Establishing the European Geological Surveys Research Area to deliver a Geological Service for Europe

Technical review report for project HotLime

This report is part of a project that has received funding by the European Union's Horizon 2020 research and innovation programme under grant agreement number 731166.

INTRODUCTION

Technical review report is part of GeoERA's Monitoring and evaluation process for co-funded projects (*hereinafter: project*). The aim of a technical review is to assess the work carried out under the project over a certain period and provide recommendations. Such technical review evaluates the project reports and deliverables, the proper use of resources, the management of the project and the expected impact.

Technical review report consists of four sections, each representing one level of monitoring and/or evaluation of the project:

Level	Monitor / Reviewer	Input	Aim
1 – Monitoring of progress indicators	Monitoring and reporting officer (GeoZS)	MPPR* FPPR**	Monitoring of the effectiveness of implementation of selected projects with respect to finance, time and administration.
2 – Scientific review	Reviewers (GeoZS)	Submitted deliverables MPPR FPPR	Quality review of the deliverables and review of achieving scientific and professional goals.
3 – Review of the theme progress	Theme coordinators	MPPR FPPR	Review of achieving theme objectives.
4 – GeoERA Progress evaluation	Stakeholder Council member(s)	Sections 1 and 2 of this report Review meetings	Overall project progress and general recommendations.

*MPPR = Midterm Project Progress Report (see PI doc no 2)
**FPPR = Final Project Progress Report (see PI doc no 2)

Monitoring and evaluation process:

M0 = End of reporting period
M1 = Submitted (Final) Project progress Report (MPPR / FPPR)
M2 = Level 1 – Monitoring & Level 2 – Evaluation
M3 = Level 3 – Evaluation of the theme progress
M3 = (Final) Review Meeting & Level 4 – Progress evaluation

Each project will be reviewed twice: for first project period M1-M18 – Technical review report, and second project period M19-M36 – Final review report.
Technical review report is based on Horizon 2020 templates but adopted to GeoERA needs. Technical reviews of projects shall be carried out on a confidential basis.

GENERAL INFORMATION

ERA-NET Cofund Grant Agreement:	731166
ERA-NET Cofund acronym:	GeoERA
Call identifier:	H2020-LCE-2016-2017/H2020-LCE-2016-ERA

Project full title:	Mapping and Assessment of Geothermal Plays in Deep Carbonate Rocks – Cross-domain Implications and Impacts
Project acronym	HotLime
Project reference number:	GeoE.171.006
Project topic:	GeoEnergy
Project specific topic:	GE2 Geothermal energy
Lead partner:	LfU Bayerisches landesamt fur Umwelt (Bavarian Environment Agency - Geological Survey)
Project website:	https://geoera.eu/projects/hotlime6/

☐ Technical review report

☒ Final review report

Period covered	01/01/2020 – 30/06/2021
Review meeting date	20.09.2021; 13:30-16:20, on-line

Contributor:	Role:	Approved on:
Barbara Simić	Monitoring and reporting officer	29.12.2021
Aleksandra Trenchovska	Monitoring and reporting officer	21.9.2021
Matevž Novak	Scientific reviewer	22.10.2021
Jasna Šinigoj	Scientific reviewer	22.10.2021
Matija Krivic	Scientific reviewer	23.9.2021
Serge van Gessel	Theme coordinator	22.12.2021
Gerdi Breembroek	Stakeholder Council member	31.01.2022
Philipe Dumas	Stakeholder Council member	22.12.2021

1 LEVEL 1 – MONITORING OF PROGRESS INDICATORS

In this section the project is monitored "remotely" on the basis of the respective reports. This part is filled in by Monitoring and reporting officer with aim to monitor the effectiveness of implementation of the selected projects with respect to finance, time and administration, based on submited MPPR and FPPR.

