GEOTHERM FORA

Standardisation of geothermal technologies

Fact Sheets

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To further develop the geothermal market in Europe, there is a need today to imporve market conditions with standards, codes and guidelines. These 'soft' measures allow to esablish rapidly a better trade of equipments and componets for all geothermal technologies produing heating, cooling and electricity.

Standardisation in the energy sector

Standardisation in the energy sector involves creating uniform specifications, protocols, and shared practices across energy generation, transmission, distribution, and consumption. This process improves interoperability, reliability, and efficiency across energy systems while facilitating the integration of new technologies. It levels the playing field for innovation and reduces complexity for operators, administrations and consumers. Standardisation usually starts once a technology or process is in active production or industrial application, meaning it has achieved the highest Technology Readiness Levels (TRL) of 9.

The international standardisation of geothermal energy production remains in its early stages compared to other low-carbon energy sources. This indicates that several geothermal energy technologies are in the Research & Development (R&D) phase of its lifecycle, despite approaching higher TRLs, and other technologies don't play in a mature market. International standards for geothermal energy have been developed for specific aspects, and in some cases rely on codes from other industries, e.g., the oil and gas sector for deep geothermal and the heat pump sector for shallow geothemal. Some relevant ISO standards have also been incorporated into national standards, but only in a limited number of countries.

The absence of common best practices and standardisation across EU countries creates significant regulatory barriers to geothermal energy market development and also causes difficulties for bankers and insurance companies. For geothermal to progress, it is crucial to raise awareness, promote standardisation, drive innovation, share knowledge, and build capacity. These steps are vital for implementing sustainable practices in the design, construction, maintenance, and operation of geothermal energy systems.

Case of resource classification

Another issue is the absence of a standardised terminology and classification for geothermal systems. The sector uses diverse terms, definitions, and acronyms. The rapid introduction of new concepts, some adapted, others new or still in prototypes, exacerbates this inconsistency. Instead of relying on these changing definitions, the industry and the sector would benefit from adopting a more transparent and systematic classification system. The main challenge is maintaining clarity and consistency amid ongoing sector developments.

Ultimately, the sector still lacks a comprehensive energy production reporting code, particularly for heating and cooling. While the matter concerns the entire heating and cooling energy sector, geothermal energy with its multiple interconnected technologies is particularly confusing.

Proposals

To improve the situation and address the gaps, three concrete actions have been identified.

1. **Advance geothermal research, development, and innovation in the geothermal sector to achieve the highest Technology Readiness Level across multiple sectors:** Although geothermal research funding has increased over the past decade, it still pales in comparison to funding for many other energy sectors. Public funding for demonstration plants is scarce and mainly applies to highly innovative technologies and sectors. A mix of public and private funding, along with European and national resources, covering all MS countries interested in geothermal energy, would enable multiple demonstrations across various geothermal sectors. The efforts presently undertaken by the IWG (Implementation Working Group) Geothermal should be strengthened.

2. **Establish Geothermal Energy Standardisation Technical Committees:** Stakeholders such as expert R&D organisations, universities, plant operators and owners, supply chain firms, standardisation bodies and regulators need to work together to develop a consensus on the energy industry standards. These standards should encompass geothermal resource exploration and assessment, thermal storage engineering, drilling and completion engineering, geothermal heating, geothermal power generation, and the design, construction, operation of geothermal plants, and the relevant fields. Moreover, specific sub-committees should be defined for geothermal system classifications and production data reporting. Separate Committees might be set up for shallow and deep geothermal sectors, but a cross-reference must always be guaranteed. Committees should refer to ETIP Geothermal, in collaboration with EGEC, IWG Geothermal, and EERA-Geothermal.

3. **Ensure that commercial interests are best served:** Although geothermal can be standardised in a deliberate and organised manner, it will likely be more challenging than standardisation in other sectors such as the oil and gas sector, where commercial interests are more strongly involved. Geothermal standardisation should take into account existing standards, but not be too reliant on them, to serve the best interests of the geothermal sector.