Horizon Europe Programme

HORIZON-WIDERA-2021-ACCESS-03

TWINNING TO SUSTAINABLE ENERGY TRANSITION

WP5: OUTREACH AND SUSTAINABILITY

DELIVERABLE 5.2 - PLAN FOR COMMUNICATION, DISSEMINATION AND EXPLOITATION ACTIVITIES (version 2)

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ABBREVIATIONS

UiS	University of Stavanger
IFPEN	IFP Energies Nouvelles
FORTH/IG	Foundation for Research and Technology Hellas / Institute of Geoenergy
NCSR "Demokritos"	National Centre for Scientific Research "Demokritos"
IFE	Institute for Energy Technology
TUC	Technical University of Crete
NTUA	National Technical University of Athens
MOOCs	Massive Online Open Courses
CCS	Carbon Capture and Storage
UHS	Underground Hydrogen Storage
SET	Sustainable Energy Transition
TG	Target Group
CDE	Communication, Dissemination and Exploitation
KPI	Key Performance Indicator
KER	Key Exploitable Results

1 INTRODUCTION

1.1 Project overview

EU is facing a pressing challenge to make the transition towards a carbon neutral economy by 2050, with an intermediate target of 55% CO2 reduction emissions compared to 1990. Greece is lagging in the energy transition process due to several reasons, such as the high share of natural gas in the electricity generation mix on a permanent basis, the use of fossil fuels (lignite) in high-demand periods and a lack of industrial plans to exploit CO2 capture and storage technologies or the penetration of geothermal energy into the electricity mix.

Geosciences can play a fundamental role in energy transition through technologies that make use of underground resources, such as the geological storage of CO2 and hydrogen and as a source of geothermal energy. This is the foundation of the TWINN2SET project, a partnership between the Institute of Geoenergy of the Foundation for Research & Technology – Hellas (EL), the University of Stavanger (NO) and the IFP Energies Nouvelles (FR). As a Twinning project, the focus falls onto knowledge exchange, mentoring and capacity building of the widening partner in the domains of a) Carbon Capture and Storage (CCS), b) Deep Geothermal Energy and c) Underground Hydrogen Storage (UHS). Complementary to the educational programme is the research part of the project which will focus on UHS, fostering interdisciplinary competencies at the interplay of a promising energy vector with subsurface reservoir characterisation, modelling, and monitoring. Overall, the TWINN2SET project will provide a coherent network that will strengthen interactions between members of the consortium and will enable the newly established FORTH/IG to participate in the European R&I process on Energy Transition.

1.2 Scope of WP5 Outreach and Sustainability

The objectives of WP5 – Outreach and Sustainability are to achieve the highest possible visibility and impact of the TWINN2SET project through continuous communication and dissemination of project results and to raise awareness at the national and EU level during and beyond the project's lifecycle. WP5 includes the development of a Communication, Dissemination and Exploitation (CDE) strategy and monitoring framework of outreach and networking activities; the set-up of an advanced High Pressure-High Temperature Lab facility at FORTH/IG with specifications provided by the advanced partners; the formulation of a common research strategy for the project and beyond.

1.3 Scope of D5.2 Plan for Communication, Dissemination and Exploitation activities

Task Leader: FORTH/IG; Partners involved: UiS, IFPEN; task duration: M1-M36

The CDE Plan sets out the roadmap for the effective implementation of TWINN2SET actions to embrace stakeholders in the project's outcomes and maximise its impact. The plan consists of three main sectors (Figure 1):

- **Communication** – aims at raising public awareness on issues related to the energy transition and making the scientific aspect of all related technologies accessible to the non-specialist.
- **Dissemination** – aims at promoting the project's results to the scientific community and training the next generation of scientists on topics related to sustainable energy transition (SET).
- **Exploitation** – aims at the promotion of technical knowledge generated through the project to end-users and the potential uptake of produced tools by the industry.

A suite of tools, methods and channels will be used to reach the objectives of the Communication, Dissemination and Exploitation Plan, each suited to the specific needs of the target audiences.

