Asccent

Active storage of captured CO_2 in net zero construction products

ASCCENT

D4.2. Short report and public presentations after mobilities, STEMs and job shadowing

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Short report after mobilities, STEMs and job shadowing

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Subject	Public report presenting the main conclusions from the expert mobilities, STEMs and job shadowing performed within the ASCCENT project. Mobilities are organised with the aim of spreading the knowledge and excellence from leading EU institutions to UNIZG-FCE, improving UNIZG FCE capacity in three main pillars: excellent science in mineral carbonation, objective validation in sustainability and innovation investment.
Lead partner	UNIZG FCE
Main authors	Vanja Gilja, Viktor Kolčić, Ivana Carević, Matea Flegar Pregernik, Ida Javorinski Milošić, Marijana Serdar
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1 Introduction

The mobility of researchers is a central element of the ASCCENT project, designed to foster knowledge transfer, strengthen collaboration between partner institutions, and provide opportunities for professional growth.

Three types of mobilities are planned with their specific aims and learning objectives:

1. **Mobility for excellent science (KPI 1.1) -** providing training on theoretical knowledge and advanced instrumentation, learning new techniques, gaining access to specific laboratory facilities and organizational methods not available at UNIZG-FCE, strengthening existing networks and fostering collaboration,
2. **Short-term educational mobility (STEM) (KPI 2.1)** - improving the level of theoretical knowledge and training in LCA at UNIZG-FCE, gaining knowledge in the field of quantitative sustainability assessment for different circular and resilient construction solutions.
3. **Job shadowing for innovation investment (KPI 3.5.) -** gaining understanding of innovation and technology transfer from an industrial perspective, improving qualification and experience of administrative staff for knowledge, innovation and technology management.

In the **period covered in this report (M1-M17, June 2024 – October 2025) five mobilities** took place.

As part of the mobility for excellent science Viktor Kolčić, PhD student from UNIZG-FCE, Croatia, spent one month at KU Leuven, Belgium. This mobility was aimed at strengthening scientific expertise, gaining access to specific laboratory facilities connected to carbonation of secondary materials and performing joint research on exploratory projects. Results of exploratory projects performed jointly by UNIZG-FCE and KU Leuven are presented in the Deliverable D 2.1.

As part of the educational mobility connected to life-cycle analysis (LCA), two short-term educational mobilities took place. Ivana Carević, postdoctoral researcher from UNIZG-FCE, Croatia, spent one month at Aalborg University, Denmark. The aim of this mobility was to deepen methodological expertise in consequential and hybrid IO-based LCA, to exchange practices of research supervision, and to advance work on a publication on regulatory frameworks for environmental assessment in the construction sector. As part of the second educational mobility, Matea Flegar Pregernik, postdoctoral researcher from UNIZG-FCE, Croatia, spent two weeks at Aalborg University, Denmark in October 2025. The aim of this mobility was to learn how Aalborg University approaches sustainability education of engineers. Additionally, the aim was to ignite cooperation on the topic of electrification processes connected to construction materials, where LCA tools can be used for objective validation.

Finally, as part of the mobility connected to the innovation investment, two job shadowing mobilities took part. Firstly, Mrs Ida Javorski Milošić, administrative staff from UNIZG-FCE, Croatia, participated on RMA Days at KU Leuven, Belgium. This event was invitation only, and due to the collaboration on ASCCENT project, staff from UNIZG-FCE was invited to participate. The workshop was focusing on learning best practices in research management and research support structures. Secondly, team from UNIZG-FCE, Croatia consisting of associate professor Marijana Serdar, Ivana Carević, postdoctoral researcher and Matea Flegar Pregernik, postdoctoral researcher, had an opportunity to exchange experiences in innovation management with the team from Holcim Innovation Centre, Lyon, France, (Christophe Levy, Vincent Morin and Bruno Huet). During the mobility, topics of industry-academia

collaboration were discussed, with the focus on introducing Croatian research institution in the collaboration mix.

Overview of planned and achieved mobilities in the period between M1-M17, from June 2024 till October 2025 are presented in Table 1.

Table 1 Key Performance Indicators (KPIs) of ASCCENT project

KPI	Key performance indicators	Target in ASCCENT M1 - M36	Performed in ASCCENT M1 - M17
1.1	Early-stage researchers trained in EU leadinginstitutions on Green Deal topics	3	1
2.1	Early-stage researchers trained on LCA in international institutions	3	2
3.5.	Staff that participated in job shadowing	4	4

Table 1 Mobilities distributed over the project period M1 (June 2024) – M17 (October 2025)

KPI	Mobility	Project month / calendar month																
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
		J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O
1.1	V. Kolčić –> KU Leuven					p	p	p	M	M								
2.1	I. Carević -> Aalborg University								p	p	p	M	M					
2.1	M. Flegar Pregernik -> Aalborg University																p	M
3.5	I. Javorski Milošić -> KU Leuven								p	p	M							
3.5	LATOM team -> Holcim Innov. Center												p	M				

p – preparation for mobility

M - mobility

2 Mobility for excellent science

This report presents the outcomes of the research mobility of Viktor Kolčić, a PhD researcher at the University of Zagreb Faculty of Civil Engineering (UNIZG FCE), who stayed at the KU Leuven in Belgium as part of the project's mobility programme in the period from 31 January 2025 till 3 February 2025. The mobility took place at KU Leuven's Department of Civil Engineering and Materials Science laboratories, which are internationally recognized for their expertise in cementitious materials, mineral carbonation, and sustainable construction technologies.

