



DELIVERABLE D6.3

Dissemination, Exploitation and Communication activities Plan

Lead Beneficiary: CNR

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ABBREVIATIONS AND GLOSSARY OF ACRONYMS

Acronym	Extended definition
CA	Consortium Agreement
D	Deliverable
DCM	Dissemination and Communication Manager
D&C	Dissemination and Communication
EC	European Commission
EM	Exploitation Manager
EP	Exploitation Plan
GA	Grant Agreement
HE	Horizon Europe
IPR	Intellectual Property Rights
M	Month
PC	Project Coordinator
PDEC	Plan for Dissemination and Exploitation including Communication activities
SC	Steering Committee
VRE	Virtual Research Environment
WP	Work Package

EXECUTIVE SUMMARY

The Plan for Dissemination and Exploitation including Communication activities (PDEC) presented here is a crucial report that Horizon Europe projects are required to submit to the EC. The PDEC summarises the strategy and concrete actions to disseminate, exploit and protect the foreground generated by the DeepU project, and to communicate the project results. It should also serve as a guideline to the Consortium for the Dissemination and Exploitation (D&E) activities to be carried out in the context of the DeepU project. DeepU PDEC is a guide for the project partners on promoting the project and maximising its impact using the promotion tools and dissemination channels. This document also indicates the roles and responsibilities of the partners and identifies the audience and the key messages that should be spread.

This PDEC gives an introduction of the dissemination activities foreseen at M6 and a summary of the most promising achievements, exploitable opportunities and identification of target segments for the DeepU project and perspective business opportunities of involved enterprises. This report is the updated version realized for the first Interim Report (M12). Revised and final versions will be achieved at M24 and M36 on the occasion of the foreseen Reports on Dissemination and Exploitation, including Communication activities (Deliverables D6.4 and D6.5).

This public Deliverable will be made accessible through the DeepU project website. It shall be used by anybody who wants to know the activities undertaken to publicise the DeepU project and make it effective in terms of utilisation of results.

The three key areas this Deliverable addresses are the dissemination, exploitation and communication actions, which are separately reported. Besides this executive summary, the Deliverable is structured into five chapters.

The **Introduction**, Chapter 1, contains information about the scope and objectives of the document and their links to the DeepU Project objectives.

Chapter 2 (**Dissemination Strategy**) describes the dissemination measures and activities that will be performed during the project's lifetime. This plan aims at making the project known at the European and international levels. Based on the plan, target groups for dissemination are identified, and the subjects and matters of these actions are described. The management, as well as the tools and activities, are defined, and the partner roles are shown. Cost-effective ways have been chosen to achieve maximum publicity for the project and its results, and indicators are identified to monitor the dissemination activities. A preliminary list of foreseen events is included in Annex 1.

Chapter 3 (**Exploitation Strategy**) drafts the exploitation management. More detailed reports on Exploitation activities and IPR will be prepared jointly with the Work Package 5 activities dedicated to Exploitation planning and IPR management, planned to start at M19.

Chapter 4 (**Communication Strategy**) outlines the communication activities to be carried out during the DeepU project and the chosen communication channels.

Chapter 5 summarises Dissemination, communication tools, channels, and target groups.

The Annex contains functional material for Chapter 2, drafting a preliminary list of events to be organised and participated in by DeepU.

1. INTRODUCTION

1.1 DeepU PROJECT IN A NUTSHELL

DeepU is a European-funded project dedicated to creating a deep (>4 km) closed-loop connection shaped like a U-tube exchanger by developing a fast and effective drilling technology. It is led by Padua University, Italy, and will be carried out for three years (March 2022-February 2025) by five partners from 3 countries.

The disruptive technology envisioned in the “Deep U-tube heat exchanger breakthrough: combining laser and cryogenics gas for geothermal energy exploitation (DeepU)” Project is expected to revolutionise the deep geothermal energy sector. A laser drill head is combined with special drill strings sustaining the coupled action of laser and cryogenic gas, responsible for melting, vaporising, evaporating and cooling even the hardest rocks. The technical feasibility of DeepU is demonstrated at the laboratory scale, and the specific objectives of the Project are: (i) select a cryogenic gas able to cool in a controlled manner the rock melted by a laser; (ii) develop an innovative lightweight drill string able to host the gas and the laser at the same time; (iii) develop specific temperature control analysis and innovative laser lenses able to convey the heat and to sustain multilateral drilling, (iv) determine the physical-thermal phenomena affecting different kinds of rocks in order to assess the borehole wall vitrification and integrity. Numerical simulations calibrated by the laboratory data provide references to define the DeepU geothermal exploitation potential, including economic analyses. The legislative aspects and environmental standards related to the proposed solution are also assessed.

DEEPU Key Words: Laser and cryogenic drilling technology, drilling speed, vitrified/glazed borehole wall, borehole casing, deep heat exchanger, environmental assessment, regulation, numerical simulation.

1.2 CONTENT, SCOPE AND OBJECTIVES OF THIS DELIVERABLE

This Deliverable is the first of three deliverables regarding the Dissemination, Exploitation, and Communication Activities of the DeepU project. In the Plan for Dissemination, Exploitation, including Communication Activities (PDEC) presented here, we lay out and steer the project’s approach to disseminating and exploiting the project’s results as well as communicating about the research with various audiences throughout the project lifespan. PDEC has been updated on the occasion of the First Interim Report (M12). The two subsequent deliverables shall present the activities carried out in the first and second year (M24, Deliverable D6.4) and at the end of the project (M36, Deliverable D6.5). In D6.4, the DeepU PDEC will be further elaborated and updated, also taking into account the activities carried out in the Work Package 5 (WP5) frame dedicated to Exploitation planning and IPR management, planned to start at M19.

The **dissemination** activities are essential to keep project participants and other stakeholders informed of the progress of the project. They must also stimulate and gather feedback from interested groups and parties and increase the project’s international visibility. The main objective of the planned dissemination activities is to increase the visibility of the project on selected communities and target groups at the national, European and International levels and to support the realisation of the impacts. Special attention will be given to contacting specific stakeholder groups to maximise impact.

This deliverable outlines the DeepU dissemination strategy in terms of identification and description of the dissemination key elements:

- a. the objectives of the dissemination (mission, vision),
- b. the subjects of dissemination (what will be disseminated),
- c. the target audience (to whom it will be disseminated and who would be interested in learning about the project findings),
- d. the dissemination channels (how it will be disseminated),
- e. the monitoring (how much dissemination works)
- f. the timing (when dissemination will take place)
- g. the dissemination management and policy (who is responsible for and how dissemination is ruled).

