

Proceedings

Roundtable

on heat transition & geothermal energy opportunities



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Title:

Proceedings for Roundtable on Heat Transition & Geothermal Energy Opportunities in Ptuj, Slovenia on 12th of December 2023.

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We would like to express our gratitude to the co-organizers of the Roundtable on Heat Transition & Geothermal Energy Opportunities in Ptuj on 12 December 2023: the GEOTHERMICA Initiative; CETPartnership TRI4 Heating & Cooling; Geothermal IWG; Ministry of Environment, Climate & Energy of Slovenia; Geological Survey of Slovenia; EEA Grants; and EEA Project INFO-GEOTHERMAL. A special thanks goes to our hosts in Slovenia, Geological Survey of Slovenia and the Ministry of Environment, Climate & Energy of Slovenia.

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Figure 1: Participants at the Roundtable on Heat Transition & Geothermal Energy Opportunities.

Introduction

The GEOTHERMICA Initiative, CET Partnership TRI4 Heating & Cooling, Geothermal IWG, EEA Grants, Geological Survey of Slovenia, and the Ministry of Environment, Climate & Energy of Slovenia organized a Roundtable on the Heat Transition & Geothermal Energy Opportunities in Ptuj, Slovenia on 12 December 2023.

Speakers introduced strategies and policies on geothermal energy of several member states and the EU; public cooperation on the heat transition; and geothermal projects and success stories. Discussions focused on opportunities and challenges on realising the potential of geothermal energy in the region.

Around 40 participants attended in-person and 11 online from 14 countries (Austria, Belgium, Croatia, France, Germany, Hungary, Iceland, the Netherlands, Romania, Slovenia, Sweden, Switzerland, Turkey, and the United States), that represented industry, member states, the European Commission, and the research community.

The Roundtable provided a platform for industry, RD&I, and member states to influence and define the pivotal role of geothermal energy in Europe's transition to sustainable energy sources.

Opening Remarks

Gregor Rome, Undersecretary Directorate for Energy at the Ministry of the Environment, Climate & Energy of Slovenia, and Hjalti Páll Ingólfsson, Deputy Lead of the GEOTHERMICA Initiative Office, CET Partnership TRI4 Office, & Geothermal IWG Office, gave opening remarks. They underscored the importance of collective efforts in leading the discourse on heat transition and geothermal energy opportunities, and set the tone for meaningful discussions that focused on sustainable energy solutions and collaborative pathways towards a greener future.

Introduction, EU Policy & Geothermal Energy in Europe

Stephan Schreiber, Co-Chair Geothermal Implementation Working Group (Geothermal IWG) & GEOTHERMICA Initiative emphasized the power of collaboration in the geothermal landscape, while Matthieu Ballu, Policy Officer, European Commission DG ENER gave an overview of relevant EU policies, including policies on geothermal energy in the EU Green Deal. Philippe Dumas, Secretary General, European Geothermal Energy Council gave an informative overview of the prospects of geothermal energy in Europe.

Country Updates: Strategies & Policies on Geothermal Energy

Representatives from Slovenia, Germany, France, Hungary, Croatia, and Switzerland gave an overview of strategies and policies on geothermal energy in their respective countries. Summaries from the presentations are available below.

Gregor Rome, Undersecretary Directorate for Energy, Ministry of the Environment, Climate & Energy of Slovenia introduced the geothermal energy sector in Slovenia. Mr Rome explained that there have been improvements in legislation for electricity and there is ongoing research in the sector (geophysics and drilling). However, there is need for regulation of data provision to reduce geological risk, for rise of interest in reworking of district heating systems with geothermal, and for successful demo projects in reinjection in sandstone reservoirs for heating.