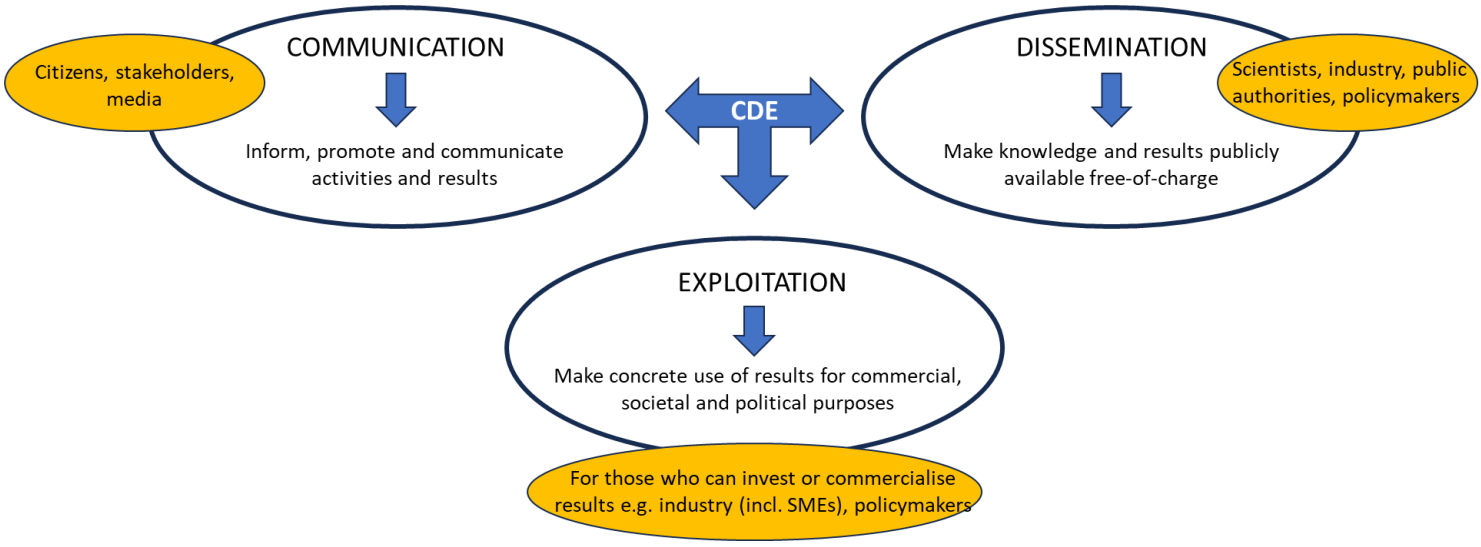

Figure 1. Sections, objectives and target groups of the Communication, Dissemination and Exploitation Plan.

1.4 Internal communication

Internal communication plays a vital role in ensuring an efficient execution of the project to maximize results. It is key to guarantee clear communication among partners and facilitate the exchange of ideas and interaction between work packages.

The members of the consortium will have the chance to communicate through:

- Project meetings: held annually with physical attendance. All partners participate and update the whole consortium on the state of the project and discuss the upcoming steps. Two project meetings have been accomplished so far, the kick-off meeting in September 2022 and the 2nd year project meeting in September 2023, both at FORTH/IG.
- Technical meetings: held in-between project meetings with either physical attendance or online. A technical meeting was held at IFPEN in January 2024 with physical participation. A virtual technical meeting was held in March 2024 with participants from all partners to prepare the project's midterm report.

The main tools used by partners for periodic communication will be:

- Email: a project mailing list has been created. The list includes the contact details of all staff involved in the project and identifies the contact person from each partner for every work package.
- Teams: this platform is used to host video calls among partners
- Google drive shared folder (TWINN2SET)

The involvement of all partners is key for a successful dissemination of the project, every partner will allocate time to dissemination and communication activities. Partners should support dissemination by:

- Making presentations referring to the project/about the project at conferences and other events and sharing them within the consortium partners

- Keeping records of all their dissemination activities (such as presentations in an event) as these will be needed for reporting purposes (template to be developed to collect dissemination activities of all partners).
- Using their institution's communication tools to support the dissemination of TWINN2SET (website, newsletters, social media accounts…)
- Linking TWINN2SET 's website to their own websites
- Inviting colleagues/interested parties to sign up for the TWINN2SET 's newsletter and follow the project on social media channels.
- Circulating TWINN2SET 's materials (e.g. leaflets, policy briefs, reports) to colleagues/ potential interested parties that are not yet on the project's mailing list.

2 Communication, Dissemination and Exploitation Plan

2.1 Target groups

We have identified 6 target groups (TG) that the Communication, Dissemination and Exploitation Plan will reach out to. These are:

TG1 TWINN2SET scientists and support staff, early-stage researchers, and students

TG2 The scientific/academic community

TG3 Heavy-emitting industry

TG4 Financial actors

TG5 Policymakers/Governmental bodies

TG6 Energy Communities

TG7 Citizens & NGOs

2.2 Messaging

Table 1. Messages intended for each TG and methods to achieve their communication.

TG	Need	Method
TWINN2SET scientists and support staff, early-stage researchers, and students (TG1)	Building excellence, strengthening of the scientific and innovation capacity of the newly established FORTH/IG. Train the future generation of scientists and future professionals on the skills required by the green economy. Career development of young scientists	Technical training through MOOCs on energy transition Summer schools & field visits Short-term visits to advanced partners. Joint case studies between IG/FORTH and each of the advanced partners. Organisation of conference at the end of the project. Workshops on soft skills development (gendered aspects of energy transition, ethics, RRI, the economy of hydrogen, IPR protection).

	Strengthen the research management capacities and administrative skills of IG/FORTH	Workshops on proposal preparation, grants management and IP management.
Scientific/academic community (TG2)	Increase the international visibility of FORTH/IG through networking and building collaborations.	Conference attendance, open-access publications and joint research strategy with advanced partners, networking strategy. Funds allocated for invited speakers at dissemination events.
Heavy-emitting industry (TG3)	Exploration of adoption pathways of CCS, UHS and geothermal energy by heavy emitting industries and interactions between standardisation bodies and investors.	Workshops with major emitting industries requiring to drastically reduce their direct environmental footprint
Financial actors (TG4)	Foster dialogue for a common vision on Sustainable Energy Transition (SET) among important actors of society, especially of the Cretan ecosystem, such as policy makers, industries, businesses, financial institutions, NGOs, and the public.	Policy briefs aiming at the inclusion of geothermal energy, UHS and CCS in the national roadmaps as enablers of energy transition. Development of a decision-making tool for the relevant authorities/agencies on UHS.
Policymakers/Governmental bodies (TG5)		
Energy communities (TG6)		Workshops on citizen engagement by involving energy communities in Crete
Citizens & NGOs (TG7)		Website, social media (Twitter + LinkedIn), YouTube, visual identity and two videos (onset & end of the project), newsletters, factsheets, collaboration with Europe Direct, local press and participation at local events.

3 Communication channels

3.1 Visual identity

Logo. A common branding was developed during proposal preparation to ensure an immediate recognition of the project. The logo, as the visual messenger of the project, will be used by all templates, reports, and dissemination activities throughout the project (Figure 2).

Figure 2. TWINN2SET logo

Dissemination templates. Templates for Microsoft Word, Microsoft PowerPoint, and Microsoft Excel were developed by FORTH/IG. TWINN2SET partners will use these during the project for presentations, reporting, newsletters, etc. The templates were developed following any applicable rules and regulations of the European Commission.