The Consortium attaches great importance to dissemination. All partners will contribute to that effort and strive to maximise the use of all existing dissemination channels, such as high-quality papers containing the best scientific achievements and oral and poster contributions to topical international and European conferences. In addition, the coordinator and industrial partners will regularly participate in workshops, fairs and showcases where technical achievements and prototypes can be shown to stakeholders. Gathering all exploitable outputs developed by DeepU within its lifespan will be crucial, defining the concrete use of research results for commercial, societal, and political purposes. The **Exploitation Plan** (EP) is designed in order to multiply the impact of the proposed solutions and prepare the transition towards industrial and commercial uptake to achieve the expected impact fully. The EP describes the activities to be undertaken (how and by whom) in order to ensure the exploitation beyond the project itself. The exploitation strategy must reflect and will be built up as a result of sound analysis of the market trends potential users, and financial sustainability. The target users will be precisely identified and analysed in terms of specific needs and objectives. Through the interaction with stakeholders, valuable feedback from those interested in the DeepU outputs, its exploitable results and – mainly – in future market products the developed technology will uncover, will help to complete the EP.

The **communication** aims to demonstrate how the DeepU project contributes to research and innovation, widens the applicability of geothermal installations and strengthens the European geothermal technology base. The communication strategy of the project has the following objectives:

- a. Raise awareness about co-creation and design among a broad segment of the public;
- b. Support the dissemination and exploitation of the results of DeepU;
- c. Provide a solid and common brand for the project facilitating its recognition;
- d. Establish sustainable tools and structures for the project, including the different communication channels, printed materials, website and social media;
- e. Ensure the visibility of the project's events, activities and different actions.

The present document is intended mainly for the project partners. However, the dissemination level of this report is public, and this communication strategy is open to involved stakeholders who can provide their free comments and suggestions. This public Deliverable will be made accessible through the DeepU project website. It shall be used by anybody who wants to know the activities undertaken to publicise the DeepU project and make it effective in terms of utilisation of results.

For comments and/or suggestions, please contact the Dissemination and Communication Manager (DCM), Adele Manzella adele.manzella@igg.cnr.it

2. DISSEMINATION STRATEGY

2.1 OBJECTIVES

The overall aim of the Dissemination Strategy within DeepU PDEC is to identify and organise the activities to maximise the project's influence and promote commercial and other exploitation of the project results.

The objectives of dissemination activities are:

- To raise public awareness about the project, its expected results and progress within defined target groups using effective dissemination and communication channels and tools (see also Chapter 4);
- To exchange experience with projects and groups working in the field in order to join efforts, minimise duplication and maximise potential;
- To disseminate the fundamental knowledge, the methodologies and technologies developed during the project;
- To pave the way for a successful commercial and non-commercial exploitation of the project outcomes.

2.2 SUBJECTS

The following DeepU general subjects will be disseminated:

- interim and final results (reached objectives and achievements)
- techniques and methodologies (in respect of IPR issues)
- environmental, legal and regulatory aspects
- innovation aspects (in an “open innovation” perspective)

The technical aspects to be covered by dissemination include lab research and modelling on physical phenomena in rock melting and evaporation with a laser beam, quench cooling with cryogenic gas, materials characterisation of borehole walls and drilling residues, and modelling of deep heat exchangers. In addition, environmental and regulatory aspects of the proposed technologies will also be considered for dissemination and discussion.

2.3 TARGET AUDIENCE

One of the critical elements of the DeepU dissemination strategy is the identification of dissemination target areas and audiences.

2.3.1 Internal dissemination (within the DeepU partners)

Ensuring effective internal communication and dissemination among the Consortium partners represents an important key success element for the DeepU Project. Industrial partners are both potential users and “influencers” because of their impact on the associated industrial sectors, and academic partners are crucial for technical development.

Adequate knowledge sharing will speed up the project results and maximise the efforts. The internal dissemination strategy aims to keep all partners fully informed about planning, work in progress and existing or potential problems. Besides the requested EC and Internal reporting, all partners are invited to communicate with WP Leaders about technical progress and issues actively. WP Leaders are also asked to keep the PC updated about the activities. Furthermore, all partners are invited to

inform the PC of any Administrative and Legal issues arising. The PC is at the partners' disposal for any technical and administrative information/issues.

The Virtual Research Environment (VRE) technologies, a communication tool described in section 4.1.3, will support data and information sharing among DeepU partners.

2.3.2 Dissemination beyond the DeepU Consortium (External dissemination)

Selecting target groups is crucial for defining the scope and characteristics of the "potential users" that dissemination activities are designed to reach. Table 1 lists the target groups identified for the Project.

Table 1: DeepU external audience

Type of audience	Definition and Motivation
Scientific and research community	This group targets all research communities interested in the DeepU project's developments, results and innovation, which can benefit their research activities. Scientific contributions of DeepU are particularly interesting for researchers working in the field of Deep Geothermal (e.g. those participating in EERA-JP Geothermal ¹) and those working in developing drilling technologies, laser techniques, material integrity, corrosion, and sub-surface geomechanics.
Industry and innovation community	Representatives of industry associations at regional, national and international levels to address and trigger the active involvement of industrial and user communities. They are expected to provide valuable feedback on the project, introduce challenging requirements to be considered and significantly impact the project's sustainable development.
International Standardization Bodies (ISB)	ISB should be aware of DeepU's scope and objectives, owing to the innovative character and eco-efficiency of the developed technologies. In an advanced project stage, ISB could be involved and provide consultative advice on pre-standardisation procedures, which may be carried out when the technology reaches a suitable readiness level.
Other EU projects	The project will also target other EU-funded projects in the same areas.
Policymakers	This comprehensive group encompasses local, regional, national and EU Authorities, Public Administrations and regulators. Representative groups are also included.
Technology and Professional	This group targets sectorial/industrial international associations like ETIP-DG ² , EGEC ³ , IGA ⁴ , EFG ⁵ , IADC ⁶ , IWCF ⁷ , API ⁸ , SPE ⁹

¹ European Energy Research Alliance – Joint Programme Geothermal, <https://www.eera-geothermal.eu>

² European Technology & Innovation Platform on Deep Geothermal, <https://www.etip-dg.eu>

³ European Geothermal Energy Council, <https://www.egec.org>

⁴ International Geothermal Association, <https://www.lovegeothermal.org>

⁵ European Federation of Geologists, <https://eurogeologists.eu>

⁶ International Assoc. of Drilling Contractors

⁷ International Well Control Federation

⁸ American Petroleum Institute

⁹ Society Petroleum Engineers

Clusters/platforms/associations	Professional associations may act as essential influencers.
Civil Society/ Non-Governmental organisations	Including associations, foundations, cooperatives and networks that operate locally, nationally and internationally. They are a significant influencer in the application sought by the project.

