MOJITO - DECARBONIZED LIME PRODUCTION THROUGH ENHANCED JOINT DIELECTRIC HEATING AND WASTE CARBONACEOUS MATERIAL ADDITION

HORIZON-EIC-2024-PATHFINDERCHALLENGES-01-02 - GRANT AGREEMENT NUMBER: 101221957

Deliverable D1.4:

Report on early-career researchers

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PU	Public	***x***
SEN	Sensitive, limited under the conditions of the Grant Agreement	

Document Type		
R	Document, report (excluding the periodic and final reports)	***x***
DEM	Demonstrator, pilot, prototype, plan designs	
DEC	Websites, patents filing, press & media actions, videos, etc.	
DATA	Data sets, microdata, etc.	
DMP	Data management plan	
ETHICS	Deliverables related to ethics issues.	
SECURITY	Deliverables related to security issues	
OTHER	Software, technical diagram, algorithms, models, etc.	

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General Information

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Project website: https://www.mojito-project.eu/

MOJITO consortium

Short	Beneficiary	Role
UNIBO	Alma Mater Studiorum – Università di Bologna	CO
FRA	Fraunhofer UMSICHT	BEN

CO…Coordinator, BEN…Beneficiary, AP…Associated Partner

Scheduled Report on Early Career Researchers Updates

The engagement of Early Career Researchers evolves during the lifespan of the project. Updated versions have already been planned (see table below) to register all relevant changes in project's ECRs.

Issue	Expected by project month (M)
Initial Report (deliverable D1.4)	M12
Intermediate Report (internal only)	M24
Final Report (internal only)	M36

FOR INTERNAL DOCUMENTATION PURPOSES					
REV.	**DATE**	**DESCRIPTION**	**PAGES**	**CHECKED**	**APPROVED**
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Table of Contents

EXECUTIVE SUMMARY **5**

1 INTRODUCTION **6**

1.1 SCOPE OF THE DELIVERABLE 7
1.2 ECR DEVELOPMENT IN THE EIC AND HORIZON EUROPE CONTEXT 7
1.3 RELEVANT GA/DOA COMMITMENTS 8

2 ECRS IN MOJITO: DEFINITION, BASELINE AND DEVELOPMENT INDICATORS **9**

2.1 PROJECT ECR DEFINITION 10
2.2 ECR DEVELOPMENT AS A MULTIDIMENSIONAL PROCESS 11
2.3 ECR BASELINE AT THE BEGINNING OF MOJITO 12
2.4 TRACKING ECR DEVELOPMENT THROUGHOUT THE PROJECT 16

3 ECRS BY PARTNER **17**

3.1 UNIVERSITY OF BOLOGNA (UNIBO) 17
3.2 FRAUNHOFER UMSICHT (FRA) 19

4 MOJITO'S ECR PROMOTION FRAMEWORK **21**

4.1 SCIENTIFIC AND TECHNICAL SKILLS 21
4.2 RESEARCH INDEPENDENCE AND LEADERSHIP 21
4.3 COMMUNICATION, DISSEMINATION, NETWORKING, MOBILITY AND COLLABORATION 22
4.4 INCLUSIVE RESEARCH ENVIRONMENT AND CAREER DEVELOPMENT 23

5 MEASURES AND ACTIVITIES **24**

5.1 QUANTITATIVE INDICATORS 24
5.2 QUALITATIVE INDICATORS 25

6 CONCLUSIONS **30**

7 ANNEXES **30**

ANNEX A – PARTNER-LEVEL ECR DATA FORM – UNIBO. **31**

ANNEX B – PARTNER-LEVEL ECR DATA FORM – FRA **36**

ANNEX C – EARLY-CAREER RESEARCHER (ECR) INFORMATION FORM – R2-1 – ALESSIA ALCANTARINI **41**

ANNEX D – EARLY-CAREER RESEARCHER (ECR) INFORMATION FORM – R2-2 – MARCO MELANDRI 47

ANNEX E – EARLY-CAREER RESEARCHER (ECR) INFORMATION FORM – R1-1 – MARIA PATANÈ . 54

ANNEX F – EARLY-CAREER RESEARCHER (ECR) INFORMATION FORM – R2-3 – JAN SEEGER..... 60

Executive Summary

MOJITO is a three-year European Innovation Council (EIC) project (Grant Agreement No. 101221957), running from 1 October 2025 to 30 September 2028, coordinated by the University of Bologna (UNIBO) in collaboration with Fraunhofer UMSICHT (FRA). The project aims to develop and validate a laboratory-scale system for the decarbonisation of lime production. The system combines electrical and microwave heating with the use of carbonaceous materials and integrated approaches to CO_2 capture, utilisation, and storage, with the objective of developing a low-carbon pathway for lime production.

The project is highly innovative – defined “high-risk high-gain” by the Commission – and offers researchers, and in particular early-career researchers, opportunities to confront and gain experience from other European groups, in particular within the EIC Concrete & Cement Portfolio activities to which five other projects participate.

This deliverable describes how MOJITO supports the development and participation of early-career researchers throughout the project.

1 Introduction

The MOJITO project (hereafter: MOJITO) considers the development and meaningful participation of early-career researchers (ECRs) as an integral dimension of responsible project implementation. By providing ECRs with opportunities to contribute to research activities, collaborate across disciplines and institutions, and develop scientific, leadership, coordination, and other transferable skills, the project supports not only individual career development but also the consolidation and circulation of scientific expertise. In this sense, ECRs participation contributes to the project's capacity to generate and retain knowledge, while supporting the continuity of the research networks and competences developed through MOJITO beyond the project lifetime and promotes interdisciplinary collaboration and future uptake of project results.

ECR development is embedded in the consortium's governance and work-package structure. Each work package identifies specific tasks suitable for ECR leadership, and ECRs participate in the consortium meetings. Other opportunities for ECR development arise through researchers' involvement in the project's scientific and technical work, collaboration between consortium partners, project meetings and events, and communication, dissemination and other project activities. This approach aligns with Horizon Europe priorities on research careers and talent ecosystems, and with the principles of the European Charter for Researchers.[1]

The project WP1 explicitly includes the monitoring of issues related to ethics, gender equality, and ECRs. This provides a clear formal basis for an ECR-promotion deliverable. WP2–WP4 contain substantial scientific and technical research activities spanning material analysis, experimental/pilot work, computational science, Discrete Fourier Transform (DFT), molecular dynamics and machine-learning force fields. WP5 covers exploitation, communication and dissemination, while WP6 addresses portfolio-level collaboration and synergies. These WPs can provide additional opportunities for ECR visibility, networking and transferable skills.

As MOJITO is part of the EIC Cement and Concrete Portfolio, ECRs also have opportunities to engage with researchers and professionals from other projects within the Portfolio, broadening their networks and enabling them to learn from approaches, expertise and experiences beyond the MOJITO consortium.

This deliverable examines how MOJITO supports the development and participation of ECRs throughout the project. It first establishes the working definition of an ECR adopted for the purposes

[1] European Commission. Directorate-General for Research and Innovation. 2025. *European Charter for Researchers*. Luxembourg: Publications Office of the European Union. doi:10.2777/5214248.

of the project and identifies the researchers who fall within this category, taking into account their career stage and role in MOJITO.

1.1 Scope of the deliverable

This deliverable documents the opportunities that MOJITO provides for ECR development and participation. These include opportunities arising from involvement in research and technical activities, collaboration across disciplines and partner institutions, participation in project meetings and events, scientific communication and dissemination, and other training or career-development activities implemented within the project.

A further objective is to document who is participating and how. This includes, where data are available, the number and distribution of ECRs across partners and work packages, their roles and level of involvement, and their participation in relevant project activities. Particular attention is given to forms of participation that go beyond attendance, such as contributing to research activities, presenting results, producing scientific outputs, taking on responsibilities, and collaborating with researchers from other institutions or disciplines.

Finally, the deliverable assesses the evidence of benefits associated with ECR participation. Rather than assuming that participation automatically results in career development, it considers available quantitative and qualitative evidence, including skills acquired, scientific outputs, presentations, new collaborations and networks, increased responsibilities, training completed, and other documented outcomes.

As MOJITO is a three-year project and this assessment is conducted after only the first year of implementation, the analysis focuses primarily on the opportunities created, activities undertaken and early evidence of development, rather than on outcomes that may require a longer period to materialise. Where evidence is not yet available or is insufficient to establish an outcome, this is explicitly acknowledged.

1.2 ECR development in the EIC and Horizon Europe context

MOJITO is funded by the European Innovation Council (EIC) under Horizon Europe. Its approach to ECRs is therefore situated within the broader Horizon Europe and European Research Area (ERA)[2] policy context, which place importance on strengthening Europe's research and innovation capacity, supporting researchers' skills and career development, and fostering attractive, open and inclusive research environments.

[2] European Commission, Directorate-General for Research and Innovation. 2024. *Horizon Europe Strategic Plan 2025–2027*. Luxembourg: Publications Office of the European Union. https://doi.org/10.2777/092911.

These principles provide a useful context for considering how participation in MOJITO may contribute to ECR development. As an EIC-funded research and innovation project, MOJITO brings together researchers working on an interdisciplinary technological challenge and provides opportunities for ECRs to gain experience through participation in research activities, collaboration across institutional and disciplinary boundaries, scientific communication and dissemination, and engagement with other members of the project consortium. Where applicable, such activities can contribute to the development of scientific and transferable skills, professional networks, and experience relevant to researchers' subsequent career pathways.

The deliverable does not, however, treat these broader Horizon Europe and ERA principles as additional contractual obligations for MOJITO. In particular, it does not assume that the project is required to implement the full range of researcher-development, mobility, or career-support measures associated with other Horizon Europe instruments or policy initiatives. Instead, it distinguishes between commitments explicitly established in the MOJITO Grant Agreement (GA) and Description of Action (DoA), ECR-related activities actually implemented by the project, and broader European principles that provide a contextual framework for interpreting these activities.

This distinction is particularly important when considering mobility, transferable skills, and inclusive research environments. The deliverable documents these dimensions where they are demonstrably relevant to MOJITO's organisation and activities, without presuming the existence of specific targets or measures that are not included in the project's contractual commitments.

Accordingly, Horizon Europe and ERA principles are used here as a contextual reference framework rather than a compliance checklist. The primary focus remains on what MOJITO has committed to do, what opportunities it provides to ECRs, who is participating, and what evidence exists of the outcomes of that participation.

1.3 Relevant GA/DoA Commitments

The commitments for the project with regards to ECRs are defined, according to the GA, as follows:

> "The beneficiaries must take all measures to implement the principles set out in Annex II to the Council Recommendation on a European framework to attract and retain research, innovation and entrepreneurial talents in Europe[3] ('the European Charter for Researchers'), in particular regarding:

[3] COUNCIL RECOMMENDATION of 18 December 2023 on a European framework to attract and retain research, innovation and entrepreneurial talents in Europe (C/2023/1640).

- working conditions,
- transparent recruitment processes based on merit,
- career development.

