Managing Urban Shallow geothermal Energy

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D 6.2

Activity report on capitalising activities with other project teams

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The involved MUSE team

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General description of the deliverable in the application

The activity report will log and summarise all major activities also including minutes of trans-project telephone conferences and joint activities in overlapping pilot areas. It will be

complemented by a conclusion on the achieved impact of MUSE and a lessons learned chapter.

Version

Version	Description
10-10-2021	Initial version

List of abbreviations

Abbreviation	Full name
KEW	Knowledge Exchange Workshop
SGE	Shallow Geothermal Energy

LIST OF CONTENTS

1 INTRODUCTION

The GeoERA project MUSE addressed the energy use of the shallow subsurface in urban environments. It was foreseen that the project will have an active interface with other projects under the umbrella of GeoERA dealing with the following related research topics:

- Existing or possible conflicts in the shallow subsurface between water supply, heat supply and mineral resources extraction in urban areas with dense underground infrastructure and in different geological settings.
- Methods and concepts for 3D subsurface modelling and spatial planning in urbanised areas.

These common issues were planned to be investigated in the scope of **WP6: Cross-cutting issues and capitalising on knowledge inside GeoERA**. The general aim was leveraging synergies with other projects by establishing an institutional interface to other projects in the GeoEnergy Specific Research Topics (SRTs) and GeoERA themes Groundwater and Mineral Resources, exchange knowledge and harmonise methods and strategies in overlapping research topics, and co-organise events in pilot areas covered by several projects.

WP6 consisted of two main tasks:

- **Task 6.1** Identification of relevant cross-cutting research topics and projects for capitalising synergies within the GeoERA programme.
- **Task 6.2** Knowledge exchange and cross-project capitalisation activities.

The first step was to identify overlapping research topics with projects inside GeoERA. Based on this, direct communication channels were established through periodic e-mail communication and videoconferences. The WP6 team also capitalised on direct linkages inside the GeoERA team and to other teams of ongoing international projects.

After establishing contacts and communication channels in **Task 6.1**, we have focused on joint activities covering cross-cutting topics. Those activities were represented by Knowledge Exchange Workshops (KEW) co-organised by MUSE on the identified topics of mutual interest and joint surveys in pilot areas addressed by other projects inside GeoERA. It was planned from the beginning that the KEWs will be open for attendance by international project teams outside of the GeoERA program.

This report describes the identified cross-cutting topics, the projects to which the MUSE team has connected, as well as the lessons learned in the process.

2 IDENTIFIED CROSS-CUTTING TOPICS AND CONTACTED PROJECT TEAMS

Firstly, the MUSE project team discussed which would be the relevant cross-cutting topics. Once the topics were identified, the WP6 team began searching for projects inside GeoERA which would be interested for a project-to-project interface and organisation of joint activities and KEWs. As some of the teams were more interested than others, the MUSE project team concluded that the scope of the search shall be widened and decided to search for projects outside of the GeoERA program for collaboration. The identified topics of common interest and the projects found to be investigating them are summarised in **Table 1**.

Table 1. Identified cross-cutting topics and projects for possible collaboration

CROSS-CUTTING TOPIC	SGE utilization	Shallow aquifers	Subsurface spatial planning	Aquifer contamination	Subsurface temperature modelling	Conflicts of use
PROJECTS	GeoPLASMA-CE	RESOURCES	GeoConnect^{3}d	HOVER	HotLime	GeoConnect3d
	GRETA	GeoTwinn		VOGERA		VOGERA
	SEADRION	BHGM		GeoTwinn		GeoTwinn

The contacts were established with the principal investigators of the projects, whereby some have expressed interest to collaborate, exchange experiences and co-organise events, while others did not. Namely, the MUSE project team was not entirely familiar with the scope of the projects so in communication it was established that the overlap is not so significant as it seemed from just reading the publicly available information about the projects.

Table 2 details who was contacted and which were the results (both positive and negative feedbacks). In both **Tables 1** and **2** the projects with which interface and collaboration were established are highlighted in green, while those without highlight are the ones which did not turn out to be compatible with MUSE topics.