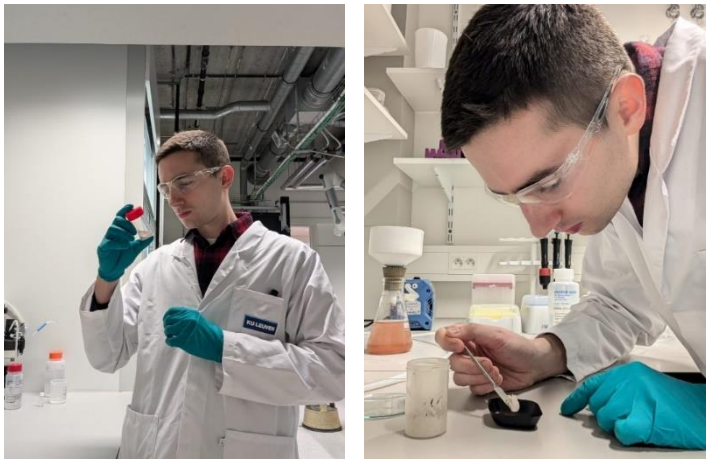

Figure 1. Viktor Kolčić, PhD student from UNIZG-FCE, during his mobility at KU Leuven, Belgium

The mobility focused on advancing the exploratory project on wet carbonation combined with mechanical activation of industrial and biomass waste materials for CO_2 sequestration. This method was identified as a promising complement to the dry carbonation approach tested at UNIZG FCE. During his stay, Viktor collaborated with KU Leuven researchers, accessed specialized equipment, and gained valuable insights into advanced mineral carbonation methodologies.

Public presentation after return was held during discussion session with PhD students at UNIZG-FCE on 7th May 2025.

2.1 Aim of mobility

The mobility lasted for four weeks and was structured around both laboratory experimentation and academic exchange. The scope included:

- Gaining training in planetary ball milling techniques for simultaneous grinding and carbonation.
- Applying wet carbonation protocols under controlled CO_2 pressure.
- Comparing experimental outcomes with those from UNIZG's dry carbonation project.
- Discussing opportunities for future collaborative proposals.

This report outlines the visit activities, interactions with researchers, study methodologies, scientific outcomes, and the broader benefits of this mobility for both Viktor's development and the ASCCENT project.

2.2 Results obtained during mobility

At KU Leuven, Viktor worked in state-of-the-art laboratories equipped with planetary ball mills with gassing lids enabling CO_2 pressurization, high-precision analytical balances and furnace-based systems for CO_2 quantification, facilities for supplementary characterization such as XRD and SEM analysis. Access to this infrastructure was essential for conducting the accelerated carbonation experiments under controlled pressurized conditions, which were not available at UNIZG. Viktor's main contacts at KU Leuven were Professor An Jacobs, who provided scientific guidance on carbonation processes and supervised the experimental programme and Professor Ruben Snellings, an expert in supplementary cementitious materials and mineral carbonation, who advised on the interpretation of mineralogical data.

The central research activity during the mobility was the experimental study of wet carbonation under mechanical activation. As in the first exploratory project, Viktor prepared selected regional waste materials: biomass ashes (BA1–BA3), paper sludge ash (PSA), concrete powder (CP), ed mud (RM).

Figure 2. a) Biomass ash 1; b) Biomass ash 2; c) Biomass ash 3; d) Concrete powder; e) Red mud; f) Raw olive pomace; g) Raw paper sludge; h) Olive pomace ash; i) Paper sludge ash

All materials were sieved, dried at 105 °C, and stored in airtight containers to avoid premature carbonation.

The experimental wet carbonation protocol was conducted by mixing 1 g of prepared sample with 10 ml of ultrapure water. Grinding with 2 mm zirconia balls at a 20:1 media-to-powder ratio and milling at 500 rpm for 10 minutes under a constant CO_2 pressure of 5 bar. This setup allowed simultaneous

grinding and carbonation, significantly accelerating reaction kinetics compared to the 28-day dry carbonation protocol.

