Position paper on energy transition

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Europe is accelerating the transition from fossil fuels to renewable energy. In 2015, the European Commission launched the Energy Union strategy to boost energy security, creating a fully integrated internal energy market, improving energy efficiency, decarbonising the economy and supporting research innovation and competitiveness. Furthermore, the EU ratified the Paris Agreement on climate, targeting an increase of the global temperature no higher than 1.5 degrees Celsius (Council, 2016, 2018) and Member States are required to draft 10-year National Energy & Climate Plans (NECPs) by the end of 2019 outlining how they will meet the new 2030 targets for renewable energy and for energy efficiency (European Commission, 2018a).

Ambitious targets mean in-depth planning from both stakeholders and policy makers. The European Federation of Geologists (EFG) is a professional organisation representing more than 45,000 geologists across Europe. The Federation's main aims are to contribute to a safer and more sustainable use of the natural environment, to protect and inform the public and to promote more responsible exploitation of natural resources. Based on the expertise that professional geologists provide, EFG believes geothermal energy (both shallow and deep geothermal), CO_2 capture and mineral extraction are part of the answer to meet the aforementioned targets (EFG, 2018, 2019).

As the demand for both energy and heating is rising each year in the EU, geothermal resources are one potential solution to meet this flourishing market. Geothermal energy unfolds in two categories: shallow geothermal and geothermal power production. First, shallow geothermal, which can provide heating and cooling on a small scale (e.g. houses) or a medium scale (e.g. smart cities). Such a system ensures a constant flow of either heating or cooling, consequently mitigating the need to produce energy via unsustainable means. Both the technology and the legal framework (European Commission, 2018a) concerning shallow geothermal are already in place; therefore, this type of heating could be used immediately, placing it among the short-term solutions for the energy transition. Furthermore, the average lifespan of a shallow geothermal well is 80 years, providing a constant and sustainable source of heating and cooling in the long run with minimal environmental drawbacks (Staffell et al., 2012). Second, EFG believes geothermal power production to be key in the energy transition as it is sustainable and can provide a constant supply of electricity, unlike solar panels or wind farms, whose efficiency is affected by the weather (EFG, 2019).

In addition, deep geothermal systems can be linked to mineral extraction thanks to technologies like Combined Heat Power and Metal extraction (CHPM), currently under development thanks to the EU funded CHPM2030 project. The project aims to develop a novel and potentially disruptive technology solution that can help satisfy the European needs for both energy and strategic metals in a single interlinked process (CHPM2030, 2017). Deep geothermal exploitation requires a longer exploration phase for carrying out geological studies to identify the optimal place to drill. This longer phase of exploration and the long period of exploitation of deep geothermal boreholes place deep geothermal systems among the mid-to-long solutions for the energy transition (ADEME, 2017).

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CO_2 geological storage (CGS) is the geological side of CO_2 capture and storage. Geological storage is closely aligned with the principal objectives of the European Federation of Geologists. The technical feasibility of large-scale CO_2 capture and storage has long been proven. The current main obstacles are the financing of pilot projects and the lack of stable political support. Project planning can also be difficult without sufficient geological information (European Commission, 2009). Financial support is still needed for the first-of-a-kind CO_2 capture and storage projects, but examples in the USA show a sharp drop in costs for the projects after the first phase of exploration (European Commission, 2013). With the increasing emission costs in the European Trading System to cost levels that are more in line with active climate policy, and the inclusion of CO_2 utilisation via Carbon Capture, Utilisation and Storage (CCUS) schemes, the economic outlook for widespread CO_2 capture and storage projects is provided (European Parliament, 2015). Whenever countries more realistically look at how to cut back greenhouse gas emissions to ambitious levels, such as was recently the case for the Netherlands (Boffey, 2019), CO_2 capture and storage immediately pops up as a much-needed part of the plan and as a short-term answer to fight climate change – at least, in those countries whose geology is suited and sufficiently explored to allow geological storage of CO_2.

Finally, technologies which convert renewable energies like wind, solar and geothermal energy into a useable and transferable form, i.e. electricity, require a significant usage of minerals. Europe is strongly dependent on mineral raw materials imports and lacks infrastructures for processing those minerals into the chemical compounds required by industries. The lack of mineral processing and refining capacity in Europe is a major constraint with political, economic, social and environmental risks. Nowadays, the rare-earth elements used by the technologies in the renewables sector are refined outside Europe, in countries that have lower environmental and social standards. At the same time, in Europe, the development of lithium extraction projects (and all other extraction projects) are being delayed by social opposition and bureaucratic issues (European Commission 2008; Faure-Schuyer et al. 2018). The EU urgently needs to define and adopt a raw materials policy capable of ensuring the sustainable extraction of the mineral raw materials that are necessary to meet the goals of the energy transition and the UN Paris Agreement on Climate Change. This would require a standard EU legal framework for land use, permitting, mining and quarrying, restoration and nature conservation. The Member States need advice and support on the establishment of uniform governance procedures that will ensure public participation and the fair distribution of revenues from minerals extraction. Furthermore, holistic perspectives for minimising negative environmental impacts and maximising the potential of mineral deposits need to be supported and disseminated as best practice across Europe. In the case of mineral deposits that are critical for the EU industry and to meet the goals of the energy transition, the fair distribution of revenues needs to be addressed at the local, regional and EU level, across the value chains that benefit from the fair access to scarce/critical raw materials.

Thanks to its Panels of Experts, EFG is capable to provide both support and information to the European institutions and national authorities in their implementation of the Energy Union strategy.

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