	Yes	Partially (comment needed)	No
PROJECT MANAGEMENT			
Has the MPPR / FPPR report been submitted on time?	☒	See comment no. 1	☐
Have there been any changes in project partnership?	☒	See comment no. 2	☐
Has the project management been performed as required?	☒		☐
Has the collaboration between partners been effective?	☒		☐
Do you identify evidence of underperforming partners, lack of commitment or change of interest of any partners?	☐ (see comment)		☒
DELIVERABLES and MILESTONES			
Have the planned deliverables for the period been submitted on time according to timeline in Project Agreement?	☐	See comment no. 3	☒
Have the planned deliverables for the period been completed (from MPPR / FPPR, sheet 4)	☐		☒
Have any changes to deliverables occurred (type/ dissemination level)? (from MPPR / FPPR, sheet 4 and 5)	☒		☐
Have planned milestones been achieved for the reporting period? (from MPPR / FPPR, sheet 4)	☐		☒
Have the project partnership identify any difficulties achieving any of the deliverables / milestones?	☒		☐
DEVIATIONS (from MPPR / FPPR, sheet 5)			
Has the project partnership identify any deviations that will not affect projects outputs?	☒		☐
Have any deviations occur on the project, with impact on project outputs?	☐		☒
In case of deviations, have the project adopted corrective measures?	☒		☐

DISSEMINATION, COMMUNICATION			
Has the project adopted its dissemination plan?	☒		☐
Have the planned dissemination activities been completed for the reporting period? (from MPPR / FPPR, sheet 6)	☒		☐
Have the partners' disseminated project results and information adequately?	☒		☐
Is the project following dissemination plan?	☒		☐
Is the project interacting in a satisfactory manner with other GeoERA projects?	☒		☐
Is the project interacting in a satisfactory manner with national/international bodies?	☐	NA	☐

FINANCE			
To the best of your estimate, have the resources used been utilised for achieving the project? (according to MPPR / FPPR, sheet 9)	☒		☐
To the best of your estimate, have the resources used been in a manner consisted with the principle of economy, efficiency and effectiveness?*	☒		☐
Are there any major deviations in the budget consumptions from the financial plan? (zero consumption in M18; deviation from plan exceeding 20% in M36)	☒	See comment no. 4	☐
Are there any major deviations in the Person - Months consumptions from the plan? (zero consumption in M18; deviation from plan exceeding 20% in M36)	☒		☐
Are any budget modifications for the project needed? (from MPPR / FPPR, sheet 5)	☐		☒

***The principles of economy, efficiency and effectiveness**: refers to the standard of "good housekeeping" in spending public money effectively. Economy can be understood as minimising the costs of resources used for an activity (input), having regard to the appropriate quality and can be linked to efficiency, which is the relationship between the outputs and the resources used to produce them. Effectiveness is concerned with measuring the extent to which the objectives have been achieved and the relationship between the intended impact and the actual impact of an activity. Cost effectiveness means the relationship between project costs and outcomes, expressed as costs per unit of outcome achieved.

Comments (highlighting the project progress) / deviations / recommendations:

The main objective of the HotLime project was to improve our understanding of the geological conditions of hydrothermal systems in deep carbonate bedrock that determine the distribution and technical recoverability of geothermal energy, thus reducing the risk of exploitation and development of the deep subsurface. The project consortium identified generic structural controls in deep carbonate formations by comparing geological situations and their structural inventory, as well as by compiling deep drilling data and their petro- and hydrophysical properties. To successfully achieve the set objectives, the partnership contributed with knowledge, experience and skills to map, characterise, estimate, compare and classify hydrothermal occurrences in deep carbonate rocks from different target areas across Europe. These spatial assessments, carried out in eleven target areas using 2D or 3D mapping and characterisation, help to reduce the risk of regional deposits building or maturing, highlight potential cross-cutting impacts and support sustainable subsurface management.

The project management structure was well defined and efficient. The consortium demonstrated that with regular collaboration and help from the work package leaders, the project was able to overcome the main challenges and meet the initial expectations. This is the only project that did not need to be extended as a result of the Covid pandemic. The project did not identify any underperforming partners that could affect the quality of the project outputs. Only one partner, GEOINFORM, discontinued its activities in the second reporting period without any impact on the project work.

The project budget changed slightly during project implementation, with some partners reducing their budgets and others increasing them. Overall, the project spent almost as much as originally planned, which is consistent with the work done and the objectives achieved.

A communication and dissemination plan was adopted and a detailed description of the activities with timetable was provided. The project's communication and dissemination activities have adhered to the plan. Cooperation with other GeoERA projects, especially with GIP -P, has been regular.