The beneficiaries must ensure that researchers and all participants involved in the action are aware of them."

Accordingly, the GA establishes three areas of particular relevance to the development and participation of ECRs: working conditions, transparent and merit-based recruitment, and career development. The European Charter for Researchers[4] provides the broader framework for these commitments and further emphasises principles relevant to ECR development, including fair assessment and career progression, continuous professional development, career development and advice, supervision and mentoring, recognition of diverse research careers, and the validation of skills acquired through research and training. The Charter also addresses researchers' working environments, research integrity, equality and diversity, open science, mobility, and the dissemination and recognition of research results.

For the purposes of this deliverable, these commitments provide the basis for examining how MOJITO addresses ECR-related aspects of project implementation. In particular, the assessment focuses on the opportunities made available to ECRs, their participation and contributions, the responsibilities they assume, and the skills, networks and experience they may develop through their involvement in the project. Ongoing monitoring of ECR-related activities and practices is therefore important to assess how these commitments are implemented throughout the project. This includes documenting relevant activities and opportunities, identifying ECR participation and contributions, and, where evidence is available, assessing their outcomes in terms of skills development, increasing responsibility and research independence, collaboration, scientific and professional experience, and career development. Given the early stage of the project, the monitoring also provides a baseline against which changes in ECR participation and development can be assessed in subsequent project reviews.

2 ECRs in MOJITO: Definition, baseline and development indicators

ECRs constitute an important group within collaborative research projects, but the literature does not provide a single, universally applicable definition of who should be considered an ECR.

[4] European Commission. Directorate-General for Research and Innovation. 2025. *European Charter for Researchers*. Luxembourg: Publications Office of the European Union. doi:10.2777/5214248.

Definitions variously refer to career stage, time since completion of a degree, professional independence, or the type of role performed within research. For example, Fisher and James (2022)[5] describe ECRs primarily as postgraduate researchers and researchers within approximately three years of completing a PhD, while noting that a broader definition may extend to researchers up to ten years post-PhD. Schlumberger et al. (2026)[6], drawing on the definition adopted by the European Geosciences Union, use a broader seven-year period encompassing students, PhD candidates and researchers who obtained their highest degree within the previous seven years. Pizzolato et al. (2023)[7], in contrast, argue for a more inclusive understanding that encompasses PhD students, junior postdoctoral researchers and other research-enabling professionals in the early stages of their careers, including research administrators and project managers.

2.1 Project ECR definition

For the purposes of this deliverable, ECRs are understood primarily in accordance with the European Framework for Research Careers[8], as researchers at the R1 (First Stage) and R2 (Recognised) stages of their research careers. This approach provides a career-stage-based definition rather than imposing a fixed number of years since obtaining a degree. It encompasses researchers at the first stage of their research career (R1), including doctoral researchers, and researchers who have developed a degree of independence but are not yet fully independent (R2). The European Charter for Researchers explicitly refers to R1–R2 as early-career researchers and highlights the particular importance of supporting their working conditions, professional development, career prospects and participation in research activities.

Within MOJITO, this category may therefore include doctoral researchers, postdoctoral researchers, research assistants and other junior research staff whose career stage corresponds to R1 or R2. This definition provides a practical basis for identifying the researchers whose participation and development are considered in the deliverable, while recognising the broader European framework

[5] Fisher, Joshua J. and Joanna L. James, "Know the game: Insights to help early career researchers successfully navigate academia, Placenta, Volume 125, 2022, 78-83, https://doi.org/10.1016/j.placenta.2021.10.013

[6] Schlumberger, Julius, Kelley De Polt, Judith N Claassen, Timothy Tiggeloven, Sophie L Buijs, Marleen C de Ruiter, Maria Vittoria Gargiulo, et al. 2026. 'Empowering ECRs to Make Research Projects Flourish: Lessons from a European Research Project'.

[7] Pizzolato, Daniel, Andrea Reyes Elizondo, Noémi Aubert Bonn, Borana Taraj, Rea Roje, and Teodora Konach. 2023. 'Bridging the Gap – How to Walk the Talk on Supporting Early Career Researchers'. *Open Research Europe* 3 (May): 75. doi:10.12688/openreseurope.15872.1

[8] European Commission, Directorate-General for Research & Innovation. 2011. *Towards a European Framework for Research Careers*. Brussels: European Commission, Directorate-General for Research and Innovation, July 21, 2011. https://euraxess.ec.europa.eu/sites/default/files/policy_library/towards_a_european_framework_for_research_careers_final.pdf.

for research careers and its distinction between different stages of researcher development. The category is therefore used here primarily as an analytical and project-management definition, rather than as a claim that all ECRs correspond to a single formal career stage.

2.2 ECR development as a multidimensional process

The development of ECRs should not be understood exclusively in terms of conventional academic outputs. Fisher and James (2022) note that publications, citations and funding remain important elements of academic assessment but argue that they do not fully capture researchers' development or contribution. Leadership, mentorship, societal impact, science communication, community engagement and service to the research community may also contribute to a researcher's academic profile and longer-term career trajectory. Their discussion also highlights the importance of developing experience in areas such as authorship, grant writing and networking.

This broader understanding is particularly relevant to collaborative European research projects, where ECRs can develop competencies that extend beyond their immediate scientific tasks. Pizzolato et al. (2023), for example, highlight the potential value of involving ECRs in decision-making and leadership, including participation in proposal preparation, work-package leadership and project governance. They also identify opportunities for capacity building, networking and support for career continuity as important dimensions of ECR development. Schlumberger et al. (2026) similarly emphasise the transition from dependent towards increasingly independent research, identifying involvement in project management, leadership opportunities, networking and dedicated ECR activities as mechanisms through which this transition can be supported. Their analysis further stresses the importance of advisory and supervisory support and of aligning researchers' activities with competencies required for more independent careers, such as mobilising resources, managing projects and promoting inclusion and diversity.

Accordingly, MOJITO considers ECR development as a multidimensional process involving not only scientific outputs but also increasing autonomy, responsibility, visibility, collaboration and transferable competences. The project therefore considers the following dimensions when documenting ECR development:

- **Scientific and research skills**, including research design, methodological competences, data analysis and scientific writing.
- **Research outputs and academic profile**, including publications, presentations, authorship responsibilities and other forms of dissemination.
- **Funding and resource mobilisation**, including experience in grant writing, proposal development and preparation of future funding applications.

- **Leadership and project management**, including responsibility for tasks or activities, coordination, decision-making and contributions to project management.
- **Networking and collaboration**, including participation in conferences, workshops, consortium activities and interactions with researchers and stakeholders beyond the immediate research team.
- **Communication and societal engagement**, including science communication, stakeholder engagement and dissemination to non-academic audiences.
- **Increasing research independence**, including the development of research ideas, responsibility for outputs, supervision or mentoring of others where applicable, and the capacity to identify and pursue future research opportunities.

These dimensions provide a basis for assessing development without assuming that all ECRs should progress in the same way or achieve the same outputs.

2.3 ECR baseline at the beginning of MOJITO

A baseline is necessary to distinguish the opportunities provided by MOJITO from researchers' pre-existing experience and achievements. The ECR baseline is therefore defined as the status of researchers at or immediately after the beginning of the project (**M1, October 2025**). It should provide a snapshot of the ECR population involved in the project and of their career stage, responsibilities, skills and experience at the project start.

The baseline should be established through information collected from the project partners and, where appropriate, directly from individual ECRs. For each ECR, the baseline should record at least:

- **Career stage and role** – R1/R2 stage, position, disciplinary background and employing organisation.
- **Involvement in MOJITO** – WP(s), task(s) and activities to which the researcher is assigned.
- **Development opportunities expected from MOJITO** – activities through which the researcher may acquire new skills, responsibilities, networks or experience.

The baseline should be understood as a starting-point profile rather than an assessment of individual performance. Differences between ECRs at M1 may reflect disciplinary background, previous employment, institutional context and career stage. Establishing these differences is important because the same MOJITO activity may represent a different developmental opportunity for an R1 researcher with limited project experience and an R2 researcher who is already undertaking relatively independent research.

The baseline should also account for changes in the ECR population over the lifetime of the project. Researchers may join or leave the consortium, change position or progress from one career stage

to another. The baseline should therefore remain a record of the situation at M1, while subsequent entries capture changes rather than retrospectively altering the original baseline.

The number of ECR positions across the consortium is given in Table 1, the names and identifiers of the ECRs are given in Table 2, while the main baseline indicators on MOJITO ECRs are given in Table 3.

Table 1. MOJITO ECRs population.

Indicator	Status	
Total number of ECRs at project start	3	
Total number of ECRs at M12	4	
ECRs by partner	UNIBO: 3	FRA: 1
ECRs by WP/task	WP1: 0	
	WP2: 3	
	WP3: 3	
	WP4: 1	
	WP5: 2	
	WP6: 1	
PhD/R1 researchers	1	
Postdoctoral/R2 researchers	3	
Other junior researchers	0	
Scientific/technical disciplines	Environmental sciences; Chemistry; Physics; Mechanical Engineering	
Gender distribution	Female: 2	Male: 2
ECRs directly funded by MOJITO	3	

Table 2. MOJITO ECRs.

Identifier	Name and Surname	Partner
R1-1	Maria Patanè	UNIBO
R2-1	Alessia Alcantarini	UNIBO
R2-2	Marco Melandri	UNIBO
R2-3	Jan Seeger	FRA

Table 3. Main baseline indicators on MOJITO ECRs.

ECR name or identifier	Researcher category/career stage	Scientific/technical disciplines	WP/task	Role in MOJITO	Start date	MOJITO-funded?
R2-1	R2	Environmental Sciences	WP2/T2.2–2.5; WP3/T3.2–3.3; WP5 (WP Leader)	Lead of WP5; supporting WP2 and WP3, including feedstock characterisation and pretreatment, dielectric property assessment of biochar–carbonate mixtures, calcination trials and product characterisation, as well as experimental data analysis, laboratory organisation, project documentation, and contributions to technical reports, deliverables and scientific presentations.	M1	No
R2-2	R2	Chemistry	WP2/T2.2–2.5; WP3/T3.2–3.3	Supporting WP2 and WP3, including feedstock characterisation and pretreatment, dielectric characterisation of biochar–carbonate mixtures, calcination experiments and product characterisation. Activities also include experimental data processing and interpretation, assessment of calcination performance, laboratory organisation, project documentation, and contributions to technical reports, deliverables and scientific presentations.	M1	Yes (since M11)
R2-3	R2	Mechanical Engineering	WP2/T2.1; WP3/T3.1; WP5/T5.3	Lead of WP3; supporting WP2 and WP5; contributing to tasks as required.	M1	Yes

ECR name or identifier	Researcher category/career stage	Scientific/technical disciplines	WP/task	Role in MOJITO	Start date	MOJITO-funded?
R1-1	R1	Physics	WP4/T4.1, 4.3–4.4	Supporting WP4, including first-principles calculations of $CaCO_3$ calcination mechanisms, development and validation of machine-learning force fields, and large-scale molecular dynamics simulations under different structural and environmental conditions. Activities also include computational data generation, processing and interpretation, assessment of calcination mechanisms and rates, management of simulation workflows and shared datasets, and contributions to technical reports, deliverables and scientific presentations.	M2	Yes

2.4 Tracking ECR development throughout the project

To complement the baseline, MOJITO should maintain an **ECR Development Record** that follows the participation and development of identified ECRs throughout the project. This approach responds to the observation that, although ECRs are important contributors to European research projects, systematic mechanisms and indicators for documenting their development remain relatively uncommon (Schlumberger et al. 2026).