Disclaimer. As included in TWINN2SET's Grant Agreement, all the material used in the Communication and Dissemination of the project must contain the EU Disclaimer (Figure 3). All partners are invited to use the following disclaimer:

This project has received funding from the European Research Executive Agency (REA) under grand agreement No 101079246. The current document reflects only the author's view. REA is not responsible for any use that may be made of the information it contains.

Figure 3. TWINN2SET disclaimer

3.2 Website

The website is the main communication and dissemination platform of the project, allowing stakeholders and others to access the project aims, development, and results. It reflects the support of the EU Commission. The TWINN2SET project website is secured within FORTH/IG servers at the following address: https://twinn2set.ig.forth.gr/

The homepage of the website presents a few key facts to spark the interest of the visitor and comprises of six sections: Project, Partners, Activities, People, Recruitment and Events/News (Figure 4).

The website will give access to all public deliverables, the bi-annual newsletter and promote relevant content (news, videos, events) for the key stakeholder groups. It will be regularly updated to include the significant flow of research (such as laboratory set-up, experimental work, publications, talks and poster presentations) and milestones.

To increase outreach, the website is directly connected to the project's social media profiles (LinkedIn, Facebook) for a wider dissemination to technical and non-technical audience and linked to all partners websites.

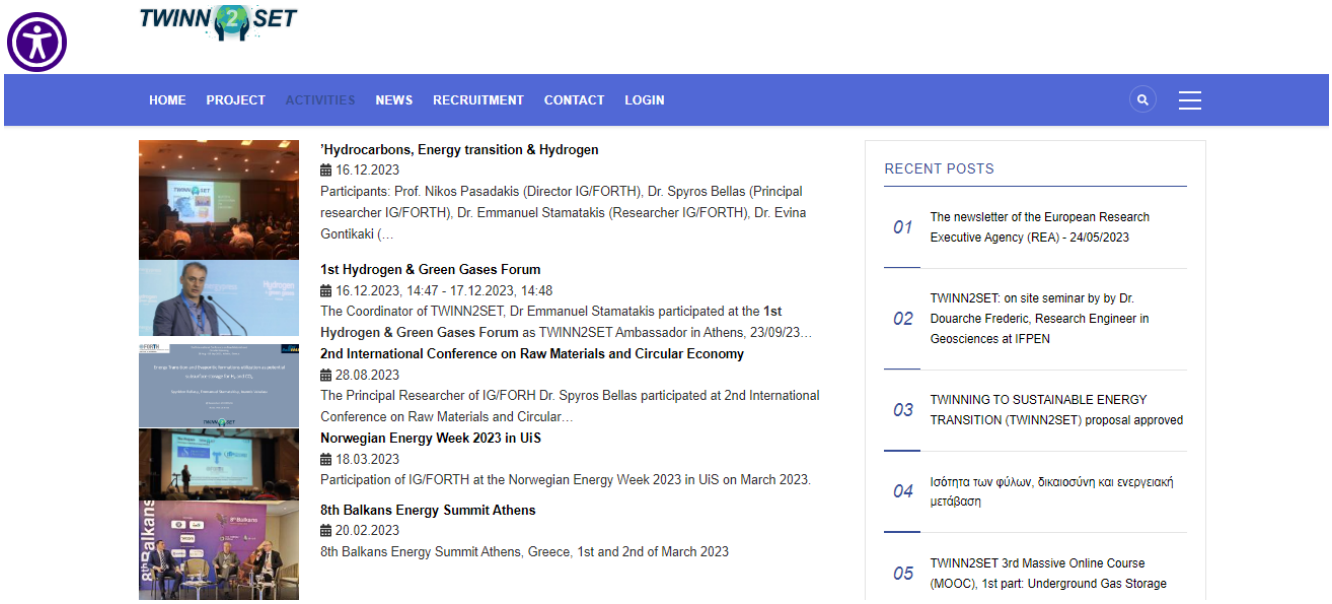

Figure 4. TWINN2SET website.

3.3 Social media

News and events relative to the TWINN2SET project are announced at the official accounts of FORTH/IG in Facebook (https://www.facebook.com/ig.forth) and LinkedIn (https://www.linkedin.com/in/institute-of-geoenergy-b18a39254/) and the LinkedIn accounts of UiS (https://linkedin.com/school/university-of-stavanger/) and IFPEN (https://www.linkedin.com/school/ifp-school/).

3.4 Promotional material

The TWINN2SET brochure (Figure 5, left) will be developed to raise awareness and increase the project's visibility among the non-specialist community as well as relevant stakeholders. It will be distributed to partner organisations to be further distributed through their networks and channels and on public events. Paper printouts will be kept to a minimum for environmental reasons. A banner has also been created for citizen events, exhibitions and summer schools (Figure 5, right).

Figure 5. TWINN2SET promotion material (brochure on the left, banner on the right)

3.5 Newsletters

A bi-annual newsletter will be created to provide updated information about the project to the relevant key stakeholders. The newsletter will be sent electronically and uploaded on the project website, and consortium partners will share it via their respective mailing lists.

The objectives of the newsletters are to:

- Increase public awareness regarding the Energy Transition
- Increase the project's visibility
- Communicate the project's results and activities to the public
- Increase website traffic
- Collect feedback

The design of the newsletter will be in-line with the pre-defined visual identity.

The 1st newsletter of TWINN2SET was published during the 1st period of the project and is available using the following link: https://twinn2set.ig.forth.gr/node/237

3.6 Press releases & local press/events

Articles in local press will be pursued throughout the project. The partners will also participate in local exhibition & fairs, Europe Direct events, MSCA and Citizens (formerly called "Researcher Nights").