Comment no. 1: The Final Project Progress Report was submitted in draft on time. The project ended without an extension as planned at the beginning and earlier than other GeoERA projects, so it had to wait for some links to the EDGI platform. In addition, the submitted version includes a draft financial statement that was approved by the Monitoring team and has no impact on the content and deliverables of the project.

Comment no. 2: One project partner has changed its name: Office of Prime Minister

OPM →Ministry for Finance and Employment MFE. One project partner, State Informational Geological Fund of Ukraine GEOINFORM has reduced its role in the project. Out of the original budget of € 9,825.59 to be spent on the project, the funds have been reduced by €7,484.21, leaving only €2,341.38 available for the project. The budget of €7,437.50 and the activities were taken over by the partner Regione Umbira RU, and the partner GEOINFORM ended its activities in the project on 31.12.2019. The change did not affect the project outputs, outcomes or objectives. The amount of 46,71 € was transferred to the project TACTIC.

Comment no. 3: Due to the pandemic situation, some activities were delayed and deliverables had to be submitted later than planned. The revised dates were communicated with the Monitoring team and the GeoERA Secretariat by amending the project plan.

One deliverable delayed during the FPPR submission period: D7.3 Final data/project results implementation report, which is a database. The Project Lead has communicated the delay, the deliverable was ready after the Review meeting. One milestone was still outstanding at the time of FPPR submission: MS5 Data and product transfer to IP finalized. The milestone was approved by the IP at the later stage.

The deliverable changes in the reporting period 2 are:
D3.1.2, D3.1.3, D3.1.4 and D3.1.1 were submitted as one deliverable D3.1. The deadlines for these deliverables have been moved from M24 (30.6.2020) or M30 (31.12.2020) → M33 (31.3.2021)
D6.2 → deliverable deleted as the Geo4Sure project was not selected for funding.
D5.2.2 postponed from M30 (31.12.2020) → M33 (31.3.2021)
D6.3 postponed from M30 (31.12.2020) →M33 (31.3.2021)

Some project deliverables were dependent on the collaboration and work of other projects. Since HotLime is the only project that ended on June 30, others have pushed back the end date to October 31, which has impacted this project as well. The partnership has found this to be an unexpected inconvenience. Nevertheless, the project has managed to stay on track thanks to good preparation and sound project management.

Comment no. 4: Some project partners spent 20% more than their planned budget, others less than 80%. The partner that exceeded its budget is LBGT. The partner that spent less than its planned budget is TNO. The consumption of man-months followed the EUR consumption.

The project coped well with the negative external factors and overcame its challenges in such a way that it was completed as originally planned. For this reason, the project is rated as "overachieving" at level 1 and thus receives the highest score.

Overall assessment of the project:

☒ 5 - **Overachiever** (the project has achieved all objectives and goals for the period and has even exceeded expectations)

☐ 4 - **Excellent progress** (the project has fully achieved its objectives and goals for the period)

☐ 3 - **Good progress** (the project has achieved most of its objectives and goals for the period with relatively minor deviations)

☐ 2 - **Acceptable progress** (the project has achieved some of its objectives)

☐ 1 - **Unsatisfactory progress** (the project has failed to achieve critical objectives)

Summary of dissemination activities:

	SCIENTIFIC COMMUNITY	GENERAL PUBLIC	POLICY MAKERS	EUROPEAN INSTITUTION	NATIONAL INSTITUTION	REGIONAL INSTITUTION	INTERNATIONAL INSTITUTION	LOCAL INSTITUTION	PRIVATE COMPANIES	OTHER	Total Target Group reach
EVENTS	10774	400									11174
MEDIA	20										20
MEETINGS	180			15	16		40				251
ONLINE_MEDIA		30000			50	100	20		30	50	30250
PUBLICATIONS	61352	500		1		100				50	62003
Total	**72326**	**30900**		**16**	**66**	**200**	**60**		**30**	**100**	**103698**

	ABSTRACTS	CONGRESS	FACEBOOK	INTERNAL PROJECT MEETING	LEAFLET	MEETING	MEETING WITH OTHER GEOERA PROJECTS	NON-SCIENTIFIC PUBLICATION	SCIENTIFIC PUBLICATION	TRAINING	WEBSITE	WORKSHOP	OTHER	Total
EVENTS		8								1		1		10
MEDIA													2	2
MEETINGS				10		4	1							15
ONLINE_MEDIA			2								1			3
PUBLICATIONS	6				1			3	7					17
Total	6	8	2	10	1	4	1	3	7	1	1	1	2	47

Are the dissemination activities adequate?

