Innovation, exploitation, and communication D1.6

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Authors: Iryna Riabchuk, Mario Silva & Carlos Escudero

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Technical References

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[1] Dissemination level: PU = Public, SEN = Sensitive, R-UE/EU-R = EU classified, C-UE/EU-C = EU classified, S-UE/EU-S – EU classified
[2] Nature of the deliverable: deliverable: R = Document, report; DEM – Demonstrator, pilot, prototype; DEC – Websites, patent, filings, videos etc; DATA – data sets, microdata, etc; DMP – Data Management Plan; ETHICS; SECURITY; OTHER

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List of Abbreviations

PMP	Project Management Plan
DMP	Data Management Plan
CoP	Community of Practice
CS	Case Study
CTG	Cross Cutting Technology Group
DMP	Data Management Plan
DOI	Digital Object Identifiers
EC	European Commission
FAIR	Findability, accessibility, interoperability, and reusability
FOAF	Friend of a Friend
GDPR	General Data Protection Regulation
ICT	Information and Communications Technology
KPI	Key Performance Indicator
OGC	Open Geospatial Consortium
PM	Person Month
SNS	Social Networking Sites
TEB	Technology Evidence Base
URL	Uniform Resource Locator
UTF	Unicode Transformation Format
WP	Work Package

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Executive Summary

The main objective of deliverable 1.6 is to provide the guidelines for the promotional activities to be carried out by the HOCLOOP Consortium throughout the whole duration of the project. This document will be updated/fine-tuned in line with the project implementation phases and needs.

To achieve its objective, the present document outlines the strategy for innovation, exploitation and communication activities, during the project lifecycle. The plan hereafter provides guidance to all consortium members and ensures a consistent approach to CDE activities. It describes the communication and dissemination objectives, identifies the key target groups, defines key messages, and presents the different communication and dissemination channels and tools developed within the project. Thus, a promotion strategy has been designed and set in place targeting dissemination, exploitation and communication activities.

1. Introduction

This report is the Innovation, exploitation, and communication plan for the HOCLOOP project. The purpose of this document is to set the strategic framework for communication, dissemination and exploitation tools and activities to achieve the largest possible impact for the project.

1.1 Report structure

- Section 1. Executive summary and introduction to the Innovation, exploitation, and communication plan
- Section 2. The main approaches followed and rules to be observed
- Section 3. HOCLOOP Innovation and Exploitation strategy
- Section 4. HOCLOOP Communication and Dissemination strategy
- Section 5. Conclusions and expected results outlining the key achievements indicators.

1.2 HOCLOOP project overview

Geothermal energy has a large potential as a clean renewable energy source. Conventional technology is mainly based on heat extraction from hot aquifers circulating between wells in permeable geological formations. Such aquifers are hard to find, limit the applications and imply high cost and risks.

Responding to this challenge, the main objective of the HOCLOOP project (“or A circular by design environmentally friendly geothermal energy solution based on a Horizontal Closed LOOP”) is to verify a novel geothermal closed loop solution for the extraction of heat from deep or shallow formation rocks. The solution is environmentally friendly and expected to improve the cost-efficiency for geothermal developments.

HOCLOOP will also enable the exploitation of geothermal energy sources in new regions with or without good hydrothermal reservoirs. Examples are low-permeability reservoirs, Hot Dry Rock and other kinds of reservoirs, such as those with high content of non-condensable gas. However, also in regions where there are hydrothermal reservoirs, the proposed system reduces the environmental impact and can prove to be preferred. The solution is expected to significantly increase the deployment of geothermal resources for trigeneration with reduced environmental impact and economic attractiveness compared to conventional geothermal plants, avoiding several issues of Enhanced Geothermal Systems (EGS).

The target design is a geothermal heat exchanger that can deliver stable and cost-efficient energy for a time span of at least 50 years serving a surface district heating/cooling and power generation unit. The solution is foreseen to be integrated with other renewables to improve the reliability of the power supply and grid stability, and to be applicable to any geological structural condition and district heating.

The HOCLOOP concept is based on the use of an innovative horizontal closed loop solution for the extraction of heat from deep or shallow formation rocks. The solution derives from new drilling technology and solves the challenges of conventional construction of geothermal wells. The solution will improve the power production due to extended reach horizontal drilling with a large hole size. Further improvement is expected to be achieved by the use of alternative to water circulation fluids, such as CO2 based fluids. It is expected that the solution can reduce the LCOE compared to the conventional solution and meet the SET plan targets. The project will develop the tools to enable the proposed geothermal solution and demonstrate the technology in a full-scale test operation to TRL5. The work will cover the development and validation of models for the heat flow and investigate the possibility for improving electricity production by using alternative fluids to water. The work will also cover the investigation of potential EU pilot sites, environmental assessment, and the social acceptance of the proposed technological solution. It is expected that the solution will enable exploitation of geothermal energy sources in new regions, including the ones where hydrothermal reservoirs are absent or do not present the adequate hydraulic properties to enable the deployment of conventional geothermal solutions. The solution is foreseen to be integrated with other renewables to improve the reliability of the power supply and grid stability, and to be applicable to a variety of geological conditions. It is also expected to solve the main issues of geothermal energy related to emissions, seismicity, and environmental aspects.

1.3 Aims and objectives

Sound communication, dissemination and exploitation activities are an integral part of any EU-funded project. Along with communicating project objectives and results, they also contribute to stronger visibility of the EU Research and Innovation funding and bring science and technological development closer to the public.

The aim of this document is to ensure that the project objectives, activities, and outcomes will reach the relevant target groups (such as Scientific, Industrial and General audience) within and beyond the demonstration campaigns. Therefore, Innovation, exploitation, and communication plan for the HOCLOOP project was developed. Moreover, this document will be further updated/fine-tuned in line with project implementation phases and needs.

The main objectives of this report are to:

- Describe the approach adopted to define the main project promotion actions aimed at addressing the different Stakeholders and Target Groups identified;
- Set up and present the Innovation, exploitation, and communication plan for using and disseminating the knowledge in the context of the HOCLOOP project, through various means, and
- Provide main conclusions, mainly in terms of expected results related to different promotion actions.

This document describes the plans made at the beginning of the project foreseen for the consortium as a whole, for the dissemination of the project concepts and outcomes, according to the provisions of the

Description of the Action (DoA), and the work foreseen under WP1. The document specifies the methodology to be followed for the design, implementation, coordination and monitoring of all project activities aiming at achieving not only the dissemination but more in general the promotion objectives of the HOCLOOP project. Also, it has set some achievement indicators to evaluate the effectiveness and the success of these activities.

1.4 Contribution of partners

To maximize the reach of the HOCLOOP project, all partners are involved and should contribute to the Dissemination and Communication activity. In particular, the HOCLOOP team composition will allow different but complementary expertise and know-how, all relevant, to maximize the project impact and results.