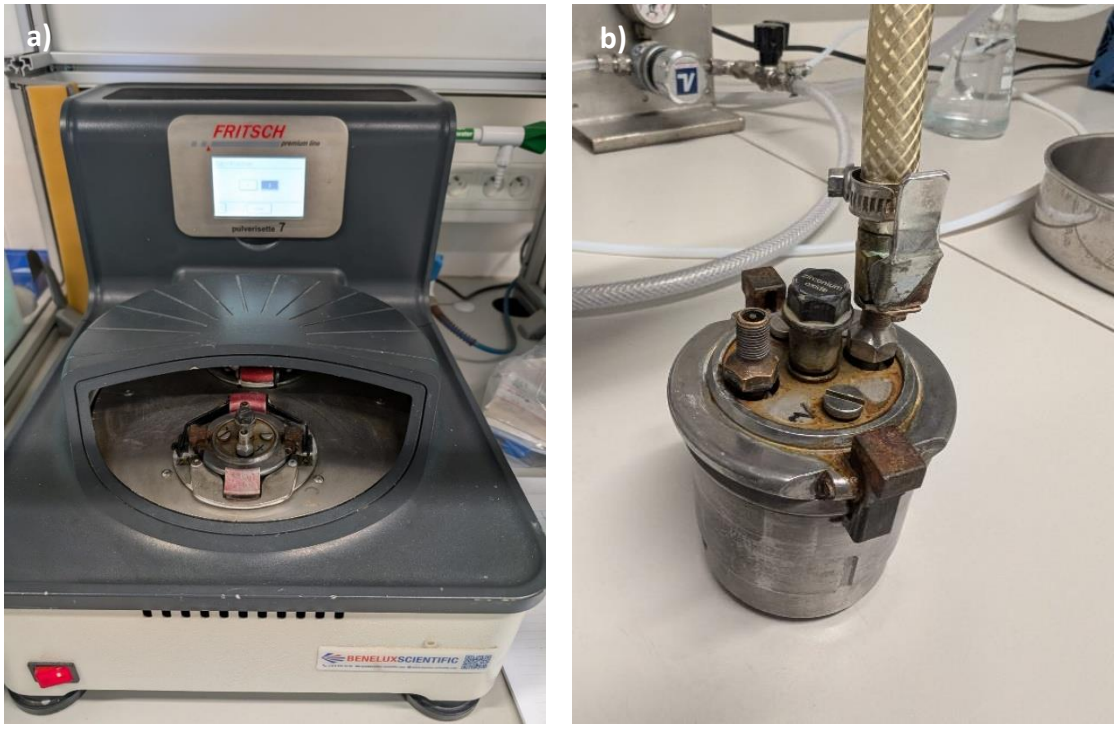

Figure 3. a) Planetary ball mill; b) Grinding jar equipped with a gassing lid for CO_2 pressurization

Measurement of CO_2 uptake instead of TGA, KU Leuven employed a furnace-based gravimetric method, heating samples to 550 °C and 950 °C to determine CO_2 release. This practical approach allowed rapid screening of carbonation efficiency.

Table 1. Theoretical and experimental CO_2 uptake with corresponding carbonation efficiency for dry and wet carbonation

Sample ID	Theoretical CO_2 max uptake	Dry carbonation CO_2 uptake		Wet carbonation CO_2 uptake	
	(%)	(%)	Carbonation efficiency (%)	(%)	Carbonation efficiency (%)
BA1	53.59	13.03	24.32	20.09	37.48
BA2	53.91	26.62	49.38	36.97	68.58
BA3	49.80	14.58	29.28	19.50	39.16
CP	41.14	2.49	6.05	0	/
RM	16.36	1.31	8.01	0	/
PSA	37.65	28.60	75.94	12.72	33.79

The experiments demonstrated significant CO_2 binding within a short timeframe, BA2 achieved the highest uptake (36.97 wt%) with efficiency of 68.6%, BA1 and BA3 showed moderate uptake (≈20 wt%) with efficiencies above 35%. PSA performed well (12.72 wt%, 33.8% efficiency) and CP and RM showed negligible uptake.

These results confirmed that mechanical activation under pressure drastically shortens carbonation time, while retaining high efficiency for Ca-rich wastes. Comparing dry and wet carbonation revealed that dry carbonation is slower but potentially more scalable. Wet carbonation with milling is highly effective for rapid screening and laboratory validation. Materials like PSA and BA2 consistently perform well under both methods, confirming their strong potential for further development. Data generated during this mobility will be integrated into joint publications on accelerated carbonation. Viktor gained experience in writing comparative research sections, combining results from UNIZG and KU Leuven. The work also lays the groundwork for future joint proposals under EU funding calls targeting low-carbon construction materials.

The mobility allowed Viktor to participate in research group meetings, where he presented the results of the dry carbonation project conducted at UNIZG, to engage in discussions on methodological differences between carbonation under ambient vs. pressurized conditions, and to compare analytical techniques, such as thermogravimetric analysis (TGA) at UNIZG and the furnace-based CO_2 release method at KU Leuven. Finally, during the mobility, collaborators from UNIZG-FCE and KU Leuven exchanged ideas about scaling up carbonation techniques for industrial application in construction materials.

2.3 Outcome of mobility for excellent science

Viktor Kolčić's mobility to KU Leuven was a highly successful component of the ASCCENT project. The visit enabled advanced experimentation on wet carbonation, fostered valuable collaborations, and significantly contributed to the project's scientific objectives.

The outcomes demonstrate the importance of supporting researcher mobility in EU-funded projects, not only for generating knowledge but also for building lasting research networks. Both the individual researcher and the broader project benefited from the exchange, ensuring that the ASCCENT consortium is better equipped to deliver innovative solutions for CO_2 sequestration and sustainable construction.

Viktor acquired hands-on expertise in advanced carbonation techniques, enhancing UNIZG's in-house research capacity. The knowledge can now be transferred to colleagues and future PhD students at UNIZG-FCE. The visit fostered stronger ties with KU Leuven, establishing a reliable partner for future joint projects and publications. Collaboration extended beyond senior researchers, engaging young scientists in both groups. The comparative study provided robust evidence on the efficiency of carbonation methods, strengthening ASCCENT's experimental framework. Identification of promising materials (BA2, PSA) provides a clear focus for scaling up in later project phases. Viktor gained confidence in leading international collaborations, presenting results, and coordinating experiments abroad. This aligns with ASCCENT's objective of training PhD researchers in project management and scientific leadership. The knowledge generated contributes directly to ASCCENT's goal of developing net-zero construction materials using regional waste streams. By validating carbonation techniques in different contexts (dry vs. wet), the project has increased methodological robustness.

