

Horizon Europe Programme

HORIZON-WIDERA-2021-ACCESS-03



TWINNING TO SUSTAINABLE ENERGY TRANSITION

WP2: BUILDING RESEARCH EXCELLENCE OF THE IG/FORTH

DELIVERABLE 2.5– REPORT ON TRAINING FOR JOINT RESEARCH PUBLICATIONS

Version 1.2

GRANT AGREEMENT 101079246
STATUS:FINAL
SENSITIVE

Funded by the European Union. Views and opinions expressed are however those of the authors only and do not necessarily reflect those of the European Union. Neither the European Union nor the granting authority can be held responsible for them

Mathilde ADELINET¹, Olga VIZIKA¹, Chrysoula Tallarou², Spyros Bellas², Emmanuel Stamatakis², Raoof Gholami³,

¹ IFPEN Energies Nouvelles, France

² Institute of Geoenergy/FORTH, Greece

³ University of Stavanger, Norway

Author printed in bold is the contact person/corresponding author

DOCUMENT CHANGE CONTROL

Version Number	Date	Brief Description of changes
1.0		First draft
1.1	31/03/26	First version
1.2	17/07/26	Final version

Contents

1. INTRODUCTION.....	5
2. PUBLICATION STRATEGY	6
3. TRAINING ACTIVITIES.....	7
4. MENTORING ACTIVITIES.....	8
5. ETHICAL GUIDANCE FOR JOINT SCIENTIFIC PUBLICATIONS.....	9
6. CONTRIBUTION TO JOINT PUBLICATIONS.....	10
7. ACTIONS AND LESSONS LEARNED	13
8. CONCLUSIONS.....	14

1. INTRODUCTION

Work Package 2 (WP2), Building Research Excellence of IG/FORTH, aims to strengthen the scientific, research and technological capacities of the Institute of Geoenergy/Foundation for Research and Technology – Hellas (IG/FORTH) in strategic areas supporting the energy transition. Through the collaboration between IG/FORTH, IFP Energies nouvelles (IFPEN) and the University of Stavanger (UiS), WP2 promotes the transfer of knowledge, the exchange of expertise and the development of sustainable scientific collaborations.

The specific objectives of WP2 are to:

- strengthen the scientific, research and technological capacities of researchers at all career stages in the fields of geological CO₂ sequestration, underground hydrogen storage and geothermal energy;
- improve the understanding of the physical, chemical and thermodynamic processes governing subsurface energy systems;
- facilitate the exchange of best practices through staff exchanges, laboratory visits, expert missions and field visits;
- reinforce scientific collaboration between the Greek, French and Norwegian partners through joint research activities, scientific publications and the expansion of long-term research networks.

These objectives are achieved through complementary activities combining knowledge transfer, collaborative research, researcher mobility and scientific capacity building.

Task 2.5, **Training and Mentoring for Joint Research Publications**, contributes directly to the objectives of WP2 by strengthening the publication capacity of IG/FORTH researchers and promoting the dissemination of collaborative research results.

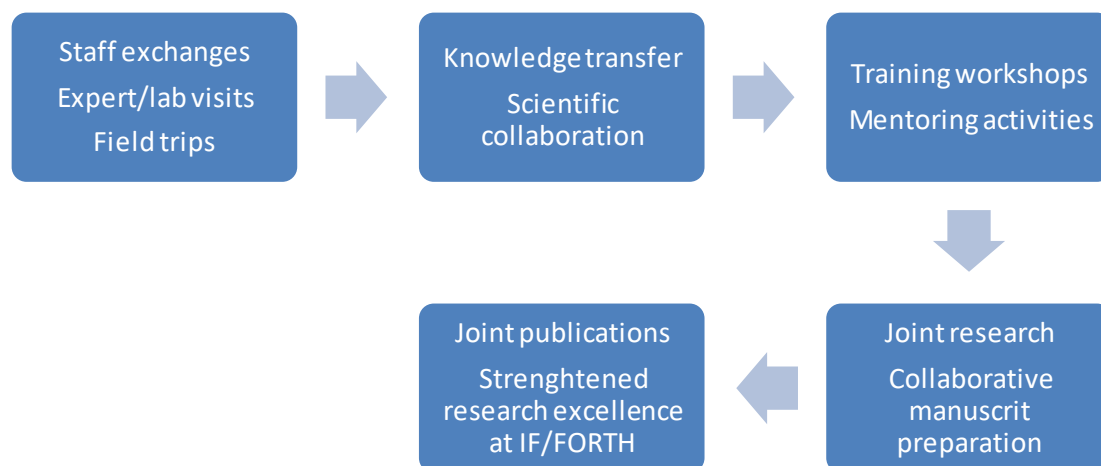
According to the Description of Action, the objectives of Task 2.5 were to:

- develop a publication strategy identifying priority research topics and appropriate high-impact journals;
- organise training and mentoring activities to strengthen the scientific writing and publication skills of IG/FORTH researchers;
- promote co-authorship between consortium partners as an outcome of staff exchanges, expert visits and collaborative research;
- increase the number and quality of joint scientific publications, with a target of six publications in journals with an impact factor greater than 3.

Through these activities, Task 2.5 supports the long-term objective of enhancing the international visibility, publication performance and scientific excellence of IG/FORTH.

Task 2.5 should not be viewed as an isolated dissemination activity. Rather, it represents the final stage of the capacity-building process initiated through the other activities of WP2.

The implementation logic is illustrated below:



2. PUBLICATION STRATEGY

Rather than defining a fixed publication plan at the beginning of the project, the consortium adopted a results-driven publication strategy. This approach reflected the exploratory nature of the collaborative research activities carried out within TWINN2SET and allowed the consortium to maximize the scientific impact of the results generated during the project.

The publication strategy established at the start of Task 2.5 consisted of defining the general principles that would guide scientific dissemination rather than assigning publications to predetermined topics. Potential publication areas were identified based on the scientific objectives of WP2—namely geological CO₂ storage, underground hydrogen storage and geothermal energy—but the final publication portfolio remained sufficiently flexible to accommodate new research findings emerging from staff exchanges, laboratory visits and collaborative research activities.

As research progressed, publication opportunities were identified whenever scientific results reached the level of maturity required for dissemination in peer-reviewed international journals. Manuscripts were therefore developed on the basis of the scientific originality and novelty, the robustness and reproducibility of the results, and the involvement of early-stage researchers, rather than according to a preset publication schedule.

This adaptive strategy ensured that:

- publications reflected the most significant scientific achievements of the project;
- early-stage researchers were involved in publications directly related to their research activities;

- co-authorship naturally emerged from collaborative work between consortium partners;
- journals were selected according to the scientific scope and quality of each individual study, with priority given to high-impact (high visibility and impact factor) international journals.

The publication process followed a continuous evaluation of the research activities conducted within WP2. Manuscript preparation was coordinated between the contributing partners through collaborative writing and internal scientific review before submission.

This flexible publication strategy proved particularly effective: six joint scientific publications were completed and one additional manuscript is under review, thereby fully achieving the objectives of Task 2.5.

3. TRAINING ACTIVITIES

Three workshops have been organized during the life of the project to enhance the joint publication work :

3.1 Open Science with a Focus on the Reproducibility of Results

- Organiser: University of Stavanger
- Date: 16 March 2023
- Objectives: reproducible research, Open Science, research integrity, transparent workflows.

This was the 1st Workshop on Open Science with focus on the reproducibility of results, in order to exchange knowledge and best practices on energy transition among the participated scientists, to openly communicate the targets and results of the various research teams from Norway (NORCE, UiS), Brazil (UNICAMP) and Greece (FORTH/IG) and try to find potential synergies

Attendees-> 6 persons from INTPART

3 persons from TWINN2SET

10 persons from SAC/NCS2030

3.2 Responsible Research and Innovation (RRI)

- Organiser: IG/FORTH
- Date: 30 June 2025
- Objectives: ethics, societal impact, responsible innovation, research integrity.