Examples of communication in local press and news webpages related to TWINN2SET are listed below:

- Article in local press on the TWINN2SET workshop "Gender aspects of energy transition". https://www.haniotika-nea.gr/imerida-institoytoy-geoenergeias-toy-ite-sta-chania/
- Article in thematic magazine on the TWINN2SET event for the public on the "Social Impact of Energy Transition". https://www.thermoydravlikos.gr/stis-3-oktovrioy-sta-chania-i-imerida-toy-ite-gia-tis-koinonikes-epiptoseis-tis-energeiakis-metavasis/

A featured article (Figure 6) was published in the Innovation News Network and will be included in the 16th edition of the quarterly publication of the magazine (The Innovation Platform Issue 16, pp 277).
https://www.innovationnewsnetwork.com/twinn2set-twinning-to-sustainable-energy transition/39883/

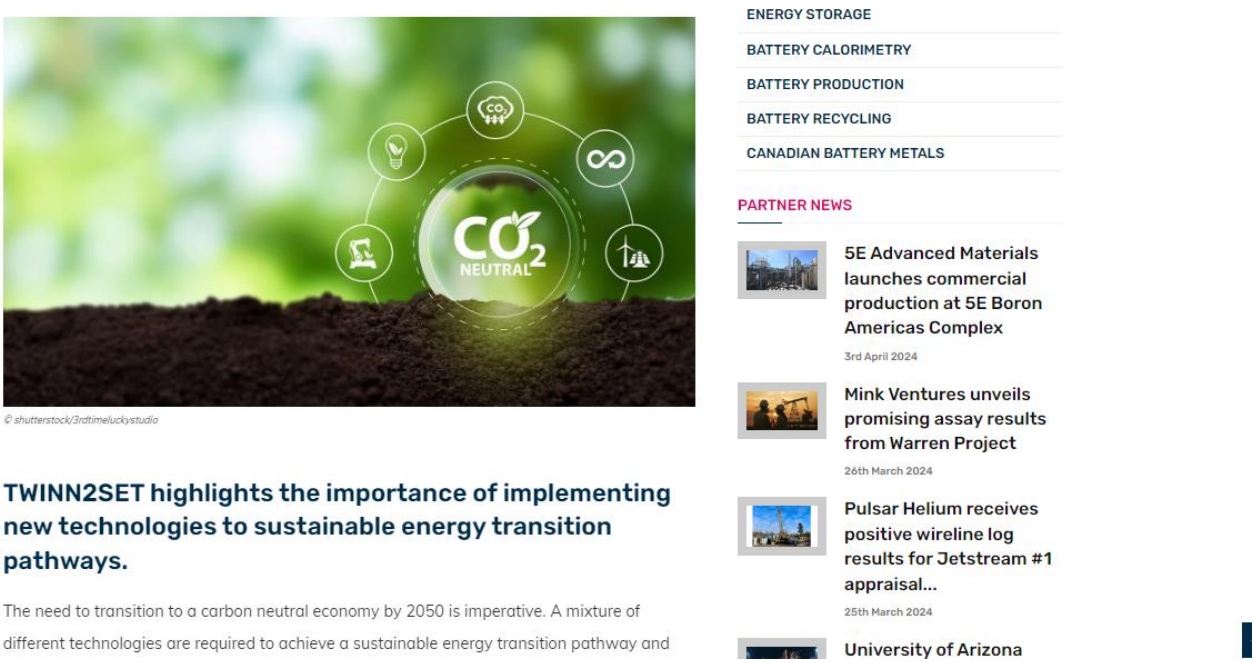

Figure 6. TWINNSET's article, Inn. News Network, 15/11/23

Citizen Engagement event organised by FORTH/IG on 28/9/2023 with support from TWINN2SET. The half-day event included talks and a photography exhibition on the topic "Energy transition and climate change" (Figure 7).

Figure 7. Citizen engagement event

3.7 Promotional videos

Two promotional videos will be prepared midterm and at the end of the project. Additional videos from outreach events will also be uploaded on FORTH/IG's YouTube channel:

www.youtube.com/@instituteofgeoenergy7456

3.8 Workshops with non-academic actors

Workshops with actors in heavy emitting industries, such as cement production (e.g TITAN) and chemical companies, consumer goods companies as well as oil and gas (e.g MOTOR OIL). These workshops will also host policy makers, targeting awareness raising and stimulation of mutual understanding of the industry challenges underpinning the transition to a green economy.

4 Dissemination channels

4.1 Massive Online Open Courses (MOOCs)

MOOCs on energy transition, geothermal systems, subsurface storage (CCS and UHS), and reservoir monitoring will be offered by IFPEN's IFP School. This prestigious programme is offered primarily to PhDs and master students of FORTH/IG but participants from collaborating institutions is possible if places are available. Three (3) rounds of MOOCs were foreseen in the project proposal. The 1st round was completed successfully in 2023 with the following courses:

- Introduction to energy transition (1 week online)
- Geothermal energy (2 weeks online/on-site)
- Underground gas storage (6 weeks online/on-site)
- Subsurface gas systems (1 week/virtually)
- Reservoir monitoring (1 week/virtually & on-site)

Despite the success of the 1st round of MOOCs, it was agreed between partners (and accepted by the PO) that replacing rounds 2 and 3 with more specialised one-to-one mentoring on specific topics of interest would present greater benefits to FORTH/IG students and staff (see section 4.2 below).

4.2 One-to-one mentoring/coaching scheme: 5 different topics per year

The one-to-one mentoring/coaching scheme comes to replace MOOC rounds 2 and 3 (in 2024 and 2025). FORTH/IG will propose specific topics related to current and future research interests in the institute. Mentoring of involved staff and students will be performed virtually.