3 Short-term educational mobilities for objective validation

Mrs Ivana Carević, postdoctoral researcher at UNIZG-FCE, undertook a mobility in the period from 23 April to 23 May 2025 at Aalborg University, Denmark. The primary aim was to strengthen expertise in advanced life cycle assessment (LCA) methodologies, focusing on consequential and hybrid input–output approaches that go beyond traditional attributional assessments.

Figure 4. Ivana Carević, postdoctoral researcher from UNIZG-FCE, Croatia, during her mobility at Aalborg University, Denmark

From October 1st to 10th, Mrs Matea Flegar Pregernik, a postdoctoral researcher from UNIZG-FCE participated in a short-term mobility program at Aalborg University, Department of Sustainability and Planning. The primary purpose of the visit was to attend a master's level course on *Sustainable Products and Services* in order to gain insights into Aalborg University's project-based learning approach to integrating sustainability into engineering education. In addition, the mobility aimed to initiate collaboration on a life cycle assessment (LCA) study related to the pilot-scale electrification of clay calcination for cement production, a process that had been previously tested at UNIZG-FCE.

Figure 5. Matea Flegar Pregernik, postdoctoral researcher from UNIZG-FCE, Croatia, during her mobility at Aalborg University, Denmark

3.1 Aim of mobilities

The main aim of the first mobility was to strengthen scientific expertise and methodological skills in advanced life cycle assessment (LCA), with a focus on consequential and hybrid input–output approaches. Participation in the PhD course at Aalborg University provided training in cutting-edge LCA

methods, covering functional unit definition, co-product algorithms, uncertainty and sensitivity analyses, as well as hybrid datasets in Brightway and SimaPro.

Beyond coursework, the mobility was also designed to contribute to broader academic objectives. A key component was the supervision of researchers engaged in project-based learning, particularly in the context of sustainable construction. Furthermore, involvement in the defence of a first-year PhD student offered an opportunity to provide constructive feedback, and contribute to the academic development of early-stage researchers.

Another significant aim was to advance ongoing research activities, particularly the drafting of a paper provisionally titled *"Regulatory framework for environmental assessment in the construction sector – what can we expect?"*. This paper intends to analyse and critically evaluate the emerging regulatory trends in environmental assessment, anticipating their potential impact on both academia and industry practices.

The main aim of the second mobility was to attend master's level course in sustainability and life cycle assessment (LCA) at Aalborg University, with the purpose of observing the implementation of flipped classroom and project-based learning approaches. In addition, the stay provided an opportunity to engage with experts in LCA modelling and measurement, particularly regarding the electrification of calcination systems as a pathway to achieving net-zero emissions in cement production - a pilot study conducted at UNIZG-FCE.

The training activities included participation in the course *Sustainable Products and Services* and observing supervision sessions of a semester-long *Seminar* course. Both the course and the supervision session offered valuable insight into innovative pedagogical practices, including project-based learning and student-centred techniques that integrate sustainability principles with practical problem-solving.

Another key aim of the mobility was to foster academic collaboration through the preparation of a joint publication. The objective of this work was to enhance existing LCA calculations of the electric calciner by developing a consequential and prospective modelling framework. This approach integrates a temporal dimension into the analysis, enabling the projection of future energy supply scenarios and assessing their potential impact on current environmental performance evaluations.

3.2 Results obtained during mobility

The participation in the PhD Advanced LCA course: Advanced LCA – Consequential and IO-based Life Cycle Assessment, organized by Aalborg University, represented the cornerstone of this mobility. The course took place in two phases: an online component between 8–25 April 2025, covering lectures and exercises on algorithms, responsibility, and reproducibility, and an on-site component in Aalborg from 12–14 May 2025, where portfolio group exercises and lectures were conducted. The course provided theoretical lectures, hands-on portfolio assignments, and group discussions that together offered a comprehensive perspective on consequential modeling, uncertainty and sensitivity analysis, and the integration of hybrid datasets. The training was led by internationally recognized experts, including Professors Bo Weidema, Jannick Schmidt, and Massimo Pizzol.

The course was structured in three modules, each covering essential elements of advanced LCA:

- Module 1 addressed attributional vs. consequential responsibility, the definition of functional units, and handling of co-products.
- Module 2 introduced Brightway modeling, uncertainty and sensitivity analysis, and the reproducibility of LCA studies.
- Module 3 focused on hybrid approaches, supply–use frameworks, and integration of IO data in SimaPro.

The course combined theoretical lectures with practical group work and portfolio assignments. A key group exercise involved developing a consequential LCA case study on a single-family house in Denmark, constructed with bricks. This provided hands-on experience in defining a functional unit, managing co-production processes, and comparing alternative material scenarios. This case study allowed to apply consequential thinking to real-world challenges, such as defining a functional unit, dealing with co-production during waste incineration, and comparing different scenarios of material use.

Modelling work was performed in Brightway and SimaPro. Using Brightway, Ivana and her team developed a product system connected to the Ecoinvent consequential database, carried out Monte Carlo simulations comparing two alternative concrete mixes, and explored the sensitivity of results to changes in assumptions. The simulations revealed that results can vary considerably depending on the choice of datasets and assumptions, underlining the necessity of transparent documentation and reproducibility.

In SimaPro, they employed Exiobase hybrid datasets to capture both direct and indirect contributions of construction and use phases. Results indicated that hybrid IO-LCA systematically produced higher greenhouse gas (GHG) emissions compared to process-based LCA. This outcome reflects the broader system boundaries of IO modeling, which include upstream and background processes often overlooked in process inventories.

