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D5.3: Exit, replication and sustainability strategy

WP5, Task 5.3

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Abbreviations and acronyms

Acronym	Description
EACEA	European Education and Culture Executive Agency
EPBD	Energy Performance of Buildings Directive
ERASMUS	Erasmus+ Programme
GA	Grant Agreement
GFV	Faculty of Geotechnical Engineering, University of Zagreb
HEP ESCO	Energy Service Company
HH	Halmstad University
TUHH	Hamburg University of Technology
UFR	University of Freiburg
ULUND	LUND University
3OC	Three o'clock
WP5	Work Package 5

Executive summary

This deliverable reports on the activities implemented within Work Package 5, Task 5.3 of the nZEBRA project, focusing on the analysis of feedback from multiplier events, partner exploitation activities carried out to date as well as input from questionnaire obtained from partners.

The objective of Task 5.3 is to ensure that project results are effectively exploited, replicated and sustained beyond the project lifetime. This will be ensured by systematically capturing and analysing stakeholder feedback and partner experiences as well as planning post project activities, which will contribute to project results exploitation.

The analysis presented in this report is based on a range of activities, including consortium meetings, educational and training events, stakeholder meetings and panel discussions as well as Input from partners received through a specifically designed Questionnaire.

The findings documented in this report provide a structured input to the Exit, Replication and Sustainability Strategy of the project and confirm a strong potential for long-term uptake of project results across higher education, professional training and industry practice.

Keywords

exploitation, replication, sustainability

1 Introduction

1.1 Purpose, scope and audience

The building sector is a major contributor to energy consumption and greenhouse gas emissions in the European Union. Achieving EU climate and energy targets therefore requires not only technological innovation, but also significant improvements in professional skills, institutional capacity and interdisciplinary collaboration across the construction and energy value chain.

The nZEBRA project addresses these challenges by developing, testing and disseminating an intensive blended course on climate-neutral buildings, combining technical, regulatory and practical implementation perspectives. The project targets students, educators and professionals involved in building design, construction, renovation and operation, with the aim of supporting the transition from nZEB to Zero Emission Buildings.

Work Package 5 focuses on dissemination, exploitation and sustainability of project results. **Within WP5, Task 5.3 is dedicated to preparing a strategy that will ensure long time post project use of the course materials and know-how acquired during the project lifetime. In order to achieve this, an analysis of feedback from multiplier events, partner exploitation activities and specifically designed questionnaire is made, ensuring that project outputs remain relevant, usable and scalable beyond the project duration.**

1.2 Partners' contributions

The following Table 1 lists the main contributions of project partners in this delivery.

Table 1 Contribution of partners

Beneficiary name	Contribution
HEP ESCO	Creating, sending questionnaire to project partners, collecting feedback, analysing feedback from project events, preparation of replication strategy, drawing up the deliverable 5.3
HH	Filling out the questionnaire, providing other relevant input, reviewer
TUHH	Filling out the questionnaire, providing other relevant input, reviewer
UFR	Filling out the questionnaire, providing other relevant input, reviewer
ULUND	Filling out the questionnaire, providing other relevant input, reviewer
3OC	Reviewer, as WP5 Leader act as advisor
GFV	Associated partner - Reviewer, filling out the questionnaire

1.3 Relation to other activities in the project

Table 2 below lists how this delivery relates to other activities (or deliverables) in the project. These activities and deliverables should be considered for further understanding.

Table 3: Relation to other activities in the project

Related WP / task / deliverable	Relation
WP3 – Course Content Development	Feedback gathered from stakeholders, educators and participants supports the improvement, refinement and validation of the course content developed in WP3.
WP4 – Comprehensive Course Development and Piloting	This deliverable incorporates insights from piloting, testing and delivery of the nZEBRA course under WP4, which are essential for evaluating the applicability, impact and replicability of the developed training materials.