2. APPROACHES FOLLOWED AND RULES TO BE OBSERVED

This section is focused on the approach adopted to identify key promotion audiences, i.e., stakeholders and users clustered in different target groups, as well as on dissemination and communication obligations of the Consortium.

In detail, this section will:

- Identify the main Stakeholder target groups for the HOCLOOP project exploitation and communication (see Section 2.1);
- Describe the meaning of dissemination, exploitation and communication and related type of actions (see Section 2.2);
- Define the obligations and role of HOCLOOP partners in relation to these actions (see Sections 2.3, 2.4).

2.1 Main stakeholders and target groups

For an effective realization of each strategy, it is crucial to know who the subjects for the promotion are. In general, target groups could be entities and/or individuals that can potentially benefit from the project results. As far as the HOCLOOP project is concerned, the identified users and stakeholder clusters are presented in Table 1, with examples and motivations.

Table 1. Target groups.

TARGET GROUP	Examples	Motivations
Scientific community and other projects	• Academia • Research organisations, research councils, research funding agencies • Universities, think tanks, etc.	• Scientific • Dissemination • Ad-hoc communication • Exploitation actions • Cross-domain collaboration/cooperation at national, European and international level

Geothermal industry	• Operators, consultants, investors, project developers, auditors (resource assessment community), technology developers, start-ups, service companies (e.g., engineering firms)	• Ad-hoc communication • Exploitation actions • Technology transfer • Customised services
Other industries and investors	• Oil & gas companies, electricity providers and producers. • Mining, equipment suppliers, banks, financiers, insurance companies	• Invest money to accelerate the market entry of green innovations and make long-term gains
Public authorities and lobby groups	• EU policy makers, national governments, regional institutions, local communities, NGOs, journalists, influencers	• Dissemination (popular science). • Ad-hoc communication • Exploitation actions • Activities focused on standards and protocols
End-users	• Users of HOCLOOP geothermal solutions. • Users of scientific and industrial tools and services developed in the project	• Reduction of energy costs. • Increased use of renewable energies • Reduction of environmental impact • Increased social acceptance.
General public	• Journalists, influencers, the citizens • Citizens and local stakeholders involved in co-creation processes as well as social innovation initiatives. • Associations/NGOs focused on environmental aspects and supporting the net-zero emission goals	• Be informed about latest technological trends and improved quality of life/health. • Ad-hoc communication awareness • Cost-benefits presentations

A coordinated approach that leverages the HOCLOOP consortium network has been set in place to reach all relevant stakeholders and decision makers, including renewable energy market players, to make them aware about the project, its development, and results. To achieve such goal and to maximize the visibility of the project, various activities and dissemination events are being set in place, (e.g., briefings, webinars, conferences).

2.2 Dissemination, exploitation, and communication type of actions

The European Commission (EC) sets a clear distinction between dissemination, exploitation, and communication. These activities shape the core part of a comprehensive promotion system, but with three different scopes and objectives i.e.:

- **Dissemination** is the public disclosure of the results of the project in any medium. Disclosure may sound passive, like a shop opening up, but it is an activity, like a shopkeeper attracting customers. It is a process of promotion and awareness raising right from the beginning of a project. It makes research results known to various stakeholder groups (like research peers, industry and other commercial actors...) in a targeted way, to enable them to use the results in their own work. In line with the EC definition, dissemination is considered here the set of actions aimed at increasing awareness and involving key user and stakeholder groups in a targeted way. Moreover, dissemination actions are considered mainly "one-way" actions, i.e. activities with few or specific feedbacks coming from the audience.
- **Exploitation** is the use of the results during and after the project's implementation. It can be for commercial purposes but also for improving policies, and for tackling economic and societal problems. In line with the EC definition, exploitation of results is considered here the set of actions aimed at reaching key actors in the market, such as for examples decision makers or European institutions, to foster the solution adoption (e.g., lobbying/ networking activities).
- **Communication** means taking strategic and targeted measures for promoting the action itself and its results to a multitude of audiences, including the media and the public, and possibly engaging in a two-way exchange. The aim is to reach out to society as a whole and in particular to some specific audiences while demonstrating how EU funding contributes to tackling societal challenges.

In line with the EC definition, communication is considered here the set of actions aimed at reaching the general public (and not only specific user groups) with traditional and new tools. Moreover, communication actions are considered mainly "two-way" actions, i.e., activities aimed at creating a flow of information, comments and exchange between Consortium and multitude of audiences and at encouraging discussion with general public (e.g., through social media).

2.3 Communication and dissemination obligations

The legal documents signed by members of the consortium, the Grant Agreement, and the Consortium Agreement, contain obligations related to communication, dissemination, and exploitation. This section presents the rules to be followed regarding communication and dissemination.

2.3.1. Informing the granting authority when planning high impact actions

According to article 17.1 of the Grant Agreement, beneficiaries must promote the action and its results by distributing target information to multiple audiences. If they engage in communication and dissemination actions expected to have major impacts, they should inform the granting authority in due time.

2.3.2. EU support acknowledgement and disclaimer

To ensure visibility and transparency, all recipients of EU funds have the legal obligation to explicitly acknowledge that their action has received EU funding (see article 17.2 of the Grant Agreement). The obligation requires all beneficiaries, managing authorities and implementing partners of EU funding to acknowledge the support from the European Union on all communication materials. Therefore, the European Union emblem and the funding statement must be displayed prominently on all printed and digital products, websites, social media channels and other communication products:

Funded by the European Union

Furthermore, any communication or dissemination action must use factually correct information. It must indicate the following disclaimer (see article 17.3 of the GA):

"Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or CINEA. Neither the European Union nor the granting authority can be held responsible for them".

2.3.3. Prior notice of any planned publication and dissemination activity

According to article 8.4.2.1 of the Consortium Agreement, prior notice of any publication activity shall be given at least 45 calendar days before the intended publication. Any objection to the planned publication shall be made in accordance with the Grant Agreement by written notice to the Coordinator and to the Party or Parties proposing the dissemination within 30 calendar days after receipt of the notice. If no objection is made within the time limit stated above, the publication is permitted. If no objection is made, the dissemination activity is permitted.

2.3.4. Prior approval before dissemination

According to article 8.4.5 of the CA, a party shall not include in any dissemination activity another party's results or background, names, and logos without their prior written approval.

2.4 Compliance with Open science practices

2.4.1. Open science practices in Horizon Europe projects and expected benefits

Open Science is defined by Horizon Europe as an approach to the scientific process based on open cooperative work, tools, and knowledge diffusion. Open Science includes open access to scientific publications, research data management and the active engagement of society, as well as optimal dissemination and exploitation of knowledge. In this way the advancement of knowledge can be accelerated by making it more reliable, efficient, and accurate, more easily understood by society and responsive to societal challenges.