DeepU Consortium has interesting and significant links with European and international activities. Some DeepU partners are members of international committees/boards of platforms, clusters and important symposia, which can ensure and facilitate the dissemination of DeepU results.

2.4 DISSEMINATION CHANNELS

Various DeepU dissemination channels are foreseen, and tools will be tailored to the different target audiences, as described in Table 2.

Table 2: Dissemination tools foreseen in DeepU

Target audience	Tools
DeepU partners	Virtual Research Environment (VRE, see Section 4.1.3 for details)
Scientific and research community	Scientific publications Webinars and workshops Scientific conferences
Industry and innovation community	Webinars and workshops Research and Innovation Events Fairs and exhibitions Articles in national and international geothermal associations' newsletters
International Standardization Bodies (ISB)	Face-to-face / existing networks
Other EU projects	Webinars and workshops Research and Innovation Events
Policymakers	Research and Innovation Events Face-to-face / existing networks
Technology and Professional Clusters/platforms/associations	Webinars and workshops Research and Innovation Events National and international geothermal association's newsletters
Civil Society/ Non-Governmental organisations	Face-to-face / existing networks

A preliminary list of **DeepU webinars, workshops and technical events** is available in Annex 1, as well as a list of **scientific conferences, fairs and exhibitions to be attended**. The lists will be updated during the project duration.

All publications will be collected in a document on the project management system and summarized in tables.

2.5 EVALUATION OF DISSEMINATION IMPACT

To monitor and evaluate the effects of the dissemination activities, quantitative indicators are defined. Such methods are synthesised in Table 3. Interim and Final reports and progress meetings will report the monitoring results.

Monitoring dissemination activities will help to identify the potential risk of ineffective dissemination and to reassess the dissemination strategy. Tracking data will be taken into account when updating DeepU PDEC.

Table 3 Dissemination activities monitoring tools

Dissemination tools	Monitoring tools
VRE	Number of shared technical documents
Scientific publications	Number of submitted or published articles Downloads of publications
DeepU Webinars and workshops	Number of registered people
Face-to-face meetings	Number of meetings Number of external participants
Scientific conferences, Research and Innovation Events	Number of attended conferences with presentations or posters Number of participants
Articles in national and international geothermal associations' newsletters	Number of articles Associations' members' number
Fairs and exhibitions	Number of attended fairs or exhibitions Number of visits and distributed brochures and flyers Number of post-event contacts List of contacts

All consortium partners are encouraged to share the dissemination material (a paper, a conference presentation or the audio file of an interview, for example) on the VRE and to report the results of each dissemination activity immediately after they are presented. The reports shall include feedback gathered by the respective partner from the target audience (if applicable) and eventually gained contacts to be listed in the contact repository for further dissemination. The dissemination activities will be checked at each project progress meeting.

2.6 TIMING

Although some dissemination activities will be carried out during the first 18 months of the project, the most significant ones will take place as final research results will be available. Indeed, the main activity in the project's first year will be communication to promote the project itself and its objectives.

The dissemination activities are to be performed according to the following logical schedule:

- 1) Targeted dissemination phase (M6-M24): the Consortium will attend selected events and organise workshops. Preliminary project results will be presented to the target audiences.
- 2) Pre-launch phase (M25-M36): this represents the period closely before the end of the project when DeepU consortium partners will start preparing their own utilisation and business plans for the industrialisation of DeepU project outputs. This phase will be focused on informing the target audience of the DeepU exploitable outputs. Important dissemination themes in this phase will also be the references gained from the realisation of DeepU lab results.

Following this logic, an initial set of dissemination events has been defined (listed in Annex 1), considering the available information on international conferences.

2.7 DISSEMINATION MANAGEMENT AND POLICY

2.7.1 Responsibilities

According to Annex 5 of the EC-GA, “*The beneficiaries must disseminate their results as soon as feasible, in a publicly available format, subject to any restrictions due to the protection of intellectual property, security rules or legitimate interests*”. They are also requested to “*use the EIC Market Place platform to exchange information on results (including preliminary findings)*”. In particular, the academic and research partners (CNR, UNIPD, FhG) are expected to publish **scientific articles** (about 12) in the professional literature (peer-reviewed, congress acts, scientific magazines, etc.). All partners will contribute to maximising the use of all existing dissemination tools, such as high-quality papers containing the best scientific achievements and oral and poster contributions to topical international and European conferences. In addition, industrial partners will regularly participate in workshops, fairs and showcases where technical achievements and prototypes can be shown to stakeholders.

It is also requested to project partners to “*ensure open access to peer-reviewed scientific publications relating to their results*”. All partners are responsible for the open access publication of their scientific papers.

Moreover, “*the beneficiaries must provide and regularly update a plan for the exploitation and dissemination of results including communication activities*”. In this regard, CNR, which leads the WP6 dedicated to Dissemination and Communication, is responsible for providing and updating the Plan. All partners are responsible for checking and reviewing the documents.

In coordination with the PC, CNR is responsible for organising the **webinars, workshops and technical events**. CNR will also manage the dissemination of DeepU results through the EIC Market Place.

CNR will also be responsible for ensuring that the **open access** publications are stored following the rules set in Annex 5 of the GA, and in particular that:

“- *at the latest at the time of publication, a machine-readable electronic copy of the published version or the final peer-reviewed manuscript accepted for publication, is deposited in a trusted repository for scientific publications*

- *immediate open access is provided to the deposited publication via the repository, under the latest available version of the Creative Commons Attribution International Public Licence (CC BY) or a licence with equivalent rights; for monographs and other long-text formats, the licence may exclude commercial uses and derivative works (e.g. CC BY-NC, CC BY-ND) and*

- information is given via the repository about any research output or any other tools and instruments needed to validate the conclusions of the scientific publication.