Figure 6. Ivana Carević, postdoctoral researcher from UNIZG-FCE, Croatia, and her team members during group assignment and project-based learning

Through these exercises, Ivana gained a deeper understanding of the methodological differences between attributional LCA (ALCA), consequential LCA (CLCA), and hybrid IO-LCA:

- ALCA provides a static snapshot of environmental burdens based on average flows.

- CLCA captures the dynamic consequences of additional demand, aligning better with decision-making contexts.
- Hybrid IO-LCA expands boundaries, accounting for hidden processes but also introducing additional complexity and potential data inconsistency.

This comprehensive exposure has not only strengthened her technical competence but also equipped her with critical insight into the advantages and limitations of each approach.

During the mobility, she was included during supervision of researchers through project-based learning on sustainable construction and environmental assessment. The insights gained in Aalborg were directly integrated into student guidance, helping them refine system boundaries, apply consequential thinking, and incorporate uncertainty analysis.

Figure 7. Project-based learning applied at Aalborg University, Denmark

She also participated in the topic defence of a first-year PhD student, contributing with feedback on methodological feasibility and research framing. This strengthened her understanding of doctoral education structures and emphasized the role of mentorship.

The mobility created space to advance the draft paper “Regulatory framework for environmental assessment in the construction sector – what can we expect?”, connecting methodological insights with anticipated policy changes.

During the second mobility, three 4 h long lectures and exercises were attended as part of the Master’s course *Sustainable Products and Services*. The sessions contextualized sustainability-oriented design and assessment within broader planning and policy frameworks, showing how LCA and related tools inform decision-making at product, service, and system levels.

The first lecture, delivered by Assoc.prof. **Søren Løkke,** introduced the conceptual framework of LCA, emphasizing its critical and reflective use rather than a purely technical exercise. The discussion highlighted that LCA should be viewed as an *approximation tool* to assess and potentially improve environmental performance, but not as an exact or all-encompassing solution to environmental problems. Key topics included the definition of system boundaries, functional units, and elementary flows, with practical examples such as televisions and vacuum cleaners used to illustrate the complexity of selecting meaningful functional units. Ethical and societal considerations were also

addressed, questioning whether certain recycling or “green” actions genuinely contribute to sustainability or merely perpetuate consumption patterns.

The second lecture, held by Prof. **Massimo Pizzol**, focused on active learning and student engagement. The session began with a recap led by students, who were expected to have reviewed literature and preparatory materials beforehand. Instead of a traditional lecture, the session took the form of a dialogue in which the professor responded to student questions, reinforcing the flipped classroom model. Students worked on creating flow charts, life cycle inventories (LCI) in Excel, and entering data into SimaPro. The exercise encouraged iterative learning, emphasizing that LCA modelling evolves progressively as understanding deepens. Reflection was integrated into the process—after each task, students were required to submit short written reflections on what they had learned.

The second part of the session was dedicated to **group work**, where students organized themselves according to their chosen projects (referred to as “portfolios”). During this 2-hour segment, the professor and two teaching assistants circulated among the groups, offering individual feedback and methodological guidance. This format reinforced active, project-based learning and allowed students to directly apply the theoretical content to their ongoing case studies.

The third lecture, delivered by prof. **Jannick Schmidt,** the session began with an overview of consequential, attributional, prospective, dynamic, and hybrid LCAs, followed by a detailed comparison between attributional and consequential methods. Through an example of modelling 1 kWh of electricity from wind and natural gas, the professor illustrated how availability and substitution effects define system boundaries and outcomes in consequential LCA. The lecture continued with an explanation of life cycle inventory (LCI) principles, unit processes, and the treatment of by-products and marginal suppliers, each supported by practical examples written on the whiteboard. The second part of the session was again dedicated to **group work,** providing feedback to the students on their portfolio tasks.

Figure 8. Group work session and designated area at Aalborg University, Denmark

Additionally, one semester project supervision session was observed, led by **Henrik Riisgaard**, Teaching Associate Professor. He met with two groups of students (two per group) to discuss their project progress. The students were tasked with preparing (1) research questions and defining the scope of the LCA for their selected product, and (2) a questionnaire for in person interviews with a representative of a company producing that product. The interaction between the professor and students was highly engaging and constructive. The early introduction of such a demanding assignment, before students had attended formal LCA lectures, encouraged responsibility and

independent learning. The students were well prepared, demonstrated strong understanding of the task, and engaged in thoughtful discussion about methodological choices and practical implications.

3.3 Outcome of mobility for objective validation

This mobility has had a significant impact on advancing scientific excellence, both in terms of individual competencies and collective contributions to the research community.

Firstly, the mobility strengthened methodological expertise. Through hands-on application of consequential and hybrid LCA, Ivana acquired practical skills in Brightway and SimaPro, reinforced by collaborative problem-solving with peers. These skills are directly transferable to UNIZG-FCE and future research in sustainable construction. Secondly, the mobility fostered scientific collaboration. Working within international groups exposed her to diverse perspectives on methodological choices, data interpretation, and communication strategies. The resulting portfolio assignments are themselves small but meaningful contributions to the growing body of case studies that demonstrate the potential of consequential and hybrid LCA in real-world contexts. Thirdly, the mobility contributed to research dissemination and impact. The ongoing development of the draft paper ensures that knowledge gained is not confined to individual learning but shared with the wider academic and professional community. By addressing regulatory frameworks, the paper is designed to bridge the gap between methodological research and policy relevance.