Potential topics suggested by FORTH/IG for consideration by IFP school are:

- Biomarkers analysis in sediments and rocks
- Hydrates phase behavior in CCS operations
- Isotopic analysis of organic mixtures in the subsurface - Gas systems & isotopic characterization
- Geothermal systems (deep geothermal & hot dry rock)

- Gold hydrogen (extracting golden hydrogen from depleted oil reserves by adding bacteria)
- LOHC (liquid organic hydrogen carriers) – reversible hydrogenation

4.3 Summer schools

Summer schools will be organized in Greece with a vision to engage young scientists in energy transition concepts and technologies with special focus on the role of geological storage in shifting to a carbon free economy. The schools will be held in English and will be open to students, ESRs and the wider academic community in Greece.

The first summer school is scheduled to take place in Chania (Greece) on 1-5 July 2024 (our poster is shown below in Figure 8).

Figure 8. Summer School poster

4.2 Field visits

The TWINN2SET training programme includes 3 field visits, 2 of which will be held in Greece at sites of interest for geothermal energy and/or CCS and 1 in France at IFPEN's industrial pilot plant of the EU-funded project "DMX Demonstration in Dunkirk".

4.3 Staff and Student exchanges / expert visits

Staff exchanges between the FORTH/IG and the advanced partners will be taking place every year. Short-term staff exchanges will be available for senior researchers, postdocs, ESRs, PhD students, as well as administrative research support staff. The exchange duration for senior staff members is up to 1 week while ESRs, postdocs, and PhD student visits will range between 2 to 4 weeks.

Expert staff from UiS and IFPEN will visit FORTH/IG for important internal seminars/workshops, such as technology transfer, IP policy, collaboration for joint publication, proposal preparation etc. 3 expert visits of 2-3 days in duration are foreseen throughout the project.

4.4 Workshop series on soft skills including project administration and management.

The series of workshops on soft skills is aimed at the career development of ESRs and students involved in TWINN2SET. These include seminars and workshops on (no. of workshops on each topic in parenthesis):

- Gender aspects (2)
- Open science with focus on the reproducibility of results (2)
- Responsible Research and Innovation (1)
- Ethics (1)
- Hydrogen economy, CCS, and its value chain (1)
- Citizen engagement (3)

The soft skills series includes workshops on research management and administration before and after proposal submission:

- Project management/administration (1)
- Mapping funding opportunities (1)
- Proposal preparation and time management (1)

4.5 Scientific publications

The partners will join forces to generate scientific publications of high quality. At least 2 training and mentoring activities will take place to foster the skills needed by FORTH/IG staff to achieve high impact publications. Information on indicative subjects and potential publication outlets of high impact factor (IF>3) that will arise from staff exchanges, expert visits etc. is included in the Joint Research Strategy (Task 5.5).

4.6 Participation in conferences/events

Important conferences in scientific areas of the project is an important medium to promote the visibility of FORTH/IG in Europe and beyond. Important conferences will be identified by M3 of the project with the aim of participating with joint contributions between partners. Conference and events that have been identified at the beginning of the project are the EU energy week, Hydrogen Review days, CCUS combined with H2 European Technology EXPO and EGEC Geothermal, and the European Geothermal Congress.

All partners are encouraged to present TWINN2SET at external events to increase the impact of the project. The coordinator must be always informed before and about the planned presentations and their content. When necessary, to ensure accuracy and consistency, the presentation content will be developed in cooperation with the coordinator.

So far, the TWINN2SET project has been promoted in the following conferences/events:

- 13th FORTH Retreat 2022, Heraklion Crete, Greece, July 2022
- 8th Balkans Energy Summit, Athens, Greece, March 2023
- Energy Norway, Stavanger, Norway, March 2023
- Day event organized by PROMEA (https://hydrogen.promea.gr/), Athens, Greece, July 2023
- 2nd International Conf. on Raw Materials and Circular Economy, 28 Aug-02 Sep 2023, Athens, Greece
- 1st Hydrogen & Green Gases Forum, Athens, Greece, September 2023

- "Hydrocarbons, energy transition, Hydrogen" organized by the Technical Chamber of Greece, Conference in Heraklion/Crete, Greece, December 2023

4.7 Networking activities

FORTH/IG will explore membership opportunities in the European Clean Hydrogen Alliance, the Hydrogen Technology Collaboration Programme (Hydrogen TCP) of the International Energy Agency, the International Geothermal Alliance, and European Geothermal Energy Council, and (at national level) in the Greek Hydrogen Association (under establishment) or other suitable groups that will be deemed appropriate for boosting visibility and enhance networking opportunities.

TWINN2SET is also seeking networking opportunities with other EU-funded projects. So far, we have aligned with the Twinning project EPIBOOST (Advancing Epigenetics Research) and presented the scope of TWINN2SET through a webinar in July 2023 (Figure 9).

Figure 9. Presentation of IG/FORTH in the context of TWINN2SET project during the EPIBOOST webinar.

4.8 Final conference.

A one-day conference will be organized towards the end of the project. The conference will focus on the achievements of the project in terms of scientific advancements and impact for FORTH/IG including knowledge transfer achieved for staff and ESRs through dissemination activities.

5 COMMUNICATION AND DISSEMINATION MONITORING

5.1 Data collection for reporting

A document to collect the dissemination activities of all the partners has been developed (Figure 10). The document should be filled up every month by all partners to gather all the dissemination activities that have taken place throughout the project:

- Posts done on the partners' social media accounts
- Posts done on the partners' websites
- Press releases
- Presentations in conferences/events
- Meetings with policy makers.

The information collected will be used for reporting purposes and to monitor that all target groups are reached.

Partner	Event title	What is it? Workshop, meeting, conference, social media post	Link	Date	Location	Name of presenter	Method (e.g., ppt, poster, flyer etc.)	No. of people reached	Target group	Status: Perfomed or Planned

Figure 10. Template of communication and dissemination activities repository

5.2 KPIs

The progress of the Communication, Dissemination and Exploitation Plan is monitored through defined Key Performance Indicators (KPIs), listed in Table 2.