Metadata of deposited publications must be open under a Creative Common Public Domain Dedication (CC 0) or equivalent, in line with the FAIR principles (in particular machine-actionable) and provide information at least about the following: publication (author(s), title, date of publication, publication venue); Horizon Europe or Euratom funding; grant project name, acronym and number; licensing terms; persistent identifiers for the publication, the authors involved in the action and, if possible, for their organisations and the grant. Where applicable, the metadata must include persistent identifiers for any research output or any other tools and instruments needed to validate the conclusions of the publication”.

The bibliographic metadata must be in a standard format and must include all of the following:

- the terms “European Union (EU)” and “European Innovation Council”;
- the name of the action, acronym and grant number;
- the publication date and length of the embargo period, if applicable, and
- a persistent identifier.

All DeepU partners are responsible for providing CNR with their dissemination products as soon as they are finalised to guarantee proper open access to them and provide all the necessary metadata information.

All partners are responsible for acknowledging EC and EIC funding in their dissemination documents, as stated in Deliverable 7.1. We recap here the general rule.

Acknowledgement

All publications or any other dissemination relating to foreground shall include the following statement to indicate that said foreground was generated with the assistance of financial support from the European Commission (according to GA, Article 17):

This research is funded by the European Union (G.A. 101046937).

Moreover, the following sentence has to be included in all publications:

The views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or EISMEA. Neither the European Union nor the granting authority can be held responsible for them.

For infrastructure, equipment and major results, the following sentence has to be included:

“This [infrastructure][equipment][insert type of result] is part of a project that has received funding from the European Union under grant agreement No 101046937”.

For any communication document, including posters and presentations, it is compulsory to include the project logo (see Chapter 4), which is part of the branded templates provided to the partners.

The **primary contact** for Dissemination scopes is the DCM, Adele Manzella adele.manzella@igg.cnr.it.

2.7.2 Policy and rules

The general rules for dissemination are governed by article 17 of the GA and art. 8.4 of CA signed 9th February 2022. Dissemination activities shall be compatible with the protection of intellectual property rights, confidentiality obligations and the legitimate interests of the owner of the Foreground and/or Background.

The dissemination strategy and activities will follow principles set in Annex 5 of the GA and the best practices successfully tested by the partners in other projects. Dissemination activities in the DeepU project are deeply wedded with intellectual property rights (IPR) protection. It is crucial to set up the dissemination rules and procedures to avoid any potential breach of any partner's IPR and to understand the difference between the interests of academia and industry partners of the DeepU project, the former inclined to publish all information they have at disposal and the latter deciding whether, when and where to publish depending on commercial considerations.

Following Annex 5, *"A beneficiary that intends to disseminate its results must give at least 15 days advance notice to the other beneficiaries (unless agreed otherwise), together with sufficient information on the results it will disseminate. Any other beneficiary may object within (unless agreed otherwise) 15 days of receiving notification, if it can show that its legitimate interests in relation to the results or background would be significantly harmed. In such cases, the results may not be disseminated unless appropriate steps are taken to safeguard those interests"*.

- Prior notice to any planned publication shall be given to the other beneficiaries 30 days before the publication, providing a copy of the planned publication. Any objection to the planned publication shall be made in accordance with the Grant Agreement in writing to the Scientific and Technical Coordinator and to any partner concerned within 30 days after the receipt of the planned publication
- When submitted to a journal, the scientific publication must be sent to all partners, who have 15 days to check and send any objection to the authors, also informing the PC. The authors will be in charge of modifying the document to safeguard other partners' interests.
- A common graphic identity has been defined (see Section 4.1) to allow for better visibility and recognition as well as branding of the DeepU project. Therefore, all dissemination products must rely on templates provided by DCM and the instructions detailed in section 4.1.
- The research will be conducted following sound analysis and scientific practice principles, considering as much as possible policy requirements and needs.
- All consortium members contributing to the project activities will be duly informed about the final outcomes and the implications stemming from project results.
- All public results will be accessible from the project website and usable by all parties who may benefit from them. In addition, sensitive results will be accessible on the VRE by the partners authorised by the PC and the reference WP leader.

3. EXPLOITATION STRATEGY

In this report, we may only draft a strategy to multiply the impact of the proposed solutions for innovative drilling technologies and deep heat exchangers and prepare the transition towards industrial and commercial uptake to achieve the expected impact. The exploitation strategy will reflect and be built up as a result of a sound analysis of the market trends, potential users, and financial sustainability (WP5). Such activities will start in month M19. The target users will be precisely identified and analysed in terms of specific needs and objectives. The exploitation activities will be coordinated by the **Exploitation Manager (EM)** in collaboration with the PC and the Steering Committee (SC). The EM is Luc Pockelé, a representative of RED, the WP5 leader.

The Exploitation Manager shall:

- a) Coordinate and implement exploitation activities;
- b) Propose IPR and exploitation strategies;
- c) Prepare the master plan for the exploitation;
- d) Prepare a list of industrial stakeholders;
- e) Contribute to proper exploitation of the results by helping industrial Partners to prepare adequate business plans and/or to get, if required, auxiliary funds for further industrialization of products and processes;
- f) Monitor the use of resources for exploitation issues.

The EM must be constantly updated on the progress of the project and the current IPR scenario in order to detect potentially exploitable results. An additional responsibility of the EM is to ensure that technological progress remains consistent with the industrial perspective and assist the PC in evaluating the project's impact from an industrial point of view.

The research data will be managed according to the Data Management Plan (D7.3 at M6), and exploitable results will be defined.

An **IPR strategy** will be developed in order to meet everybody's (i.e., researcher, SME, industry and society) needs and expectations (Task 5.3). Furthermore, the Consortium, coordinated by the EM, will explore the possibilities offered by the European IP Helpdesk (https://intellectual-property-helpdesk.ec.europa.eu/index_en) to expand IP capacity building for the DeepU technologies.

An infrastructure is created within the Consortium in order to tap into the collective intelligence and bring it together during the project. In this regard, the Consortium will discuss the potential of the results, collected and treated in WP5, to have an economic or commercial impact. When possible and appropriate within the IPR strategy, results should be patented.

No partner will exploit or disseminate any result emanating from the project unless it is properly protected and there is an agreement amongst all partners on the dissemination of this information. The framework for this agreement is addressed within the CA. There each partner will register their own background information. Knowledge generated through the DeepU project, including research results, technologies, literature, know-how, etc., which are deemed to have commercial potential shall be protected by relevant IPR protection, including patents, trademarks, industrial design, copyrights, know-how as well as through a confidentiality agreement or any other agreements and contracts according to Horizon Europe (HE) rules. Protected IPR must be made available to the stakeholders participating in DeepU or a third party, including public and private sectors, through a licensing agreement or any other legal agreements and contracts complying with HE rules.