1/7/2024:

*Workshop on Intellectual Property by IFPEN, **Ms. Emmanuelle CECCHI** IFP Energies nouvelles (France) & **Ms. Lorraine LANG** IFP Energies nouvelles (France), approximately 25 participants*

Management of Intellectual Property

Best practices of IP Policies enabling faster and successful transfer of innovative technologies for the benefit of society, entrepreneurial issues



IFPEN - All rights reserved - Limited distribution - 2016-2021



3.3 Open Access Publishing, FAIR Data and Managing & Sharing Research Data

- Organiser: IFPEN
- Date: 6 March 2026
- Objectives: Open Access publishing, FAIR principles, research data management, Horizon Europe Open Science requirements, repositories, Data Management Plans, digital identity (ORCID), publication strategy.

From "Training course for doctoral students : module 4"

OPEN SCIENCE TRAINING



4. MENTORING ACTIVITIES

During the TWINN2SET project, a mentoring approach was established to support the preparation of joint publications.

A prominent example is the work of PhD candidate Adamantia Raftogianni (School of Mining and Metallurgical Engineering, National Technical University of Athens), who, with support from IFP School academic staff, developed a reservoir-modelling study that resulted in the manuscript entitled:

Thermodynamic Modeling and Wellbore Phase Transition in the Milos Geothermal Reservoir: Comparison of Black Oil and Compositional Approaches.

IFP School's mentoring combined guidance on technical issues with training in scientific communication and publication practices, especially adapted to capacity building for the early-stage researcher.

Key elements of the support provided included:

- Manuscript planning: jointly defining the research questions, structuring the paper, drafting an outline and establishing a realistic work plan for completion.
- Interpretation of modelling results: detailed review of model set-up, robust interpretation of outcomes.
- Scientific writing: coaching on clear and logical organisation of arguments.
- Iterative reviews: a coordinated internal review process where the co-authors provided structured feedback and verified scientific accuracy across successive drafts.
- Journal selection: evaluation of candidate journals for scope, audience and impact;

The manuscript is now substantially complete and, following iterative review cycles between the author and co-authors, is ready for submission to *Energies* (Impact factor 2026: 3.9).

5. ETHICAL GUIDANCE FOR JOINT SCIENTIFIC PUBLICATIONS

The writing of scientific papers must respect important ethical principles, and the researchers involved need to be adequately sensibilized to those principles. This is particularly important for the young researchers (Ph.D. students and early-career researchers). Recent advances in AI tools may complexify the application of ethics principles, and the rules to apply need to be specifically defined.

In the Twinn2set project, the young personnel involved in publication writing received briefing on the ethical principles below. These principles were followed in preparing the manuscripts.

The primary ethical principle is transparency about who did what. The manuscript should clearly state who designed the study, who performed experiments and/or modelling, who analysed the data, and who wrote each section of the article.

The use of AI tools has also risen as a major issue in publication writing. AI should serve only as a support tool; it must not be listed as an author or substitute for the authors' scientific writing. Wherever AI text is used, authors should rework it into their own scientific voice. Personnel were informed about journal requirements and the need to declare AI assistance (language editing, summarization, code generation).

There are also ethical concerns regarding integrity of images, figures and graphics. AI was explicitly forbidden for fabricating experimental images or producing fake microscopy/results figures. The use of AI for schematic or illustrative artwork when used needs to be declared and consistent with the target journal's policies

Publishers increasingly use plagiarism-detection and AI-screening tools. To avoid issues, any AI assistance should be openly declared and ensure that AI was used only to support—not to automatically produce—the manuscript.

A significant ethical risk arises when sensitive information is entered into public AI services. Teams must not disclose unpublished results, confidential industrial data, personal data, proprietary code, reviewer reports, or other sensitive material to such tools. Raw data and

confidential materials must remain protected. Personnel were warned not to upload unpublished results, confidential industrial data, personal data, proprietary code, reviewer reports or other sensitive material to public AI services.

6. CONTRIBUTION TO JOINT PUBLICATIONS

One of the principal objectives of Task 2.5 was to strengthen the publication capacity of IG/FORTH researchers through collaborative scientific activities involving IFPEN, the University of Stavanger (UiS) and IG/FORTH. Rather than considering publications as an independent dissemination activity, the consortium viewed them as the final outcome of the scientific collaboration established through staff exchanges, joint research, training activities and mentoring.

The publication strategy adopted by the consortium was intentionally **results-driven**. As research activities progressed, publication opportunities were identified whenever sufficiently mature and scientifically significant results were obtained. This flexible approach enabled the consortium to maximise the scientific value of the research while ensuring that early-stage researchers actively participated in the preparation of manuscripts alongside senior scientists.