After completing the mobility period, Ivana Carević held an internal presentation at the Faculty of Civil Engineering, University of Zagreb. The presentation was delivered to lecturers and researchers working in the field of sustainability. The aim was to share the insights and experiences gained during the PhD course and broader mobility activities, including methodological advances in consequential and hybrid LCA, supervision practices, and reflections on the link between science and regulatory frameworks. This internal dissemination ensured that the benefits of the mobility extended beyond individual learning, strengthening the academic community at the University of Zagreb and fostering discussions on integrating advanced LCA approaches into teaching, research, and future collaborations.

The second mobility contributed substantially to the advancement of scientific expertise, pedagogical innovation, and research collaboration. Through participation in lectures and project supervision at Aalborg University, valuable insights were gained into the implementation of project-based learning and the flipped classroom approach. These methods demonstrated how complex sustainability topics such as life cycle assessment (LCA) can be effectively taught on an engineering level through experiential, people-centred learning that fosters critical thinking and real-world problem solving. The principles of this pedagogical approach will be implemented at UNIZG within the *Green Building* educational activities for engineers and in the education of LCA calculations.

The mobility also strengthened methodological knowledge in advanced LCA, particularly in the field of consequential modelling, including the treatment of system boundaries, marginal suppliers, and market effects. This foundation provides a stronger methodological basis for future research and teaching in sustainability assessment, enabling the development of more comprehensive and forward-looking analyses.

In terms of research collaboration, the visit advanced work on a joint publication concerning the LCA of electrified calcination processes and inspired the development of a new paper concept on the application of artificial intelligence (AI) in LCA education, initiated by Asst. Prof. Agneta Ghose.

4 Job shadowing for innovation investment

As part of the capacity building segment of the Asccent project of the University of Zagreb Faculty of Civil Engineering, Ida Javorski Milošić took a part in the Research managers and administrators' visit to KU Leuven (RMA days) that took place in Leuven, Belgium from 24 to 26 March 2025. The participation was part of the 3rd pillar of the project – increasing capacity for attracting innovation investment and building stronger academia-industry partnerships.

Details on the event are available at

https://research.kuleuven.be/EU/f/extra/event-internal/rma_visit_2025.

Presentation on mobility was held at the Faculty of Civil Engineering, University of Zagreb internally for newly established Centre for Projects, Innovations and Technology Transfer (CePITT).

Second mobility with the focus on innovation investment took place at Holcim Innovation Centre. Members of the LATOM team (Marijana Serdar, Ivana Carević and Matea Flegar Pregernik) had an opportunity to visit Holcim Innovation Centre in Lyon, France and discuss investments in innovation with HIC team (Christophe Levy, Scientific Director and Director R&D Concrete & Aggregates at the Holcim Innovation Center, and researchers Vincent Morin and Bruno Huet). The visit was particularly inspiring thanks to a guided tour showcasing Holcim's innovative approaches to building materials and systems. Following the tour, the discussions with the HIC team cantered on the development of UNIZG-FCE laboratories, as well as opportunities for staff engagement and capacity building.

Figure 9. Visit to Holcim Innovation Center Lyon, France

4.1 Aim of mobilities

The event at KU Leuven, Belgium, was *invitation-only*, with participants mostly from Belgium and the Netherlands (Belgian participants: Université libre de Brussels; Hasselt; Universiteit Antwerpen, University of Mons, Université de Liège; Dutch participants: University of Amsterdam, Utrecht University, Maastricht University, Radboud UMC, University of Leiden). Representatives from the UK and Ireland included: Swansea University (UK), University College London (UK), Edinburgh Napier University (UK), University College Dublin (IE). Other participants included the University of Otago (NZ), University of "Carol Davila" (RO), Eötvös Loránd University Budapest (HU), Nova Information Management School, NOVA University Lisbon (PT), University of Milan (IT), University of Freiburg (DE), University of Tartu (EE) and University of Zagreb (HR).

Most attendees were research managers working in university project offices, while KU Leuven hosted the programme with presentations from their experienced staff. This international mix made the

discussions lively and enriched the learning experience. This event brought together research managers and administrators from across Europe to exchange ideas, learn from each other, and see how a leading university like KU Leuven supports research and innovation. It was a chance to step away from daily work and gain a fresh perspective on how research management can be organised and improved.

At HIC, France, LATOM team members took the opportunity to have a meeting with HIC team. The main aim of the meeting was to discuss the opportunities for industry-academia collaboration between HIC and UNIZ-FCE.

4.2 Results

The programme was designed to include individual participants' presentations (4-5 in a row), with individual presentations from the host-university's research managers from various offices and various backgrounds of expertise. The topics covered included the following:

- Introduction to KU Leuven Research Policy (Katrien Bollen)
- Excellent Science: ERC (Iesel Van der Plancken)
- Excellent Science: MSCA (Marlies Lambrecht – Sarah De Baets)
- Horizon Europe collaborative research support: informing researchers and writing support (Sara Nelissen – Sarah De Baets)
- KU Leuven research support: network of central and decentral managers and advisors (Marlies Lambrecht)
- Supporting innovations (Vincent Buyens)
- Horizon Europe collaborative research support: pre-award administrative support and project management (Sanne D'haen)
- Project administration (IT system, processes, timesheets, reporting, audit, …) (Sanne D'haen)
- Open access and Research Data Management services, tools and training (Kylie Cortebeeck – Veerle Van den Eynden)
- Gender and Diversity policy and support (Marjan Van Aerschot)
- Research integrity and ethics (Wouter Vandevelde).