2 Analysis of Exploitation, Replication and Sustainability Activities

2.1 Methodology

2.1.1 Feedback Collection Approach

The analysis presented in this report is based on qualitative feedback collected through multiple channels within the nZEBRA project. These include:

- project kick-off and consortium meetings,
- educational and training activities (e.g. Summer Schools),
- stakeholder meetings and multiplier events,
- panel discussions and expert exchanges,
- Questionnaire on the use and application of nZEBRA project results.

2.1.2 Data sources

Feedback was documented through meeting minutes, event summaries, discussion notes and structured partner exchanges. In addition, a short Questionnaire was distributed to project partners in order to collect structured feedback on the usability, relevance and future application of the nZEBRA project results. The responses confirmed the value of the developed learning materials and activities for education and training in sustainable building design and construction. The collected feedback was used to identify opportunities for the long-term sustainability and wider replication of the project results.

2.2 Results and Findings from Project Events

2.2.1 Project Kick-off and Consortium Meetings



Figura 1: Kick off meeting, Hamburg 2023.

The project kick-off meeting and subsequent consortium meetings provided the foundation for exploitation and replication activities.

From the early stages of the project, partners aligned on objectives, target groups and expected impacts, including the long-term use of project results.

These meetings also facilitated exchange of national perspectives on policy frameworks, market conditions and skills needs.

2.2.2 Educational and Training Activities – Hamburg summer school 2025

Educational activities, including the nZEBRA Summer Schools served as key validation points for the project's educational concept. Participants engaged in interdisciplinary learning covering technical building performance, regulatory frameworks and practical implementation challenges. Feedback collected during these activities confirmed:

- strong relevance of the course content,
- high added value of combining academic and industry perspectives,
- significant replication potential within formal higher education curricula and professional training programmes.



Figura 2: Summer school, Hamburg, 2025.

2.2.3 Educational and Training Activities – Halmstad summer school 2026.

Both summer schools 2025 and 2026 were preceded by seven intense weeks of digital learning with a new topic each week filled with assignments and learning new softwares. The blended part took place on site in Halmstad where the students met live for the first time in the final week when the nZEBRA course, BF8011, was carried out the second time. It started with a study visit to Stena Recycling and and later in the week there was an introduction to our FabLab. The students worked the whole week with assignments in groups and meeting the lecturers live. The vivid discussions and the actual feedback during the week validated the need and pedagogical advantage of meeting IRL face to face.



Figure 3: Summer School in Halmstad, 2026.

2.2.4 Dissemination events

The project results were disseminated in a number of events, which enabled open discussion of challenges related to sustainable buildings, EPBD implementation and market readiness.

Participants were given the opportunity to express their views on the topic.

The feedback collected represents a direct input to exploitation planning and confirms the relevance of nZEBRA outputs for a broad range of stakeholders.

2.2.5 Hybrid stakeholder event and panel discussion on EPBD Implementation



Figura 4: Hybrid event, Zagreb, 2025.

A hybrid stakeholder event aimed at promoting the nZEBRA project results and engaging key stakeholders from the education, industry, and public sectors in was held in Zagreb 2025.

The event included a panel discussion with representatives from academia and public sectors, focusing on the application of challenge- and project-based learning approaches in sustainable building design, construction, and management.

The discussion provided valuable insights into the practical relevance of the project outputs and highlighted opportunities for their further use in education and professional training. The panel concluded that the transition towards energy-efficient, low-carbon and nZEB buildings is achievable, but requires a systemic approach that goes beyond technology. Success depends on aligning policy, finance, regulation and market practice, while strengthening cooperation among keystakeholders.

Energy efficiency in buildings was identified as one of the most cost-effective and immediately available pathways to decarbonisation, with significant potential to deliver environmental, economic and social benefits.



Figura 5 Panel discussion, Zagreb, 2025.

2.2.6 Stakeholder event and panel discussion ending the nZEBRA project

A hybrid stakeholder event was held at Halmstad University 2026, aiming at promoting the nZEBRA project results and engaging key stakeholders from education, industry, and public sectors. The four presenters representing the three sectors had the following themes; HH discussed energy regulations for buildings and NEB buildings, Prof. Aghaei talked about an international project for

climate neutral energy supply for buildings, EVIA showed hempcrete and other sustainable materials, and the CEO for Eksta AB talked about their economically viable nearly zero-energy and plus-energy buildings from 1980s up till today. The concluding panel discussion was facilitated by Charlotta Winkler from Öresundskraft, ensuring an interactive exchange between speakers and participants.