Stephan Schreiber, Co-Chair Geothermal IWG & GEOTHERMICA Initiative introduced strategies and policies on geothermal energy in Germany. More than half of total energy consumption in Germany is for heating and cooling, and in 2022, only 18.2% came from renewables. There are 42 geothermal installations in Germany (30 heat only, 2 power only, and 10 CHP). Policies for the heat transition in Germany include Heat Strategy for Cities; Renewable Heating Networks Act (50% in 2023); GEG – Buildings Energy Act; BEW – Investment support for heating networks; and BEG – Investment support for building refurbishment and new buildings and transformation of heating systems. Germany’s geothermal strategy, “Geothermal for the heating transition” was published on 11 November 2022. The main focus of geothermal research and innovation priorities in Germany is “broad rollout of geothermal heating.” Geothermal showcases in Germany include Munich (since 2008), Schwerin (since 2015), and Hamburg (expected in 2025).

Imre Szilagyi, Geo-Energy Advisor at the Ministry of Energy of Hungary introduced geothermal strategies and policies in Hungary. Geothermal heat production counted for 7% of total heat production in Hungary in 2022. There are around 1,000 thermal wells, and their share in primary energy production is 1.5% (2022). As of December 2023, 9 geothermal exploration permits have been awarded, while 56 are with the Geothermal Energy Committee, and 15 with the Mining Authority. Hungary’s main strategy goals for geothermal is to increase geothermal energy usage by 20% by 2026, and to double the share of geothermal in total heat production by 2030. Geothermal policies in Hungary include the “National Energy Strategy” and “National Energy and Climate Plan.” Strengths of the geothermal sector in Hungary include excellent resource base; exploration maturity (seismic data, wells); availability of geoscience database; and Geothermal Information Platform (OGRe). Challenges include increasing geological risks; reinjection; aquifer management; and capacity building.

Stefano Benato, Geoenergy Research Program Leader (external) of the Swiss Federal Office of Energy introduced strategies and policies for geothermal energy in Switzerland. Switzerland's "2050 Energy Transition Strategy" includes plans to reduce average energy consumption per capita by 43% by 2035; withdrawal from nuclear energy; and increasing the use of renewable energy. Renewable heat supply accounts for 25% of total heat supply, thereof 5% is geothermal. There are 31 shallow geothermal installations in Switzerland (heating, thermal baths, geothermal probes, storage, tunnel water for space heating, greenhouses, balneology, and fish farming). Deep(er) geothermal project is in the pipeline (300 GWh). Challenges for the geothermal energy sector in Switzerland include geological risk; significant financial downside; public acceptance; regulatory framework; long delivery time for Heat Pumps; shortage of skilled labour; and spatial planning. There are subsidy schemes for heat (exploration subsidies), and power (exploration subsidies, geothermal guarantee scheme, and feed-in tariffs). Ten projects have been granted SFOE subsidy support that are planned or already under way. Haute-Sorne (power) is a showcase for Switzerland, with drilling expected to start in 2024. The Bedretto Underground Laboratory for Geoenergies is 1,5 km below the surface within a 5,2 km long tunnel. The lab has hosted a number of EGS-related projects. The main challenge identified is heat storage, as there is no clear national or cantonal vision, and no policy alignment yet. Policies on the horizon include Parliamentary Motion Black Box Subsurface; and the Geothermal Play Fairway Analysis.

Philippe Laplaige, Geothermal Expert at the French Ecological Transition Agency (ADEME) introduced strategies and policies on geothermal energy in France. ADEME is a public agency under the joint authority of the Ministry for Ecology and the Ministry for Research, which supervises and coordinates the application of environmental policies and supporting public authorities for their design. ADEME's priority areas include renewable energies; energy efficiency; air quality; noise control; transport & mobility; waste & recycling; polluted soil and sites; and environmental management. There were 205,300 installations in France in 2022, mainly for individual houses. Collective housing and tertiary building installations (2% of the total) produced almost 20% of the energy produced with geothermal shallow energy in France in 2022. Deep geothermal heat production is mainly dedicated to district heating in France. There were 79 deep geothermal plants in operation in 2022, and 83% of the heat was produced in the Paris area. In mainland France, 45% of the energy need is for heat, of which 60% is produced with fossil fuel or gas. Only 1% of the total heat production comes from geothermal. With the changing energy context and the problem of global warming, there is an urgent need to further promote geothermal energy. The French National Geothermal Plan was launched in February 2023, and it aims to strengthen drilling capacity; simplifying regulations; promoting installations; improving knowledge of the subsoil; reinforcing specific existing tools for deep geothermal energy; and encourage new financial arrangements within the field.