The program was structured to cover all stages of the research cycle and included:

- Research Policy and Strategy
    - Presentations on KU Leuven's long-term research policy, investment in talent programs, and approaches to building interdisciplinary consortia.
    - Strategic planning for positioning the university in the Horizon Europe program.
- Support for Excellence (ERC and MSCA)
    - Detailed sessions on how KU Leuven supports researchers in applying for ERC Grants, including internal peer review, mock interviews, and targeted writing workshops.
    - Examples of successful MSCA Individual Fellowship and Doctoral Network applications, showing how tailored guidance increases success rates.
- Collaborative Research in Horizon Europe
    - Pre-award and post-award support structures for Horizon Europe projects, including how to set up large consortia, manage budgets, and deal with administrative challenges.

    - Case studies from ongoing collaborative projects demonstrated how universities can maximize impact and ensure compliance with funding rules.
- Research Data and Open Science
    - Presentations on Open Access publishing policies, research data management plans (DMPs), and institutional infrastructure to support FAIR data principles.
    - Practical examples of KU Leuven's repositories and tools available for researchers.
- Research Integrity, Gender, and Diversity
    - Sessions dedicated to ethics in research, anti-plagiarism systems, and KU Leuven's integrity framework.
    - Presentations on gender equality plans, diversity policies, and inclusivity in research projects.
- Innovation and Industry Collaboration
    - Case studies of KU Leuven spin-offs, licensing agreements, and intellectual property management.
    - Presentations on strategies for strengthening academia–industry partnerships, technology transfer, and valorization of research results.
- Professionalization of Research Managers
    - Sessions on the career development of research support staff, skills frameworks, and continuous training.
    - Networking discussions on different models of research administration across European universities.

Each session combined practical examples, policy explanations, and opportunities for questions, making the learning interactive and engaging.

During the three-day program, participants engaged in 34 presentations (Link to all presentations of host-instution: presentations Ku Leuven) covering a wide range of topics related to research management and support, including:

- KU Leuven research policy, funding mechanisms, and collaboration networks.
- Support for ERC and MSCA proposals, including writing workshops, mock interviews, and peer-to-peer exchanges.
- Horizon Europe collaborative research support, pre- and post-award processes, and project management structures.
- Open Access and Research Data Management services, gender and diversity policy, and research integrity and ethics.
- Innovation and technology transfer mechanisms, with examples from KU Leuven's spin-offs and industry collaborations.

The mobility provided direct exposure to different models of research support structures (centralized, decentralized, hybrid), highlighting how KU Leuven has built a strong tradition of research support over decades. Networking opportunities with representatives from Belgium, the Netherlands, the UK, Ireland, Germany, Italy, Portugal, and other countries allowed for sharing practices and creating potential for future cooperation.

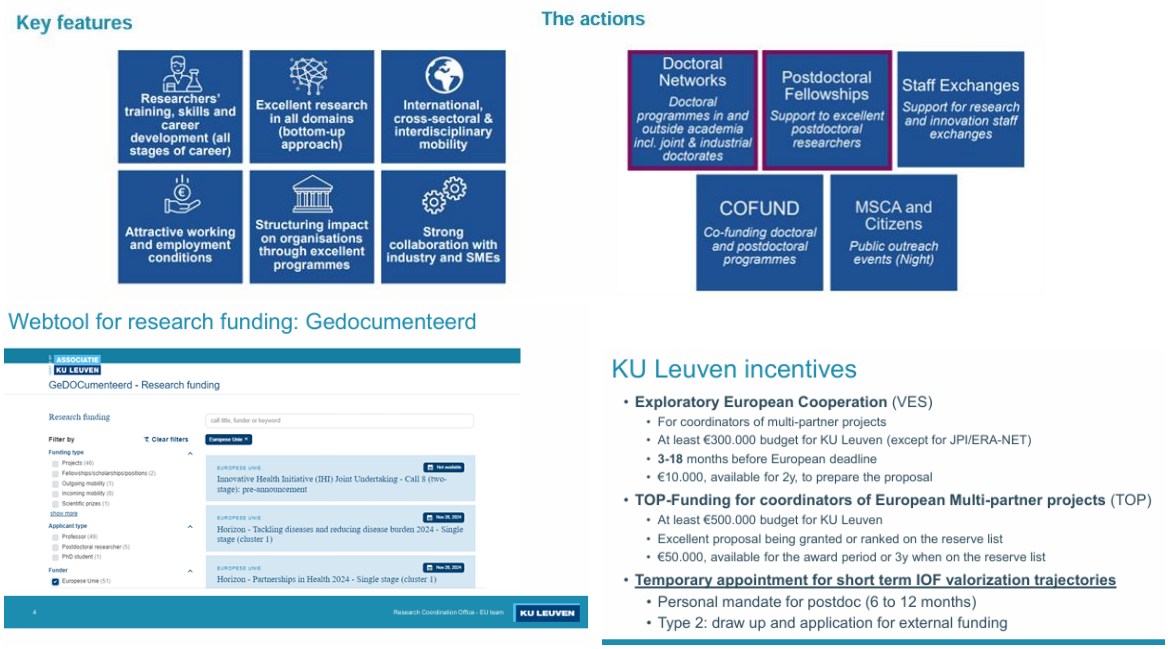

Figure 10. Overview of funding opportunities presented during RMA days at KU Leuven, Belgium

During the job shadowing at HIC, France, topic covered were:

- Contract research – opportunities for collaboration between HIC and UNIZG-FCE through dedicated small scale research missions,
- Industrial doctoral thesis – opportunities for HIC to finance doctoral research at UNIZG-FCE,
- Short-term industrial missions – opportunities for short term research stays of researchers for UNIZG-FCE at premises of HIC, France.