As the nZEBRA project was approaching its conclusion on developing the intensive blended learning course on climate-neutral buildings the two events; final stakeholder meeting and Master's course reflected the project's core ambition: to bridge education, research and practice, and to support the transition towards a more sustainable built environment.

The Master course was presented as designed to meet new requirements and address the complex challenges of EPBD and nearly zero-energy building, focused on developing intensive blended learning on climate-neutral buildings, meeting new requirements and addressing the complex challenges of NZEB. The event created an inspiring and collaborative meeting place for students, researchers, industry professionals and public authorities to exchange ideas and explore how nearly zero-energy buildings can be developed and implemented in practice.



Figure 6 Christer Kilersjö CEO at Eksta AB



Figure 7 Prof. Aghaei representing Norway's Technical University

2.2.7 Summary of insights received from partners through the questionnaire

University of Freiburg, University of Zagreb Faculty of Geotechnical Engineering, Halmstad University, Hamburg University of Technology, LUND University, provided valuable input through filling in the distributed questionnaire.

Most respondents find the project materials very useful, particularly online courses, digital tools, scientific articles, and teaching toolkits. They highlight that these resources will support teaching activities, professional work, and the development of future projects. Many plan to use the materials in internal trainings, regular academic courses, or in everyday operational tasks, and several respondents indicate they will continue adapting and updating the materials beyond the project's duration. A controlled-access sharing model is preferred over fully open availability.

Respondents generally favour simple registration systems for users, either to monitor outreach, to provide access only to enrolled learners, or to regulate the use of more specialised materials. The majority still supports broad accessibility as long as minimal restrictions are in place.

All respondents recognise the potential for replication across different contexts. They see opportunities for reuse in future educational programmes, joint project activities, capacity-building

initiatives, and sector-specific professional training. Some also view the materials as relevant for wider industry stakeholders and for inclusion in other collaborative or EU-funded projects. Participants identify several areas for improvement, such as reducing overlap between modules, enhancing coordination, and adjusting content to better fit the time available to learners. They recommend periodic updates to reflect technological and regulatory changes, as well as strengthening content related to policy, standards, financial aspects, and cost considerations. Many emphasise the importance of more real-world examples and case studies to better connect theory with practice.

Additional suggestions include using promotional materials for future dissemination and ensuring advanced teaching resources remain accessible upon request. Overall, the responses indicate strong value and wide applicability of the project outputs, a clear preference for a lightly restricted but accessible model of sharing, and recognition that regular updates and stronger practice-oriented content will be essential for long-term sustainability.

Educational institutions: partner universities will integrate the nZEBRA learning materials into their regular courses, internal trainings and professional development programmes, and will continue updating and adapting the content for long-term educational use.

Specifically, HEP ESCO, as an industry partner, will use the project results in the following manner:

- educate engineers in the mother corporation (the biggest Croatian national energy company)
- provide the materials to the energy institute Hrvoje Požar to be used in their nZEB training centre,
- provide the materials to the Croatian Green Building Council to be used among their member as well as potentially exploit with other EU funded projects.

2.2.5 Partner Questionnaire Insights – Tables & Charts

Note on methodology: the following tables and graphs quantify the narrative responses of partners (5 institutions) from chapter 4.5. The numbers are derived by coding qualitative statements into aggregated categories that serve internal analytical and visual purposes.

