

“Possibilities and limitations of geothermal energy use for heating and production of electricity at volcanic islands”

October 1st 2020, WebEx

Executive summary

About geothermal energy use on volcanic islands

Due to unique landscapes, volcanic islands like the Canary, Azores, and Aeolian or in the Aegean Sea are very attractive for tourists, which in turn put stress on the islands' energy supply. In the context of climate change mitigation as well as for economic reasons, measures need to be taken to substitute the import of fossil fuels for energy production by on-site resources, which are able to provide base load supply. Active or post-active volcanic islands offer elevated geothermal heat flux, which could be used for combined heat and power production at base load level. However, especially in arid or semi-arid volcanic islands, major constraints for using geothermal energy are given by lack of groundwater, which acts as a heat carrier fluid.

Conclusions of the workshop

Starting in the early 1970s due to the global oil crisis, geothermal energy use on volcanic islands has been investigated for over 40 years. Although exploration started at the same period in most European volcanic islands, some of them, like the Azores, already managed to introduce geothermal energy for electricity production – others, like the Canary- or Aegean Islands still struggle to do so. In this context islands face various barriers, such as low local community trust into the safety and environmental impact of the technology, limited demand or missing incentives. Moreover, low and substituted price for fossil fuels from the 1980s on diminished the interest of local governments in geothermal investments. Other islands like Iceland pursued in developing geothermal energy despite of the economic boundary conditions for fossil fuels and managed to decarbonize the electricity and heating sector by applying locally available energy resources. Nowadays, more than 90% of Iceland's heat and more than 25% of its electricity demand is supplied by geothermal energy.

In the light of the green energy transition geothermal will play an important role in supplying communities with on-site renewable electricity and heating on volcanic islands. The key success can be summarized as:

- High safety and environmental standards of geothermal installations,
- High level of efficiency by supplying different energy demands (e.g. combined heat and electricity, agriculture) and by combining geothermal with other renewable energy sources (e.g. solar energy),
- Applying geothermal energy at its full spectrum of, which also includes deep closed loop systems and shallow geothermal (e.g. for cooling),
- Amended islandic and intra-islandic energy supply and distribution infrastructure to bridge the gap between high availability of supply and low demand,
- Enhanced acceptance and support of the local communities by delivering an instant reward for choosing geothermal (e.g. new jobs, better living conditions),
- Building competence hubs for geothermal energy use on (volcanic) islands.

In 2018, the EU started the “*Clean Energy for European Islands*” initiative, which may help to boost geothermal energy use on islands. As the next 20 years will be crucial to achieve the clean energy transition, actions need to be done now to stimulate investments in geothermal energy!

Link to workshop materials

- [Presentations](#)
- [Post-workshop, high quality recorded presentation given by Juliet Newson \(Iceland\)](#)
- [You tube stream](#)

Detailed program of the workshop and contact details of the presenting authors

9:15	<i>Opening of the web room, digital coffee</i>
9:30	Opening of the workshop and welcome address by Gregor Goetzl , chair of the COST Action CA18219 Geothermal-DHC, contact: gregor.goetzl@geologie.ac.at
9:45	Welcome address and keynote by Attila Kujbus , European Geothermal Energy Council: “Geothermal energy use on (volcanic) European Islands from a market and policy point of view”, contact: akujbus2010@gmail.com
10:00	Keynote presentations (20 minutes speaking time and 5 minutes Q&A) <ul style="list-style-type: none"> • Bernard Sanjuan (BRGM, France): “Development of high-temperature geothermal energy in the French West Indies”, contact: b.sanjuan@brgm.fr • José Martins Carvalho (TARH, Portugal): “40 years of geothermal activity in the Azores, achievements and challenges”, contact: jmc@tarh.pt
10:50	<i>Short coffee break</i>
11:00	Keynote presentations, part 2 (20 minutes speaking time and 5 minutes Q&A) <ul style="list-style-type: none"> • Celestino García de la Noceda Márquez: “Geothermal resources in the Canary Islands: potential and constraints”, contact: c.garcia@igme.es • Evangelos Spyridonos (Greece): “PPCR S.A. planning for the development of the high temperature geothermal potential of the Aegean volcanic arc islands”, contact: espyridonos@ppcr.gr • Juliet Newson (Iceland): “Learning from successful geothermal energy utilization in Iceland”, contact: julietn@ru.is
12:15	<i>Lunch break</i>
13:00	Short presentations (15 minutes speaking time and 5 minutes Q&A) <ul style="list-style-type: none"> • Jessica Chicco: “The Salinelle of Mt.Etna” Geosite: thermo-physical and geochemical monitoring of hydrothermal fluids, aimed at understanding both their geothermal potential and their possible correlations with Mt. Etna activity”, contact: jessica.chicco@unito.it • Per Gwalter, Iain Pittman, Gary Williams: “De-risking and Enabling Geothermal Energy Developments”, contact: per.gwalter@ceraphi.com • Isabel Fernandez: “CROWD THERMAL project”, contact: isabel.fernandez@eurogeologists.eu Interactive workshop – plenary discussion <ul style="list-style-type: none"> ○ <i>What are the main techno-economic barriers for the development of geothermal energy in volcanic islands?</i> ○ <i>Are there non techno-economic barriers like social acceptance and risks, which need to be considered for applying geothermal energy on volcanic islands?</i> ○ <i>How can these barriers be removed and which technological concepts may allow including geothermal energy in energy supply?</i>
14:30	<i>End of the workshop</i>

Conveners of the workshop

Vasiliki GEMENI	CERTH (Greece)	Gregor GOETZL	GBA (Austria)
Emilio L. PUEYO MORER	IGME (Spain)	Giuseppe MANDRONE	UNITO (Italy)
Mónica SOUSA	APG (Portugal)	Bernard SANJUAN	BRGM (France)
Attila Kujbus	EGEC (Belgium)		



About Geothermal-DHC

The COST Action CA18219 Geothermal-DHC addresses the inclusion of geothermal energy in decarbonized heating and cooling grids across Europe. The network follows a technologically bottom-up approach involving the whole spectrum of geothermal and envisaging the whole process chain from planning to operation and monitoring. Our network addresses both, refitted existing heating and cooling networks as well as new grids. Geothermal may act as a heating source, sink or storage and may be combined with other renewables or waste heat in multivalent heating and cooling grids. Geothermal-DHC aims to demonstrate that geothermal energy has the potential to significantly **enhance the share of renewable energy sources in heating and cooling grids to 30% in 2030 and 50% in 2050** in Europe.

Geothermal-DHC connects researchers from various disciplines (e.g. geosciences, energy conversion and social science) with stakeholders (e.g. energy suppliers, municipalities and energy planners), who are interested to lower the CO₂ footprint of heating and cooling in their region. Currently, the network is covering participants from more than 30 European countries as well as observers from outside of Europe.

For more information on Geothermal-DHC please visit www.geothermal-dhc.eu.