☐ 5 - **Overachieved** (the projects dissemination activities have exceeded expectations)
☐ 4 - **Excellent** (the projects dissemination activities have fully achieved its expectations)
☒ 3 - **Good** (the projects dissemination activities are adequate)
☐ 2 - **Acceptable** (the projects dissemination activities are acceptable)
☐ 1 - **Unsatisfactory** (the project has failed to disseminate)

Cummulative financial statement:

	Person months	**Total eligible costs**	**Reimbursement rate**	**GeoERA contribution**	**In-kind contribution**
Plan	**250**	**1.658.682**	**29,7**	**492.628**	**1.166.054**
1st period consumption	137	956.847,00	29,7	272.217,00	684.630,00
2nd period consumtion	103,98	757.476,53	29,7	236.937,09	520.539,44
TOTAL	**240,98**	**1.714.323,53**		**509.154,09**	**1.205.169,44**

2 LEVEL 2 – SCIENTIFIC REVIEW

In this section the project is reviewed ”remotely” on the basis of the respective reports. This part is filled in by reviewer with aim to review the quality of the deliverables and review of achieving scientific and professional goals. Scientific review is based on submitted deliverables and reported Impact statement in MPPR/FPPR.

Impact statement (from MPPR / FPPR, sheet 8):

The development of a common procedure for assessing the viability of geothermal reservoirs and its application to different pilot areas yields a common high level of understanding of hydrothermal systems in carbonate rocks. This transnational focus substantially contributes to an improved and better harmonized European overview of prospective and identified geothermal energy resources and leaves behind an established expert network safeguarding the sustained dialog over the upcoming challenges of boosting geothermal energy. The easy to compare depiction of the results as part of a comprehensive knowledgebase allows policy makers to focus future investigations on the most promising “hot spots”. Specifically HotLime’s geothermal base assessment using a common applicable methodology which is less data demanding, allows for the transfer of the assessment to other deep carbonate rocks, much more widespread in Europe than the project’s scope. The access to the pooled information via EGDI ensures an easy and enduring impact spread beyond the project, for science education, civil society’s awareness-raising and policy making alike. Thereby, the modular design of the “HotLime Geothermal Atlas” also allows for future extension by further areas.

Expected impact (from Project Agreement):

The planned cooperation between the partners will ensure HotLime's clear transnational focus. Developing generic information and methodologies based on and validated by trans-regional and crossborder use cases will serve national and European stakeholders and end-users. The joint development of a common procedure for assessing the viability of geothermal reservoirs and its application to different pilot areas will yield a common high level of understanding of hydrothermal systems in carbonate rock suites and will substantially contribute to an improved and better harmonized European overview of prospective and identified geothermal energy resources. Testing HotLime's approach in deep carbonate rock suites of contrasting geological settings and providing reliable data and additional mapping products pertinent to the development of deep geothermal installations will increase the confidence in the prospectivity and potential contribution of those geothermal resources across Europe. In addition, as deep carbonate rocks are widespread in many parts of Europe, the outputs of HotLime are applicable to promoting geothermal exploitation in many regions of the EU. This will further stimulate green thermal energy uptake especially in urban regions and populous areas with a high density of potential customers for direct heat use. HotLime will increase awareness of the economic viability of deep geothermal installations in carbonate environments. Increased understanding and knowledge transfer and the provision of a consistent and data-driven knowledge base will aid the formulation of policy tools and strategies aiming for large-scale geothermal energy developments across Europe. Thus, the HotLime project will complement EU-funded programmes, including the new GEOTHERMICA, through identification and assessment of geothermal resources, in order to demonstrate geothermal energy deployment within the energy system and develop paths to commercial large-scale implementation. It will deliver a sound basis for further site specific, indepth research and development. Sharing the improved understanding of potential benefits and impacts from developing deep geothermal plays in carbonate aquifers will raise public awareness and support the social licence to operate. In some countries, demonstration of geothermal potential, including in deep carbonate basins, will facilitate and accelerate development of licencing regulations for commercial exploitation of geothermal energy.

