

Pilot Roadmaps

1. Green Buildings





3.1 Green Buildings

3.1.1 Green Buildings – Europe

Pilot Introduction

Representing the Green Buildings pilot within the GoNaturePositive! project, the European Federation of Green Roof and Living Wall Associations (EFB) works alongside its affiliated partners - the Portuguese Associação Nacional de Coberturas Verdes (ANCV) GREENROOFS® and the Czech Associations of Svaz zakládání a údržby zeleně, z.s. (SZÚZ) – Asociace zelených střech a fasád (AZSF) - to advance the integration of nature-based solutions into the built environment across Europe. EFB, as a network of national associations (currently 18 associations, which unite more than 1,800 companies - mainly SMEs, organisations and experts), brings together cross-European expertise to promote green roofs and living walls as key elements of sustainable and regenerative urban development, based on the understanding that buildings can actively contribute to biodiversity, climate adaptation, and human well-being.

Acting at the interface of policy, research, and practice, EFB serves as a coordination and knowledge hub, enabling the exchange of standards, best practices, and innovation among its members. The scope of EFB's interests extend into wider value chain of the built-environment and enabling technologies, where building design, materials and sustainable operations have an influence the efficacy and scalability of nature-positive solutions. For the purpose of developing a roadmap for Europe, EFB was supported by the European Construction Technology Platform (ECTP).

Vision

This is our shared future: **a fully circular, nature-positive built environment that restores ecosystems, empowers people, and ensures that nature and humanity flourish together.**

By 2050, cities and buildings have become living ecosystems: regenerative, circular, and inclusive, where people and nature thrive as one. The built environment restores more than it consumes, strengthening both community well-being and planetary health. Every policy, investment, and design decision supports a nature-positive transformation: vegetation and biodiversity are integral to urban planning; buildings are designed with living envelopes that purify air, store carbon, and reconnect people with nature. Regenerative design, circular materials, and green technologies are the norm. Businesses lead with transparency and innovation; finance institutions value natural capital; citizens enjoy affordable, healthy, and nature-rich homes. Standards ensure quality, safety, and long-term resilience across Europe and beyond. Education, research,



and cooperation unite all sectors: policymakers, enterprises, NGOs, and communities – in building cities that are not only climate-neutral, but ecologically restorative and socially just.

Baseline

During the Baseline workshop, the stakeholders have identified different challenges. For each one, they provided details on the state-of-the-art of the challenge, giving an overview of the baseline (policy, technology, social adaptation, finance, etc.). Here below challenges are reported and described.

1. Fragmented Policy, Weak Implementation & Standardisation

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- Absence of a technical European Standard/norm for green roofs and walls (e.g. EN).
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- Adaptation of relevant EU policies on the national level waters down the topic, and policy impact is lost due to different national prioritisations.
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- National leadership in EU policy implementation is missing or insufficiently competent, leading to fragmented national policy results.
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- Low integration of green roofs/walls into building frameworks and certification schemes.
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- Policy lags behind innovation, failing to accommodate emerging technologies.
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- Need for an EU-wide harmonisation and policy placement to create an open, competitive EU market.
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- Changing mandates and public policy priorities from government to government.
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- Greening buildings should be clearly and strongly put in CSRD in order to motivate / oblige stakeholders to invest.
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2. Financing & Cost Barriers

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- Upfront CAPEX and persistent OPEX costs of nature-positive solutions compared to conventional construction.
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- Unclear ROI and competition for green finance and rooftop space (PV vs Multifunctional green Roofs).
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- Changing political mandates and priorities affecting public funding availability.
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- Low valuation of societal/ecosystem benefits, focus only on investor-level ROI.
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- Limited availability of market-ready finance/insurance products (performance/impact-based, SROI instead of CBA).
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- Market demand is inconsistent, reducing willingness of suppliers and investors to scale.
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- Need for financial incentives for GI, e.g. the reduction of VAT, or with variable rates, depending on their ecological, technical, and social value.
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3. Technology Readiness & Scalability

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- Technology, in some cases, fails to meet biodiversity or habitat criteria.
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- Limited large-scale deployment of living building materials and bio-based materials.
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- Local sourcing of materials and workforce remain a challenge for system providers.
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- Uncertainty among growers regarding future demand of appropriate plants.
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- Need for climate-resilient, future-proof plant selection and knowledge.
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- Sector expansion must integrate new players (e.g., construction companies shifting to NbS) without reducing quality.
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- Low availability and regulatory frameworks of circular-economy product offerings.
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- Climate change intensification (heat, drought) will increase maintenance challenges, affecting long-term performance.
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4. Measurement & Monitoring Challenges