An interesting concept was analysed, where French companies have tax refund if funding research activities, so called "Crédit Impots Recherche". More about the taxation can be found here https://entreprendre.service-public.fr/vosdroits/F23533. Similar tax reduction exist in Croatia, called "državne potpore" and should be analysed in more detail. Universities should reach out to industrial stakeholders, enforcing the use of this tax refund opportunities, in such a way improving the willingness of industry to fund research missions.

4.3 Outcomes of mobility

The Leuven mobility was a great experience of stepping away from everyday work, gaining a new perspective, getting insights from a world-class university, and contemplating on possible improvements that could be implemented in UNIZG-FCE. Ida had a chance to discuss global events that Belgian and Dutch universities are quite concerned about (external threats in our SWOT analysis exercise) and discuss project support with so-called *liaison officers*, university personnel intermediaries for university-related issues in Brussels (such as was our colleague from the University of Amsterdam).

Researchers at KU Leven are directed to various specialized research support staff members for various specific queries. They are provided ample opportunities for preparing for project proposals (mainly workshops), they are sent mailers and personalized (targeted) e-mails, they can have individual consultations, or they can study programme-related materials available on the University Intranet.

The support staff is concerned with taking away focus of KU Leuven researchers from the ERC, the MSCA and similar individual and highly competitive grants, towards those that are collaborative and entail the formation of research teams. No project application at KU Leuven is left non-reviewed before project application. KU Leuven researchers are obliged to hand in project applications for internal review before they are submitted. They are advised on financing lines that are most suitable for them based on their research background and career stage.

The underlying remark at KU Leuven was that nothing came overnight. KU Leuven has a long tradition of research support; its Technology Transfer Office marked its 50th anniversary in 2022. The strategy top-down needs to be clear and sufficient funds secured and the results will then come and have the anticipated *snowball effect*. This may be part of the answer to the question of the ASCCENT project concerning the ways in which an organisation can increase capacity for attracting innovation investment and building stronger academia-industry partnerships. Organisations that have long traditions and proven track-records in research and innovation on an international level will find ways to attract innovation investment and form meaningful partnerships with organisations that are from both, the private-sector and the public-sector.

The second job shadowing mobility at the Holcim Innovation Centre in France strengthened collaboration between UNIZG-FCE and HIC in the field of innovation investment. The visit resulted in concrete discussions on future cooperation, including opportunities for contract research, industrial doctoral theses secondments, and short-term research missions. Participants gained valuable insights into Holcim's innovative practices and research infrastructure, which will inform the development of UNIZG-FCE laboratories and staff capacity building. Additionally, the exploration of tax incentive schemes such as France's *Crédit Impôts Recherche* and Croatia's *Državne potpore* highlighted potential mechanisms to enhance industry engagement in research funding.

5 Main outcomes and outlook

During period covered by this report (M1 – M17) in total **five mobilities** took place:

- one research-oriented mobility,
- two LCA-oriented mobilities and
- two innovation-oriented mobilities.

From these named mobilities three were longer stays – research mobility at KU Leuven (1 month), LCA educational mobility at Aalborg University (1 month and 2 weeks). Other two mobilities were shorter stays – project management-oriented workshop at KU Leuven and innovation investment meeting at Holcim Innovation Centre, France.

Main outcomes of each mobility are highlighted hereafter:

- **Mobility for excellent science (KPI 1.1)** – hands-on training on dry and wet carbonation and advanced techniques of analysis of carbonated materials, access to specific laboratory facilities connected to wet carbonation, experience of early-stage researcher Viktor Kolčić in preparing scientific reports on results, discussion with leading expert in the field, strengthening existing collaboration between UNIZG FCE and KU Leuven,
- **Short-term educational mobility (KPI 2.1)** – deepening knowledge on the application of consequential and hybrid LCA, including the treatment of system boundaries, marginal suppliers, and market effects, improving digital literacy in Brightway and SimaPro of researchers from UNIZG FCE, implementation of project-based learning and the flipped classroom approach which can be used to effectively transfer knowledge on engineering level, establishing new and strengthening the existing collaboration between UNIZG FCE and Aalborg University,
- **Job shadowing for innovation investment (KPI 3.5.)** - gaining a new perspective, getting insights from a world-class institutions from scientific and industrial sector, such as KU Leuven and Holcim Innovation Centre, contemplating on possible improvements that could be implemented in UNIZG-FCE, the exploration of governmental and regional incentive schemes as potential mechanisms to enhance industry engagement in research funding.

Value of presented mobilities is immense and of paramount importance for capacity building of UNIZG-FCE, Croatia. Through this mobilities there is a direct impact on spreading excellence, ensuring the availability of knowledge and instrumentation, and transfer of best practices from different EU countries.

In the forthcoming period, mobilities for excellent science and innovation investment will be planned, especially in collaboration with RISE, Sweden.