Table 4 Usefulness of project materials

Material	Very useful	Useful	Somewhat useful	Not useful
Online courses	4	1	0	0
Digital tools	4	1	0	0
Scientific articles	4	1	0	0
Teaching toolkits	4	1	0	0

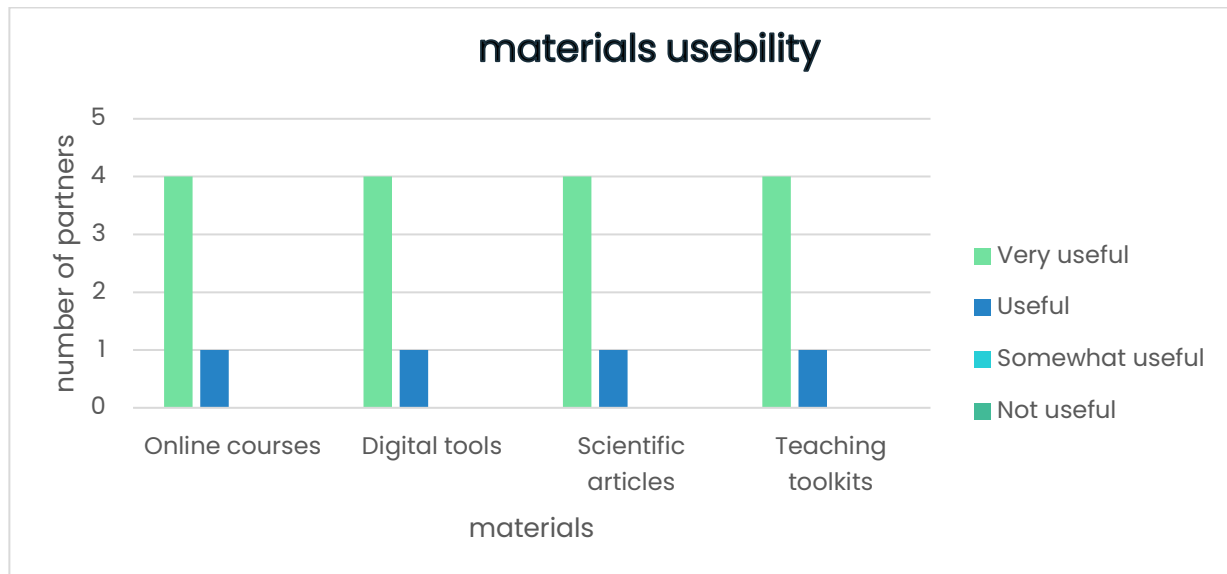


Table 5 Preferred model for sharing materials

Model	Number of partners
Registration (simple)	3
Access only to registered participants	1
Fully open access	1

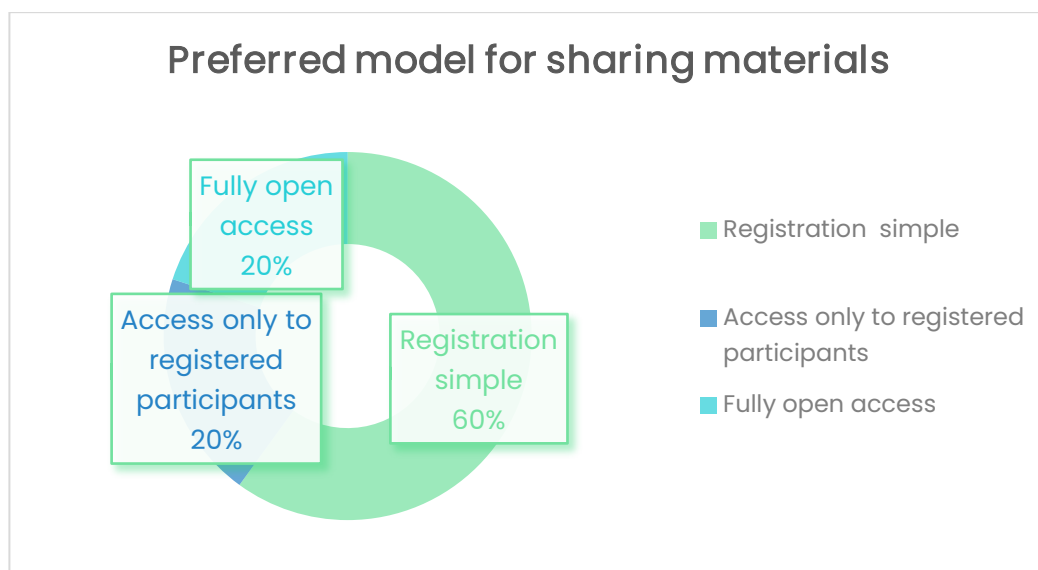


Table 6: Replication areas

Replication area	Number of partners
University curricula	5
Professional/training	4
Joint EU projects	3
Capacity-building initiatives	3
Industrial stakeholders (wider)	2