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- Proper quantification of GI energy and biodiversity benefits in building applications remains challenging. No standardised studies to assess the impact of greenery on building consumption, in relation to climate conditions and to the vegetation type.
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- Carbon impact: greening solutions are today calculated as more expensive regarding carbon footprint than having nothing because ecosystem services are not valued properly.
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- Current EU frameworks, such as the Nature Restoration Regulation (Art. 8), focus mainly on the quantity of urban green, creating challenges for linking them to quality-based ecological metrics.
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- Countries still lack national-level metrics to measure nature gain or nature-positive outcomes.
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5. Knowledge, Skills & Awareness Gaps

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- Limited technical and value chain knowledge, low professional capacity and expertise in some specific markets (not in others); lack of standardised training for all.
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- Integration of nature-positive knowledge into the education system (vocation, applied and academic levels).
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- Low awareness of biodiversity benefits; ecosystem services are undervalued.
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- Knowledge remains fragmented and siloed across languages, institutions, and sectors.
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- Lack of diverse, context-specific case studies (e.g. for Mediterranean and hot/arid climates).
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- Continued risk of low awareness of biodiversity and nature-related impacts of green buildings, hindering widespread market confidence and demand, unless targeted communication and evidence-building improve.
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6. Societal Disconnect & Acceptance

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- Weak societal connection to nature; cynicism and disengagement reduce support for green solutions.
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- Limited communication and education on benefits; no clear responsibility for public outreach and awareness-raising.
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- Unequal access to green and regenerative buildings.
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- Significant and persistent gap between experts and society.
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Pathways

The identification of the challenges has helped the participants to identify possible solutions to overcome the existing barriers. Solutions have been clustered according to the Target Group mostly responsible or suitable for carrying out the activities proposed. Furthermore, a prioritisation exercise has been conducted, considering feasibility and impact, which has led to the identification of one (or a few) solution for each TG.

Selected solutions have then been analysed in detail, identifying objective, current state, scope of the initiative, expected outcomes, key activities necessary to reach the objective, milestones by 2030 and 2050, indicators, and risks and mitigation strategy.

While an overall restitution of all initiatives for each TG are reported in the Annex 1, here we report the six main initiatives for “*a fully circular, nature-positive built environment that restores ecosystems, empowers people, and ensures that nature and humanity flourish together*” presenting the objective, expected outcomes and key milestones:

1. Develop a European Standard for Green Roofs and Walls – TG7 Standard Bodies	
Objective	To create a pan-European Standard covering design, installation, maintenance, safety, and performance metrics (biodiversity, water, energy, carbon) for green roofs, living walls, and façade greening, with climate-zone differentiation.
Expected Outcome	• A harmonised EU standard accepted by industry players, enabling market growth. • Standards are linked to certification and regulate minimum specifications while allowing for local market and climate tailoring. • Turning green roofs/walls into defined products to boost uptake.
Milestones	• By 2030: EFB associated countries must vote to support the initiative (May 2026/27, EFB General Meeting). Workshop agreements for Building-Level (BL) and District-Level (DL) standards; Formal Standard Working Agreements finalized for both BL and DL. • By 2050: 2035 - Implementation of both Building- and District-Level Standards.

2. Develop New Financing Products – TG4 Finance	
Objective	Create and scale new financing instruments (Green Impact Bonds, SROI-based tools, OPEX financing, insurance-linked resilience products) to enable widespread adoption and long-term maintenance of green and nature-positive roofs and walls.



Expected Outcome	• Green infrastructure is standard, valued building fabric. • Financing tied to measurable performance criteria. • Market matures: public grants decrease, private and blended finance dominate. • Multifunctional roofs (minimum green+PV) widespread. • Frameworks like Biodiversity Net Gain adopted.
Plans	• By 2030: Living labs operational; more green finance instruments; clear ROI KPIs (water, biodiversity, health, OPEX); certification metrics integrated. • By 2050: Multifunctional roofs standard; green infrastructure mandatory; blended finance mature.