Evaluation of deliverables

No.	Title	Status (Approve/ Reject)	Comments
D1.1.2	Minutes of Meetings	Approved	
D1.1.4	Final Project Progress Report	Approved	
D1.1.5	Annual Expenditure Reports	Approved	
D3.1.1	Best practice manual for resource assessment	Approved	All deliverables combined into deliverable D3.1
D3.1.2	Spatial resource assessment in areas in focus	Approved	
D3.1.3	Classification system for plays and prospects	Approved	
D3.1.4	Quantitative assessment tool for carbonate rocks	Approved	
D4.1	Report on deep carbonate play development strategies and impacts	Approved	Including D5.1.2 Geothermal planning recommendations
D5.1.1	Licensing regulations report	Approved	Different title of the deliverable
D5.2.2	Glossary of technical terms (feature data code lists)	Approved	
D5.2.3	Knowledge database	Approved	
D6.1.2	Implementation of fault network in FaultDB	Approved	
D6.3	Geomanifestation methodology evaluation log	Approved	
D7.3	Final data/project results implementation report	Approved	

Has the quality as a whole been achieved according to the objectives? Has the project as a whole been making satisfactory progress?

☐ 5 - **Overachiever** (the project has achieved all objectives and goals for the period and has even exceeded expectations)

☒ 4 - **Excellent progress** (the project has fully achieved its objectives and goals for the period)

☐ 3 - **Good progress** (the project has achieved most of its objectives and goals for the period with relatively minor deviations)

☐ 2 - **Acceptable progress** (the project has achieved some of its objectives)

☐ 1 - **Unsatisfactory progress** (the project has failed to achieve critical objectives)

Comments (highlighting the project progress) / deviations / recommendations:

The overall result of the project is in total accordance with its aims and objectives and meets its ambitions.
A great amount of high-quality work resulted in the two extensive reports within the WP3 and WP4. The ambitious task to analyze 11 case study areas of deep-seated carbonate geothermal plays gave not only the compilation of reports from the involved partners but also good summarizing conclusions.
The only shortcoming in the goals to fully address the specifics of the heterogenous anisotropic carbonate reservoirs in the quality assessment within WP3 was the application of the standard Heat-In-Place resource assessment methodology without adaptations in order to be applicable for the carbonate reservoirs. The same can be said on the use of ThermoGIS approach and the Quantitative assessment tool, both already existing methods not further developed or adapted.
The project however fully addressed deep carbonate reservoirs specifics within WP4 resulting in the synthesis of the case studies which has been used to elaborate the list of risks and mitigation measures and a series of recommendations as additions to the existing Online Risk Register of the GeoRisk project.
One of the very useful project results is the very thorough review of the national legislations across all concerning regulations within WP5, again with well written synthesis.
The project results also show good project-project interface, resulting in links within HIKE Fault Database, and good collaboration with GeoConnect3d project. The project/WP leads experienced some unexpected difficulties in interaction with GIP-P project in the implementation of the database and feature data code-list to the EGDI Semantic Web. These still to be solved.
Nevertheless, the final knowledge database in the shape of linkable Atlas of Carbonate Rock Geothermal Reservoirs, already in the present state, fully exhibits the achieved project goals with this very useful tool for stakeholders and other end-users.

3 LEVEL 3 – REVIEW OF THE THEME PROGRESS

In this section the project is reviewed ”remotely” on the basis of the respective reports. This part is filled in by Theme coordinator with aim to review the achieved scientific goals in accordance with theme objectives, on the basis of Sheet 3 in MPPR / FPPR – Project contribution to GeoERA project.

Project contribution to GeoERA project (from MPPR / FPPR, sheet 3):

HotLime substantially contributes to GeoERA’s objective to integrate the GSO’s information and knowledge on clean (low-carbon) and efficient subsurface energy, at the heart of the H2020’s Societal Challenge 3, and with this more specifically underpins the aim of Geo-Energy theme to develop transparent, harmonized and science-based pan-European information and knowledge on the subsurface potential to deliver energy resources. The joint approach of HotLime’s partners in characterizing and assessing the geothermal potential in deep carbonate reservoirs, based on state-of art methodologies for harmonized mapping and common assessment methods, results in pan-European data and information services on the distribution of geo-energy hyperlinked to various explanatory reports and factsheets. Such Information in understandable form will enable policy decisions to support a safe and responsible exploitation of subsurface resources and capacities. Implementing scientific intelligence and information into the policy domain considering relevant cross-thematic links to groundwater and mineral resources will help to evaluate competition, interference and synergies between different uses of subsurface space.