By making project results and data accessible to all societal actors, other researchers, innovators, and the public can find and re-use these for their own specific needs. In this way, further research is encouraged, novel solutions can be found, and complex challenges can be tackled. The benefits of open science include[1]:

[1] European Commission, European Innovation Council and SMEs Executive Agency, Scherer, J., Weber, S., Alveen, P., et al., European IP Helpdesk: successful valorisation of knowledge and research results in Horizon Europe : boosting the impact of your project through effective communication, dissemination and exploitation, Publications Office of the European Union, 2022, https://data.europa.eu/doi/10.2826/437645

- Increased visibility of research, enhanced reputation and better understanding and support (also financially), by presenting research and its results not only to the scientific community, but also to potential industrial partners, policymakers and society at large,
- Exchange of knowledge on cross-sectoral and interdisciplinary levels will help discover novel approaches and solutions,
- Knowledge transfer, uptake and commercialization of novel technologies and results by industry, decision makers and the scientific community will strengthen Europe's research and innovation landscape,
- Making project results openly available and searchable will spread knowledge and allow that knowledge to be built upon.

Providing open access to peer-reviewed publications resulting from the project is mandatory for Horizon Europe funded projects. This includes articles and long-text formats, such as monographs and other types of books. Immediate open access is required i.e., at the same time as the first publication, through a trusted repository, and using specific open licenses (a Creative Commons license). Open access is encouraged for those publications that are not peer reviewed. Beneficiaries should also ensure open access to research data via a trusted repository under the principle 'as open as possible, as closed as necessary'. The Open Research Europe (ORE) platform, set up by the European Commission in 2020 can be used as an open access platform for scientific publications to fulfil the open access requirements.

2.4.2. HOCLOOP's Open science strategy

HOCLOOP conforms to the Horizon Europe open science policy[2] and will ensure open access of scientific results generated by the project to interested stakeholders. HOCLOOP will implement different actions to cope with the open science practices:

a) Disseminate project deliverables and results – as soon as possible – through appropriate means, including their diffusion via scientific publication (Article 17 of the Model Grant Agreement),

b) Ensure open access (online access to research outputs provided free of charge to the end- user) to all peer-reviewed scientific publications relating to its results (Article 17 of the Model Grant Agreement),

c) Manage the digital research data generated in the action responsibly, in line with the FAIR (Findable, Accessible, Interoperable and Reusable) principles (Article 17 of the Model Grant Agreement),

d) In order to provide clarity in intellectual property and assets management and to allow the European Commission to follow up and provide help when needed, the beneficiaries must indicate the owner(s) of the results (Results Ownership List) in the final periodic report (Article 16 of the Model Grant Agreement).

A Data Management Plan (D8.2) will provide further information on data and publications to be disseminated in an open science manner. It will help planning and structuring the research data management, to ensure that the relevant data is findable, accessible, interoperable and reusable ("FAIR"), as well as define the procedures involved in capturing, handling and managing the research data throughout the project's life cycle and beyond. Open Science should not affect the IP generated by

[2] European Commission, Directorate-General for Research and Innovation, Horizon Europe, open science: early knowledge and data sharing, and open collaboration, Publications Office of the European Union, 2021, https://data.europa.eu/doi/10.2777/18252

the project's research results and is based on an adequate management of IP. The DMP is aligned with the CDE plan.

2.5 Compliance with overall gender strategy

Gender issues in European project dissemination and communication activities are a complex and multifaceted problem that requires a comprehensive approach to overcome. The EU has made considerable progress in promoting gender equality in various fields, including research and innovation. However, gender inequalities persist in project dissemination and communication activities, which can negatively impact the effectiveness of these activities.

The EU Gender Action Plan III calls for a gender equitable world and provides a strategic, ambitious policy tool that sends a clear message of the EU's commitment to gender equality and women's empowerment in all areas of its external action4.

In line with the EU's Gender Action Plan (GAP), the HOCLOOP project supports gender equality in three main areas:

a) Advancing equal participation and leadership. Women are and will be included in the project work, both as researchers, administrative personnel, and work package/task leaders.

b) Strengthening economic and social rights and empowering women and girls. By encouraging women to take leading roles in HOCLOOP, the project will support women's career advancement, equal access to employment and financial opportunities.

c) Combatting gender-based violence. HOCLOOP Gender Action Plan will take steps to ensure that actors involved in the project follow a code of conduct prohibiting all forms of sexual harassment and other forms of gender-based violence.

When it comes to the dissemination and communication activities, to make sure that all processes are inclusive, a specific action plan, with main procedures has been set in place to address possible gender issue(s). In carrying out the activities we specifically pay attention to:

- Gender-neutral / sensitive wording: Gender-impartial language is implemented in the communication and dissemination activities. Our messages are structured to possibly avoid any bias towards a particular sex or social gender. When reporting informative data, this is reported in a gender-sensitive way.
- Gender-neutral images: As images can speak louder than words, we are attentive in selecting appealing images (especially for communication purposes). This means that the images used in our communication materials do not reinforce gender stereotypes and include a wide mix of people in different environments. Once both these criteria are met, the dissemination and communication processes are allowed to move forward.

In conclusion, overcoming gender issues in project dissemination and communication activities requires a comprehensive approach that addresses gender stereotypes and biases, promotes gender-sensitive language and visuals, and evaluates project dissemination and communication activities from a gender perspective. By taking these steps, we can create more inclusive and effective activities that promote gender equality and advance the EU's goals of innovation and sustainability.

3. INNOVATION AND EXPLOITATION STRATEGY

The main objective of this section is to provide insight into the first steps taken to develop the strategy for the innovation and exploitation of HOCLOOP results. It provides the guidelines to build the strategic exploitation plan. The innovation and exploitation strategy furthermore identifies the key exploitable results (KER) and the potential beneficiaries, determines the concrete business plan, and analyses associated IPR issues, as well as potential risks.

3.1 Innovation and exploitation strategy

The consortium's expertise will be optimally used to disseminate the project and its results towards the scientific community, actors on remediation and environmental agencies. Before any dissemination activity, relevant project results will be assessed for commercial potential by the Exploitation Board and protected as appropriate before disclosure.

Publications: Scientific publications and conference presentations are strongly supported by all partners who benefit from the quality assurance that comes with peer review of project results. We anticipate that breakthrough results will be targeted to high impact publications including Science, Nature and PNAS. Most publications on novel heat fluids for geothermal use will combine results from across WPs due to the interdisciplinary and interlinked nature of the research. Partners will also target specialized journals according to the scientific impact of their results.

