

# The Future of Geothermal

## IEA Workshop

11 October 2024

09:00 - 18:00

9, rue de la Fédération, Paris, France

Draft agenda

International  
Energy Agency

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## Background

Geothermal is a promising and versatile renewable energy resource with vast untapped potential for electricity generation, heating and cooling. Geothermal has been a part of energy systems for more than 100 years but has played a limited role at global scale. The geothermal industry is at a critical juncture, with new technologies enabling access to previously untapped resources driven by cost reductions and innovative financing models paving the way for its increasing role in clean energy transitions. For electricity, geothermal energy can provide dispatchable low-emissions power and contribute to the integration of wind and solar PV along with other technologies. Geothermal heating and cooling present significant opportunities for direct use in residential and commercial buildings, industry processes and agriculture. Additionally, the integration of geothermal energy with critical mineral extraction (particularly lithium) could present a unique opportunity contributing to the diversification of supply chains for the energy transitions as demand for batteries is surging worldwide.

Techniques developed by the oil and gas industry, including a deep understanding of the subsurface, drilling and completing wells, predicting fluid flows and managing large-scale projects, can help to tap into deeper geothermal resources. The potential for technology spillovers is considerable given the wide range of transferrable disciplines, including resource characterisation, exploration, drilling, operations, maintenance, and risk management.

To successfully scale up geothermal energy, a number of challenges need to be addressed. Geothermal projects face higher perceived risks during early exploration phases compared to other renewable energy technologies and require a significant upfront investment, particularly in the exploration and drilling phases. Combined with lengthy and complex permitting processes, geothermal project lead times remain long. In addition, technological uncertainties remain for next-generation geothermal concerning the achievement of sustainable heat flows and potential risks of seismic activity. Attention to mitigate these risks for geothermal has been limited to date in many countries. Policies supporting reduction of overall costs, development of business cases, derisking, innovation and pilot projects could increase the bankability of conventional and next-generation geothermal projects and unlock the technology potential.

This workshop aims to bring together policymakers, industry representatives, and civil society organizations to gather input and strategic guidance for the IEA special report on geothermal energy, identify key barriers and opportunities for geothermal, while fostering dialogue and developing strategies to accelerate geothermal energy adoption.

## Format

The meeting will be a one-day event, informal in nature and held under the Chatham House Rule. Each session will be introduced by invited guest speakers and will be followed by a roundtable discussion. Attendance is by invitation only, places are limited.

For further information on participation please contact [martina.lyons@iea.org](mailto:martina.lyons@iea.org)

Draft agenda	
8:30 - 9:00	Registration and welcome coffee
9:00 - 9:15 (15')	<b>Welcome and opening remarks</b> <ul style="list-style-type: none"> <li>• <b>Dr. Fatih Birol</b>, Executive Director, IEA</li> </ul>
9:15 – 10h45 (1h30')	<b>Session 1: Status and prospects for conventional geothermal energy</b> This session focuses on the status and current trends in conventional geothermal development, regionally and globally. It aims to cover power and heat applications, technology challenges, current policy environments, costs, investment trends, financing and ownership aspects.  <b>Guiding questions:</b> <ul style="list-style-type: none"> <li>• <i>What are currently the key trends and expectations in conventional geothermal development?</i></li> <li>• <i>What are the regional and global perspectives for conventional geothermal deployment to 2030 and in the long term? What are the technical and economic challenges the industry faces in developing projects?</i></li> <li>• <i>What policies and regulatory environment can enable further growth of conventional geothermal technologies for electricity generation and heat production?</i></li> </ul>
10:45 – 11:05 (20')	Coffee break
11:05 – 12:35 (1h30')	<b>Session 2: Next-generation geothermal: innovation breakthroughs</b> This session focuses on recent innovation in geothermal energy and explores how technology gains for enhanced and advanced geothermal systems (e.g. in exploration, resource assessment, drilling, resource management) could unlock new opportunities. It will cover the upside potential enabled by such technical innovations, possible applications for heat and power, and the challenges and conditions for next generation technologies to develop rapidly.  <b>Guiding questions:</b> <ul style="list-style-type: none"> <li>• <i>To what extent enhanced and advanced geothermal technologies can unlock geothermal deployment in the medium and long term?</i></li> <li>• <i>What are the most important recent innovation breakthroughs in geothermal systems? How do they address existing obstacles?</i></li> <li>• <i>What are the most pressing technical, environmental and social acceptance challenges to accelerate their deployment?</i></li> <li>• <i>How can policy makers help fast-track innovation in next-generation geothermal? How can the public and private sector collaborate?</i></li> </ul>
12:35 – 14:00	Lunch break

<p><b>14:00 – 15:30</b> <b>(1h30')</b></p>	<p><b>Session 3: Business case and financing schemes for next-generation geothermal</b></p> <p>This session focuses on the business case to enable next-generation geothermal projects scale up. It will discuss derisking schemes, financing options, ownership structure, as well as the importance for multiple revenue streams, including from flexibility services and critical mineral extraction, and the role of the public sector.</p> <p><b>Guiding questions:</b></p> <ul style="list-style-type: none"> <li>• <i>To what extent can the cost of the next-generation technologies decline in the near future, and under which conditions? What are the critical cost inflection points for next-generation geothermal to really take off?</i></li> <li>• <i>What are the existing derisking mechanisms and how effective are they? What investment and operating schemes could best fit geothermal projects?</i></li> <li>• <i>What type of policies and regulations could best support next-generation geothermal in terms of permitting, zoning, remuneration and sustainability?</i></li> <li>• <i>How can geothermal projects exploit thermal storage potential? Do current market structures sufficiently value geothermal power flexibility?</i></li> <li>• <i>To what extent can critical mineral contribute to the business case of geothermal projects?</i></li> </ul>
<p><b>15:30 – 15h50</b> <b>(20')</b></p>	<p><b>Coffee break</b></p>
<p><b>15:50 – 17:20</b> <b>(1h30')</b></p>	<p><b>Session 4: How to leverage the oil and gas sector’s capacities to accelerate geothermal development?</b></p> <p>This session explores opportunities for the oil and gas sector to contribute to the development of next-generation geothermal, building on the sector’s expertise in resource assessment, exploration, drilling, large-scale project management, derisking of projects and more. It will discuss potential contributions in terms of knowledge transfer and operational collaboration.</p> <p><b>Guiding questions:</b></p> <ul style="list-style-type: none"> <li>• <i>What are the examples of collaborative partnerships between the geothermal and the oil and gas industries in transferring knowledge and technologies across different areas from resource assessment to project management?</i></li> <li>• <i>Where and how could the oil and gas industry further leverage its knowledge, experience, and equipment to support geothermal scale-up? What could drive the oil and gas industry to involve itself more actively in geothermal business?</i></li> <li>• <i>How can policy makers foster collaboration between oil &amp; gas and geothermal industries?</i></li> </ul>
<p><b>17:20 - 17:45</b> <b>(25')</b></p>	<p><b>Closing remarks and main takeaways</b></p> <ul style="list-style-type: none"> <li>• <b>TBD</b></li> </ul>