Theme objectives:

Theme objectives (Excellent) With the assessment of deep geothermal resources in limestone formations, the HotLime project directly contributes to GeoEnergy Theme objective to evaluate potential subsurface contributions with regards to energy resources and storage capacities (Deliverables D2.0, D3.1 and D4.1). By developing and deploying common and clearly documented assessment methodologies (D3.1), the project paves the way for future updates and new assessments in underexplored areas. The results are harmonized and therefore fit for purpose to compare resources between countries and at EU level (D2.0). The incorporation of uncertainty calculations is particularly useful for resource classification frameworks which also consider confidence levels. Both the results and methodologies are a stepping stone for future programmes such as the CSA – Geological Services for Europe which specifically asks for a pan-EU atlas of geothermal resources. The assessment methodologies are not limited to the

evaluation of geothermal resources in deep limestones, but also to resources in sandstone aquifers.

HotLime takes the assessments a step beyond by considering operational strategies and investment risks (D4.1 and D5.1.1). These are among others depending on the to the faults. HotLime's fault mapping and modelling results are directly incorporated in the HIKE project Fault Database. Both projects have contributed to common standards, specifications and semantic concepts.

Theme scope and approach/methods: Excellent
The HotLime project comprehensively addresses geothermal energy from hydrothermal resources within intermediate and deep limestone intervals. These resources are still underexplored and may substantially contribute to Europe's Green Deal ambitions. A wide variety of relevant characteristics is included in the assessment including porosity, permeability and formation water compositions.

Hotlime specifically supports the following GeoERA-Energy aspects mentioned in the call documents:

- The project follows a uniform presentation of geothermal assessments including distribution/depth/thickness/properties of carbonate formations (geothermal prospects) in 2D and 3D. Correlation schemes are a key element of the mapping and modelling approach
- The project develops and applies common (industry) standards for resource calculation and classification. Implementation and improvement of existing methodologies (e.g. ThermoGIS)
- Methods and concepts for 3D mapping of carbonate formations in 11 (partly cross-border) areas (presented as result/progress + publication)
- The project presents methods, concepts and results from 2D/3D mapping and characterization of carbonate formations with deep geothermal potential. The results are presented as compatible and interoperable model scales/resolutions and geometries. Pilot areas are partly defined as cross-border areas and can be considered as stepping stones for a full pan-EU mapping (CSA-Geological Services for Europe)

Beyond state of art (Excellent)
The Hotlime project presents novel insights for a technically challenging yet very relevant geothermal play in Europe. Hotlime contributed to advanced and harmonized resource estimation workflows addressing uncertainty and sensitivity (stochastic resource calculations, exploration and development risks). By working in 11 key areas (D2.0), Hotlime has stimulated cross-fertilization by share knowledge & experience among partners and projects

Project-2-Project:
HotLime has directly collaborated with the HIKE project to develop and populate the European fault database.

Has the project as a whole achieved the objectives and expected impact of the theme?

☐ 5 - **Overachiever** (the project has achieved greater impact on project theme and/or other themes than expected)
☒ 4 - **Excellent progress** (the project has fully achieved its objectives and goals towards the theme as expected)
☐ 3 - **Good progress** (the project has achieved most of its impact towards the theme for the period with relatively minor deviations)
☐ 2 - **Acceptable progress** (the project has minor impact)
☐ 1 - **Unsatisfactory progress** (the project has failed to achieve critical objectives and/or has no impact on the theme)

Comments / deviations / recommendations:

The HotLime project methods and results are recommended to become part of the GeoERA follow-up: CSA – Geological Services for Europe.

4 LEVEL 4 – GEOERA PROGRESS EVALUATION

In this section the project is reviewed on the Review meetings, where projects present their overall progress and achievements. This section relates to particular project, broader impact of GeoERA as a whole on policies will be covered at the Final Review meeting with questionnaire and interview with Evaluator.