Exploitation plan: The main goal of the exploitation plan is to effectively use the project's results through scientific, economic, political or societal exploitation routes, aiming to turn R&I actions into concrete value and impact for society and the industry. All Consortium partners as well as potential external exploitation partners will actively contribute to technology and knowledge transfer to enhance the exploitation potential of HOCLOOP's key exploitable results (KERs). In the first year, a preliminary exploitation plan will be developed with the partners, and it will be regularly updated to integrate new KERs and details on IPRs. The final exploitation plan will be finalized in M42 and it will report all the KERs and agreed exploitation routes. The project will deliver the following potential KER, as described in the table below.

Table 2. Key exploitable results

Key exploitable result	Potential users	Routes to exploitation	IPR strategy: patent, trade secret
Performance improvement of alternative CO2 based fluids and their engineering potential	Geothermal operators and stakeholders, smart grids and district heating/cooling networks, heat exchangers and fluid machinery manufacturers, research institutions working on the assessment of innovative fluid properties	Publications in scientific journals, articles in sectorial magazines (geothermal, energy, renewables, powerplants), pilot applications in geothermal, heat transfer, heating/cooling and powerplant industry	Engineering service sale: thermo fluid dynamic design and optimization of the horizontal borehole with alternative CO2 based mixtures customized on different geothermal and surface conditions. Patents on effective mixtures and the related engineering techniques. Patented Micro finned tubes with

			sCO2/ILs heat transfer enhanced features
Drill Heat String	Geothermal operators and stakeholders as above.	Pilot applications to verify performance. Publications and marketing.	Several patents around the DualPipe technology and the vacuum insulated string.
Modelling tools	Geothermal operators and stakeholders as above.	Publications and marketing. Case studies as a service.	Interest in the technology will generate need for improved models and work related to further developments.
Software for heat transfer optimisation	Heat exchanger (including borehole HX) designers and manufacturers	Contract research and software licensing	Own code development protected by software code protection.

3.2 Exploitation management structure

The main goal of the innovation and exploitation strategy is to turn the project results into value that impacts the society. Open science practice will be implemented in the HOCLOOP project and proper protection of results will be ensured before any disclosure. The Exploitation Board will evaluate the commercial potential of results before any dissemination activity and proper protection of the results will be ensured prior to any disclosure.

The intellectual property manager (IPM) will manage the execution of the overall exploitation plan of the project and support the partners in setting up their individual business plans to exploit the results of HOCLOOP. The IPM will also ensure that partners assess opportunities for applying for patents or declaring copyrights. In general, the IPM will ensure that partners respect the GA and CA in terms of IP.

3.3 Management of intellectual property rights (IPR)

The knowledge generated in HOCLOOP, and the respective intellectual property rights will be governed by the terms of the Grant Agreement (GA) and the Consortium Agreement (CA), both agreements based on the DESCA HEU model. All partners have signed the CA in order to ensure proper management of the generated knowledge, this includes ownership of results, transfer of results, dissemination, access rights to identified background, implementation and exploitation of results.

A summary of the IP management within the project is given in Figure 1. This includes a series of workshops to evaluate the outcomes and the potential exploitation pathways. More information about the defined workshops is given Figure 1.

Important questions to consider when evaluating the potential exploitation pathways are:

- What is the exploitable result?
- Can it be commercialized?
- Should the result be intellectually protected?
- Who is the target audience?
- Who is the owner of the results, one or more project partners?
- What is the time to market?

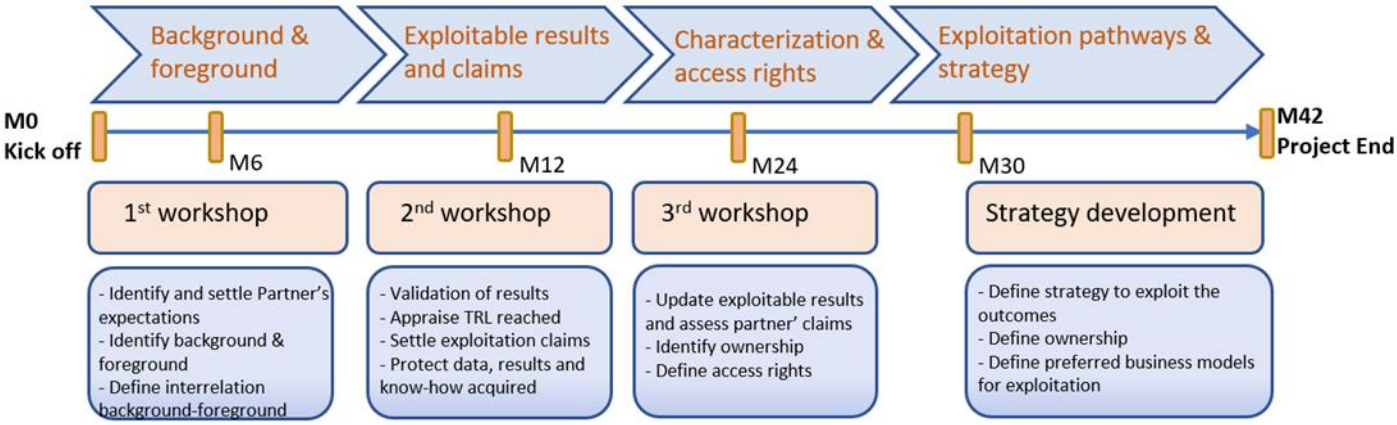

Figure 1. IP management within the HOCLOOP project.

Background and foreground

"Background" means any data, know-how or information, including any rights such as intellectual property rights, that is (a) held by the beneficiaries before they acceded to the CA and (b) needed to implement or exploit results. Partners may add additional background during the project period as long as they give written notice to the other partners and gets approval of the General Assembly.

"Foreground" means data, knowledge or IP produced during the project period. A partner is entitled to foreground when they have carried out the work generating the results.

The Partners have identified and agreed on background knowledge to ensure good and trustful cooperation during the project. The background for each Partner was first defined in "Attachment 1: Background included" in the Consortium Agreement.

Within the first six months of the project the first workshop on IP management will take place. The purpose of this workshop is to identify and settle the Partner's expectations related to defined background and foreground and define interrelation between the defined background and foreground.

3.4 Exploitable results and access rights

The key exploitable results will be updated and refined during the project period. During this process the project partners will gather information about the results and develop a characterization table for each KER, Table 3. This template might be updated as part of the exploitation process to ensure that all relevant information related to a KER is defined. This process is for the partners to identify know-how, technologies and services that can be commercialized by the end of the project and to identify the main ideas about ownership, possible markets, and suitable exploitation strategies.

Table 3 .Characterization table for exploitable results.