As a result, **six joint scientific publications** were produced during the project, fully achieving the objective defined in the Description of Action. An additional publication is also under preparation.

The publications cover the three main scientific domains addressed within WP2:

WP2 scientific objective	Scientific subjects
Geological CO ₂ sequestration	Capillary trapping, CO ₂ hydrate formation
Underground H ₂ storage	Salt precipitation, hydrogen-brine-calcite interactions, caprock integrity
Geothermal energy	Thermo-hydrodynamic-chemical modelling of geothermal wells

Together, these publications significantly contributed to strengthening the scientific expertise of IG/FORTH in subsurface energy systems while reinforcing long-term collaboration between the consortium partners.

Eight publications have been produced during Twinn2set project:

No.	Year	Full reference	Journal / volume	DOI / link	Main topic / relevance
1	2026	M. Ghaedi , R. Gholami, S. Bellas, E. Stamatakis. Coupled thermal-hydrodynamic-chemical modeling of calcite scaling in geothermal wells.	Geoenergy Science and Engineering, 260	https://doi.org/10.1016/j.geoen.2026.214415	Geothermal systems; scaling; subsurface reactive processes
2	2026	M. Ghaedi , R. Gholami, S. Bellas, E. Stamatakis. Capillary trapping in CO2 storage sites: A traffic light system for preliminary leakage risk assessment.	Gas Science and Engineering, 145	https://doi.org/10.1016/j.jgsce.2025.205807	CO2 storage; leakage-risk screening; decision support
3	2025	M. Ghaedi , R. Gholami, S. Bellas, E. Stamatakis. Hydrogen-Brine-Calcite Geochemical Interactions During Underground Hydrogen Storage.	Greenhouse Gases: Science and Technology, 0: 1-12	https://doi.org/10.1002/ghg.2368	Underground hydrogen storage; geochemical interactions
4	2025	M. Ghaedi , R. Gholami, S. Bellas, E. Stamatakis. Evaporation-induced salt precipitation and dry-out evolution during hydrogen storage in geological porous media.	International Journal of Hydrogen Energy, 102	https://doi.org/10.1016/j.ijhydene.2025.01.141	Hydrogen storage; porous media; dry-out and salt precipitation
5	2025	P. Trimi , S. Bellas, I. Vakalas, R. Gholami, V. Gaganis, E. Gontikaki, E. Stamatakis, I.V. Yentekakis. A Review of Caprock Integrity in Underground Hydrogen Storage Sites: Implication of Wettability, Interfacial Tension, and Diffusion.	Hydrogen, 6(4)	https://doi.org/10.3390/hydrogen6040091	Caprock integrity; UHS safety; interfacial processes

No.	Year	Full reference	Journal / volume	DOI / link	Main topic / relevance
6	2024	C. Tallarou, A. Labropoulos , S. Stavropoulos, N. Pasadakis, E. Stamatakis, S. Bellas, R. Gholami, I.V. Yentekakis. A Combined Experimental and Computational Study on the Effect of the Reactor Configuration and Operational Procedures on the Formation, Growth and Dissociation of Carbon Dioxide Hydrate.	Sustainability, 16(20)	https://doi.org/10.3390/su16208854	CO2 hydrate formation; experimental and computational methods
7	2023	Nikolaos Chalkiadakis, Emmanuel Stamatakis, Melina Varvayanni, Athanasios Stubos, Georgios Tzamalīs and Theocharis Tsoutsos. A New Path towards Sustainable Energy Transition: Techno-Economic Feasibility of a Complete Hybrid Small Modular Reactor/Hydrogen (SMR/H2) Energy System.	Energies, 16(17), 6257	https://doi.org/10.3390/en16176257	Energy transition; hydrogen systems; techno-economic feasibility
8	2026	Veronika Abdulina , Spyridon Bellas, Tina Puntervold, Skule Strand, Dimosthenis Telemenis , Aleksandr Mamonov : "Petrophysical Controls on Fluid Storage and Wettability in Cenozoic Diatomites from Norway and Greece"	Geoenergy Science and Engineering, 266	https://doi.org/10.1016/j.geoen.2026.214677	Petrophysical Control, fluid storage, wettability, diatomites, Norway, Greece

Beyond their scientific contribution, these publications demonstrate the successful implementation of the capacity-building objectives of WP2. They reflect:

- the establishment of sustainable scientific collaborations between IG/FORTH, IFPEN and UiS;
- the active involvement of early-stage researchers in internationally co-authored publications;
- the transfer of expertise through staff exchanges, training workshops and mentoring activities;
- the strengthening of IG/FORTH's capacity to publish in international peer-reviewed journals;
- the development of a collaborative publication culture within the consortium.