DELIVERABLE D6.3
DISSEMINATION, EXPLOITATION,
COMMUNICATION ACTIVITIES PLAN

Each member of the Consortium is responsible for the protection and exploitation of its own generated intellectual property. Where IPR is generated between two or more partners, the CA provides mechanisms for joint protection and exploitation. All partners collaborate in providing scientific results in accordance with the patents policy defined in the CA.

4. COMMUNICATION STRATEGY

Communication aims to raise awareness of the DeepU project: general scope, coverage, goals and plans to reach them, and results. The Lead partner of these activities is CNR, which will coordinate its actions with the PC and all the DeepU partners.

4.1 COMMUNICATION TOOLS

4.1.1 Brand identity

Branding is the process of creating a unique name and image through a consistent theme to support awareness about the project activities. It includes a logotype of the project, templates for printable reports (Deliverables) and presentations. The related files have been set and shared on the VRE and are part of the Communication KIT, available for free download from the Project Website.

The DeepU LOGO is



It will be used for any (internal or external) deliverable, report and dissemination tool.

The logo is also available in other formats that may be used on various media and occasions.

For example, another version of the DeepU LOGO is in two colours



4.1.2 Website

The website serves as a hub for all project-related information. To ensure maximum visibility of the DeepU objectives and results, the website has been registered in the "eu" domain and with an intuitive URL to increase hit rates: <https://www.deepu.eu>

CNR maintains the website, and the Webmaster will regularly do the update upon input from the DCM and partners. It includes tools to keep track of users and their geographical location, most visited pages and other parameters. All partners will be asked to link to the DeepU website from their websites to improve it for Search Engine Optimization.

The website's structure has been defined according to the needs and focus of the projects. Its language is English, and at the present moment it contains only the most general parts, but many sections have already been planned to contain future products. The website includes the following:

- a HOME page briefly introducing the DeepU project and giving relevant information. It also contains links to the digital version of the project leaflet and brochure;
- an ABOUT THE PROJECT page, with project objectives, a short profile of each of the DeepU Partners and a link to their websites;

- a CONTACT page, which enables people to easily get in touch with relevant contact people of the project Consortium and to be inserted in the DeepU list of contacts for further communication;
- a VRE button for direct access to the VRE (see next section for details).

The DeepU website also allows subscribing to the Newsletter via the subscription form. Information about the newsletter content and structure can be found in paragraph 4.1.6.

The other sections that are foreseen to be activated when the project starts to produce documents are:

- a PROJECT OUTPUTS page containing public deliverables, open access scientific papers, public reports and articles, eNewsletter and videos, and press releases;
- a NEWS&EVENTS page with the latest information related to the project, and information (calendar) on DeepU events (meetings, workshops, Conferences, etc.) and upcoming events, conferences and fairs where DeepU results will be disseminated;
- Social Networks buttons for direct access to active social media (LinkedIn, YouTube – see section 4.1.5 for details).

The EU co-funding is duly acknowledged on all website pages.

The website will be continued after the end of the project for at least two years, although it is not guaranteed that the content will be updated.

4.1.3 Private Collaborative Platform, the VRE

The Virtual Research Environment (VRE) technologies, set up early in the project, guarantee internal communication among DeepU partners. The VRE is accessible from the project website for the registered partners. Through VRE, DeepU members can take advantage of modern facilities for collaboration, such as Social Networking and a Shared Workspace. The Shared Workspace acts as a remote, redundant data repository (file system) able to store and organise data in different formats and sizes in a system of folders, shared or not among the community. The Platform also enables messaging among partners and news (e.g. when a new document is uploaded). VRE is an essential tool for both dissemination and communication activities and will be the base of data sharing among partners.

4.1.4 Print Media

Several print media will be developed throughout the course of the project.

The main objective of the project **leaflet and brochure** is to provide our audiences (technical and also non-specialists) with an attractive and written project overview and a summary of the main project objectives and characteristics. The text is designed to inform not only experts but also interested non-specialists. The attractive and professionally made documents prepared by CNR are published on the project website to assist the dissemination effort. The first version of the leaflet and brochure presents the goals of the project and its objectives and includes the website address. The wider brochure expands the perspective with a view of the background stage, the innovative concept and the principal (expected) findings. Furthermore, it provides essential information on DeepU Consortium. All partners' logos are also displayed. The documents have been translated into the

Italian and German languages and edited for communication at the national level. The various versions are available on the project website and printed occasionally.

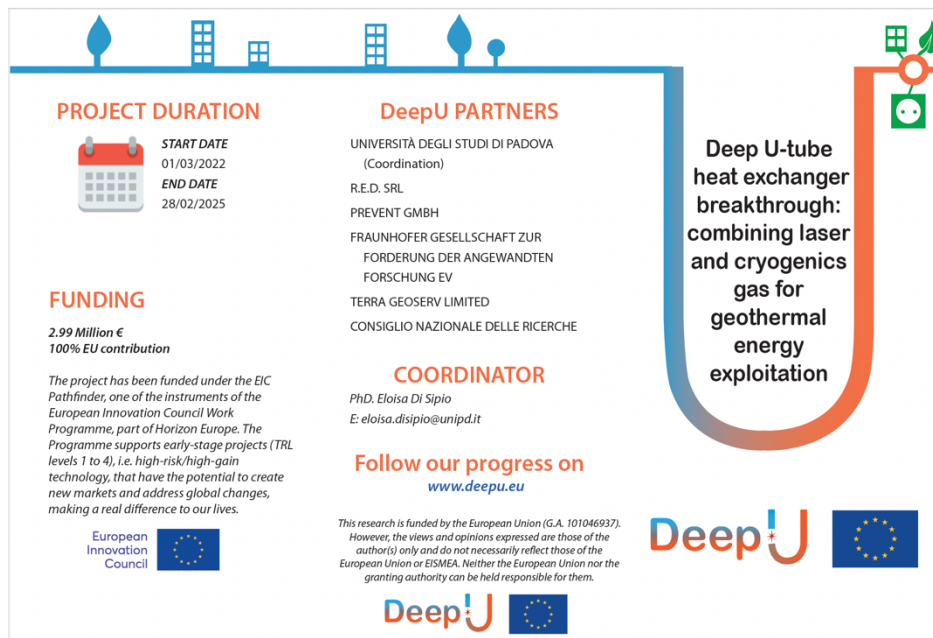
The final version of the brochure will be implemented in the final stage of the project, at about April 2025 (M34). This version will contain updated content, with an overview of the technical results and a new layout to make it more attractive. This version is designed for specialist audiences.

