cost efficiency for the consumers)

4. Risk management

The development of geothermal energy in new markets is conditioned to the proper management of the different risk factors that are specific to deep geothermal technologies, chiefly: the geological risk.

The solution to this specific risk usually include some sort of risk mitigation facility, the nature and functioning of which can vary greatly. Priorities in this area, notably for the development of deep geothermal energy project across Europe, include:

- Harmonization of evaluation standards;
- Integration of exploration costs in the business model: portfolio management model versus insurance scheme;
- Addressing the moral hazard issue in an insurance scheme;

- Creation of a risk sharing facility over the borders (Pan-European).

Associated research topics:

- R&M 1: Development of a specific resource assessment standard. Shared resource assessment methodologies exist in oil & gas business. They facilitate the dialogue between companies and financial institutions (may be addressed by WG 1)
- R&M 2: Survey of exploration or pre-cost risk in other industries (e.g. hydrocarbons) and how the increases in cost due to risk are managed and integrated in the overall business model. Benefits/drawbacks analysis of portfolio vs insurance schemes. Analysis of the specific issue of moral hazard in insurance schemes.

5. Financing

As a capital-intensive technology, the matter of financing is key for the viability of geothermal projects. From research and development stage, to project at scale, the right financing mechanisms are necessary to lower the cost of geothermal energy and improve its competitiveness. The priorities in that regard include:

- Risk threshold for acceptability of funding by banks or private investors.
- Degree of uncertainty/certainty on resource evaluation versus Final Investment Decision.
- Bankability of geothermal projects along the development time.
- How to enable low cost financing for the development?

Associated research topics:

- F: Look-back survey of the post FID development of geothermal projects in order to assess the nature and level of remaining uncertainties that can impact the profitability of investments.

6. Legal and regulatory

In regulatory terms, deep geothermal energy is often as closely associated to 'conventional' mining resources as it is with renewable sources. The regulatory framework defined by such regulations is extremely important in defining deep geothermal energy projects:

- Position of geothermal energy in the different codes (Mining, Environment, Water, ...)
- Introduction of a unifying process for geothermal projects (one address for all ministries)
- License granting processes (FCFS, license rounds, competition window, ...)
- Works authorization processes.

Although this category of issues may have a significant impact on the development of geothermal energy, they do not seem to require or generate needs for R&D actions.

7. Information

To allow the development of new geothermal energy projects, it is paramount to have access to the right information. Among the specific challenges for the geothermal sector, information on the underground is particularly challenging and costly to acquire.

- Availability of geological information. How to enable the exploitation of data created by Oil&Gas exploration and operation?
- Possibility to make unused data publicly available.
- Consistent statistical data.
- European portal for geological and geothermal data?

Although this category of issues may have a significant impact on the development of geothermal energy, they do not seem to require or generate needs for R&D actions. These issues are addressed through ongoing activities of stakeholders (ex: ERA-NET).

8. Skills, human and material resources

Beyond the regulatory, financial, technical framework, deep geothermal energy projects usually require a high level of specific skills. This makes the development of a skilled workforce an imperative to allow the widespread development of geothermal energy. This rests on the following priorities:

- Science, education, training.
- Industry branch development in a context of decreasing Oil & Gas investments.
- Communication & Dissemination and Public awareness on geothermal energy.

Although this category of issues may have a significant impact on the development of geothermal energy, they do not seem to require or generate needs for R&D actions. These issues are addressed through ongoing activities of stakeholders (for instance EGEC-GEOLEC).



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