Martina Tuschl, Director of Geothermal Energy Sector at the Croatian Hydrocarbon Agency discussed the development and application of geothermal energy in the Republic of Croatia. Geothermal data available in Croatia consists of seismic data (more than 20,000 km 2D and 5,000 km² 3D); more than 3,500 wells (191 key wells, of which 71 are related to electricity potential and 120 with heating potential); geological report; final drilling report; well prognosis; water analysis (salinity report); DST testing results; and chemical rock analysis. Geothermal potential in Croatia is defined in four proven plays regarding its lithology and evolution phase of Pannonian basin. There are 43 geothermal sites with heat generation potential and 32 with electricity generation potential. There has been a revival of geothermal exploration activities in Croatia, with over a dozen exploration licenses awarded in 2023. The Croatian geothermal portfolio includes 7 exploitation fields and 28 exploration blocks. The Hydrocarbons Exploration and Exploitation Act defines tendering procedures; exploration licenses; exploration activities; and exploitation and production licenses. The National Recovery and Resilience Plan was introduced to mitigate geological risk; to interpret, analyse and synthesize geophysical data; to understand the subsurface and determine geothermal potential; and to utilize geothermal energy for the needs of the local community. The scope of the project is to acquire new geophysical data (2D seismic and MT data); to conduct geological and geophysical study of each area; and to drill 2 geothermal wells.

Public Cooperation Supporting Geothermal Energy & Heating Transition

Lauren Boyd, Co-Chair of the GEOTHERMICA Initiative, Gerdi Breembroek, Chair of the Geothermal IWG, Alicja Wiktorja Stoklosa, Office Manager of the CETPartnership TRI4 Heating & Cooling, and María Guðmundsdóttir, Project Manager Geothermal Resources at the National Energy Authority of Iceland (EE Grants Partner) discussed public cooperation supporting geothermal energy and the heat transition.

The GEOTHERMICA Initiative is a platform through which public sector representatives collaborate, pool national efforts to accelerate the deployment of geothermal energy, and work together towards the global energy transition. The SET Plan Geothermal Implementation Working Group (IWG) coordinates research and innovation efforts to support the transition to a resilient and climate-neutral Europe which utilizes geothermal energy to its full potential. The Clean Energy Transition Partnership (CETPartnership) enables more than 50 national and regional RTDI programme owners and managers from 30 European and non-European countries to align their research and innovation priorities, pool national budgets and launch Joint Calls. EEA Grants are funded by Iceland, Liechtenstein and Norway as part of the European Economic Area Agreement, and have the following goals; to contribute to a more equal Europe both socially and economically, and to strengthen the relations between Iceland, Liechtenstein and Norway, and the 15 Beneficiary States in Europe.

Projects & Success Stories on Geothermal & Heat Transition

Speakers from Hungary, Iceland, Austria, Slovenia, Croatia, and Germany introduced projects and success stories on geothermal and the heat transition. Summaries from the presentations are available below.

Nóra E. Gál, Hydrogeologist at the Geological Survey of Hungary (SARA) introduced the Szeged District Heating Transition Project in Hungary. Hungary is in transition on geothermal energy utilization since the legal framework and the authorization process changed in 2023. All geothermal utilizations (except balneology and agricultural) now fall under the Mining Act which simplifies the permit process. Applications for over 70 geothermal projects have since been submitted to the mining authority. These projects include a binary power plant, thermal water heating of public buildings, and district heating systems. One of the largest developments is the Szeged District Heating System, where the geothermal transition is realized step by step. Szeged is a university town and a health centre in Hungary. District heating supplies more than 27,000 residents and 433 institutions in Szeged. The transition to geothermal in Szeged started in 2014 when 2 privately owned geothermal heating circuits were built. In 2017, integration of geothermal energy was initiated in the 15 largest heating circuits of the Dh Company in Szeged. Now there are 97 thermal wells in Szeged, 23 are for energy production and 11 are reinjection wells. She concludes that the Szeged geothermal system is a well thought out and well-funded project, with strong geological and hydrogeological knowledge base.