The leaflet and brochure can be circulated in printed form, e.g., at conferences or other events. Their electronic version (PDF file) can be distributed by email or on the media networks and downloaded from the project website. The Partners may translate the leaflet and brochures into languages other than English, if deemed necessary (for example, in German for the Offenburg fair), using the master template created and managed by CNR.

A poster for fairs and large conference booths has been prepared and will be updated. The primary purpose of the poster is to catch the audience's attention. Therefore, CNR takes care of its visual aspect while checking that its content is clear and easily understandable by the target end users. Concerning the layout and design, the poster shows the project's logo and the colours to emphasise the link to the project's graphic. From the content point of view, the poster illustrates the project's objectives and includes basic information, including preliminary results, if available, and on the Consortium, including all partners' logos.

All the print documents are included in the Communication KIT, and it is possible to download them from the DeepU website. A summary of the documents' main details is provided in Table 4.

Figures 1-4 show the miniature appearance of the leaflet and the brochure released in M3.



PROJECT DURATION


START DATE
01/03/2022

END DATE
28/02/2025

FUNDING

2.99 Million €
100% EU contribution

The project has been funded under the EIC Pathfinder, one of the instruments of the European Innovation Council Work Programme, part of Horizon Europe. The Programme supports early-stage projects (TRL levels: 1 to 4), i.e. high-risk/high-gain technology, that have the potential to create new markets and address global changes, making a real difference to our lives.

European Innovation Council 

DeepU PARTNERS

UNIVERSITÀ DEGLI STUDI DI PADOVA
(Coordination)

R.E.D. SRL

PREVENT GMBH

FRAUNHOFER GESELLSCHAFT ZUR FÖRDERUNG DER ANGEWANDTEN FORSCHUNG EV

TERRA GEOSERV LIMITED


CONSIGLIO NAZIONALE DELLE RICERCHE

COORDINATOR

PhD. Eloisa Di Sipio
E: eloisa.disipio@unipd.it

Follow our progress on
www.deepu.eu

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DeepU 

Deep U-tube heat exchanger breakthrough: combining laser and cryogenics gas for geothermal energy exploitation

Figure 1: DeepU Leaflet page 1

Increasing accessibility of deep geothermal resources for low carbon heating and power generation is a fundamental requirement to accelerate the development of decarbonised and indigenous energy supplies in Europe.

The DeepU project seeks to achieve the deployment of 'geothermal anywhere' and at providing a stable, uninterrupted, base load energy to meet global CO₂ emission reduction targets. The disruptive technology envisioned in the project will revolutionise the deep geothermal energy sector, offering a complementary approach and an alternative solution to traditional energy storage and production, decentralising the power supply also in areas where this is currently deemed uneconomic.

ABOUT DeepU

The ultimate goal is to extract energy from the underground using deep (>4 km) vitrified, waterproof, non-cracked U-tube heat exchanger by combining laser and cryogenic gas into a single technological drilling solution. This innovative technology liquefies and vitrifies the rocks, leaving the borehole ready for heat exchange immediately after drilling. In addition, the demonstration at the laboratory scale produces the information required for assessing the technological, environmental and economic sustainability and defining the potential and commercial attractiveness of the proposed solution.

OBJECTIVES

- Develop and calibrate the drilling technology by: selecting a cryogenic gas able to cool in a controlled manner the rock melted by a laser; developing an innovative lightweight drill string able to host the gas and the laser at the same time; developing specific temperature control analysis and innovative laser lenses able to convey the heat and to sustain multilateral drilling;
- Determine the physical-thermal phenomena affecting different kinds of rocks to assess the borehole wall vitrification and integrity;
- Evaluate the legislative aspects and environmental standards related to the innovation proposed;
- Define the DeepU geothermal exploitation potential, including economic analyses, based on case studies modelling.

Figure 2: DeepU Leaflet page 2

THE PROJECT TEAM

Our partners from three European countries have joined forces to develop a technology that has the potential to implement the share of geothermal energy worldwide.

UNIVERSITÀ DEGLI STUDI DI PADOVA
The University of Padova (UNIPD), founded in Italy in 1222, is one of Europe's oldest and most prestigious seats of learning. The geothermal research group belonging to the Department of Geosciences is at the forefront of the research in geothermal energy, especially related to rocks' thermal properties characterisation, the effect of heat transport, underground heat storage, geothermal heat pumps and deep closed loop wells. UNIPD is the DeepU project's coordinator and is directly responsible for the petrophysical characterisation of the rocks.

R.E.D. SRL
RED SRL is a spin-off Company of the Italian CNR that designs and installs heating and cooling systems for buildings, in particular on geothermal based and other renewable energy sources. RED SRL is also active in the energy management of small and medium-sized enterprises and owns an Italian patent on an innovative co-axial borehole heat exchanger. In DeepU, RED SRL leads the exploitation and market planning activities, including the IP management strategy.

PREVENT GMBH
Prevent is a German engineering company with affiliated prototyping and manufacturing in the field of plasma drill and laser drill strings, working on optimising lightweight multiple drill pipes and drill heads for plasma and laser deep hole drilling. The company has a long experience in the fields of drilling technology, shaft sinking technology, electrics and electronics, as well as drill rig engineering. For the DeepU project, it develops and manufactures different multiple drill pipes and drill heads for laser drilling with different cryogenic gases.

FRAUNHOFER GESELLSCHAFT ZUR FÖRDERUNG DER ANGEWANDTEN FORSCHUNG EV
Fraunhofer IAPT takes part in the Fraunhofer community of currently 76 institutes in Germany with over 30.000 employees, which is the world's leading organisation, especially for applied research. At its location in Hamburg, Fraunhofer IAPT conducts R&D in the field of laser technologies and additive manufacturing. In the DeepU project, Fraunhofer IAPT is responsible for developing the combined laser and gas process and designing the drilling head using 3D printing technologies.

TERRA GEOSERV LIMITED
GeoServ is a leading Irish and international SME that specialises in providing tailored services to the geothermal, natural resource, energy and environmental sectors. Its specialist services are focused on delivering turnkey geothermal systems for heating, cooling and energy storage applications and providing project management at the exploration and development stages. Geoserv coordinates the activities related to regulatory and environmental aspects of the DeepU project.

