Sustainable finance and geothermal energy: opportunity or additional challenge?

OVERVIEW OF THE SUSTAINABLE FINANCE FRAMEWORK

The sustainable finance framework aims to direct private and public financial flows towards companies, technologies and projects that are consistent with the long-term objective of a decarbonised economy. The framework is structured around a major concern of standardisation and preventing greenwashing, notably in light of the rapidly increasing number of “green” financial products. Overall, the Sustainable Finance framework seeks to identify a list of sustainable investments, increase the amount of money being channelled to such investments, and ensuring that these financial flows are robust both from an environmental and financial perspective. At the heart of the Sustainable Finance framework is the European Taxonomy for Sustainable Investments which discriminates between investments that are sustainable and those that are not.

The Taxonomy, and the Sustainable Finance Regulation from which it derives, are only parts of the sustainable framework however. They are central components, but the robustness of the Taxonomy is for instance legitimised in principle by the Platform on sustainable finance, a group of experts who work to ensure the alignment of the sustainable finance criteria and their implementation are consistent with the environmental objectives at the core of the sustainable finance framework. Moreover, the success of the Sustainable Finance is very much reliant on the extent to which it is taken up by financial stakeholders as a relevant indicators of the “sustainability” of an investment portfolio or a financial product.

Figure 1. Main components of the Sustainable Finance Framework

A core matter of the sustainable finance framework is to answer the question “why should an investor or a project developer seek compliance with this scheme”. From the perspective of the European Commission developing the framework and based on the demands of the financial industry and industries potentially eligible as sustainable investments, the reasons would include:

- **Increased transparency and reliability of “green finance” increases capital flows towards such products thanks to greater trust of consumers and investors;**
- **Greater “green finance” availability means lower cost of financing for project developers;**
- **Sustainable Finance Framework to prevent greenwashing and set thresholds for the consistency and robustness of ESG strategies of companies.**
The environmental priorities of the sustainable finance taxonomy reflect the main areas of environmental regulation developed at the European level. Two fundamental principles allow to identify a sustainable investment: it must make a substantial contribution to a given environmental objective, and it must do no significant harm to all the others. This means that in principle a project which provides great climate change mitigation benefits but is not complying with requirements for water protection cannot be considered a sustainable investment. In practical terms, various “taxonomies” are being drafted to clearly define the eligibility of investments. The taxonomies for climate change mitigation and adaptation are already available. An additional taxonomy on local environmental impacts and a Social taxonomy are currently respectively on the drafting board and being discussed. The full list of environmental impacts that the taxonomy focuses on include:

(a) climate change mitigation;
(b) climate change adaptation;
(c) the sustainable use and protection of water and marine resources;
(d) the transition to a circular economy;
(e) pollution prevention and control;
(f) the protection and restoration of biodiversity and ecosystems.

For the purpose of this document, whenever we refer to the ‘taxonomy’ without any further precision, we will be referring to the Sustainable Finance Taxonomy on Climate Change Mitigation. This is indeed the category under which geothermal projects are most usually the target of investment as a renewable energy production technology.

Geothermal energy technologies are clearly identified as sustainable investments in the sustainable finance taxonomy. Geothermal power plants, geothermal district heating and cooling, geothermal cogeneration, geothermal heat pumps, ATES, UTES and other forms of thermal energy storage can all be eligible as a “sustainable investment”. They are however – like all investment categories identified in the taxonomy delegated act – required to comply with a set of criteria listed in the table below.

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Geothermal electricity</th>
<th>Geothermal CHP</th>
<th>Geothermal DHC</th>
<th>Geothermal heat pumps</th>
<th>Energy Storage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emissions</td>
<td>LCE &gt; 100gCO2e/kWh Verified by independent 3rd party</td>
<td>LCE &gt; 100gCO2e/kWh Verified by independent 3rd party</td>
<td>LCE &gt; 100gCO2e/kWh Verified by independent 3rd party</td>
<td>Refrigerant GWP &lt;675 Compliance with Ecodesign</td>
<td>The activity stores thermal energy, including UTES or ATES</td>
</tr>
<tr>
<td>Adaptation</td>
<td>No specific criteria</td>
<td>No specific criteria</td>
<td>No specific criteria</td>
<td>No specific criteria</td>
<td>No specific criteria</td>
</tr>
<tr>
<td>Water protection</td>
<td>No specific criteria</td>
<td>No specific criteria</td>
<td>No specific criteria</td>
<td>No specific criteria</td>
<td>No specific criteria</td>
</tr>
<tr>
<td>Circular economy</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>Emphasis on circularity in supply chain</td>
<td>Waste management required</td>
</tr>
<tr>
<td>Pollution prevention</td>
<td>Compliance with EU air quality legal framework</td>
<td>Compliance with EU air quality legal framework</td>
<td>Compliance with EU air quality legal framework</td>
<td>n.a.</td>
<td>n.a.</td>
</tr>
<tr>
<td>Biodiversity</td>
<td>No specific criteria</td>
<td>No specific criteria</td>
<td>No specific criteria</td>
<td>n.a.</td>
<td>No specific criteria</td>
</tr>
</tbody>
</table>

Table 1. Criteria for geothermal technologies in the sustainable finance taxonomy on climate change mitigation.
Geothermal technologies fall within 5 different categories of sustainable investments. This raises some questions for implementation: what happens when a project ticks several boxes. Cases of geothermal heating and cooling projects that include both a heat pump and a thermal storage component are not uncommon for instance. This should however only be a minor issue which would not impact greatly financial financial flows: geothermal project would either be assimilated to their dominating category, or broken down according to investment expenditure per category (the later option requiring further reporting from the part of financing actors).