The record should be updated periodically, for example annually and at the end of the project, and should combine quantitative participation data with qualitative evidence of development. Rather than measuring development through a single KPI, the record should document a progression from opportunity and participation towards increased responsibility and demonstrated competence.

The ECR Development Record will therefore use the fields in Table 4.

Table 4. Main tracking indicators on MOJITO ECR development.

Dimension	Baseline	Development	Evidence/outcome
Scientific skills	Existing methodological expertise	New methods or research competencies acquired	Training, research activities, outputs
Academic profile	Publications, presentations, authorship experience	New publications, presentations or greater authorship responsibility	Publications, conference programmes
Grant writing	Previous proposal experience	Contribution to MOJITO or new proposal preparation	Proposal sections, submitted applications
Leadership/project management	Existing responsibilities	Responsibility for tasks, activities or coordination	Meeting records, WP/task responsibilities
Networking	Existing research networks	New collaborations, conferences and consortium contacts	Events, collaborations, co-authored outputs
Communication/stakeholder engagement	Previous experience	New engagement and communication responsibilities	Workshops, presentations, dissemination activities
Research independence	Degree of autonomy at M1	Increasing responsibility for ideas, decisions and outputs	Research outputs, leadership roles, supervisor/project feedback

Dimension	Baseline	Development	Evidence/outcome
Career development	Position and career objectives at M1	New opportunities, applications, roles or collaborations	Applications, appointments, further funding, career progression

This monitoring approach also makes it possible to distinguish activities delivered by the project from developmental outcomes for individual ECRs. For example, the number of workshops attended is an activity indicator, whereas the acquisition of a new competence or the assumption of a new responsibility represents a developmental outcome. Likewise, the number of ECRs participating in a consortium meeting indicates participation, while the number taking responsibility for a presentation, task or decision provides evidence of more active involvement.

Where possible, evidence should therefore be collected at three levels: (1) **participation**, documenting what opportunities ECRs accessed; (2) **contribution and responsibility**, documenting how actively they participated and whether their responsibilities increased; and (3) **outcomes**, documenting changes in skills, outputs, networks, independence or career opportunities. This provides a more meaningful picture of ECR development than relying solely on publication or training counts. The approach is consistent with the literature's emphasis on moving ECRs progressively towards greater independence.

For MOJITO, the ECR baseline and subsequent development records should therefore be maintained as a living monitoring instrument throughout the project. The baseline establishes the starting position at M1; periodic updates document opportunities, participation and changing responsibilities; and the final assessment considers the evidence of skills development, increased independence, scientific and professional outputs, networking and career-related outcomes. This makes it possible to assess not simply whether ECRs participated in MOJITO, but how their participation contributed to their development over the course of the project.

3 ECRs by Partner

3.1 University of Bologna (UNIBO)

The recruitment, working conditions and professional development of researchers at the University of Bologna have historically been addressed through the Human Resources Strategy for

Researchers (HRS4R).[9] UNIBO endorsed the European Charter for Researchers and the Code of Conduct for the Recruitment of Researchers[10] in 2005 and, from January 2012, conducted an internal analysis that led to the development of an HR Strategy and Action Plan. The European Commission subsequently approved the Strategy and Action Plan and, in November 2013, granted UNIBO the "HR Excellence in Research" logo. At the time, this recognition reflected the University's commitment to implementing the principles of the Charter and Code, including the promotion of an attractive and supportive working environment and open, transparent and merit-based recruitment. The HRS4R recognition should be understood as part of UNIBO's historical institutional framework rather than as a current accreditation. The current EURAXESS public list of organisations holding the HR Excellence in Research award includes 22 Italian organisations and does not list the University of Bologna. Accordingly, this deliverable refers to UNIBO's HRS4R history as evidence of an institutional commitment previously established through the European Charter and the HRS4R process, without implying that UNIBO currently holds the HR Excellence in Research award.

UNIBO participates in MOJITO with two groups, named in the proposal as **UNIBO-TPU** (UNIBO-Thermal Processing Unit) and **UNIBO-CMU** (UNIBO-Computational Modelling Unit). UNIBO-TPU has track record in developing novel composites between carbonaceous and mineral materials through calcination, which are the object of two patents and of two applied technology projects. UNIBO-CMU is dedicated to the development and application of computational protocols to study the materials modelling and function by applying several methods, which include DFT, high-throughput calculations, classical, ab-initio, machine learning and multi-scale molecular dynamics.

UNIBO-TPU includes two R2 ECRs:

- R2-1, Alessia Alcantarini, who obtained a Master's degree in Environmental Analysis and Management from the University of Bologna in 2021. Since then, she has been working in the Environmental Management Research Group (EMRG) at the University of Bologna. She has been involved in the MOJITO project since its beginning and is responsible for WP5 (Exploitation, Communication and Dissemination).
- R2-2, Marco Melandri, who obtained a Master's degree in Chemistry from the University of Bologna in 2018. Since then, he has been working in the EMRG. He has been involved in

[9] Alma Mater Studiorum – Università di Bologna. n.d. "Human Resources Strategy for Researchers Incorporating the Charter & Code (HRS4R): Strategy and Action Plan".

[10] Commission of the European Communities. 2005. "Commission Recommendation of 11 March 2005 on the European Charter for Researchers and on a Code of Conduct for the Recruitment of Researchers (2005/251/EC)." *Official Journal of the European Union* L 75 (March 22): 67–77.

the MOJITO project since its beginning as an experimental scientist and is responsible for Data Management.

UNIBO-CMU includes one R1 ECR:

- R1-1, Maria Patanè, who holds a Master's degree in Physics and is currently a PhD student. She is actively involved in the activities of the group, with a particular focus on the preparation of Deliverable D4.1 (Report on first principles calculations).

A MOJITO-funded PhD opportunity at the University of Bologna, Ravenna Campus, was publicly advertised by the UNIBO-TPU research group with a planned start in October 2025 and a research focus on the development of the decarbonised-lime system. The call did not receive applications and therefore did not result in the recruitment of a PhD researcher.

Two possible factors may help explain the lack of applications. First, the relatively limited recognition of doctoral qualifications within parts of the Italian private sector may reduce the attractiveness of a PhD pathway for candidates seeking employment outside academia. Second, the level of doctoral funding in Italy may constitute a constraint on the attractiveness of PhD positions. Italian doctoral scholarships are regulated at national level and, under the applicable framework, provide a relatively modest level of financial support (about 1,200 €/month net) compared with salaries available for other qualified positions.

Both factors are external to MOJITO's project-level control. The unsuccessful recruitment therefore represents an implementation challenge that should be understood in its wider institutional and national context rather than as evidence of a lack of ECR opportunities within the project.

3.2 Fraunhofer UMSICHT (FRA)

The professional development of ECRs at the Fraunhofer-Gesellschaft is addressed through a range of institutional measures aimed particularly at junior scientists and doctoral researchers. Fraunhofer's approach combines participation in application-oriented research with structured training and career development, while doctoral researchers are supported through personal supervision, appropriate research facilities, transparent employment conditions and opportunities to develop autonomy and self-reliance.[11]

At the level of Fraunhofer UMSICHT, this approach is particularly institutionalised through the UMSICHT Research School, established in 2016 to provide common framework conditions and

[11] Fraunhofer-Gesellschaft. n.d. "A Doctorate with Fraunhofer." Fraunhofer-Gesellschaft. https://www.fraunhofer.de/en/about-fraunhofer/profile-structure/human-resources-and-corporate-culture/doctorate.html.

structured support for doctoral candidates.[12] The Research School is organised around three main areas: supervision, qualification and networking. Supervision is supported through formal supervision or mentoring agreements and regular meetings concerning research progress and work plans. Qualification includes doctoral coaching, an individual training plan combining mandatory and elective activities, continuing education, colloquia and regular information meetings. Networking activities promote exchange among doctoral candidates and interaction with researchers within UMSICHT, other Fraunhofer Institutes and external research organisations, thereby supporting their integration into the national and international research community. UMSICHT also provides in-house seminars on topics such as programming, self-presentation and experimental design, while doctoral researchers are automatically included in the Research School's support programme.

The UMSICHT Research School therefore provides a particularly relevant institutional framework for ECR development within MOJITO. It combines participation in application-oriented research projects with structured supervision, skills development, networking and exposure to industrial partners. The programme explicitly aims to prepare doctoral researchers both for careers within Fraunhofer UMSICHT and for subsequent careers outside the organisation. Its longer-term outcomes are also documented through the Research School's alumni: after ten years of operation, almost 90 doctoral researchers had completed their dissertations, with former participants reporting the development of competences including project management and leadership and pursuing careers in both research and industry.[13]

For MOJITO, FRA includes one R2 ECR:

- R2-3, Jan Seeger, who obtained a doctoral degree in Mechanical Engineering at Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU) in cooperation with OTH Amberg-Weiden through the BayWISS BayWISS-Kolleg Energie joint doctoral program. He has been working with Fraunhofer UMSICHT and has contributed to research on Thermo-Catalytic Reforming (TCR)-derived fuels, including their injection and ignition behaviour. He is participating in the MOJITO project as an experimental scientist and is responsible for the development of the prototype microwave calciner, including the definition of its technical characteristics and the coordination of its construction with the external industrial partner.

[12] Fraunhofer UMSICHT. n.d. “UMSICHT Research School.” Fraunhofer UMSICHT. https://www.umsicht.fraunhofer.de/en/jobs-career/doctoral-thesis.html.

[13] Fraunhofer UMSICHT. 2026. “Alina Gawel on the UMSICHT Research School.” Fraunhofer UMSICHT, May 4, 2026. https://www.umsicht.fraunhofer.de/en/press-media/press-releases/2026/research-school-gawel.html.

4 MOJITO's ECR Promotion Framework

4.1 Scientific and technical skills

MOJITO started in October 2025. During its first year, ECRs have been involved across different areas of the project, with a particularly strong focus on scientific and technical activities. To document their participation and development, a partner-level data request form has been compiled by each partner and an individual ECR information form has been filled out by each identified ECR; the completed forms are included in the Annexes (A-F) to this deliverable.