CONSIGLIO NAZIONALE DELLE RICERCHE
The Italian National Research Council (CNR) is a public organisation with Italy's largest network of institutes. It carries out, promotes, spreads, transfers and improves research activities in the main sectors of knowledge growth. Its Institute of Geosciences and Earth Resources (IGG) has provided technologies and solutions for geothermal assessment for many decades and promotes geothermal applications and innovation in the leading international platforms. CNR-IGG is responsible for the DeepU resource modelling and the dissemination and communication activities.

Deep U-tube heat exchanger breakthrough: combining laser and cryogenics gas for geothermal energy exploitation

www.deepu.eu

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Figure 3: DeepU Brochure page 1

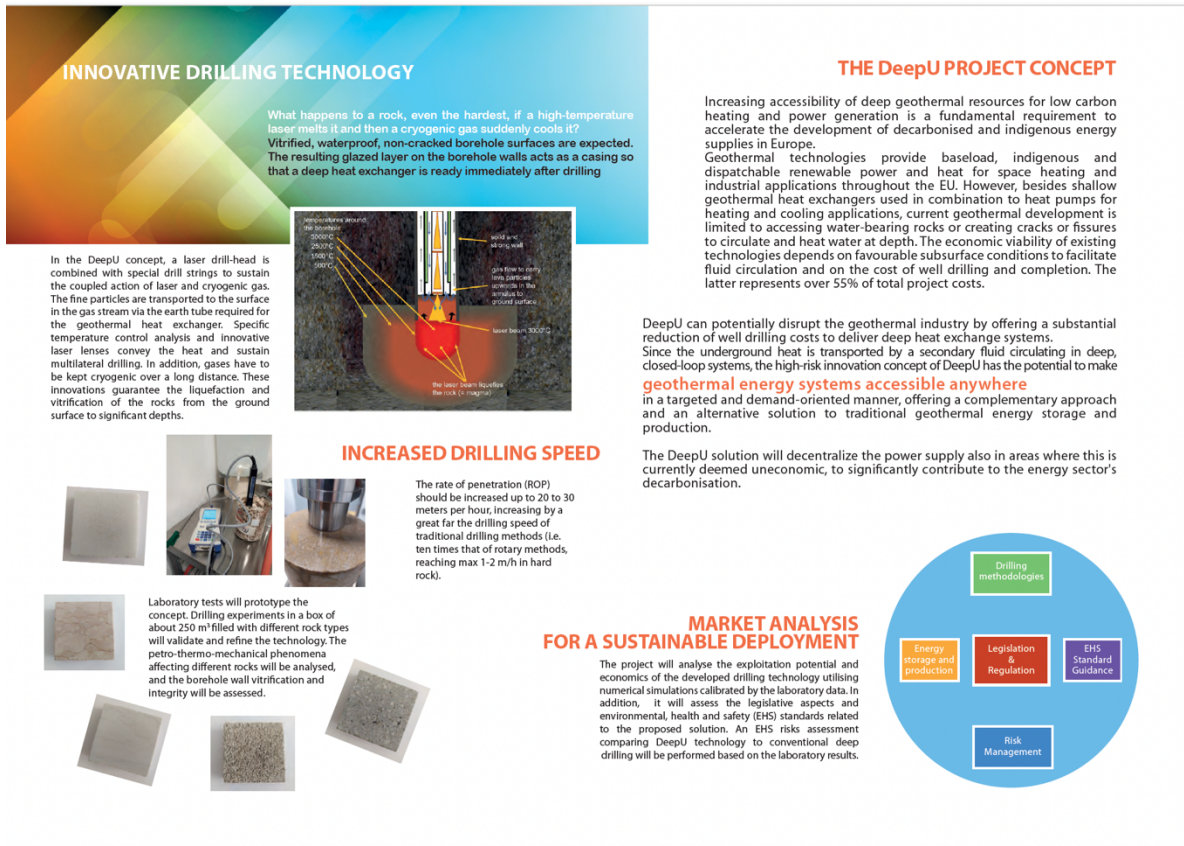


Figure 4: DeepU Brochure page 2

Table 4 Print media details

Document	Format	Diffusion	Expected printed copies	Due date
Leaflet	A4, three-fold	Physical events Face-to-face meetings Website Media channels and networks	300	M3
Preliminary Brochure	A3, two-fold	Physical events Face-to-face meetings Website Media channels and networks	300	M3
Final Brochure	A3, two-fold	Physical events Face-to-face meetings Website Media channels and networks	300	M34
Poster	A0 larger or	Fairs Congress booths	10	M6, M24

4.1.5 Social Media

In order to reach a broad target audience while establishing two-way communication channels, the presence of the DeepU project on social media is one of the key actions for dissemination activities. The channels will be used to communicate the project's achievements and to present webinars and videos. DeepU will be registered in standard platforms like:

LinkedIn: A LinkedIn group has been created (<https://www.linkedin.com/deepu-eu>) as one dissemination instrument for reaching stakeholders and industry professionals.

YouTube: To accompany the website and ease the publication of videos produced during the project, e.g. videos of related conferences or workshops, the Consortium will create a dedicated channel on the YouTube video platform. The channel will be publicly available at <http://www.youtube.com/> to contain videos embedded into the DeepU project's main website.

The website will have direct access to these social networks by clicking over the icons situated on the website. This way, it will be easy for every user to participate when visiting the website.

These social media will be continued after the end of the project for at least two years, although it is not guaranteed that the content will be updated.

4.1.6 News Media

4.1.6.1 Electronic Newsletter

DeepU news will be issued periodically (5 issues in total, starting in M14 (April 2023) and then twice per year, i.e. at months M19, M25, M31, and M36) to provide project-related news to the various stakeholder groups. The Newsletter must contain meaningful content for professionals and assist in promoting the DeepU project. It is less focused on field experts but more on building a general understanding of the developed technology and goals. For detailed and complex project findings and information, the Newsletter will refer to deliverables hosted on the website and other sources of information.