Rúnar Thór Jónsson, Regional Managing Director – Central and East Europe at [Arctic Green Energy](#) presented “Harnessing Geothermal Energy to Transform Cities.” Arctic Green and its JVs form the world’s largest and fastest growing geothermal heating and cooling consortium, providing clean, profitable heating and cooling to cities across the world. Arctic Green Energy is developing or operating over 850 geothermal projects, most of which are in geothermal heating and cooling. Projects range from geothermal electricity to waste heat, heat pumps, solar PV, and AI driven energy management systems. Their JV in China is the world largest district heating company in the world. Of the total global energy usage, 51% is used for heating and cooling. Transition to renewables for transportation and electricity has been progressing rapidly, however, transition to renewables for heating and cooling is slow. Fossil fuel generates 85% of heating and cooling. Arctic Green Energy’s method to set up district heating systems is to drill typically 2 km into the ground, one well for extraction and one for reinjection. Within the closed loop they extract the heat through heat exchangers or absorption chillers for heating and cooling. Their proof of concept is a Chinese city, Xiong’an, where geothermal district heating replaced the coal fired system.

Bernhard Novotny, Head of Geothermal Projects at OMV presented “Deep Geothermal Energy for Decarbonizing the City of Vienna – strategic cooperation between a utility company and the oil and gas industry.” Currently, the heat distribution network covers around 36% of the entire heat market in Vienna, of which renewables count for 18%. Efforts to decarbonize the heat distribution network rests on 3 pillars: diversification of production portfolio; digitization of the heating grid; and sustainable optimization of the customers. The aim is to have a climate neutral heating grid by 2040, with 56% of heating demand to be covered by heat distribution network. The “deeper” joint venture between Wien Energie and OMV was established in 2023.

Matej Prkič, Director at GeoGreen introduced geothermal projects in Slovenia. There are many ongoing shallow geothermal projects (depth up to 300 meters/25°C) in Slovenia. The last middle geothermal project (depth from 300 metres to 2,000 metres/temperature up to 75°C) was implemented in 2012/2013, and currently there is one active project in Moravske Toplice. Middle geothermal energy in Slovenia is used for heating of buildings, district heating, and heating of greenhouses. There is one deep geothermal project (depth more than 2,000 metres/temperature up to 100°C) in Slovenia, a closed loop system. Some of the challenges for the geothermal sector include that 2D seismic data is outdated, and that it is hard to get permits. Prkič concludes that geothermal energy is not always the first choice for energy supply in Slovenia. Given the natural conditions, it is necessary to define the priority use of geothermal energy in individual regions in Slovenia. Shallow geothermal is practiced widely with subsidizing. Legislation is needed that would solely regulate geothermal.

María Gudmundsdóttir, Project Manager Geothermal Resources at the National Energy Authority Iceland introduced the KeyGeothermal project. KeyGeothermal is a pre-defined project under the Polish Energy and Environment programme (EEA Grants) that focuses on capacity building of the key stakeholders in the area of geothermal energy. The main objectives of the project are to build the knowledge of key stakeholders in Poland in the field of optimal use of geothermal energy and management of its resources; to enhance capacity building and knowledge-based methods; to increase energy security, development of low-emission heating, and opportunity to increase social and economic equality by providing clean energy and lowering heating costs; and to decrease pollution and CO2 emissions. Project activities include training activities in Poland; study visits to Iceland; expert study visits; information and communication; final report; and project management.