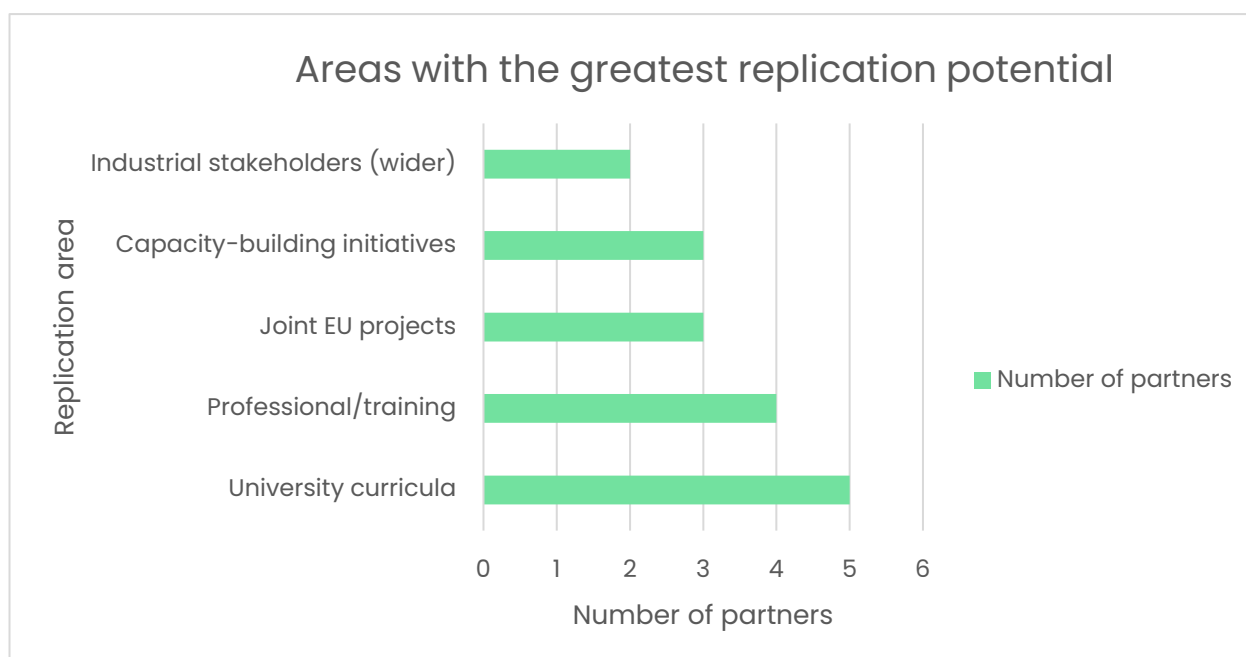
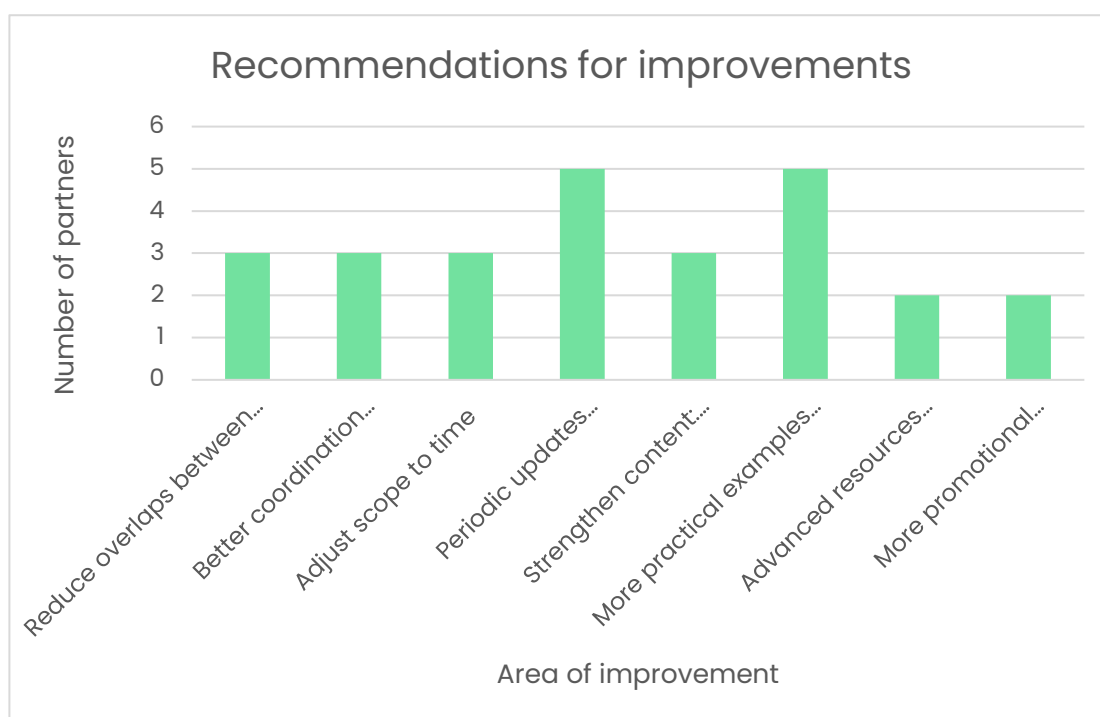