At UNIBO, R2-1 is involved across the project's technical activities, with a particular focus on material characterisation. In addition to her scientific contributions, she has taken responsibility for WP5 and actively participates in the Portfolio meetings, providing opportunities to develop experience beyond her specific research tasks. R2-2 is also involved across the project's technical activities, with a particular focus on material characterisation and calcination and on Data Management. R1-1 contributes instead to the project's computational research activities, developing experience in the application of computational approaches within the broader MOJITO research framework.

At FRA, R2-3 has taken responsibility for the design of the prototype microwave calciner and is following its construction in collaboration with UNIBO and Fricke und Mallah Microwave Technology GmbH, the company awarded the relevant contract.

These activities provide ECRs with opportunities to develop scientific and technical competences while progressively assuming responsibilities within the project. They also expose researchers to methods, technologies and forms of expertise beyond their immediate disciplinary background. In particular, the interaction between experimental research, materials science, computational modelling, prototype development, and coordination activities creates a multidisciplinary research environment in which ECRs can broaden their technical knowledge and develop an understanding of the interdependencies between different components of the MOJITO system.

4.2 Research independence and leadership

As noted above, R2-1 is responsible for WP5 and represents MOJITO in Portfolio Working Group 2 – Regulatory Environment (see, e.g., the email of 14 May 2026 from Gráinne Greehy, Chair of WG2). These responsibilities extend beyond participation in technical research activities and provide her with experience in coordinating project activities, contributing to discussions at the portfolio level and representing the project in an external working group.

R2-3 is responsible for the development of the prototype calciner. He has played a central role in defining the technical characteristics of the calciner for the tender and participates in the weekly WP2 meetings as the main interface between MOJITO and Fricke und Mallah Microwave Technology GmbH[14], the company contracted to build the prototype. This role involves not only technical input but also coordination and communication between the project and an external industrial partner, providing experience in managing a key component of the project's development.
All ECRs participate in the consortium meetings, where they present their research activities and results. They are also expected to contribute to the preparation of future scientific publications arising from the project. These activities provide opportunities to develop scientific visibility, communication skills and experience in disseminating research results to an international consortium.
The relatively small size of the MOJITO consortium, comprising only two partners, further facilitates regular interaction between ECRs and researchers working across different areas of the project. As a result, ECRs are continuously exposed to experimental, computational, materials, engineering and environmental aspects of MOJITO. This cross-disciplinary exposure provides opportunities to broaden their research perspective and to understand how different forms of expertise contribute to the development of the overall system.
Taken together, these activities illustrate different dimensions of research independence and leadership within MOJITO: ECRs are not only involved in the implementation of research tasks but, in specific cases, also assume responsibility for work packages or technical components, represent the project in wider working groups, coordinate interactions with external organisations and communicate project results to the consortium. These responsibilities provide concrete opportunities for ECRs to progressively develop autonomy, coordination and leadership skills alongside their scientific expertise.

4.3 Communication, dissemination, networking, mobility and collaboration

ECRs participate in the consortium and EIC portfolio meetings, as well as external events and other occasions to communicate research to scientific, industrial, policy and public audiences.
As an example of ECR networking activities, a two-day conference was held in Ravenna, Italy, from 24 to 25 June 2026, hosted by the University of Bologna within the EU-funded NET-Fuels project[15]. Two MOJITO ECRs from UNIBO participated in the conference (R2-1, R2-2), which

[14] https://www.microwaveheating.net
[15] https://netfuelsproject.org

brought together actors from academia, industry, research and innovation organisations, public institutions, and trade unions. The programme consisted of a regional Stakeholder Workshop involving 14 actors and an international Scientific Symposium involving 61 participants from academia, industry, and public institutions. Scientific sessions, keynote lectures, posters, and a roundtable addressed carbon-removal pathways, industrial symbiosis, biomass valorisation, policy and governance frameworks, and the social aspects of industrial de-fossilisation. Participation in the Workshop and Symposium provided MOJITO ECRs with an opportunity to gain a broader understanding of the challenges of decarbonisation and of how private and public actors address them.

All ECRs expenses for travels and participation to events are taken care by the specific Partner.

4.4 Inclusive research environment and career development

The monitoring of ECRs careers is done at the WP1 level (Tasks 1.1 and 1.4). The PI directly interact with ECRs, and the Project Management Team keeps record of the achievements according to the terms defined in the GA/DoA. Examples of the kind of information which are tracked during the project execution are reported in the Annexes.

ECRs are directly mentored by senior researchers. In particular, R2-1 and R2-2 are mentored by Antonio Primante, MOJITO's chief technical officer, whereas R1-1 is mentored by Prof. Clelia Righi, who is responsible for WP4, and R2-3 is mentored by Martin Meiller, FRA's coordinator. No specific barriers to ECRs participation in MOJITOs activities have been identified.

Table 5 summarises the ECR-related issues and how monitoring is performed.

Table 5. Summary of ECR-related issues and monitoring.

Information	Status
Formal ECR-related objective/commitment	Principles set out in Annex II to the Council Recommendation on a European framework to attract and retain research, innovation and entrepreneurial talents in Europe.
Management mechanism for monitoring ECRs	MOJITO's PI monitors ECR issues through periodic (bi-monthly) colloquia with ECRs.
ECR-related activities planned in the DoA	Described in the present section.
Additional measures introduced during implementation	As the project started in 2025, a review of the measures and their results will be evaluated in M24 and M36, to be reported in internal deliverables.
Person/role responsible for ECR monitoring	Prof. Diego Marazza, MOJITO's PI.

5 Measures and Activities

Data on the measures and activities implemented to promote and develop ECRs in MOJITO were collected using both **quantitative** and **qualitative approaches**. Quantitative information is presented in Section 5.1 (Table 6), providing an overview of the ECRs participating in the project and their involvement in relevant activities. Qualitative information is presented in Section 5.2 (Table 7), providing further detail on the specific measures and activities, including their objectives, implementation, ECR participation and available evidence of their contribution to ECR development. Together, these two levels of analysis provide an overview of both the extent of ECR participation and the nature of the opportunities and activities available within the project.

5.1 Quantitative indicators

Table 6. Quantitative indicators of ECRs activities.

Indicator	Status	Evidence/output
Number of ECRs participating in at least one project activity	4	Annexes A-F
Percentage of ECRs over total project collaborators	21% (4/19)	For the full list of participants, see Part A of the proposal.
MOJITO-specific recruitment and funding of ECR positions	3 A further PhD Call by UNIBO sponsored by MOJITO received no application	Annexes A-F
Number of ECR presentations	9	"MOJITO Preliminary results" and meeting records.
Number of ECR-led/co-led activities	6	Annexes A-F
Number of ECR publications/project outputs	4	D2.1, D2.2, D4.1, D5.3
Training hours/training events attended by ECRs	0	N/A
Conference participations	2	Attendance list
Mobility/secondment days	0	N/A

5.2 Qualitative indicators

Table 7. Qualitative indicators of ECRs activities.

Measure/activity	WP/task	ECRs participation	Date/period	Evidence/output
Participation in technical and consortium meetings	Cross-project	All ECRs participate in internal technical meetings and consortium meetings.	M4–ongoing	Meeting records from 14 April and 16 July 2026.
Participation in scientific and technical research activities	R2-1: WP2/T2.2–2.5; WP3/T3.2–3.3; WP5 (WP Leader). R2-2: WP2/T2.2–2.5; WP3/T3.2–3.3. R2-3: WP2/T2.1; WP3/T3.1; WP5/T5.3. R1-1: WP4/T4.1, 4.3–4.4.	R2-1: Characterisation of biochar and carbonate materials. R2-2: Characterisation of biochar and carbonate materials. R2-3: Sourced appropriate biochar materials and clarified all relevant technical parameters; supplied UNIBO with selection of biochars for characterization and performance measurements. R1-1: First-principles prediction of the activation energies and reaction paths of the calcination process; MLFFs development.	R2 ECRs: M1–ongoing. R1-1: M2–ongoing.	R2-1, R2-2: Experimental research on biochar/carbonate materials and calcination. Contributions fed into D2.2. R2-3: Contributions fed into D2.1 and D2.2. R1-1: DFT/MLFF/MD computational research. Contributions fed into D4.1.

ECR responsibility for work packages and major project components	R2-1: WP5/T5.2, 5.3 responsible; WP2/T2.2-2.3 laboratory analyses and data processing; UNIBO's contribution to D2.2. R2-2: WP1/T1.3 NOMAD project repository; Consolidation of analytical results and internal documentation. R2-3: WP3/T3.1 Electric/MW rotary kiln choice, purchase and	R2-1: led WP5; performed laboratory analyses and processed the resulting experimental data; prepared the input-material characterisation report for D2.2. R2-2: Created the project workspace, introduced the repository to consortium partners and coordinated user onboarding and access management; integrated results from complementary analytical techniques, contributed to the internal technical report and meeting minutes, and supported the organisation of shared documentation. R2-3: held several technical meetings in addition to the monthly scheduled meeting to coordinate the pilot plant procurement	R2-1, R2-2: M1–ongoing R2-3: M1 (WP3 leadership since M10)–ongoing	R2-1: meeting records; D2.2. R2-2: NOMAD workspace; internal technical report. R2-3: Pilot-plant purchase, commissioning and first operation; meeting records; tender documents; and D5.3.

Measure/activity	WP/task	ECRs participation	Date/period	Evidence/output
	commissioning; FRA's contribution to D5.3.			
Participation and representation in EIC Portfolio working groups	N/A	R2-1: Represented MOJITO in WG2 activities of the EIC Portfolio "Cement & Concrete as a Carbon Sink" meetings. R2-2: Participated in the WG3 (LCA) activities of the EIC Portfolio "Cement & Concrete as a Carbon Sink" meeting. R2-3: Participated in the EIC Portfolio "Concrete & Cement as a Carbon Sink" meeting	R2-1: March 2026–September 2026. R2-2: March 2026. R2-3: 27/28. January 2026	R2-1: Delivery of "Regulatory Environment Template" and "Template for Standardisation Route to Market". R2-2: Delivery of LCA roadmap development process; MOJITO_WG3_final.pptx., and meeting records. R2-3: meeting records.
Scientific communication and presentation of results	WP2, WP3, WP4 and cross-project activities	R2-1, R2-2: Contributed on preparation of scientific presentations. R2-2: Presented on the tender process and pilot plant design. R1-1: Presented preliminary results and summaries of DFT and MD simulations.	R2-1, R2-2: March–July 2026 R2-3: 15 October 2026	R2-1, R2-2: "MOJITO Preliminary results" and meeting records. R2-3: Presentation and meeting records. R1-1: "MOJITO Preliminary results" and meeting records.