Based on technical review summaries provided by Sections 1 – 3 of this report, and project presentation on the (Final) Review meeting:

Has the project as a whole been making satisfactory progress according to your own understanding and expectations of the GeoERA project?

☐ 5 - **Overachiever** (the project has exceeded expectations)
☒ 4 - **Excellent progress** (as expected)
☐ 3 - **Good progress** (minor recommendations given below)
☐ 2 - **Acceptable progress** (below expectations)
☐ 1 - **Unsatisfactory progress** (the project did not meet expectations)

Overall comments for the project (overall recommendations, modifications, corrective actions, or re-tuning the objectives to optimize the impact or keep up with the State of the Art, re-focusing; or a simple praise)

Stakeholder one evaluation:

I congratulate the partners for their achievement. I welcome the multi-disciplinary approach and the coverage of both technical and non-technical issues.
The project contributed to the implementation of the ETIP DG roadmap and the implementation plan of the DG IWG of the SET Plan.
It helps to a better understanding of hydrothermal systems in carbonate rocks to enhance the predictability of underground conditions. Geothermal resources beyond those already in development have to be characterised in greater detail in order to optimize their use and increase energy production.
The overall objective of the project contributes to reduce the costs of exploration technologies and increase the probability of successfully characterising geothermal resources prior to drilling and during geothermal development.
The project contributes to tackle the issue of de-risking project, which is a main barrier for project development.
The project dealt also with access to geological data, and licensing and regulations. This is an ongoing activity by many stakeholders, which needs to continue for further simplification on procedures and a better access to data.

Stakeholder two evaluation: The Hotlime project has in my view done a very good job in elucidating possibilities for geothermal energy. The availability of the results

should in my view be highlighted in such media as “ThinkGeoEnergy”. Unfortunately for the external experts, there was not really a presentation of the project achievements at the final review meeting.

The quality of the work is evident, but it remains important to communicate the progress. Industrial partners can surely use the results. They are not daily visitors at EGDI I am sure. I am really pleased with the content of the work – please spread the good news!

Annex 1: Review meeting list of participants

Name	Role	Organisation
Joop Hasselman	GeoERA Coordinator	Netherlands Organisation for Applied Scientific Research
Barbara Simić	Monitoring and Reporting Officer (Level 1)	Geological Survey of Slovenia
Aleksandra Trenchovska	Monitoring and Reporting Officer (Level 1)	Geological Survey of Slovenia
Jasna Šinigoj	Scientific Reviewer (Level 2)	Geological Survey of Slovenia
Matevž Novak	Scientific Reviewer (Level 2)	Geological Survey of Slovenia
Matija Krivic	Scientific Reviewer (Level 2)	Geological Survey of Slovenia
Serge van Gessel	Geothermal Energy Theme coordinator (Level 3)	Netherlands Organisation for Applied Scientific Research
Philipe Dumas	GeoERA Stakeholder (Level 4)	The European Geothermal energy council
Gerdi Breembroek	GeoERA Stakeholder (Level 4)	Netherlands Enterprise Agency
Jørgen Tulstrup	Information Platform Theme coordinator and GIP-P Project Lead	Geological Survey of Denmark and Greenland
Gerold Diepolder	Project Lead	Bavarian Environment Agency
Timo Spörlein	Project Lead proxy	Bavarian Environment Agency
Isabel Rupf	Project member	Regional Council Freiburg
Russell Rogers	Project member	Geological Survey of Ireland
Brian McConnel	Project member	Geological Survey of Ireland
Sarah Blake	Project member	Geological Survey of Ireland
Hans Veldkamp	Project member	Netherlands Organisation for Applied Scientific Research
Charles Galea	Project member	Ministry for Finance and Employment, Malta

Johannes Großmann	Project member	Bavarian Environment Agency
Ignasi Herms	Project member	Cartography and Geology Institute of Catalonia
Montse Colomer	Project member	Cartography and Geology Institute of Catalonia
Norman Natali	Project member	Umbria Region - Geological Survey
Marco Ogna	Project member	Umbria Region - Geological Survey
Chiara D'Ambrogi	Project member	Italian Institute for Environmental Protection and Research
Maurizio Marino	Project member	Italian Institute for Environmental Protection and Research
Clemens Porpaczy	Project member	Geological Survey of Austria