Staša Borović, Senior Research Associate at the Croatian Geological Survey presented “Multidisciplinary approach to conceptual modelling of hydrothermal systems in Croatia (HyTheC project).” The HyTheC project is funded by the Croatian Science Foundation, with roughly half of the funding amount covering the salaries of a PhD student and a PostDoc researcher. The goal of the project is to establish competitive research groups of early career scientists specialised in specific research topics. The HyTheC project uses multidisciplinary methodology consisting of hydrogeological and hydrochemical research; geothermic and geophysical research; structural-geological research; and remote sensing. HyTheC pilot areas

include Daruvar, Hrvatsko zagorje, and Topusko. Key takeaways from the project include that there is usually a significant gap between the specific locations of utilisation in comparison to regional scale researches of entire HTSs; and that long-term sustainable utilisation of natural thermal springs cannot be planned or secured without system-level understanding. A multidisciplinary research group has been formed which will answer these challenges using the appropriate skill set, equipment, and methodology.

Ferid Seyidov, Lead R&D Engineer at Vulcan Energy Engineering introduced geothermal energy projects in Germany. Hydrothermal deep geothermal energy has the potential to cover up to 25% of Germany's heat needs. Geothermal energy is increasingly becoming the focus of companies, especially as a heat source. Lithium production is another pillar of deep geothermal energy. There is a focus on the Molasse basins (heat production) and Upper Rhine Graben (URG) (electricity production). Drilling activities for power projects are in Graben-Neudorf (URG) and Insheim (URG). All relevant license areas in the URG for electricity production have been allocated. Renewable energy sources accounted for 20% of district heating sources in Germany in 2022. Heating applications accounted for 74% of utilization of geothermal energy in 2022, while 26% were utilized for electricity generation. There is great potential for geothermal energy in the Upper Rhine Graben as geological conditions are optimal; there is seismic data available; the temperature is high; there is potential for 8-10 large geothermal power plants; and there is potential use for combined heat and power and cooling. Main barriers to the expansion of geothermal energy in Germany include unsuitable regulatory framework conditions; lack of risk mitigation funds and insurance; lack of investment in key technologies and innovation; lack of skilled personnel; and lack of geothermal exploration.

Recommendations & Conclusions

Key takeaways from the Roundtable include the following:

- There needs to be focus on capacity building in the sector, as lack of skilled labour affects geothermal development.
- Shortage in drilling and exploration capacities needs to be addressed to further geothermal development.
- Risk mitigation funds and insurance should be established.
- More investments in technologies and innovation in the geothermal sector are needed.
- Legal framework for permits and licensing needs to be simplified.
- Implementing geothermal projects is a significant step towards achieving energy independence and reducing reliance on traditional sources.
- Geothermal projects create employment opportunities, fostering economic growth in local communities.

- Local municipalities stand to gain from support and education programs, enlightening communities about geothermal energy's benefits and diverse applications.
- Championing favourable local laws and policies is imperative to foster an environment supportive of developing geothermal projects.
- International collaboration accelerates local processes, fostering collective efforts towards a more sustainable energy landscape.

Acknowledgements

We would like to express our gratitude to the co-organizers of the Roundtable on Heat Transition & Geothermal Energy Opportunities in Ptuj on 12 December 2023, the GEOTHERMCIA Initiative; CETPartnership TRI4 Heating & Cooling; Geothermal IWG; Ministry of Environment, Climate & Energy of Slovenia; Geological Survey of Slovenia; EEA Grants; and EEA Project INFO-GEOTHERMAL. A special thanks goes to our hosts in Slovenia, Geological Survey of Slovenia and the Ministry of Environment, Climate & Energy of Slovenia.



GEOTHERMAL
IWG

Iceland
Liechtenstein
Norway grants



The valuable contributions from all participants enriched the discussions, marking the beginning of a collaborative effort to promote sustainable energy solutions. Thank you for fostering a meaningful dialogue and paving the way for continued cooperation.