Measure/activity	WP/task	ECRs participation	Date/period	Evidence/output
Contribution to project deliverables and technical reporting	WP2, WP3, WP4.	R2-1, R2-2: Contributed to D2.2. R2-3: Contributed to D2.1, D2.2, and D5.3. R1-1: Contributed to D4.1	R2-1, R2-2: September 2026. R2-3: October 2025– February 2026 R1-1: November 2025–March 2026	R2-1, R2-2: D2.2. R2-3: D2.1, D2.2, and D5.3. R1-1: D4.1.
Research data management and shared research infrastructure	WP2, WP4, cross-project data management.	R2-2: Established the NOMAD shared project workspace, introduced it to partners and coordinated onboarding/access. R1-1: Established the NOMAD shared project workspace.	March–September 2026	NOMAD project workspace; shared records.
Interdisciplinary and intersectoral collaboration	WP2, WP3, WP4.	R2-2: Collaborated with Fassa Bortolo S.r.l. on carbonate-material supply and characterisation. R2-3: Coordinated with UNIBO and Fricke und Mallah GmbH on pilot-plant development.	R2-2: July 2025–September 2026. R2-3: M1–ongoing	R2-2: Provision of $CaCO_3$ and dolomite samples; technical meetings and knowledge exchange; analytical data on carbonate materials generated according to UNI EN 459-2:2021 and used in WP2 activities and datasets. R2-3: N/A
Preparation of external research-resource proposals	WP4, computational research	R1-1: Contributed to the preparation and drafting of EuroHPC Extreme and ISCRA B project proposals; PI and co-author of the project proposal “AI-guided design of reactive porous CaO from $CaCO_3$ calcination”.	March–June 2026	EuroHPC Extreme and ISCRA B project proposals are under review; “AI-guided design of reactive porous CaO from $CaCO_3$ calcination” project has been approved (NDR: EHPC-AIF-2026SC02-210)

Measure/activity	WP/task	ECRs participation	Date/period	Evidence/output
Skills, training and career development	N/A	R2-1, R2-2: mentored by MOJITO's chief technical officer R2-3: mentored by FRA's coordinator R1-1: mentored by WP4's coordinator	M1–ongoing	N/A
Participation to scientific events and networking	N/A	R2-1, R2-2: Participated in the NET-Fuels2026 Conference	24-25 June 2026	Attendance list

6 Conclusions

This document summarises the MOJITO approach to the promotion and development of early-career researchers (ECRs). Four ECRs currently participate in project activities, contributing to scientific and technical research as well as to project management, coordination, dissemination and communication activities. Their individual involvement and contributions are detailed in Annexes C to F.

As MOJITO has been running for only one year, the evidence available at this stage primarily concerns ECR participation, responsibilities and development opportunities, while the number of concrete outputs and longer-term outcomes remains limited. In particular, beyond project deliverables, the project has not yet produced scientific or technical publications specifically involving ECRs, while participation in conferences and other external dissemination activities has so far been limited. These aspects are therefore expected to develop further during the remaining project period.

The project will continue to implement the measures and principles relevant to ECR development, including those set out in the European Charter for Researchers, and to document relevant activities and evidence through the project administration. In addition, internal development reviews will be conducted during the remaining project period to assess ECR participation, responsibilities, skills development and other emerging outcomes, providing an opportunity to identify further development opportunities and, where appropriate, strengthen the measures implemented by the consortium. The results of this monitoring and the evidence collected will be reported in subsequent updates of this Deliverable for internal use.

7 Annexes

Annex A – Partner-Level ECR Data Form - UNIBO

Annex B – Partner-Level ECR Data Form – FRA

Annex C – Early-Career Researcher (ECR) Information Form – R2-1 – Alessia Alcantarini

Annex D – Early-Career Researcher (ECR) Information Form – R2-2 – Marco Melandri

Annex E – Early-Career Researcher (ECR) Information Form – R1-1 – Maria Patanè

Annex F – Early-Career Researcher (ECR) Information Form – R2-3 – Jan Seeger

Annex A – Partner-Level ECR Data Form – UNIBO.

Purpose. This form collects partner-level information on early-career researchers (ECRs) involved in MOJITO for the project deliverable on ECR participation and development. It is intended for completion by each consortium partner and complements the individual ECR information form.
Reporting principle. Please report information that can be supported by institutional or project records where possible. Do not infer contractual targets or project commitments: these will be checked separately against the Grant Agreement and Description of the Action (DoA). Use "N/A" where a category does not apply and indicate when figures are approximate.

A. Partner information

Partner/organisation	UNIBO
Contact person for this request	Prof. Andrea Contin
Department/unit	Department of Physics
Work package(s) led or contributed to	All WPs
Relevant task(s)	All Tasks
Date of information/reporting cut-off	24 September, 2026

B. ECR baseline and population

Please provide the total number of ECRs participating in MOJITO at project start (M1) and at the time of reporting (M12), including their gender distribution and whether their positions are specifically funded through MOJITO.

Indicator	**M1 (project start)**	**M12 (time of reporting**
Total ECRs	2	3
PhD/R1 researchers	0	1
Postdoctoral/R2 researchers	2	2
Male ECRs	0	1
Female ECRs	1	2
Other gender/prefer not to specify ECRs	0	0
MOJITO-funded/recruited	0	2

Please provide the ECR breakdown by work package/task where available.

ECR name or identifier	Researcher category/career stage	Scientific/technical disciplines	WP/task	Role in MOJITO	Start date	MOJITO-funded?
Alessia Alcantarini	R2	Environmental Sciences	WP2/T2.2–2.5; WP3/T3.2–3.3; WP5 (WP Leader); WP6/T6.1	Lead of WP5; supporting WP2 and WP3, including feedstock characterisation and pretreatment, dielectric property assessment of biochar–carbonate mixtures, calcination trials and product characterisation, as well as experimental data analysis, laboratory organisation, project documentation, and contributions to technical reports, deliverables and scientific presentations.	M1	No
Marco Melandri	R2	Chemistry	WP2/T2.2–2.5; WP3/T3.2–3.3	Supporting WP2 and WP3, including feedstock characterisation and pretreatment, dielectric characterisation of biochar–carbonate mixtures, calcination experiments and product characterisation. Activities also include experimental data processing and interpretation, assessment of calcination performance, laboratory organisation, project documentation, and contributions to technical reports, deliverables and scientific presentations.	M1	Yes (since M11)
Maria Patanè	R1	Physics	WP4/T4.1, 4.3–4.4	Supporting WP4, including first-principles calculations of $CaCO_3$ calcination mechanisms, development and validation of machine-learning force fields, and large-scale molecular dynamics simulations under different structural and environmental conditions. Activities also include computational data generation, processing and interpretation, assessment of calcination mechanisms and rates, management of simulation workflows and shared datasets, and contributions to technical reports, deliverables and scientific presentations.	M2	Yes

C. ECR recruitment and funding

Identify ECR positions recruited or specifically funded through MOJITO, including PhD positions, postdoctoral positions, research assistants or other junior research roles.

Position/role	Career stage	Recruitment date	Research focus/WP	Filled/vacant	Notes
Scientific and technical officer	R2	September 2026 (M11)	WP2, WP3	Filled	
PhD	R1	November 2025 (M2)	WP4	Filled	
PhD	N/A	October 2025	Development of the decarbonised -lime system	Vacant	The PhD call received no application.

D. ECR-related activities implemented

List ECR-related activities organised, funded or facilitated by your organisation as part of MOJITO. Include activities specifically aimed at ECRs as well as project activities that provided substantial development or participation opportunities.

Activity	Date/period	ECR participants	Purpose/opportunity	ECR role/contribution	Output/evidence
Participation in EIC Portfolio meetings	M1-ongoing	Alessia Alcantarini, Marco Melandri	Opportunity to confront and gain experience from other European groups and projects	MOJITO representatives in WG2 and WG3	Meetings records

E. ECR responsibilities and leadership

Identify cases where ECRs have taken responsibility for or made substantial contributions to project tasks, experiments, analyses, presentations, publications, deliverables or other outputs.

ECR	WP/Task/activity	Nature of responsibility	Date/period	Evidence/output
Alessia Alcantarini	WP5	WP leader.	M1-ongoing	N/A
Alessia Alcantarini	T5.2–5.3	Laboratory analyses and data processing.	M1-ongoing	Internal technical report
Alessia Alcantarini	D2.2	UNIBO's contribution to D2.2.	September 2026	D2.2
Marco Melandri	WP1/T1.3	NOMAD project repository; Consolidation of analytical results and internal documentation.	M1-ongoing	Project workspace, internal technical report
Marco Melandri	D2.2	UNIBO's contribution to D2.2.	September 2026	D2.2

F. Training, skills and career development

Record training, supervision, mentoring or other development activities involving ECRs. Only report formal schemes if they actually exist; informal supervision or development opportunities may also be recorded.

Activity	Date/period	ECRs involved	Skills/competences	Formal or informal	Evidence/outcome
Mentoring	M1-ongoing	Alessia Alcantarini, Marco Melandri	N/A	Informal	N/A
Mentoring	M2-ongoing	Maria Patanè	N/A	Informal	N/A

G. Collaboration, mobility and research networks

Provide evidence of ECR involvement in cross-partner, interdisciplinary and, where applicable, intersectoral collaboration. Include mobility or secondments only where they actually occurred.

ECR	Partner/ organisation	Country	Type of collaboration/mobility	Purpose	Date/duration	Outcome/evidence
Marco Melandri	Fassa Bortolo S.r.l.	Italy	Knowledge and material exchange	Supply and characterisation of carbonate materials, with technical exchange on lime production, material properties and industrial applications.	July 2025–September 2026	Provision of $CaCO_3$ and dolomite samples, technical knowledge exchange, and analytical data supporting WP2 activities and datasets.

H. Outputs and evidence of benefits

Provide available evidence of outcomes associated with ECR participation in MOJITO. Where possible, distinguish participation from demonstrated outcomes.

ECR/group	Output or outcome	Date	How MOJITO contributed	Evidence/reference
Alessia Alcantarini, Marco Melandri	D2.2	September 2026	MOJITO's deliverable	D2.2
Maria Patanè	D4.1	November 2025–March 2026	MOJITO's deliverable	D4.1

I. Challenges and recommendations

Identify challenges affecting ECR recruitment, participation, development or retention, and suggest measures that could be considered for the remainder of the project.

Challenge	Effect on ECRs/project	Cause or context	Action already taken	Recommendation for remaining period

Annex B – Partner-Level ECR Data Form – FRA

Purpose. This form collects partner-level information on early-career researchers (ECRs) involved in MOJITO for the project deliverable on ECR participation and development. It is intended for completion by each consortium partner and complements the individual ECR information form.
Reporting principle. Please report information that can be supported by institutional or project records where possible. Do not infer contractual targets or project commitments: these will be checked separately against the Grant Agreement and Description of the Action (DoA). Use "N/A" where a category does not apply and indicate when figures are approximate.

A. Partner information

Partner/organisation	Fraunhofer UMSICHT
Contact person for this request	Dr.-Ing. Martin Meiler; Dr.-Ing. Jan Seeger
Department/unit	Combustion and process heat
Work package(s) led or contributed to	WP2, WP3, WP5
Relevant task(s)	Task 2.1 - 2.4, Task 3.1 - 3.2, Task 5.1
Date of information/reporting cut-off	30. September 2026

B. ECR baseline and population

Please provide the total number of ECRs participating in MOJITO at project start (M1) and at the time of reporting (M12), including their gender distribution and whether their positions are specifically funded through MOJITO.