Characterization of exploitable results
▪ Name of the KER ▪ Partner(s) ▪ Short description of result ▪ Short description of innovation ▪ Potential users/markets ▪ Defined background

▪ Expected foreground ▪ IP rights for the results ▪ Routs to exploitation ▪ Possible IPR strategies

To develop and support this process a set of workshops will take place (2nd and 3rd workshop described in Figure 1). The preliminary defined KERs will be modified or confirmed, and their characterization and the partner's expectations clarified.

3.5 Strategy development

The last stage of the innovation and exploitation process is the strategy development for each KER. At this point the final strategy for exploitation of results will be settled together with defined ownership and preferred business models for exploitation.

Business models from the defined KERs should include the information listed in Table 4.

Table 4. Overview of content of a business model

Business model content
▪ Key partners ▪ Key activities ▪ Key resources ▪ Value propositions ▪ Customer relationships ▪ Customer segments ▪ Communication and marketing channels ▪ Cost structure ▪ Revenue streams ▪ Risk analysis

4. COMMUNICATION AND DISSEMINATION STRATEGY

The project's communication and dissemination strategy has the following main objectives:

- Raising awareness of HOCLOOP solutions,
- Engaging with stakeholders,
- Disseminating the project' results,
- Promoting the HOCLOOP industrial use cases,
- Setting up feedback channels to gather inputs from the target groups,
- Facilitating the market uptake of results by promoting their economic, technical, scientific, and societal benefits.

The following sections provide an overview of the key messages and channels as well as activities to be used to achieve these objectives. The results of the communication and dissemination strategy will

be constantly monitored to assess its effectiveness, progress, and to implement changes where necessary.

4.0 Communication aims

Communication activities will aim to:

- Increase awareness of the relevance of the novel and sustainable geothermal solutions.
- Reach the broadest audience of interested stakeholders (academic, industry and professional) and the general public.
- Advertise the project results both to the Scientific and Industrial communities, while protecting the IPR generated for future commercial exploitation and,
- Share the knowledge acquired using a capacity building approach targeted towards young students. For these activities, the Communication Departments of IFE and RW together with the Business Development Unit of IFE will provide the required support.

The outreach activities will include the development of press releases, articles, photography, interviews, and other material with the contribution of all beneficiaries. Throughout the duration of the project, the beneficiaries will amplify the communication surrounding the project through their networks and communication offices.

4.1 Key messages

To ensure a clear communication and dissemination strategy, a set of key messages and topics relevant for the project has been defined.

The following key topics are the most common and relevant for the project and will constitute the backbone of the HOCLOOP communication activities:

- Renewable energy.
- Modelling of heat transfer and fluid dynamics.
- Geothermal energy in closed loops.
- Extraction of heat.
- Drilling technology.
- Alternative circulation fluids for heat extraction.
- Electricity production and surface integration of geothermal energy.

Key messages should be direct, simple, clear, action-oriented concise and consistent. The following key messages are identified to be communicated:

- Achieve lower Levelized Cost of Energy (LCOE) by using an innovative horizontal closed loop solution for the extraction of heat from deep or shallow formation rocks,
- Improve the reliability of the power supply and grid stability,
- Develop advanced models to describe the heat extraction from rocks by the closed loop solutions in different geological settings.
- Develop novel advanced fluid dynamic tools to describe the fluid flow in closed loops for a more intensive exploitation of geothermal energy resources.

- Avoid the risks of seismicity, a general and well-known problem in regular geothermal exploitation schemes, by using the HOCLOOP solution.
- Improve the electrical energy production by using alternative fluids to water,
- Develop solutions making EU electricity production more cost-efficient and competitive,
- Integrate renewable energy sources in industrial settings,
- Communication channels and tools.

In order to engage with the target groups presented in Section 2.1., HOCLOOP will use a large variety of channels and tools in order to communicate and disseminate the project's outcomes. Furthermore, the project will operate as a communication channel to support relevant European Commission Energy Directives and legislation.

Communication and dissemination materials related to the project activities will be based on the HOCLOOP Corporate Identity (CI) toolkit, which is being developed in Task 1.4 (Task 1.4. Innovation Management, communication, and dissemination) together with a professional design agency. The CI toolkit comprises the project logo, a color palette, fonts, key visuals and templates for the newsletters, Power Point and word templates (e.g. for deliverables, press releases and articles). All elements of the CI toolkit are accessible to the project partners via the project SharePoint repository.

In the following, tools and channels used for the project communication and dissemination are presented.

4.1.2. Project Website

The project website is one of the main communication tools for EU funded projects. The HOCLOOP project website was published by M6 and is accessible under https://www.hocloop.eu/. The HOCLOOP website includes the following content:

- Project Homepage - General overview of the project,
- In a nutshell - Background, Objectives, Concept, Impact,
- Our partners - Short descriptions of the project partners, their contribution to the project and contact information,
- Implementing HOCLOOP – Project implementation plan,
- News & events – News about the project,
- Deliverables & Library– Public deliverables, communication materials,
- Contact.

The website will be administrated and maintained by project coordinator IFE and will be updated on a regular basis with the latest results and news concerning the project. Additionally, it will be maintained for at least 2 years after the project. Moreover, the website offers the possibility for visitors to subscribe to the newsletter, to follow the project's social media accounts, and to contact the website administrator via a dedicated contact form.

The main target audience of the website are industrial stakeholders and research organizations working on projects and topics related to the geothermal energy industry and, to a lesser extent, people interested in these topics in general. The expected key performance indicator (KPI) for this channel is 100 visits per month, 20% returning visitor rate and 20 downloads once public reports are uploaded.

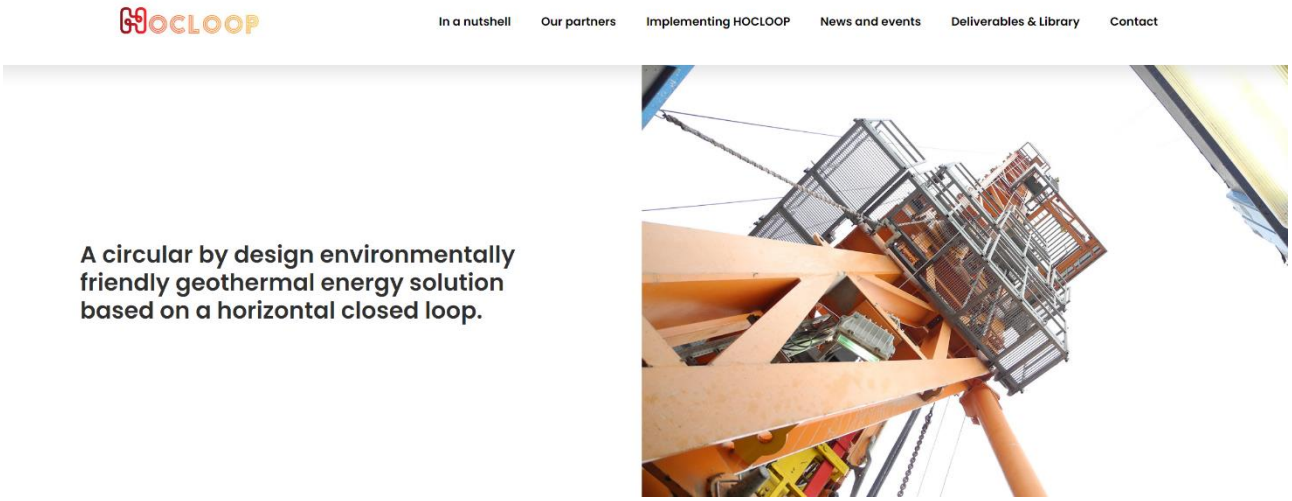

Figure 2. HOCLOOP website: Homepage

Figure 3. HOCLOOP website: Homepage (2)