Table 2. Contacted projects and principal ivestigators

Project	Funding	Contact person	e-mail address
BHGM	national - HR	Josip Terzić	jterzic@hgi-cgs.hr
GeoConnect3d	H2020 - GeoERA	Kris Piessens	kpiessens@naturalsciences.be
GeoPLASMA-CE	EU Interreg CE	Gregor Gőtzl	Gregor.Goetzl@geologie.ac.at
Geothermal-DHC	H2020 - COST	Gregor Goetzl	Gregor.Goetzl@geologie.ac.at
GeoTwinn	H2020 - Twinning	Davor Pollak	dpollak@hgi-cgs.hr
GRETA	EU Interreg Alpine Space	Kai Zosedar	kai.zosseder@tum.de
HET	national - HR	Goran Krajačić	goran.krajacic@fsb.hr
HotLime	H2020 - GeoERA	Gerold Diepolder	Gerold.Diepolder@lfu.bayern.de
HOVER	H2020 - GeoERA	Laurence Gourcy	l.gourcy@brgm.fr
RESOURCES	H2020 - GeoERA	Hans-Peter Broers	Hans-Peter.broers@tno.nl
SEADRION	EU Interreg ADRION	Neven Duić	neven.duic@fsb.hr
VOGERA	H2020 - GeoERA	Sian Loveless	sian@bgs.ac.uk

As it is visible from **Table 2**, most of the project teams were interested in collaboration and exchange of ideas and knowledge: nine out of 12 responded positively, which is 75%. Some of them have been included in KEW activities as co-organisers, while others have shown interest to participate in events and exchange ideas and opinions.

3 OVERVIEW OF KEW TOPICS

KEWs co-organized by MUSE addressed relevant topics in managing urban shallow geothermal energy, as well as connected topics:

- Environmental monitoring of shallow geothermal energy use and its impact on shallow groundwater bodies;
- Temperature measurements and corrections, and temperature modelling of shallow and deep subsurface;
- Spatial plans and mapping of shallow geothermal energy for energy planning and environmental management;
- Resource assessment and resource management in urban areas,
- The role of deep and shallow geothermal energy in the decarbonization process;
- Approaches to stakeholder interaction in personal and digital environment;
- The European shallow geothermal market and actual developments.

The target value in the application phase was to organise three KEWs, while nine were organised in the end, including both physical and online events. The locations, contents, speakers and presentations are described in detail in **D 6.1** and its **Annex**, so it will not be re-iterated here.

4 CONCLUSION AND LESSONS LEARNED

Since the preparatory phase and writing of the proposal, the MUSE project team was aware of the complexity of managing shallow geothermal energy adequately in urban areas. Here the subsurface serves multiple roles and the competition of (potential) users is evident, or will become evident, depending on the population and infrastructure densities in different urban settlements.

Due to those considerations, the MUSE team saw a need to connect to other research teams studying different aspects of urban subsurface and has foreseen a whole work package dedicated to such collaboration and an active outreach toward researchers involved in studying related topics.

The number of successfully organised events, which has by far surpassed the set target, clearly shows that most of the attempts to connect were successful (we could connect to three quarters of the projects reached out to). However, it is also visible that establishing such contacts and maintaining them is a time-intensive endeavour and a degree of failure to find common ground must be expected when starting.

Also, it must be taken into account that the onset of the COVID-19 pandemic in the second half of the project implementation definitely hindered our efforts in the realm of organising events where the actual project results could be presented to a wider audience. Namely, some of the physical events were already in a high stage of preparation when they were either cancelled or moved into virtual space, as detailed in **D 6.1**. The experience of working from home and the restrictions imposed on public gatherings have also taught us that there is a limit to which virtual collaboration can replace personal meetings and communication. At some point it became evident that, as it is supposedly not a problem to click and connect to any event, colleagues became saturated by online events and there would have been no use in pushing to organise more of them.

In the view of the MUSE project team, the top rank value of the KEW events is the networking of the project teams and surveys on the topic of geothermal, which has already resulted in two common project applications to different funding sources: one was submitted and received funding, while the other was rejected, but will be resubmitted with improvements. Teams from different collaborating projects have applied for a H2020 COST project which was granted funding in 2019, with the same project coordinator as MUSE. It is the project Geothermal-DHC (*Research Network for Including Geothermal Technologies into Decarbonized Heating and Cooling Grids*), i.e., one of the topics which was elaborated through the KEWs. The unsuccessful application was to the UNESCO IGCP (International Geoscience Program) funding which serves as a knowledge hub to facilitate the international scientific cooperation in the geosciences.