Indicator	**M1 (project start)**	**M12 (time of reporting**
Total ECRs	1	1
PhD/R1 researchers	0	0
Postdoctoral/R2 researchers	1	1
Male ECRs	1	1
Female ECRs	0	0
Other gender/prefer not to specify ECRs	0	0
MOJITO-funded/recruited	1	1

Please provide the ECR breakdown by work package/task where available.

ECR name or identifier	Researcher category/career stage	Scientific/technical disciplines	WP/task	Role in MOJITO	Start date	MOJITO-funded?
Jan Seeger	R2	Mechanical Engineering	WP2/T2.1; WP3/T3.1; WP5/T5.3	Lead of WP3; supporting WP2; contributing to tasks as required.	M1	Yes

C. ECR recruitment and funding

Identify ECR positions recruited or specifically funded through MOJITO, including PhD positions, postdoctoral positions, research assistants or other junior research roles.

Position/role	Career stage	Recruitment date	Research focus/WP	Filled/vacant	Notes
Scientist/ Researcher	research assistants	September 2025	WP3 Pilot Plant	Filled	

D. ECR-related activities implemented

List ECR-related activities organised, funded or facilitated by your organisation as part of MOJITO. Include activities specifically aimed at ECRs as well as project activities that provided substantial development or participation opportunities.

Activity	Date/period	ECR participants	Purpose/opportunity	ECR role/contribution	Output/evidence
Participation in EIC Portfolio meeting	27/28. January 2026	Jan Seeger	Opportunity to confront and gain experience from other European groups and projects	Representative of Fraunhofer UMSICHT	Meetings records

E. ECR responsibilities and leadership

Identify cases where ECRs have taken responsibility for or made substantial contributions to project tasks, experiments, analyses, presentations, publications, deliverables or other outputs.

ECR	WP/Task/activity	Nature of responsibility	Date/period	Evidence/output
Jan Seeger	WP3	WP leader.	M1	Deliverable 2.1
Jan Seeger	Interpretation of material-characterisation results in the field of microwave technology	Report preparation; use of results for pilot-plant engineering	November 2025– September 2026	Deliverable 2.2
Jan Seeger	Development of the Plan for Exploitation Activities	Coordination and contribute	November 2025– September 2026	Deliverable 5.3

ECR	WP/Task/activity	Nature of responsibility	Date/period	Evidence/output
Jan Seeger	organising research data and supporting of open access concepts	Leading the Data-Management Plan implementation at Fraunhofer UMSICHT	April–September 2026	Deliverable D1.2

F. Training, skills and career development

Record training, supervision, mentoring or other development activities involving ECRs. Only report formal schemes if they actually exist; informal supervision or development opportunities may also be recorded.

Activity	Date/period	ECRs involved	Skills/competences	Formal or informal	Evidence/outcome
Mentoring	M1-ongoing	Jan Seeger	N/A	Informal	

G. Collaboration, mobility and research networks

Provide evidence of ECR involvement in cross-partner, interdisciplinary and, where applicable, intersectoral collaboration. Include mobility or secondments only where they actually occurred.

ECR	Partner/organisation	Country	Type of collaboration/mobility	Purpose	Date/duration	Outcome/evidence
Jan Seeger	Fricke und Mallah GmbH	Germany	Collaborative design and procurement	Coordination with UNIBO and Fricke und Mallah GmbH on pilot-plant realisation.	M1–ongoing	N/A

H. Outputs and evidence of benefits

Provide available evidence of outcomes associated with ECR participation in MOJITO. Where possible, distinguish participation from demonstrated outcomes.

ECR/group	Output or outcome	Date	How MOJITO contributed	Evidence/reference
Jan Seeger	D2.1, D2.2, D5.3	October 2025–February 2026	MOJITO's deliverables	D2.1, D2.2, D5.3

I. Challenges and recommendations

Identify challenges affecting ECR recruitment, participation, development or retention, and suggest measures that could be considered for the remainder of the project.

Challenge	Effect on ECRs/project	Cause or context	Action already taken	Recommendation for remaining period

Annex C – Early-Career Researcher (ECR) Information Form – R2-1 – Alessia Alcantarini

Purpose. Please complete this form to provide information on your individual involvement in MOJITO for the project deliverable on ECR participation and development. Report MOJITO-related activities and outcomes only. Use "N/A" where appropriate.

Evidence. Where possible, provide links, document names or other references (e.g. agendas, presentations, publications, certificates or project records). Estimates are acceptable if exact figures are unavailable; please indicate when a figure is approximate.

Data. Do not include unnecessary sensitive personal information. The information will be consolidated with other ECR responses and project records.

A. Your profile in MOJITO

Name	Alessia Alcantarini
Gender	Female
Institution/partner	University of Bologna
Department/research group	Department of Physics - DIFA
Role in MOJITO	Scientific and technical involvement in MOJITO research, covering feedstock characterisation and pretreatment, preparation and evaluation of the dielectric properties of biochar–carbonate mixtures, and design and execution of calcination trials with subsequent product characterisation. Activities also include processing and interpreting experimental results, evaluating calcination performance, organising laboratory work and shared project documentation, and contributing to the preparation of technical reports, project deliverables and scientific presentations.
Work package(s)/task(s)	WP2 – Input-material characterisation, feedstock pretreatment and mixture preparation, characterisation of calcination products, and performance measurements (Tasks 2.2–2.5). WP3 – Experimental planning and calcination testing using the electric/microwave rotary kiln (Tasks 3.2–3.3). WP5 – WP Leader
Career stage at project start (M1)	Research Fellow

Highest degree and year obtained	Master's degree in in Science and Technology for the Environment and Territory, 2021
Date/month of joining MOJITO	M1
Recruited or specifically funded through MOJITO?	No
If yes, type of position (e.g. PhD, postdoc, research assistant)	
If no, please indicate other funding sources	

B. MOJITO activities and opportunities

List MOJITO-related research, training, meetings, workshops, conferences, mobility/secondments, dissemination and communication activities in which you have participated.

Date/period	Activity/event	Type	Your role/contribution	Output/result	Evidence/link
January–September 2026	Characterisation of biochar and carbonate materials	Research	Contribution to physicochemical characterisation analyses	Consolidated characterisation of input materials for Task 2.2.	UNIBO contribution to D2.2
January–July 2026	Internal technical meetings and consortium meetings	Scientific exchange	Participated in methodological discussions, experimental planning and project progress reviews.	Agreed analytical priorities, follow-up actions and meeting records.	consortium meeting records of 14 April and 16 July
March 2026-September 2026	Leadership for Mojito project in WG2 activities of the EIC “Cement & Concrete as a Carbon Sink” Portfolio	Technical meeting/portfolio activity	Contribution on WG2 meetings on Regulatory Environment. Participation in the webinar “Advancing Low-Carbon Cement and Concrete Through Standardisation”, organised by Working Group 2 (WG2).	Delivery of “Regulatory Environment template" and "Template for Standardisation route to Market"	File in WG2 shared folder
March–July 2026	Contribution on preparation of scientific presentations	Scientific communication	Prepared preliminary results and summaries of materials properties	Supporting internal and consortium discussions.	“MOJITO Preliminary results” and meeting records

C. Responsibilities and active contribution

Identify instances where you took responsibility or made a substantial contribution to experiments, analyses, presentations, papers, deliverables, tasks or other project outputs.

Date/period	Activity/output	Your responsibility or contribution	Evidence
January–September 2026	Laboratory analyses and data processing.	Performed the laboratory analyses planned under the relevant MOJITO tasks and processed the resulting experimental data.	Internal technical report; meeting minutes of 16 April and 14 July 2026
From M1	WP 5 - Leadership	Coordination	
March–July 2026	Contribution to scientific presentations	Contribution to the presentation on biochar properties,	"MOJITO Preliminary results"; 16 July 2026 meeting records
March- September 2026	WG 2 Leadership	Participation in Portfolio WG2 meetings as a representative of the MOJITO project.	WG 2 Shared folder
September 2026	UNIBO contribution to Deliverable D2.2	Prepared the input-material characterisation report and participation an internal review before sharing it with Fraunhofer, the deliverable lead partner.	Characterisation report; internal review and transmission emails

D. Skills, training and career development

Include scientific/technical skills and, where relevant, transferable skills such as communication, writing, presentation, project management, data analysis, interdisciplinary working or stakeholder engagement.

Date/period	Activity/output	Skills/competences developed	Evidence/outcome
January–September 2026	Interpretation of material-characterisation results	Improved ability to compare and interpret chemical, thermal, and structural data for biochar and carbonate materials.	Internal technical report; contribution to D2.2
March–September 2026	Preparation of reports and scientific presentations	Further development of scientific writing	Participation in consortium presentations; UNIBO contribution to D2.2
January–September 2026	Participation in technical and consortium meetings	Experience in interdisciplinary collaboration and joint planning of experimental activities.	Meeting minutes and agreed follow-up actions

E. Collaboration, mobility and networks

Record cross-partner, interdisciplinary and, where applicable, intersectoral collaboration. Include mobility or secondments only where they actually occurred.

Date/period	Partner/organisation	Country	Type of collaboration	Activity/purpose	Outcome/evidence

F. Benefits and outcomes

What, if anything, has changed for you as a result of your involvement in MOJITO? Focus on outcomes that can be described or evidenced. Examples include new skills, scientific outputs, presentations, publications, new collaborations, increased responsibility, experience with a new method or technology, professional networks or career opportunities. Do not assume an outcome where there is no evidence yet.

Outcome/benefit	How MOJITO contributed	Evidence, if available
Broader experience in material characterisation	Working with complementary analytical results	Internal technical report; scientific presentations
Stronger interdisciplinary collaboration and scientific communication	opportunities to discuss results with colleagues and project partners.	Meeting minutes; consortium presentations

G. Challenges and recommendations

Challenge encountered	Effect on ECR participation/development	Suggested improvement

H. Optional ECR case study/testimonial

If you are willing, provide a short example (approximately 100–200 words) describing how participation in MOJITO has contributed to your research or professional development. It may be used as an anonymised or attributed case study in the deliverable, subject to your consent.

Consent for use of testimonial/case study: Yes/No

Preferred attribution (if applicable): _____

I. ECR-related targets or commitments

If you are aware of ECR-related targets, commitments or indicators in the MOJITO Grant Agreement/Description of the Action, list them below or identify the relevant document/section. Do not reconstruct contractual commitments from memory.

Target/commitment/indicator	Source document/section	Notes

Annex D – Early-Career Researcher (ECR) Information Form – R2-2 – Marco Melandri

Purpose. Please complete this form to provide information on your individual involvement in MOJITO for the project deliverable on ECR participation and development. Report MOJITO-related activities and outcomes only. Use "N/A" where appropriate.

Evidence. Where possible, provide links, document names or other references (e.g. agendas, presentations, publications, certificates or project records). Estimates are acceptable if exact figures are unavailable; please indicate when a figure is approximate.