GEOTHERMAL
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Iceland
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Norway grants



Appendices

List of Speakers & Presentations

1. **Gregor Rome**, Undersecretary Directorate for Energy, Ministry of the Environment, Climate & Energy of Slovenia (Opening Remarks)
2. **Hjalti Páll Ingólfsson**, Lead GEOTHERMICA Initiative Office, CETPartnership TRI4 Office, & Geothermal IWG Office (Opening Remarks)
3. **Stephan Schreiber**, Co-Chair Geothermal IWG & GEOTHERMICA Initiative (Introductions)
4. **Matthieu Ballu**, Policy officer, European Commission DG ENER
[EU Policy & Geothermal Energy](#)
5. **Philippe Dumas**, Secretary General, European Geothermal Energy Council
[Prospects of Geothermal Energy in Europe](#)
6. **Gregor Rome**, Undersecretary Directorate for Energy, Ministry of the Environment, Climate & Energy of Slovenia
[Slovenia: Strategies & Policies on Geothermal Energy](#)
7. **Stephan Schreiber**, Co-Chair Geothermal IWG & GEOTHERMICA Initiative
[Germany: Strategies & Policies on Geothermal Energy](#)
8. **Imre Szilagyi**, Geo-Energy Advisor, Ministry of Energy of Hungary
[Hungary: Strategies & Policies on Geothermal Energy](#)
9. **Stefano Benato**, Geoenergy Research Program Leader (external), Swiss Federal Office of Energy
[Switzerland: Strategies & Policies on Geothermal Energy](#)
10. **Philippe Laplaige**, Geothermal Expert, ADEME
[France: Strategies & Policies on Geothermal Energy](#)
11. **Martina Tuschl**, Director of Geothermal Energy Sector, Croatia Hydrocarbon Agency
Croatia: Strategies & Policies on Geothermal Energy
12. **Gerdi Breembroek**, Chair Geothermal IWG
[Geothermal IWG \(Public Cooperation Supporting Geothermal Energy & Heat Transition\)](#)
13. **Alicja Wiktoria Stoklosa**, Office Manager TRI4 Heating & Cooling
[CETPartnership TRI4 Heating & Cooling \(Public Cooperation Supporting Geothermal Energy & Heat Transition\)](#)
14. **María Guðmundsdóttir**, Project Manager Geothermal Resources, National Energy Authority of Iceland
[EEA Grants \(Public Cooperation Supporting Geothermal Energy & Heat Transition\)](#)
15. **Lauren Boyd**, Co-Chair GEOTHERMICA Initiative
[GEOTHERMICA Initiative \(Public Cooperation Supporting Geothermal Energy & Heat Transition\)](#)

16. **Nóra E. Gál**, Hydrogeologist, Geological Survey of Hungary SARA
[Projects in Hungary](#)
17. **Rúnar Þór Jónsson**, Regional Managing Director, Arctic Green Energy
[Arctic Green Energy Projects](#)
18. **Bernhard Novotny**, Head of Geothermal Projects, OMV
[Deep Geothermal Energy for Decarbonizing the City of Vienna](#)
19. **María Guðmundsdóttir**, Project Manager Geothermal Resources, National Energy Authority Iceland
[KeyGeothermal](#)
20. **Stša Borović**, Senior Research Associate, Croatian Geological Survey
[Multidisciplinary approach to conceptual modelling of hydrothermal systems in Croatia \(HyTheC project\)](#)
21. **Ferid Seyidov**, Lead R&D Engineer, Vulcan Energy Engineering
[Deep Geothermal Plants in Germany](#)
22. **Matej Prkič**, Director, Geogreen
[Geothermal Projects in Slovenia](#)
23. **Paul Ramsak**, Co-Chair GEOTHERMICA Initiative (Conclusions & Summary)

Agenda



Roundtable

Venue: Grand Hotel Primus, Terme Ptuj, Slovenia

CET

12 December 2023

08:30 Registration

09:00 Opening Remarks

- **Gregor Rome**, Undersecretary Directorate for Energy, Ministry of the Environment, Climate & Energy of Slovenia
- **Hjalti Páll Ingólfsson**, Lead GEOTHERMICA Initiative Office, CETPartnership TRI4 Office, & Geothermal IWG Office

09:10 Introduction to Roundtable Discussions

- **Stephan Schreiber**, Co-Chair Geothermal IWG & GEOTHERMICA Initiative
- **Matthieu Ballu**, Policy officer, European Commission DG ENER: *EU Policy & Geothermal Energy*
- **Philippe Dumas**, Secretary General, European Geothermal Energy Council: *Prospects of Geothermal Energy in Europe*

