

The International Webinar “Geothermal Energy for Sustainable Development - GeoESD2021” organized by the Turkish Journal of Earth Sciences, TUBITAK was held successfully on December 8, 2021

Concluding Remarks

Eighty participants from Turkey, Iceland, the USA, Poland, Germany, Chile, India, Indonesia, Ethiopia, and Australia actively participated in discussions throughout the day, and more than 100 people watched the webinar on Zoom and YouTube. Eighteen papers were presented, including two keynote speakers from Iceland and Poland. Dr. Alexander Richter, Former President of the International Geothermal Association, gave an overview of the past and current developments in geothermal industries, emphasizing new emerging enhanced geothermal system (EGS) technology adopted by some countries. Prof. Dr. Barbara Tomaszewska, Deputy Head IDUB AGH UST project, AGH University of Science and Technology, talked about various applications in the world regarding geothermal energy for sustainable development. Papers presented include heat flow studies, geothermal reservoirs characterization, EGS technology, supercritical circulation of CO₂ for heat extraction from granites, direct application of geothermal fluids in agricultural irrigation, use of geothermal energy resources in ecotourism, lithium extraction techniques from geothermal fluids, and use of geothermal greywater in agriculture. There was active participation from participants on various aspects related to developments of geothermal energy production in Turkey, drilling technologies adopted for heat extraction from granites, and lithium extraction from geothermal brines for the lithium battery industry.

The entire workshop was grouped into five sessions, and each session was chaired by eminent researchers in the field of the geothermal industry. Session I was chaired by Dr. Bedri Kurtuluş, Visiting Professor in Muğla Sıtkı Koçman University, International Water Resources Department, IYTE. Session II was chaired by Prof. Dr. Mustafa M. Demir, Dean of Engineering Faculty, IYTE, Session III was chaired by Cannur Bozkurt, Manager, Center for Geothermal Excellence, TAQA Industrialization & Services Company, Sessions IV and V were chaired by Prof. Dr. Orhan Gündüz, Environmental Engineering, IYTE.

A brief introduction initiated the workshop by The Editor in Chief of the Turkish Journal of Earth Sciences, Prof. Dr. Orhan Tatar. Then, Prof. Dr. Alper Baba, the Vice-Chancellor, IZTECH (İzmir Institute of Technology), briefed the current status of Turkey's geothermal resources and industrial activities. Prof. Dr. Dornadula Chandrasekharam, TUBITAK fellow, International Water Resources Department, IZTECH described the events that resulted in the publication of the special issue of the Turkish Journal of Earth Sciences on Geothermal energy for sustainable development. Prof. Dr. Yusuf Baran, Chancellor, IZTECH, described the significance of renewable energy with special emphasis on geothermal energy resources, the related studies carried out by IYTE, and planned innovations under the Institute's renewable energy support programs. The President of the Scientific and Technological Research Council of Turkey (TUBITAK), Prof. Dr. Hasan Mandal, inaugurated the webinar with his encouraging address to all the participants about the overall development in the energy sector of Turkey. He also talked about the government's future programs in this sector to support reducing carbon

dioxide emission and controlling climate change-related issues in Turkey and across the world as well.

Geothermal energy is the fastest-growing energy source in the world. Clean, renewable geothermal power has a huge potential as a clean energy source, and it is as important as fossil fuels are today; however, we need to focus on new technologies to make the resource economically viable and available to all. Geothermal energy can be utilized for power generation and other types of direct uses such as heating and cooling, fish farming, bathing, greenhouse applications. Compared to other renewable energy technologies, geothermal is unique as it provides a base-load alternative to fossil fuels-based electricity generation, and it can also replace those used for heating. For this reason, it is extremely important creating more support programs for different applications of geothermal energy such as EGS, drilling technology, CO₂ using and storing, and mineral extraction from geothermal fluids.

We thank TUBITAK for the organization of this webinar, the researchers who shared their valuable pieces of works, and all the participants for their contributions to enriching the discussions throughout the webinar.