Data. Do not include unnecessary sensitive personal information. The information will be consolidated with other ECR responses and project records.

A. Your profile in MOJITO

Name	Marco Melandri
Gender	Male
Institution/partner	University of Bologna
Department/research group	DIFA/EMRG
Role in MOJITO	Scientific and technical contribution to MOJITO experimental activities, including feedstock characterisation and pretreatment; preparation and dielectric characterisation of biochar–carbonate mixtures; planning and implementation of calcination experiments; and characterisation of the resulting products. Contribution to experimental data processing and interpretation, assessment of calcination performance, organisation of laboratory activities and shared documentation, and preparation of technical reports, project deliverables and scientific presentations.
Work package(s)/task(s)	WP2 – Input-material characterisation, feedstock pretreatment and mixture preparation, characterisation of calcination products, and performance measurements (Tasks 2.2–2.5). WP3 – Experimental planning and calcination testing using the electric/microwave rotary kiln (Tasks 3.2–3.3).
Career stage at project start (M1)	Research Fellow
Highest degree and year obtained	Master's degree in Chemical Sciences, 2018.
Date/month of joining MOJITO	M1

Recruited or specifically funded through MOJITO?	Since September 2026 (M11)
If yes, type of position (e.g. PhD, postdoc, research assistant)	Scientific and technological technical officer
If no, please indicate other funding sources	

B. MOJITO activities and opportunities

List MOJITO-related research, training, meetings, workshops, conferences, mobility/secondments, dissemination and communication activities in which you have participated.

Date/period	Activity/event	Type	Your role/contribution	Output/result	Evidence/link
January–September 2026	Characterisation of biochar and carbonate materials	Research	Contributed to the interpretation and integration of chemical, thermal, structural and surface-characterisation data.	Consolidated characterisation of input materials for Task 2.2.	UNIBO contribution to D2.2
January–July 2026	Internal technical meetings and consortium meetings	Scientific exchange/project coordination	Participated in methodological discussions, experimental planning and project progress reviews.	Agreed analytical priorities, follow-up actions and meeting records.	consortium meeting records of 14 April and 16 July
March 2026	Participation in the WG3 (LCA) activities of the EIC “Cement & Concrete as a Carbon Sink” Portfolio associated with the MOJITO project	Technical meeting/portfolio activity	Contributed to Life Cycle Assessment (LCA) aspects, and supported the collaborative review and refinement of the WG3 roadmap document.	Delivery of LCA roadmap development process.	File MOJITO_WG3_final.pptx. And meeting records
April 2026	NOMAD project repository setup	Research data management	Introduced NOMAD to partners and established the shared project workspace.	Operational repository with access for consortium members.	Consortium meeting records; NOMAD workspace
March–July 2026	Preparation and sharing of scientific presentations	Scientific communication	Prepared preliminary results and summaries of biochar properties, FTIR and XRD findings.	Presentation materials supporting internal and consortium discussions.	“MOJITO Preliminary results”, and meeting records

C. Responsibilities and active contribution

Identify instances where you took responsibility or made a substantial contribution to experiments, analyses, presentations, papers, deliverables, tasks or other project outputs.

Date/period	Activity/output	Your responsibility or contribution	Evidence
April 2026	NOMAD project repository	Created the project workspace, introduced the repository to consortium partners and coordinated user onboarding and access management.	NOMAD workspace; consortium meeting records of 14 April 2026
January–September 2026	Consolidation of analytical results and internal documentation	Integrated results from complementary analytical techniques, contributed to the internal technical report and meeting minutes, and supported the organisation of shared documentation.	Internal technical report; meeting minutes of 16 April and 14 July 2026
March–July 2026	Scientific presentations	Prepared and circulated preliminary results and developed the presentation on biochar properties, FTIR interpretation and carbon structural ordering assessed by XRD.	"MOJITO Preliminary results"; PCM – FT-IR & Graphitization degree, 16 July 2026
September 2026	UNIBO contribution to Deliverable D2.2	Prepared the input-material characterisation report and organised internal review before sharing it with Fraunhofer, the deliverable lead partner.	Characterisation report; internal review and transmission emails

D. Skills, training and career development

Include scientific/technical skills and, where relevant, transferable skills such as communication, writing, presentation, project management, data analysis, interdisciplinary working or stakeholder engagement.

Date/period	Activity/output	Skills/competences developed	Evidence/outcome
January–September 2026	Interpretation of material-characterisation results	Improved ability to compare and interpret chemical, thermal and structural data for biochar and carbonate materials.	Internal technical report; contribution to D2.2
April–September 2026	NOMAD repository setup and shared documentation	Practical experience in organising research data and supporting access and information sharing among partners.	NOMAD project workspace; shared records

Date/period	Activity/output	Skills/competences developed	Evidence/outcome
March–September 2026	Preparation of reports and scientific presentations	Further development of scientific writing and presentation skills.	Consortium presentations; UNIBO contribution to D2.2
January–September 2026	Participation in technical and consortium meetings	Experience in interdisciplinary collaboration and joint planning of experimental activities.	Meeting minutes and agreed follow-up actions

E. Collaboration, mobility and networks

Record cross-partner, interdisciplinary and, where applicable, intersectoral collaboration. Include mobility or secondments only where they actually occurred.

Date/period	Partner/organisation	Country	Type of collaboration	Activity/purpose	Outcome/evidence
Jul 2025 - Sep 2026	Fassa Bortolo S.r.l.	Italy	Intersectoral collaboration (Academia-Industry)	Supply and characterization support of carbonate materials (limestone and dolomite), technical exchange on lime production, material properties and potential industrial applications within the MOJITO project.	Provision of $CaCO_3$ and dolomite samples; technical meetings and knowledge exchange; analytical data on carbonate materials generated according to UNI EN 459-2:2021 and used in WP2 activities and datasets.

F. Benefits and outcomes

What, if anything, has changed for you as a result of your involvement in MOJITO? Focus on outcomes that can be described or evidenced. Examples include new skills, scientific outputs, presentations, publications, new collaborations, increased responsibility, experience with a new method or technology, professional networks or career opportunities. Do not assume an outcome where there is no evidence yet.

Outcome/benefit	How MOJITO contributed	Evidence, if available
Broader experience in material characterisation	Working with complementary analytical results	Internal technical report; scientific presentations
Experience in European project reporting and data management	practical experience in reporting and organising shared research data.	D2.2 contribution; NOMAD project workspace
Stronger interdisciplinary collaboration and scientific communication	opportunities to discuss results with colleagues and project partners.	Meeting minutes; consortium presentations

G. Challenges and recommendations

Challenge encountered	Effect on ECR participation/development	Suggested improvement

H. Optional ECR case study/testimonial

If you are willing, provide a short example (approximately 100–200 words) describing how participation in MOJITO has contributed to your research or professional development. It may be used as an anonymised or attributed case study in the deliverable, subject to your consent.

Participation in MOJITO has helped me broaden my experience in material characterisation and collaborative research. A practical example was preparing the UNIBO contribution to Deliverable D2.2, which required bringing together results from different analytical techniques and discussing their interpretation with colleagues. This strengthened my ability to compare data, recognise methodological limitations and present findings clearly. Setting up the NOMAD project workspace gave me practical experience in organising and sharing research data with project partners. Through these activities, alongside technical meetings and consortium presentations, I have gained experience in connecting laboratory work with the documentation and communication requirements of a European research project.

Consent for use of testimonial/case study: Yes

Preferred attribution (if applicable): _____

I. ECR-related targets or commitments

If you are aware of ECR-related targets, commitments or indicators in the MOJITO Grant Agreement/Description of the Action, list them below or identify the relevant document/section. Do not reconstruct contractual commitments from memory.

Target/commitment/indicator	Source document/section	Notes

Annex E – Early-Career Researcher (ECR) Information Form – R1-1 – Maria Patanè

Purpose. Please complete this form to provide information on your individual involvement in MOJITO for the project deliverable on ECR participation and development. Report MOJITO-related activities and outcomes only. Use "N/A" where appropriate.

Evidence. Where possible, provide links, document names or other references (e.g. agendas, presentations, publications, certificates or project records). Estimates are acceptable if exact figures are unavailable; please indicate when a figure is approximate.

Data. Do not include unnecessary sensitive personal information. The information will be consolidated with other ECR responses and project records.

A. Your profile in MOJITO

Name	Maria Patanè
Gender	Female
Institution/partner	University of Bologna
Department/research group	DIFA
Role in MOJITO	As part of the UNIBO-CMU research team and in collaboration with senior researchers, contribution to MOJITO computational activities, including first-principles calculations of the activation energies and reaction pathways associated with $CaCO_3$ calcination; development, training and validation of machine-learning force fields for $CaCO_3$ polymorphs, carbon-based process materials and relevant environmental species; and setup and execution of large-scale molecular dynamics simulations under different structural and environmental conditions. Contribution to computational data generation, processing and interpretation, assessment of calcination mechanisms and rates, management of simulation workflows and shared datasets, and preparation of technical reports, project deliverables and scientific presentations.
Work package(s)/task(s)	WP4 – First-principles prediction of the activation energies and reaction paths of the calcination process (Task 4.1) MLFFs development (Task 4.3) MD simulations of the calcination process in vacuum (Task 4.4)
Career stage at project start (M1)	Master student in Physics
Highest degree and year obtained	Master's degree in Physics, 2025
Date/month of joining MOJITO	M2
Recruited or specifically funded through MOJITO?	Yes

If yes, type of position (e.g. PhD, postdoc, research assistant)	PhD student
If no, please indicate other funding sources	

B. MOJITO activities and opportunities

List MOJITO-related research, training, meetings, workshops, conferences, mobility/secondments, dissemination and communication activities in which you have participated.

Date/period	Activity/event	Type	Your role/contribution	Output/result	Evidence/link
November 2025–March 2026	First-principles prediction of the activation energies and reaction paths of the calcination process	Research	Contributed to perform DFT simulations to compute the activation energy barriers for $CaCO_3$ polymorphs (calcite, aragonite, vaterite)	First principles energy barriers for Task 4.1.	UNIBO contribution to D4.1
November 2025–July 2026	Internal technical meetings and consortium meetings	Scientific exchange	Participated in methodological discussions, planning computational activities and project progress reviews.	Agreed analytical priorities, follow-up actions and meeting records.	Consortium meeting records of 14 April and 16 July
March–July 2026	Preparation and sharing of scientific presentations	Scientific communication	Prepared preliminary results and summaries of DFT and MD simulations.	Presentation materials supporting internal and consortium discussions.	MOJITO Preliminary results and meeting records
April–September 2026	MLFFs development	Research	Contributed to generate MLFFs to complete Task 4.3 and perform the simulation in Task 4.4	Work in progress	
June–August 2026	Preparation of paper related to task 4.1	Scientific communication	Performed computational calculations and contributed to manuscript writing	Work in progress	

C. Responsibilities and active contribution

Identify instances where you took responsibility or made a substantial contribution to experiments, analyses, presentations, papers, deliverables, tasks or other project outputs.