Table 7 Recommendations for improvement

Area of improvement	Number of partners
Reduce overlaps between modules	3
Better coordination between teachers	3
Adjust scope to time	3
Periodic updates (technology/policies)	5
Strengthen content: policy/standards/finance/costs	3
More practical examples and case studies	5
Advanced resources available on request	2
More promotional materials for dissemination	2



Source: Summary of the partner questionnaire (nZEBRA, WP5 Task 5.3). Numerical values are derived from narrative responses and may be adjusted after verification with the original questionnaires.

3 Conclusions

The evidence collected within Task 5.3 demonstrates a strong foundation for the long-term exploitation, replication and sustainability of the nZEBRA project results. Feedback gathered across partner organisations, stakeholder events, educational activities and the dedicated questionnaire confirms that the project outputs directly address current market and policy needs, particularly in the context of the EPBD revision and the increasing demand for skills related to climate-neutral and zero-emission buildings.

Higher education institutions show clear readiness for institutional anchoring of the course materials through their integration into formal curricula, internal training structures and accreditation frameworks. The modular design of the nZEBRA course supports flexible adaptation, continuous updates, and long-term usability in academic environments. Partners have expressed commitment to maintaining and updating the materials beyond the project duration, ensuring that the course remains aligned with evolving regulatory, technological and market developments.

HEP ESCO, as an industry stakeholder, identified multiple opportunities to apply the course materials in internal training for in-house professionals, client advisory processes, national training centres and collaboration with professional associations. This ensures a direct contribution to strengthening national competencies and supporting the transition to nearly zero-energy and zero-emission building practices.

Stakeholder engagement activities conducted throughout the project have also strengthened the visibility and credibility of the nZEBRA course. Open-access dissemination, supported by digital tools, structured communication channels and targeted outreach, will further facilitate ongoing adoption and adaptation of the learning materials by external users. High recognition of replication potential among partners - ranging from academic integration to professional upskilling, capacity-building initiatives and future European collaborations - demonstrates that the project results extend well beyond their original scope.

Overall, Task 5.3 confirms that the nZEBRA project has developed outputs with significant long-term value, strong relevance for multiple target groups and high potential for continued application across Europe. The findings presented in this deliverable provide a solid foundation for the Exit, Replication and Sustainability Strategy and ensure that the project's impact will persist beyond its lifetime through sustained use, ongoing adaptation and continued collaboration among partners and external stakeholders.

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