A more salient topic in the case of geothermal projects’ compliance with the sustainable finance taxonomy regards the issue of the threshold on life-cycle emissions that geothermal power, cogeneration and heating and cooling plants are required to demonstrate compliance with. Doing a full LCE assessment before an investment is not practical (or even always possible) endeavour, nor indeed is it a cheap one. Moreover, stakeholders in the geothermal sector will be quite aware that the natural emissions of the geothermal resource must be deducted from the footprint of the power plant. The GEOENVI project has anticipated these challenging questions and developed a simplified methodology for geothermal project developers to be able to assess the LCE emissions their projects are likely to have. Such simplified tools and services are likely to be the core drivers of implementation and verification of this LCE thresholds for reasons of practicality: if not the cost of the certification as a sustainable investment is likely to significantly exceed the benefits.

The sustainable finance taxonomy is supposed to be an evolving document to reflect the reality of the industries, but also to progressively align requirements more closely with the requirements of an increasingly decarbonised economy. In the case of geothermal projects for instance, this can include a progressive lowering of reporting requirements (especially regarding LCE compliance) since a greater amount of LCA availability will contribute to demonstrate the systematic compliance of geothermal project with the criteria (especially in the case of binary plants, CHP or heating and cooling projects).

THE GEOENVI SIMPLIFIED LIFE CYCLE ASSESSMENT TOOL

It is unpracticable for a project developer to undertake a full LCA of its project before any investment has taken place. Indeed, the actual parameters of the projects can usually only be know after the first well has been drilled – i.e. after spending an important part of the CAPEX. The GEOENVI project, funded by the European Union Horizon 2020 programme, has brought together academia and industry to design a simplified tool that can help project developers evaluate the impact of their investments prior to construction based on best available scientific knowledge. The LCA tool allows developers to estimate the life cycle impact for various geothermal technologies (from power plants to district heating and cooling projects) across a wide range of environmental impacts. This tool is a crucial tool to provide reliable and transparent indicators to investors looking to invest in a geothermal project for compliance with the Sustainable Finance Framework. It has been developed according to the same ISO standards required by the Taxonomy Delegated Act to ensure consistency with the sustainable finance framework.
The sustainable finance framework may be an opportunity for geothermal project developers, allowing them to access financing more easily at a cheaper cost. On the short term however, this new framework is unlikely to significantly change the financing conditions for geothermal projects since gas, the most significant competitor of geothermal projects in attracting financing (whether for the provision of baseload and flexible electricity or for the production of heating and cogeneration) is set to be considered a sustainable investment like geothermal energy is.

The sustainable finance framework will first impact companies and stakeholders in the financial sector which will be required to report the consistency of their books with the sustainable finance taxonomy. This may lead to some reporting requirements for project managers and developers. Indeed, the sustainable finance framework will apply as much to existing loans provided to a geothermal power plant for instance, and for upcoming projects.

For geothermal project developers the sustainable finance framework is susceptible to impact:

> Public finance: financing from public financial institutions to renewable energy projects is going to be rapidly aligned with the sustainable finance framework. The European Investment Bank, which has for instance provided a loan for several tens of million euros to geothermal developers in the Netherlands has stated that it will be looking to align its energy lending criteria with the Taxonomy. Other public investment banks are likely to follow as the legislative package underlying the sustainable finance comes into force.

> Geothermal derisking: geothermal risk mitigation schemes are largely financed and managed via public financial institutions or direct public support which means they will likely be increasingly considered as a sustainable finance scheme. This can be quite interesting for increasing the visibility of such schemes and attracting private finance towards them – although this will only be a possibility in markets where maturity is high enough for the funds to have a sufficient degree of profitability to interest private stakeholders. In an early phase, such derisking funds could however be relevant for actors of the insurance sector looking to increase their exposure to sustainable finance schemes.

> Availability of green finance: In the medium term, the sustainable finance scheme could allow geothermal project developers to access financing at a lower price. This will however be a secondary factor in the cost of financing which will continue to be primarily defined by the specific level of risk of an investment, which in many cases requires dedicated derisking schemes in the geothermal sector. For the geothermal heat pump sector however, we may see the emergence of funding schemes to finance large scale deployment of heat pumps on models already observed for instance in the US in the solar panel industry. This however requires a high degree of standardisation of geothermal heat pump projects.

**TAKEWAYS:**

> Ambivalent policy: The sustainable finance framework is not going to restructure the energy system by itself, and is mostly a nudge for the financial sector. For this reason the prospects for the geothermal industry lack clarity and certainty in the early phase of implementation. Moreover, the lack of internal consistency of the taxonomy in terms of reporting requirements or even thresholds is an issue for the credibility of the framework.

> Evolving text, subject to political forces

> Geothermal is a sustainable investments – criteria must be refined to aligned with reality of the sector

> Requirements of reporting are yet to be clarified, especially for new projects