Table 2. Communication and Dissemination KPI's

Channel	KPI
COMMUNICATION	
Website	Visits < 5 = Poor, visits 5-40 = Good, visits > 40 = Excellent
Social media	LinkedIn & Facebook KPIs: 1 post every 2 months
Promotional material	250 brochures
e-Newsletters	2 per year
Press releases & local press/events	At least 3 per year
Promotional videos	2 videos (midterm and final year), up to 50 views
Workshops with non-academic actors	2 workshops engaging citizens; 3 workshops with non-academic actors along the value chain of CCS, UHS and Geothermal Energy
DISSEMINATION	
Training (MOOCs)	11th week program (November-June 2023) on topics relevant to Energy Transition
Training (one-to-one mentoring)	At least 5 topics (in 2024 - 2025)
Summer schools	2 summer schools (in 2024 & 2025) attracting at least 50 participants per year.
Field visits	3

Staff and Student exchanges	60 short-term visits of FORTH/IG staff to UiS and IFPEN (includes project/technical meetings and field trips) Total senior units per year = 5 units Total ESRs units per year= 5 units
Workshops on soft skills and project management/administration	7 workshops on soft skills; 3 workshops on Enhancing Research Management and Administration Skills of FORTH/IG
Scientific publications	6 joint publications are foreseen throughout the project at journals with IF >3.
Participation in conferences/events	3 conferences (1 conference/year for 1 person) for FORTH/IG; 1 conference for UiS
Final conference	One-day conference on M35

5.3 Progress of Communication and Dissemination activities

The status of each Communication and Dissemination activity so far and whether KPIs are on track are presented in Table 3.

Table 3. Status of KPIs

Activity	Status	KPI on track? (Y/N)
Website	Up and running, 40 views, 10<60sec & 30>4-5min Regular flow <20 views, due to announcements >60 views	Good
Social media	Facebook page: 444 followers LinkedIn page: 729 followers, up to 55 likes and plenty of reposts and comments from internal and external member	Y
Promotional material	Designed	Y
e-Newsletters	1st newsletter released in September 2023	N
Press releases & local press/events	3 publications in local press or news websites; 1 publication in thematic magazine; 1 citizen engagement event.	Y
Promotional videos	Midterm video currently being produced	Y
Workshops with non-academic actors	Will be scheduled towards the end of the project	Y
Training (MOOCs)	1st round completed (2022-2023)	Y
Training (one-to-one mentoring)	Replaces 2nd and 3rd round of MOOCs (2024, 2025).	Y
Summer schools	1st summer school to take place in Chania, 1-5 July 2024.	Y
Field visits	2 field visits completed	Y
Staff and Student exchanges	Short-term visits until Month xx (5 units per year for senior staff and 5 for ESRs) Senior=6 units	Y

	ESRs=5 units	
Workshops on soft skills and project management/administration	1 of 2 workshops on Gender aspects (10/2022) 1 of 3 workshops on Citizen engagement (09/2023) 1 of 2 in Open Science (03/2023) 1 of 1 workshop on Research management and administration skills (09/2023)	Y
Scientific publications	1 peer-reviewed was published Two papers in preparation	Y
Participation in conferences/events	Participation in 3 scientific conferences and 2 one-day events on hydrogen economy	Y
Final conference		Y

5.4 Risk management

Identified delays in KPIs

- Newsletters – annual rather than bi-annual

  1st newsletter of TWINN2SET was published on September 2023 during the 1st period of the project analyzing all the activities undertaken during this time and the 2nd is being prepared and will be available by mid-June 2024.

- 6 peer-reviewed publications

The 1st peer-reviewed article[1] with acknowledgement on TWINN2SET has been published on Energies/MDPI with Impact Factor 3.2[2], while 2 more peer-reviewed papers are currently under preparation. The Consortium will intensify efforts to reach at least 6 peer-reviewed publications on prestigious Journals with Impact Factor ≥ 3 by the end of the project as promised. Nevertheless, in order to increase the visibility of TWINN2SET towards the Scientific Community, the Consortium has decided to use additional routes.

In that context, an article in Innovation News Network was published in November 2023[3], an Innovation Platform launched in early 2020 which quickly became a go-to source for the latest news dedicated to research, emerging science, policy and innovation topics across the globe. Moreover, special focus is given to presenting project's research results at well-established scientific Conferences, at both National and International level. Finally, the Coordinator, Dr. Emmanuel Stamatakis, has been recently invited to act as Guest Editor for Energies/MDPI and a new Special Issue entitled "*Green Hydrogen and Fuel Cells - Towards Sustainable Energy Future*" that is being planned for release by the end of 2024. This will provide the whole Consortium a unique opportunity to communicate its work on hydrogen technology through this Special Issue.

[1] Energies | Free Full-Text | A New Path towards Sustainable Energy Transition: Techno-Economic Feasibility of a Complete Hybrid Small Modular Reactor/Hydrogen (SMR/H2) Energy System (mdpi.com)
[2] Energies | An Open Access Journal from MDPI
[3] TWINN2SET: Twinning to sustainable energy transition (innovationnewsnetwork.com)

6 Networking

6.1 Stakeholder network

A stakeholder network will be developed to maximise the project's dissemination and communication. The network will be built progressively during the project's lifecycle, and it will gather stakeholders interested in TWINN2SET activities. An initial list will be created starting from contacts from project partners' network (Figure 11). Each partner is committed to promoting the project through their own website, newsletters, social media pages, and any other communication they might use with the final goal of involving interested actors in the project in their network. TWINN2SET social media channels will serve to encourage the public to join the stakeholder network. Network members will have access to the project newsletter and will periodically receive information on TWINN2SET activities (e.g., workshops, publications, news).