09:50 Country Updates: Strategies & Policies on Geothermal Energy

- **Slovenia – Gregor Rome**, Undersecretary Directorate for Energy, Ministry of the Environment, Climate & Energy of Slovenia
- **Germany – Stephan Schreiber**, Co-Chair Geothermal IWG & GEOTHERMICA Initiative
- **France – Philippe Laplaige**, Geothermal Expert, ADEME

10:35 Coffee Break

10:50 Country Updates: Strategies & Policies on Geothermal Energy

- **Hungary – Imre Szilagy**, Geo-Energy Advisor, Ministry of Energy of Hungary
- **Croatia – Martina Tuschl**, Director of Geothermal Energy Sector, Croatia Hydrocarbon Agency
- **Switzerland – Stefano Benato**, Geoenergy Research Program Leader (external), Swiss Federal Office of Energy: *Strategies & Policies on Geothermal Energy in Switzerland*

11:35 Panel Discussions: Strategies for Heating Transition & Geothermal Opportunities

- **Moderators: Paul Ramšak & Lauren Boyd**

12:15 Lunch Break

13:15 Public Cooperation Supporting Geothermal Energy & Heating Transition

- **GEOTHERMICA Initiative – Lauren Boyd**, Co-Chair GEOTHERMICA Initiative
- **Geothermal IWG – Gerdi Breembroek**, Chair Geothermal IWG
- **CETPartnership TRI4 Heating & Cooling – Alicja Wiktorja Stoklosa**, Office Manager TRI4
- **EEA Grants – María Guðmundsdóttir**, Project Manager Geothermal Resources, National Energy Authority of Iceland



14:05	Projects & Success Stories on Geothermal & Heating Transition
	<ul style="list-style-type: none"> - Hungary – Nóra E. Gál, Hydrogeologist, Geological Survey of Hungary SARA - Arctic Green Energy – Rúnar Þór Jónsson, Regional Managing Director, Arctic Green Energy - Vienna – Bernhard Novotny, Head of Geothermal Projects, OMV - Slovenia – Matej Prkič, Director, Geogreen
15:05	Coffee Break
15:20	Projects and Success Stories on Geothermal & Heating Transition
	<ul style="list-style-type: none"> - KeyGeothermal – María Guðmundsdóttir, Project Manager Geothermal Resources, National Energy Authority Iceland - Croatia – Staša Borović, Senior Research Associate, Croatian Geological Survey: <i>Multidisciplinary approach to conceptual modelling of hydrothermal systems in Croatia (HyTheC project)</i> - Vulcan Energy – Ferid Seyidov, Lead R&D Engineer, Vulcan Energy Engineering
16:10	Panel Discussions: Regional Solutions for Heating Transition
	<ul style="list-style-type: none"> - Moderators: Nina Rman & Andrej Lapanje
16:50	Conclusion and summary
	<ul style="list-style-type: none"> - Paul Ramsak, Co-Chair GEOTHERMICA Initiative
17:00	Reception & Networking
19:00	Dinner at Grand Hotel Primus

Field trip

CET	13 December 2023
09:00	Meet in Lobby of Grand Hotel Primus, Terme Ptuj
	<ul style="list-style-type: none"> - Visit geothermal wells and utilization system in Terme Ptuj
09:45	Depart by Bus for Heating & Cooling Field Experience
	<ul style="list-style-type: none"> - Geothermal greenhouse Lušt in Renkovci - Geothermal power plant at abandoned hydrocarbon well Pg-8 – project Si-Geo-Electricity - Lunch in Moravske Toplice - Geothermal reinjection well Mt-9 for Terme 3000 Moravske Toplice
16:30	Arrival at hotel
19:00	Dinner (self-paid)

These proceedings capture the knowledge and insights shared at the workshop on Roundtable on heat transition and geothermal energy opportunities in Ptuj, Slovenia, in December 2023. We hope the information and experiences shared in this document will inspire innovation and collaboration to advance sustainable heating and cooling solutions through geothermal energy in Europe.