Figure 4. HOCLOOP website: Our partners

4.1.3. Social media channels

Social media channels (LinkedIn, Twitter)

Social media channels have become an effective way to expand reach and foster stakeholder engagement and interactive communication. Two social media channels are planned to be set up in September 2023 to support the HOCLOOP communication and dissemination activities:

- LinkedIn profile: https://www.linkedin.com/company/hocloop-project/, @HOCLOOP Project
- Twitter profile: https://twitter.com/hocloop, @hocloop

The accounts are managed by the project coordinator IFE. They will regularly publish general information on the project, participation in events, updates on the project advancement, etc. The consortium will support IFE and provide inputs. Moreover, all partners will contribute to giving the project more visibility via their own channels by following, likes and shares of the posts to disseminate them as widely as possible, including in their national languages. When tweeting or referring to the project in other social media, partners are encouraged to use hashtags and mention the project by using its handle.

For this purpose, a preliminary list of hashtags to be regularly used has been defined:

#HOCLOOP

#geothermal

#geothermalfluids

#HorizonEU

#renewables

#renewableenergy

Also, more Research-oriented social media, such as ResearchGate (https://www.researchgate.net/), could be leveraged as well, through the activity performed by the HOCLOOP researchers.

4.1.4. Promotional videos

Videos have become a crucial tool in the communication activity of individuals, businesses, and organizations. The relevance of videos can be attributed to their ability to convey messages in a visually appealing and engaging manner. Videos have the power to capture the attention of the audience and retain it for longer periods, making them an effective medium for storytelling, marketing, and education. They are often shared on social media platforms to reach a larger audience and can be shared across multiple platforms, making them a powerful tool for communication. Videos can effectively convey the unique selling proposition of a product or service and generate interest among potential customers. Therefore, to showcase the progress of HOCLOOP project, two (2) short videos will be created and released respectively in M26 and M40. These will be published on YouTube and crosslinked with the HOCLOOP website. They will be used across social media, as well as a supporting video material during HOCLOOP showcases and presentations during events and conferences.

4.1.5. Other communication channels

The project will be communicated to the public also at large scale using other more traditional communication channels i.e., via press releases and publications in news media, magazines at local and regional level. The content will cover general information, latest news and HOCLOOP developments.

EU and international media at project level will be leveraged. In this sense, local and national media at city/ region level will be used. In particular:

- At EU level: Regional and national mass media of the EU members and Norway will be reached;
- At international level: the main international mass media and specialised channels will be targeted.

At project milestones, press releases will be issued centrally to international media list, and also adapted, and disseminated to the local press (both broad and specialized), as well as to all project and partner networks, platforms, and stakeholders. All partners will disseminate non-confidential information of the project in their national language to local/regional newspapers and media. The press releases will be uploaded to the main page of the project website and made available to the general public and will also be distributed via various media channels.

4.1.6. KPIs for Communication

To quantify and track the effectiveness of communication activities, some Key Performance Indicators (KPIs) have been identified:

Table 5. Communication KPIs

Item	Goal	#	KPI
Exploitation of website	Reaching the widest audience possible, by using the website for promotional activity and regularly update it with news related to the project development and achievements	5000 20	5,000+ unique views 20 news on the website
Social media channels	Channels/ profiles to increase exposure of the project and create a large online community of interested parties.	2	2 channels, 500 followers, 7000 people reached
Videos	Outreach wide audience	2	500+ views
Other communication channels	Spreading HOCLOOP results on traditional mass media (via press releases and participation in radio, newspapers, magazines at local and regional level and TV)	4	4 media appearances, 200k people reached[3]

4.2 Dissemination actions

Numerous dissemination and communication activities will be carried out within the HOCLOOP project to engage with stakeholders and promote the project's outcomes. In the following sections the different activities are described in more detail.

4.2.1. Dissemination goals and activities

A set of dissemination and communication activities will be performed to ensure the maximum impact of the project on industry, the research community and the whole society through high transparency and as wide as possible dissemination of the research results. The main objectives of the dissemination activities for HOCLOOP include:

- Promoting scientific excellence and innovation, targeting the developments for geothermal applications.
- Technology transfer of the R&D+I results to the industry, environmental consultants, stakeholders, renewable energies, raising awareness of the usefulness of the developed methodologies, for a better understanding of geothermal exploitation resources.
- Generate market demand for the technologies and products developed, to increase the exploitation.
- Retaining Europe at the international leading edge of research by developing breakthroughs concepts and exploiting platforms in geothermal energy.
- Contributing to knowledge exchange and mutual learning, and encouraging talented students, scientists, and engineers to join our partner institutes and enterprises.
- Fostering public awareness, engagement and understanding of science and technology energy-resources related, as well as drawing the attention of national governments and regional authorities.
- Attract the interest of potential partners and public or private investors.

[3] C. 50,000 people impacted per media appearance is estimated for traditional mass media channels.

- Enhance partners' reputation and visibility at local, national and international level.

4.2.2. Project logo

The HOCLOOP logo has been designed to provide an immediate and visual indication of the project. The project logo must be placed on all published materials (Figure 5). This includes not only promotional material, but also deliverables, event announcements, factsheets, infographics, presentations, or agendas.

Figure 5. HOCLOOP logo

4.2.3. Project flyers and brochures

Several specific project brochures/leaflets will be prepared and released in English and translated to different languages (e.g. Norwegian, French). This will allow to support the overall project dissemination activities by providing information about the HOCLOOP's objectives, achievements, and expected results, and will be updated accordingly throughout the duration of the project.

In detail, these will be made available to the HOCLOOP Consortium partners for workshops, for the participation at conferences and events, and they will also be available on the project's website. The first HOCLOOP flyer has been prepared and released at the end of M6. It is going to be used as a shareable material for social media, and for dissemination purposes during events, as well as downloadable from the website.

The release of further project brochures and materials has been already planned across the 42 months of the project. However, to address specific timing needs - should it be the case - the release of such materials may change to serve specific events, conferences, etc.