Reference partner (origin of the contact)	Name	Surname	Email	Organisation	Country	Stakeholder group	Why interested in TWIN2SET

Figure 11. Stakeholders contact list template for consortium contacts collection.

Table 4. Bilateral meetings held so far to promote TWINN2SET to stakeholders.

Date / Place	Participants	Meeting scope & outcome
10/3/2023 (Oslo, Norway)	Jiri Muller (Special Advisor, IFE) Emmanuel Stamatakis (FORTH/IG)	Bilateral meeting to communicate TWINN2SET scope & objectives and to discuss potential synergies between the 2 Institutions; Dr. Jiri Muller also accepted the invitation to join the Advisor Board of the project.
24/3/2023 (telco)	Giorgos Kalantzopoulos, Sissel Opsahl Viig, Mario Silva (IFE, Norway) & Nikos Pasadakis, Emmanuel Stamatakis, Spyros Bellas, Evina Gontikaki (FORTH/IG)	Follow-up meeting to further exploit synergies between FORTH/IG & IFE in TWINN2SET-related topics.
27/3/2023 (telco)	Juan Soto (Bureau of Economic Geology, The University of Texas at Austin, USA & Granada University, Spain) & Emmanuel Stamatakis, Spyros Bellas (IG/FORTH)	Bilateral meeting to discuss opportunities for collaboration and knowledge transfer on salt bodies tectonics relevant to potential locations for Hydrogen Storage in Greece.

7 EXPLOITATION STRATEGY

7.1 Identification of Key Exploitable Results (KER)

A key exploitable result is anything having a commercial or social significance (i.e., providing knowledge or economic profit). This could be a patent, consultancy services, licenses, knowhow, publications etc.

For TWINN2SET identified KERs are:

1. **HTHP lab (Task 5.3).** An advanced High Temperature High Pressure (HTHP) lab facility capable of performing rock & fluid lab experiments, tests, and analysis, will be set up at FORTH/IG with guidance from advanced partners on the specifics of the equipment required. The HTHP lab will be used to perform various tests and measurements for the identification of suitable geological sites for hydrogen storage and can be used in the future to offer consulting services to the private sector.
2. **Decision-making tool (Task 4.3)**. An integrated geochemical/mineralogical, bio-geochemical, and thermodynamic numerical simulation software/model for the identification, evaluation and ranking of suitable geological sites for hydrogen storage.

7.2 Roadmap towards characterization and exploitation of KER:

This section presents the Plan on exploiting the project results after the end of the project, as well as the Communication to potential markets and end-users. In that context, major stakeholders affected or actively participating in National & European R&D & Energy planning and to Sustainable Energy Transition adaptation and implementation, have been identified with a special focus on hydrogen technologies. Key benefits or problems solved by TWINN2SET Research activity are also presented.

Thus, the objectives of this section are to identify the major stakeholders who will have an important role on the respective market development and organization of a hydrogen-based economy, the identification of barriers and ways to overcome them, weighting these barriers against each other and against the potential benefits and the market investigation for Underground Hydrogen Storage (UHS).

Stakeholder categories like relevant local, national and third-party key actors were recorded (e.g. local and regional authorities, market actors, etc.). Stakeholders identified were mainly at the national, regional & European level. The identification of major stakeholders was made by the Exploitation Manager (Dr. Evina Gontikaki) and all colleagues involved in this deliverable (see names in page 2). Then the stakeholders were divided in different categories such as:

- Public Organizations
  - Ministries
  - General Directorates
  - Regulatory Authorities
  - Municipalities
  - Energy Agencies
- Enterprises
- Associations
- Energy Service Companies (ESCOs)
- Academic/Research Organizations
- Funds

Thirty seven (37) stakeholders have been identified and contacted through the Coordinator (FORTH/IG) at national level:

- *12 Public Organizations*
  - 3 Ministries (Ministry of Transport; Ministry of Education; Ministry of Energy & Environment)
  - 2 Directorate General (General Secretariat of Energy; General Secretariat of Research & Innovation)
  - 1 Regulatory Authority (RAE)
  - 2 Energy Agencies (Aegean Energy & Environment Agency; Hellenic Hydrocarbons and Energy Resources Management Company)

- 2 Municipalities (Chania; Heraklion)
- 2 Regional Governments (Region of Crete; Region of Western Macedonia)

- *3 Associations/NGOs* (CLUBE; Hellenic Association for Energy Economics; Institute of Energy for Southeast Europe)
- *10 Academic/Research Organizations* (CERTH; HCMR; NCSR DEMOKRITOS; EIE; University of Westem Macedonia; Technical University of Crete; University of Crete, ELMEPA, NTUA; University of the Aegean)
- *2 Funds* (Hellenic Fund for Entrepreneurship and Development; uni.fund)
- *3 Project Consortia* (TRIERES; CRAVE-H2; H2SKILLS)
- 7 *Enterprises/private companies* (HEREMA; MOTOROIL; HELLENIQ ENERGY; Terna Energy; PPC; TITAN; HELLENIC HYDROGEN)

Other Stakeholders at European & International Level

Eight (8) bodies of stakeholders at European level have also been identified by the Consortium:

- 4 European Commission Bodies (Clean Hydrogen partnership, Clean Energy, ENEA, REA, EDA)
- 1 European Association (Hydrogen Europe)
- 2 Austrian Organizations (Technical University of Gratz, Green Energy Center)
- 2 UK academic organizations (University of Cardiff, Durham University)

Outreach activities aimed at each of the stakeholders are summarized in Table 5.

Table 5. Identified stakeholders and outreach activities towards the exploitation of TWINN2SET outcomes.