The diversity of the publication topics also illustrates the multidisciplinary nature of the project, encompassing geological CO₂ storage, underground hydrogen storage and geothermal energy. Together, these scientific outputs contribute to increasing the international visibility of IG/FORTH and reinforce its position within the European research community working on subsurface energy technologies.

7. ACTIONS AND LESSONS LEARNED

The following table summarises the different actions lead into the WP2.5 :

Performance Indicator	Target	Achievement
Publication strategy	Developed	Completed
Training workshops	At least 2	3 workshops organised
Mentoring activities	At least 2	Continuous mentoring implemented throughout the project
Joint scientific publications	6	6 publications completed + 1 under preparation
High-impact journals	IF > 3 (where applicable)	Objective achieved
International co-authorship	Expected	Achieved for all publications

Overall, all contractual objectives associated with Task 2.5 were successfully achieved or exceeded.

The implementation of Task 2.5 provided valuable experience regarding the organisation of collaborative scientific research and the preparation of joint publications within an international consortium. The lessons learned throughout the project may serve as useful recommendations for future European collaborative projects.

One of the principal lessons learned concerns the importance of maintaining flexibility in publication planning. Rather than following a rigid publication roadmap established at the beginning of the project, the consortium adopted a results-driven approach, allowing scientific publications to emerge naturally from the maturity of the research results.

This strategy ensured that publications reflected genuine scientific advances while allowing researchers to adapt to new research opportunities arising from staff exchanges and collaborative investigations.

The experience gained during TWINN2SET demonstrated that formal training alone is not sufficient to significantly improve publication performance. The combination of thematic workshops and continuous scientific mentoring proved particularly effective in supporting researchers throughout the entire publication process.

The mentoring activities demonstrated the importance of providing individual scientific guidance to PhD candidates and early-stage researchers. Participation in internationally co-authored publications enabled these researchers to develop practical experience in scientific writing, manuscript preparation, peer-review procedures and international collaboration.

This approach represents one of the most sustainable outcomes of Task 2.5, as the competencies acquired during the project will continue to benefit both the researchers and their institutions beyond the lifetime of TWINN2SET.

8. CONCLUSIONS

Task 2.5 played a central role in achieving the capacity-building objectives of WP2 by strengthening the publication capabilities of IG/FORTH researchers and promoting international scientific collaboration between the consortium partners.

The consortium successfully implemented a comprehensive approach combining a flexible publication strategy, thematic training workshops, continuous mentoring activities and collaborative manuscript preparation. This integrated methodology enabled researchers to strengthen both their scientific competencies and their ability to disseminate research results in high-quality international journals.

The organization of three complementary training workshops provided researchers with practical knowledge in Open Science, Responsible Research and Innovation, research data management and scientific publishing, while the mentoring activities offered personalized support throughout the preparation of scientific manuscripts. These activities were closely

integrated with staff exchanges and collaborative research, ensuring that knowledge transfer was directly connected to the production of scientific outputs.

The publication strategy adopted during the project was intentionally results-driven, allowing manuscripts to emerge from the most significant scientific findings generated during the collaborative research activities. This flexible approach proved particularly effective, leading to the publication of six jointly authored scientific papers covering geological carbon dioxide storage, underground hydrogen storage and geothermal energy.

Beyond the quantitative achievements, Task 2.5 has contributed to establishing a sustainable culture of international collaboration, scientific excellence and Open Science within the consortium. The strengthened partnerships between IG/FORTH, IFPEN and the University of Stavanger provide a solid foundation for future collaborative research initiatives and will continue to support the international visibility and scientific development of IG/FORTH beyond the completion of the TWINN2SET project.