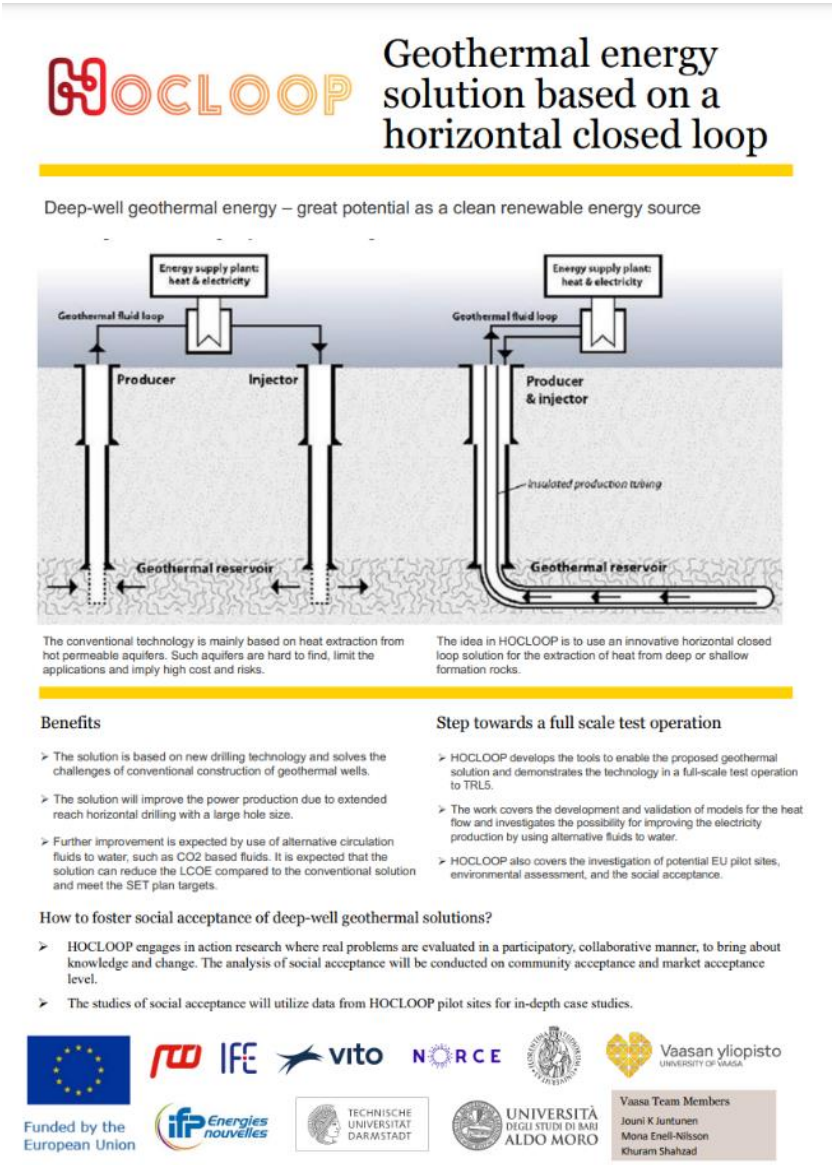

Figure 6. HOCLOOP flyer

4.2.4. Publications

In view of the dissemination activity, HOCLOOP will target the production of high impact contributions to be disseminated through peer-reviewed publications. The publications will be made available Open Access by using the Golden Route, in which the publications will be made available Open Access directly at the Publisher. The articles and results will also be published on Open Research Europe to provide free and full access to the research. Potential journals for publications are listed in the SCI with an impact factor higher than 1.0, such as Renewable Energy; Renewable & Sustainable Energy Reviews; IEEE Transactions on Power Systems; Applied Energy; Energy; Energy Economics, Joule, Sustainability; Energies; Earth System Science Data; Geothermics etc.

To facilitate the uptake of HOCLOOP's results in research and ensure knowledge and technology transfer HOCLOOP will publish at least 15 scientific publications. As a first step the partners identified

possible publication topics (see Table 6). Table 6 will be refined and updated during the project duration, as the project partners achieve results and have more precise plans regarding their planned publications. Researchers will upload publications in openAIRE, the online repository Zenodo and on the project public website.

Table 6. Potential publication topics

LEADING PARTNER	Potential topic
IFE	Heat transport modelling: 3-D visualization tools of the rock temperature and the heat flow based on the geological characteristics of the formation for arbitrary well-geometries and paths. Development of benchmarking tests to validate the numerical temperature solutions for the rock. Novel businesses for geothermal energy exploitation.
UNIFI	Characterization of CO2 and CO2-based fluid mixtures as heat carriers in geothermal heat extraction in closed-loop systems. Thermodynamic properties of CO2-based fluids. Modelling the heat transfer, natural circulation and pressurization features of CO2 and other CO2 based SF and ILs in the borehole and at surface.
VITO	Impact assessment of heat extraction from horizonal closed wells on Geo-thermal power plants. Case-study of the application of the HOCLOOP concept at the Balmatt plant based on the results of the simulations underground and possible surface integration.
IFPEN	Simulation of water and CO2 as thermal carrier fluids in the closed loop system considering the natural flow of water in the rocks. Optimization of the design of the closed loop system by simulations based on the relevant parameters for its performance: fluid flow rate, injection temperature and well geometry, etc. Integration of the surface modelling in the subsurface heat transfer flow model to improve the design of both the underground loop and the above ground energy system.
TUDa	Evaluation of the HOCLOOP solutions in comparison with the vertical borehole heat exchanger scenario. Conceptual pre-designs of both the underground loop and the above ground energy system for each of the pilot sites evaluated. Modelling data and step-by-step tutorials for analysis of deployment of the HOCLOOP concept.
VAASA	Analysis and in-depth evaluation of the acceptance of geothermal exploitation based on the HOCLOOP concept on the societal level (considering the perceived risks of conventional geothermal exploitation and the mitigations presented by HOCLOOP), and on the market level.
UNIBA	Characterization of novel ionic liquids as heat carriers in geothermal heat extraction in closed-loop systems as an alternative to water. Thermodynamic properties and behaviour of ionic liquids used as thermal fluids. Analysis of the impact of a closed loop system for geothermal heat extraction on seismicity-driving parameters. Minimization of seismicity in the exploitation of geothermal sources using the HOCLOOP concept.
NORCE	Technical details of field-pilot deployment of a closed-loop system for extraction of geothermal heat. Evaluation of performance and techno-economic feasibility of real exploitation.

A list of scientific journals that support open access publication is given in the following table.