Stakeholder	Dissemination and exploitation activities envisaged towards the stakeholders
Public bodies as regulatory bodies – policy makers, implementing legislation. Both incentive schemes and obligated construction rules will support the uptake of UHS.	○ Dissemination to policy makers will be conducted with approval of the PSC and, when appropriate, in liaison with the REA PO. The main objectives are to create technology awareness, its related benefits for the environment and to stimulate actions for a successful market uptake
Private investors actively seeking hydrogen solutions.	○ Dissemination campaign within professional groups and by PR articles in selected journals
Research institutes further developing the technology and/or developing complementary research activities	○Disseminate results in scientific articles & presentation in dedicated conferences ○Setting up and participating to dedicated scientific working groups ○Setting up new national and international research and innovation projects along with other research institutes and universities.
Training institutes – associations providing training	○Development of guidebooks and videos and other recorded learning tools. ○Develop dedicated (online) training courses/webinars ○Organisation of workshops and seminars for professionals; Supporting master thesis topics jointly between academic and industrial partners
Financial institutes	○ Dedicated seminars informing financial institutes about TWINN2SET added value

End-users	○ Dedicated information sessions informing end-users about TWINN2SET added value.
Utility providers	○ Dedicated seminars informing the utility providers about the added value the concept can bring.

Stakeholders' involvement

The goal is the promotion of the active involvement of local, regional, national, European, international and sectoral stakeholders through targeted outreach activities, including meetings with stakeholders in each target country, including:

- Policy makers, legislators & civil leaders,
- Educators and academics,
- NGOs and professional associations
- Private sector enterprises and general public.

Stakeholders' engagement will be promoted through the development of local, national, international and sectoral networking and bilateral meetings, under the supervision and support of the Coordinator and the Project's Exploitation Manager for the duration of the project and beyond. For further promotion of stakeholder involvement and engagement, the Exploitation Manager will develop an analytic consultation guide, according to which different consultation tools and mechanisms will be selected and enforced. In particular a ***permanent consultation mechanism***, to discuss policies, practices and synergies with respect to hydrogen technologies and Energy Transition will be developed. Permanent consultation mechanism's provided services include:

- Face-to-face consultations through bilateral meetings
- Consultation workshops

The major stakeholders identified will be contacted during project implementation. The objective is to show to these key actors the path to include/increase energy transition in their portfolio and to demonstrate the importance of these actions. The enrolment of stakeholders in TWINN2SET project is crucial for the success of the project results, because these are the actors that develop the technologies and build the infrastructures for energy storage and energy transition. These stakeholders have an important role in the respective market development and organization of energy storage and energy transition power system and the identification of barriers and ways to overcome them.

Bilateral meetings & Collaboration with other Research Consortia

To support dissemination and large uptake of TWINN2SET research results in the large research community, the consortium will join efforts with other national and European research consortia. All consortium members are already involved in other national and/or European projects allowing integration of results within the boundary limits of confidentiality as described in the consortia agreements of the individual projects and the TWINN2SET Consortium Agreement. The consortium members will seek additional collaboration not only with other Twinning projects but also with HORIZON EUROPE ones dealing with hydrogen technologies and Energy transition. The TWINN2SET consortium has a strong drive towards open information and will encourage other consortia to share information whenever possible. As such duplication of work is avoided

and more data becomes available to support the own research work and dissemination of results. Continued collaboration within the TWINN2SET consortium and with national and European research consortia will allow the TWINN2SET team to identify timely wider testing and scaling up of results along with experts in the field.

7.3 Results from exploitation activities so far

The major outcomes of the stakeholder's involvement & consultation so far are the following:

- The ***development of a joint research proposal*** with the name ***DeepSEA*** between **UiS/FORTH/TUG** under the Clean Hydrogen Partnership 2024 call.

- The ***cooperation between FORTH/IG & NCSRD*** regarding Hydrogen Storage Underground. As a result, an advanced core flooding experimental equipment has been made available by NCSRD to the TWINN2SET project. This equipment has been already installed at FORTH/IG premises and is fully operated.

- The ***cooperation between FORTH/IG and the Region of Western Macedonia*** on a ***new demo project*** funded by the regional funds in order to study potential geological formations for hydrogen storage in the region. The Region of Western Macedonia is a Region under Transition and large hydrogen projects are being designed that will create a huge demand for hydrogen storage.

- The ***collaboration between FORTH/IG & CLUBE*** *(Cluster of Bioeconomy & Environment of Western Macedonia), as well as between* ***TWINN2SET & H2SKILLS*** *(Green Skills for Hydrogen)* projects for the parallel organisation of their Summer Schools during 1-5 of June 2024. There will be a live interface between the 2 Summer Schools with targeted common presentations.

- The **participation of FORTH/IG in a new HORIZON EUROPE project (TRIERES)** after the invitation by MOTOROIL (TRIERES Coordinator), following the successful exploitation actions of TWINN2SET. The TRIERES project aims to develop a small Hydrogen Valley in Korinthos, the first hydrogen ecosystem in Greece.

- The **participation of FORTH/IG as a sub-contractor of NCSRD in a new project (CALIPSO)** funded by the European Defence Agency (EDA) on hydrogen safety aspects.

- The **participation of the Coordinator, Dr. Emmanuel Stamatakis, as Non Governmental Greek Expert** for the Energy and Environment (EnE) CapTech of the EUROPEAN DEFENCE AGENCY (EDA).

- The **participation of the Coordinator, Dr. Emmanuel Stamatakis** at the Technical Committee 2 (Hydrogen storage, transport & distribution) of the HYDROGEN EUROPE RESEARCH – CLEAN HYDROGEN PARTNERSHIP.

- The **participation of TWINN2SET WP4 Leader, Dr. Spyros (Spyridon) Bellas** at the Technical Committee for Conducting an International Evaluation Competition of the Hellenic Hydrocarbons and Energy Resources Management Company (HEREMA S.A.) relevant to the Project "DEVELOPMENT OF A CARBON CAPTURE AND STORAGE FACILITY"