Date/period	Activity/output	Your responsibility or contribution	Evidence
November 2025–September 2026	Consolidation of analytical results and internal documentation	Integrated results from DFT and MD simulations, contributed to the internal technical report and meeting minutes.	Internal technical report; meeting minutes of 16 April and 14 July 2026
March–July 2026	Scientific presentations	Prepared and circulated preliminary results and developed the presentation on DFT and MD simulations.	MOJITO Preliminary results; UNIBO-CMU presentations, 16 April and 14 July 2026
March – September 2026	NOMAD project repository	Created the project workspace for WP4.	
March 2026	UNIBO contribution to Deliverable D4.1	Contributed to prepare the deliverable.	UNIBO contribution to D4.1

D. Skills, training and career development

Include scientific/technical skills and, where relevant, transferable skills such as communication, writing, presentation, project management, data analysis, interdisciplinary working or stakeholder engagement.

Date/period	Activity/output	Skills/competences developed	Evidence/outcome
November 2025 –March 2026	Computational investigation of $CaCO_3$ polymorph stability, minimum-energy pathways, and the microscopic reaction mechanism of CO_2 desorption.	Development of computational expertise in the analysis of $CaCO_3$ polymorphs and activation barriers associated with the calcination process.	Deliverable D4.1
January – September 2026	Development of machine-learning potentials and associated molecular dynamics simulations of calcination reaction	Development of expertise in machine-learning interatomic potentials and molecular dynamics simulations.	Progress meeting 16 July.
April–September 2026	NOMAD repository setup and shared documentation	Practical experience in organizing research data and supporting access and information sharing among partners.	NOMAD project workspace; shared records

Date/period	Activity/output	Skills/competences developed	Evidence/outcome
March–September 2026	Preparation of reports and scientific presentations.	Further development of scientific writing and presentation skills.	Consortium presentations; UNIBO contribution to D4.1
March-June 2026	Drafting of proposals for computational resource allocation	Contributed to the preparation and drafting of EuroHPC Extreme and ISCRA B project proposals	Currently under review
June 2026	EuroHPC AI project proposal	PI and co-author of the project proposal “AI-guided design of reactive porous CaO from $CaCO_3$ calcination.	Approved NDR : EHPC-AIF-2026SC02-210

E. Collaboration, mobility and networks

Record cross-partner, interdisciplinary and, where applicable, intersectoral collaboration. Include mobility or secondments only where they actually occurred.

Date/period	Partner/organisation	Country	Type of collaboration	Activity/purpose	Outcome/evidence

F. Benefits and outcomes

What, if anything, has changed for you as a result of your involvement in MOJITO? Focus on outcomes that can be described or evidenced. Examples include new skills, scientific outputs, presentations, publications, new collaborations, increased responsibility, experience with a new method or technology, professional networks or career opportunities. Do not assume an outcome where there is no evidence yet.

Outcome/benefit	How MOJITO contributed	Evidence, if available
Broader experience with computational tools for identifying and analysing minimum-energy pathways.	Working with complementary experimental results.	Internal technical report; scientific presentations
Experience in European project reporting and data management	Practical experience in reporting and organizing shared research data.	NOMAD project workspace
Stronger interdisciplinary collaboration and scientific communication	Opportunities to discuss results with colleagues and project partners.	Meetings; consortium presentations

G. Challenges and recommendations

Challenge encountered	Effect on ECR participation/development	Suggested improvement

H. Optional ECR case study/testimonial

If you are willing, provide a short example (approximately 100–200 words) describing how participation in MOJITO has contributed to your research or professional development. It may be used as an anonymised or attributed case study in the deliverable, subject to your consent.

Participation in MOJITO has allowed me to strengthen my expertise in computational modelling of mineral systems, with particular focus on the structural and energetic characterisation of the three $CaCO_3$ polymorphs and on the investigation of dissociative processes. A significant part of this work involved comparing the structural and energetic properties of calcite, aragonite and vaterite through atomistic simulations, providing a computational basis for assessing their relative stability and behaviour. In parallel, my contribution to Deliverable D4.1 involved exploring the potential energy surface associated with a dissociation process and identifying the corresponding minimum-energy pathway. This activity strengthened my experience in the computational characterisation of reaction mechanisms, including the analysis of intermediate configurations, energetic barriers and structural changes along the reaction coordinate. It also improved my ability to critically assess the computational methodology and interpret simulation results in terms of the underlying atomistic mechanisms. Through this work, together with technical discussions and consortium presentations, I further developed my ability to integrate computational results into the broader scientific, collaborative and reporting framework of a European research project.

Consent for use of testimonial/case study: Yes

Preferred attribution (if applicable): _____

I. ECR-related targets or commitments

If you are aware of ECR-related targets, commitments or indicators in the MOJITO Grant Agreement/Description of the Action, list them below or identify the relevant document/section. Do not reconstruct contractual commitments from memory.

Target/commitment/indicator	Source document/section	Notes

Annex F – Early-Career Researcher (ECR) Information Form – R2-3 – Jan Seeger

Purpose. Please complete this form to provide information on your individual involvement in MOJITO for the project deliverable on ECR participation and development. Report MOJITO-related activities and outcomes only. Use “N/A” where appropriate.

Evidence. Where possible, provide links, document names or other references (e.g. agendas, presentations, publications, certificates or project records). Estimates are acceptable if exact figures are unavailable; please indicate when a figure is approximate.

Data. Do not include unnecessary sensitive personal information. The information will be consolidated with other ECR responses and project records.

A. Your profile in MOJITO

Name	Jan Seeger
Gender	Male
Institution/partner	Fraunhofer UMSICHT
Department/research group	Combustion and process heat
Role in MOJITO	Project scientist in charge of system setup and experimental testing on the Fraunhofer side.
Work package(s)/task(s)	WP 2 - Analysis of input materials, products and gathering of relevant process data - Feedstock supply (Task 2.1); WP3 - Pilot plant purchase, commissioning and operation Task 3.1 Electric/MW rotary kiln choice, purchase and commissioning and preparation of First set of test mixture calcination in E/MW rotary kiln; WP5 - Exploitation, Communication and Dissemination in particular FRA UMSICHT’s contribution to Deliverable D5.3 – Plan for Exploitation Activities.
Career stage at project start (M1)	MSc.
Highest degree and year obtained	Dr.-Ing. 2026
Date/month of joining MOJITO	01.10.2025
Recruited or specifically funded through MOJITO?	Yes
If yes, type of position (e.g. PhD, postdoc, research assistant)	Scientist
If no, please indicate other funding sources	

B. MOJITO activities and opportunities

List MOJITO-related research, training, meetings, workshops, conferences, mobility/secondments, dissemination and communication activities in which you have participated.

Date/period	Activity/event	Type	Your role/contribution	Output/result	Evidence/link
15. October 2026	MOJITO Project meeting	kick-off meeting	Presentation on the Tender process and planed first designed choses of the Pilot plant. Participated in methodological discussions, experimental planning and project progress reviews.		meeting minutes Presentation
27./28. January 2026	EIC Portfolio Concrete & Cement as a Carbon Sink meeting	kick-off meeting	Representative of Fraunhofer UMSICHT		meeting minutes
16. July 2026	MOJITO Project meeting	Consortium Meeting	Lead of WP3; Contributing to WP2 and WP6		meeting minutes

C. Responsibilities and active contribution

Identify instances where you took responsibility or made a substantial contribution to experiments, analyses, presentations, papers, deliverables, tasks or other project outputs.

Date/period	Activity/output	Your responsibility or contribution	Evidence
October 2025 – January 2026	WP 2 Feedstock supply	Sourcing appropriate biochar materials and clarifying all relevant technical parameters, including the availability of specific particle size ranges.	D2.1 – Report on feedstock supply
November 2025 – August 2026	WP 2 Feedstock supply	Supplying UNIBO with selection of Biochars for characterization and performance measurements	D2.2 – Report on feedstock supply
ongoing	WP 3 Pilot plant purchase, commissioning and first operation	Several technical Teams meetings in addition to the monthly scheduled meeting to coordinate the pilot plant procurement.	tender documents; several minutes of meetings for clarifying technical details in online meetings
February 2026	Deliverable D 5.3	FRA UMSICHT contribution to Deliverable D 5.3	Plan for Exploitation Activities

D. Skills, training and career development

Date/period	Activity/output	Skills/competences developed	Evidence/outcome

Include scientific/technical skills and, where relevant, transferable skills such as communication, writing, presentation, project management, data analysis, interdisciplinary working or stakeholder engagement.

E. Collaboration, mobility and networks

Record cross-partner, interdisciplinary and, where applicable, intersectoral collaboration. Include mobility or secondments only where they actually occurred.

Date/period	Partner/organisation	Country	Type of collaboration	Activity/purpose	Outcome/evidence
ongoing	UNIBO	Italy	Project partner	Several meetings and coordination efforts related to the technical site and the transfer of feedstock.	
ongoing	Fricke und Mallah	Germany	Microwave plant sales engineer	Technical coordination and meetings details of the pilot plant.	

F. Benefits and outcomes

What, if anything, has changed for you as a result of your involvement in MOJITO? Focus on outcomes that can be described or evidenced.

Outcome/benefit	How MOJITO contributed	Evidence, if available

Examples include new skills, scientific outputs, presentations, publications, new collaborations, increased responsibility, experience with a new method or technology, professional networks or career opportunities. Do not assume an outcome where there is no evidence yet.

G. Challenges and recommendations

Challenge encountered	Effect on ECR participation/development	Suggested improvement

H. Optional ECR case study/testimonial

If you are willing, provide a short example (approximately 100–200 words) describing how participation in MOJITO has contributed to your research or professional development. It may be used as an anonymised or attributed case study in the deliverable, subject to your consent.

Participation in the MOJITO project has significantly contributed to my professional development, particularly by opening a new research field for me: high-temperature microwave processing. Before MOJITO, my work focused mainly on conventional thermochemical conversion and combustion diagnostics. Engaging with microwave-based reactor concepts has broadened my technical

perspective, introduced me to new measurement challenges such as dielectric characterization at elevated temperatures, and strengthened my understanding of electromagnetic heating principles. Equally important has been the international collaboration within the consortium. Working closely with partners from Italy, and Germany has improved my coordination skills, enhanced my ability to communicate technical requirements across institutional boundaries, and provided valuable insight into different engineering approaches and research cultures. This collaborative environment has accelerated problem-solving, encouraged knowledge exchange, and supported my growth as a researcher involved in complex, multidisciplinary pilot-plant development.

Consent for use of testimonial/case study: Yes
Preferred attribution (if applicable): _____

I. ECR-related targets or commitments

If you are aware of ECR-related targets, commitments or indicators in the MOJITO Grant Agreement/Description of the Action, list them below or identify the relevant document/section. Do not reconstruct contractual commitments from memory.

Target/commitment/indicator	Source document/section	Notes