Table 7. List of potential open-access publication platforms to be used for HOCLOOP's publications

NAME OF JOURNAL	Editor	Area of interest
Open Research Europe **Weblink**	European Commission	All
IEEE Open Access Journal of Power and Energy **Weblink**	EEE journals	Renewables
European Journal of Operational Research **Weblink**	Elsevier	Methodology of operational research and the practice of decision making
Renewable Energy **Weblink**	Elsevier	Renewables
Energies **Weblink**	MDPI	Renewables
Renewable and Sustainable Energy Reviews **Weblink**	Elsevier	Renewable and Sustainable Energy
Joule **Weblink**	Elsevier	Sustainable energy
Geothermics **Weblink**	Elsevier	Geothermal Research and its Applications
Energy Economics **Weblink**	Elsevier	Energy economics and energy finance
Energy **Weblink**	Elsevier	Energy engineering and research
Applied Energy **Weblink**	Elsevier	Energy
Frontiers in Energy Research **Weblink**	Frontiers	Energy
Procedia CIRP **Weblink**	CIRP	High quality proceedings from CIRP conferences
Expert System with Applications **Weblink**	Elsevier	Expert and intelligent systems applied in industry, government, and universities worldwide

4.2.5. E-newsletter

An e-newsletter shall be released and regularly distributed by email to inform on HOCLOOP news and events. Interested users can register on the public website to receive the HOCLOOP e-newsletter, by filling in a registration form, where they can record their e-mail addresses. Users have the possibility to unsubscribe the e-newsletter at any time. The published newsletters will be available also in the HOCLOOP web site.

4.2.6. International conferences and fairs

Together with the publication of results in scientific and industrial publications, the visit of international conferences and fairs will be a crucial lever to disseminate the project' findings to a scientific and technical audience. This way, the partners will facilitate the market uptake of the HOCLOOP solutions, connect with stakeholders, enhance knowledge transfer, and exploit synergies with other EU & international projects. Partners of the HOCLOOP project plan to participate in at least ten exhibitions, scientific conferences, workshops or industrial events. Scientific conferences will offer a further opportunity for partners to present results in the form of papers and posters.

The following table lists events, relevant to the HOCLOOP topics, that project partners attended or plan to attend to disseminate results and connect with the main target groups.

Table 8. International conferences and fairs

EVENT NAME	Date and location	Website
Energy Week	20-24 March 2023 Vaasa, Finland	Weblink
GeoEnergy 2023	5-6 June 2023 Bergen, Norway	Weblink
EAGE GET 2023	14-17 November 2023 Paris, France	Weblink
ENLIT Europe	28-30 November 2023 Paris, France	Weblink
World Sustainable Energy Days	5-8 March 2024 Wels, Austria	Weblink
All-Energy Exhibition and Conference	15-16 May 2024 Glasgow, UK	Weblink
The Smarter Europe	19-21 June 2024 Munich, Germany	Weblink
Smart Energy Systems International Conference	Tbd Copenhagen, Denmark	Weblink
Sustainable Places Conferences	Tbd	Weblink
European Sustainable Energy Week	Tbd Brussels, Belgium	Weblink
Energy Week	10-14 March 2024 Vaasa, Finland	Weblink

4.2.7. Synergies/interactions with other projects and initiatives

Projects under the same call often share goals and aim at similar audiences. Connecting and clustering with likeminded beneficiaries e.g., by following their social media channels, can attract each other's followers, enlarging the community of interested individuals and organizations.

HOCLOOP aims to actively build synergies with and share knowledge with similar R&D projects and networks/clusters. The Consortium will make use of the up-to-date knowledge and outcomes from other Geothermal projects in which one or more partners were involved: GEOENVI, GECO, GEMex, REFLECT, GEOSMART. Possible synergies are:

- Exchange of knowledge through workshops and participation in EU networks,
- Build on experience gained during the implementation of the projects,
- Joint communication activities (e.g., common participation in events and joint presentations/workshops, common newsletter articles, etc.),
- Cross-feeding of social media channels.

Alongside this objective HOCLOOP will co-organize and participate in joint workshops and networking sessions. Related outcomes will be published at HOCLOOP web site. More EU projects and possible clusters for collaboration are going to be further identified together with partners.

4.2.8. Publication of a project guidebook

The project guidebook will be one of the most important dissemination tools of HOCLOOP. This guidebook will contain a short presentation of challenges faced by the geothermal energy sector in the EU, a detailed presentation of key exploitable results of HOCLOOP, and a description of newly produced training materials. This guidebook will be written in an easy and accessible way to be suitable for as many target groups as possible. It will be made available to the general public for download on the project webpage and a few printed copies will be handed to project partners to foster the uptake of results.

4.2.9. Final event

Final Event Presenting the outcomes of the HOCLOOP project, a Final Event is envisaged in M42. This event will bring together all the partners, the stakeholders and citizens, to show the project's achievements and showcase the strength of the network but also to disseminate target audiences and raise awareness.

4.2.10. KPIs for Dissemination

To quantify and track the effectiveness of dissemination activities, some Key Performance Indicators (KPIs) have been identified:

Table 9. KPIs for Dissemination

ITEM	Goal	#	KPI
Logo	To grab attention and make a strong first impression and reach the widest audience	1	Logo ready
Website	Create a user-friendly website	1	Website launched
Project flyer/brochure	To reach a large audience. These include flyers, brochure/leaflets and banners, for distribution at conferences and trade shows as well as networking activities/events	5	4 project leaflets 1 banner Expected reach 1000+ people
Scientific publications	Articles in scientific journals and posters, spreading HOCLOOP scientific results to the scientific audience. (Impact factor of publications higher than 2.0)	15	2000+ views
Conferences	Participation in key events, international conferences and events dedicated to RI showcasing	12	200+ attendees per event
Project guidebook	To disseminate project results among stakeholders and wide audience	1	1000+ copies distributed
Final event	Organisation of a final event	1	150+ attendees

5. CONCLUSIONS

This document illustrates the plan for the innovation exploitation and communication for the HOCLOOP project, both covering activities already performed during the first months and those planned for the rest of the project. Most of these activities have been already presented in WP1 on the Coordination, management, and communication of HOCLOOP results. As seen, dissemination is the core activity for HOCLOOP promotion. In detail, the dissemination actions for awareness lay the grounds of the overall strategy, given the innovative solution proposed by HOCLOOP and the final product stemming from the

R&D are currently not known for most U&S. The website and the participation in international conferences and events are the key channels for dissemination.

Specific communication actions are foreseen to reach a wider audience, when relevant and possible. Nevertheless, these actions play a secondary role in the overall HOCLOOP promotion scheme, considering the scope of the project, mostly related to professionals more than mass market target audience.

It is to be noted that for all these activities, gender-neutral and gender-sensitive language is utilized and a specific action plan related to communication and dissemination has been set in place. This allows to ensure that the gender dimension is integrated as a transversal issue in the HOCLOOP project activities.