The Newsletter will be disseminated as follows:

- Via links on social media
- Via direct 'ad hoc' emails to the DeepU list of contacts
- Via passive browsing on the Newsletter page of the DeepU website

The content should be:

- Short
- Non-technical
- Engaging
- Set within a real-world context
- Colourful
- Enjoyable to read
- Easy to read on-screen as MailChimp produced HTML

The Newsletter will include announcements of the project's progress, dates, details, and comments regarding project-related conferences, meetings, events or publications. Since it must give fair treatment to the breadth of the subject matter of the DeepU project, each WP will have a headline

article slot. The Newsletter must also be opportunistic in tying into the project's results that generate newsworthy content throughout the project.

Subscription to this Newsletter is open to everyone using the already active webpage button.

4.1.6.2 Press releases

The press releases will target a broad non-expert audience, such as citizens, students and local communities. They are meant to inform about the project milestones and main results and get press coverage of the project activities. They will be drafted in English and translated when necessary.

The press releases will be published strategically when major achievements have been made. They will include, e.g. information on DeepU events and interviews with experts. In addition, all press releases will be archived on the DeepU project website.

The press contacts addressed by press releases are included in the DeepU list of contacts.

4.1.7 Other Media

4.1.7.1 Video

At least one video clip will be produced promoting the DeepU project goals and developed geothermal technologies, performed during the demonstration phase. In addition, a high-quality movie to present the main project results will also be shot toward the end of the project. The videos will be shown during the DeepU workshops and final conference and will support the technical D&C activities.

4.1.7.2 Outreach

Participation in outreach activities such as the European Night of Researcher's will target a broad non-expert audience, such as citizens, students and local communities. They are meant to inform on the project milestones and main results. The academic and research partners in Italy will be active in this regard. All partners are invited to participate in such events in their countries. European events will also be sought and possibly organised.

4.1.8 Communication KIT

It is available on the DeepU website and will be regularly updated when new documents (brochures, posters) are produced. It contains all branding documents (logo, deliverable template, presentation template), the leaflet, and brochures.

4.2 EVALUATION OF COMMUNICATION IMPACT

Table 5 lists the indicators to be used for monitoring and evaluation purposes.

Table 5 Communication activities monitoring tools

Dissemination tools	Monitoring tools
Website	Number of visits Most viewed website pages Search terms and search engines leading to the website could also be checked and analysed
VRE	Individual participant activity monitoring (access, social interaction, posts and replies)

Leaflet and brochure	Number of reprints Downloads from the website
Social media	Media coverage Clicks, likes, new followers
Newsletter	Subscription rate Readership rate Download from the website
Press releases	Number of articles Download from the website
Videos	Visualisations
Outreach	Number of attended outreach occasions at national and international levels
Communication KIT	Downloads from the website

4.3 COMMUNICATION MANAGEMENT

4.3.1 Responsibilities

CNR will be responsible for managing the website, VRE, social media, and eNewsletters, and preparing branding and print materials, press releases, and videos. CNR will coordinate with the PC for planning and monitoring communication activities.

WP leaders are responsible for organising articles for the eNewsletters, and press releases.

The **primary contact** for Communication scopes is the DCM Adele Manzella adele.manzella@igg.cnr.it.

5 OVERVIEW OF DISSEMINATION AND COMMUNICATION TOOLS AND TARGET AUDIENCE

Table 6 summarises how the different tools are distributed on the mentioned channels and the main stakeholder groups targeted by the D&C activities.

Table 6 DeepU dissemination tools, channels and target audience

Tools	Online/Digital	Media	Network	External Events	Target audience
Brand identity	x	x	x	x	Scientific community Industry&SME Public at large
Website	x	x	x		Scientific community Industry&SME Public at large
Print media (brochure, leaflet, poster)	x	x	x	x	Scientific community Industry&SME Public at large
eNews	x	x	x		Scientific community Industry&SME Public at large
Press releases	x	x			Industry&SME Public at large
Videos	x	x	x		Scientific community Industry&SME Public at large
Outreach				x	Public at large
DeepU Webinar, conferences	x		x		Scientific community Industry&SME
Scientific publications	x		x	x	Scientific community Industry&SME
General audience articles	x	x	x		Industry&SME Public at large
Participation in fairs, technical exhibitions				x	Industry&SME

ANNEX 1

PRELIMINARY LIST OF EVENTS

Preliminary list of events to be organised

Event	Location & Date	Type of event	Activities
DeepU webinar on Laser and gas flushing medium for deep geothermal drilling	online, March 2024	International webinar	Presentation of DeepU concept and results, consultation with target groups
DeepU webinar on Petrophysical effects induced by laser and cryogenic gas on rocks	online, June 2024	International webinar	Presentation of DeepU concept and results, consultation with target groups
DeepU webinar on environmental and regulatory aspects	online, November 2024	International webinar	Presentation of DeepU concept and results, consultation with target groups
Workshop on drilling technology to be organised in the frame of ETIP-DG	TBD	European workshop	Presentation of DeepU concept and results, consultation with target groups
Policymaker meetings	TBD, 2024, 2025	Face-to-face meetings at the national and European level	Presentation of results, consultation
Open-day on DeepU concept	TBD, 2024	Open-day at the national level	Visit to facilities, presentation of the concept
DeepU Final Conference	TBD, February 2025	Conference	Presentation of all project results to stakeholders

Preliminary list of external events with potential for DeepU participation

Event	Location & Date	Type of event	Activities
European Geothermal Congress 2022	Berlin, Germany, on October	Congress & Expo	Leaflet and brochure at EGEN booth stand
World Geothermal Congress 2023	Beijing, China, September 2023	Conference & Expo	Presentation or poster
GeoTHERM - expo & congress in Offenburg	Offenburg, Germany, on February 2023	Conference & Expo	Distribution of leaflets and brochures
GeoTHERM - expo & congress in Offenburg	Offenburg, Germany, on February 2024, 2025	Conference & Expo	Dissemination at booth stand, possibly a stakeholder event Face-to-face meetings
ETIP-DG meeting	February 2023 TBD in 2024 and 2025	Stakeholder networking meeting	Presentation of project concept and results Face-to-face meetings
Stanford workshop	Stanford, US, 2024, 2025	Workshop	Presentation of project concept and results
GRC congress	TBD, US, 2024, 2025	Workshop	Presentation of project concept and results
EIC Innovation Bootcamp 2023, 2024	TBD 2023, 2024	Business Acceleration and Innovation Events	Exploitation design
Pitching events	TBD, 2024	Pitching events organised at the EU level	Presentation of concepts for market uptake
The Geoscience paradigm: resources, risk and future perspectives	Potenza, Italy September 2023	Conference	Presentation of project concept and results