3. Mandatory GI/NBS Performance & Ecological Metrics – TG1 Policymakers

Objective	Introduce mandatory minimum performance requirements for Green Infrastructure (GI) and Nature-Based Solutions (NBS) into key EU policies (EPBD, EED, etc.) and develop standardized ecological metrics, monitoring, and scoring to drive nature-positive outcomes.
Expected Outcome	• Quality Marking for entire green roof/wall systems and components. • Standardised, uniform performance metrics enabling multi-functional design. • Achieved minimum integration standard for GI/NBS across the EU. • A clear sectoral urban green agenda with understood performance benchmarks. • Cities have the data and understanding to set and meet their "satisfactory level".
Plans	• By 2030: Achieve exemplar markings for systems and components; create and implement the application-metrics matrix (2x2 chart) for multi-functional design.

4. Low-Carbon Circular Materials and Local Supply Chains – TG2 Business

Objective	To drive investment and innovation in low-carbon, circular materials, local plant/substrate supply chains, and scalable solutions, transforming the green infrastructure market towards sustainability and resilience.
Expected Outcome	• A mature market for local, low-carbon materials and supply chains. • Regenerative design and circular materials are the norm. • Standards enable local material use and innovation. • Businesses expand portfolios of scalable, sustainable solutions.
Plans	• By 2030: Map existing local projects under EFB. • By 2050: Publish EFB guidance documents for circular/local implementation.



5. Cities And Communities - Fair Access to Green – TG5 Citizens and Communities

Objective	Ensure fair, inclusive, and equitable access to green roofs, living walls, and nature-based solutions across European cities, with a strong focus on vulnerable communities, social housing, schools, healthcare facilities, and climate-exposed neighbourhoods.
Expected Outcome	• Green roofs and walls recognised as essential urban public infrastructure. • Reduced inequality in access to urban nature and ecosystem services. • Improved health, thermal comfort, and well-being in vulnerable communities. • Cities empowered to deliver socially just, nature-positive urban regeneration. • Stronger social acceptance and ownership of GI/NBS projects.
Plans	• By 2030: GI/NBS embedded in public buildings and social housing programmes; community pilots launched in multiple EU regions. • By 2050: Fair access to green infrastructure mainstreamed across European cities.

6. Skills Training - Developing Training for Professionals – TG6 R&D Institutions

Objective	Build a skilled, qualified, and future-ready European workforce capable of designing, installing, maintaining, and monitoring high-quality green roofs, living walls, and nature-positive building systems.
Expected Outcome	• Harmonised European training framework for green roofs and walls. • Recognised professional competencies and qualifications. • Higher quality, safer, and more resilient GI/NBS projects. • Strong link between standards, certification, and workforce skills.
Plans	• By 2030: EU-level training framework established; pilot programmes running in multiple countries. • By 2050: GI/NBS skills embedded in mainstream education and professional practice.

Summary

The roadmap was co-created through a structured online process consisting of two workshops (four sessions) held between November and December 2025: a Visioning session (4 November) followed by Baseline and Pathways sessions (4 and 9 December). The process engaged more than 50 participants across 8 target groups (Policy Makers, Business, Nature-Based Enterprises, Finance and Investors, Environmental Bodies and NGOs, Citizens and Communities, R&D and Academia, and Standards Bodies), ensuring full value-chain representation. Workshops were facilitated by experts of the University of Cambridge and combined plenary discussions, breakout groups, and prioritisation



exercises to move from vision to concrete actions and milestones in 2027, 2030, and 2050.

The workshops were further complemented by a series of internal discussions and workshops within the EFB network and ECTP - European Construction Technology Platform, which helped refine and consolidate the proposed pathways, solutions, and action plans to ensure they address the maximum range of identified challenges.

Feedback was very positive - particularly regarding the cross-sector exchange and the focus on implementable outcomes. A key takeaway is that overcoming fragmentation across policy, finance, and knowledge is both the main challenge and the main lever for scaling nature-positive solutions in the green building sector.

The roadmap identifies fragmentation across policy, standards, finance, and skills as the main barrier to scaling green roofs/walls and nature-based solutions (GI/NBS) in Europe and proposes key breakthroughs including a harmonised EU-wide standard, mandatory performance metrics, innovative financing models tied to measurable outcomes, fair access to green infrastructure and structured training systems for professionals. While challenges persist - such as low investor confidence, unclear ROI, skills gaps, and uneven social acceptance, with risks of inconsistent quality and greenwashing - the document highlights strong opportunities to scale through standardisation, pilot projects, public procurement, the development of local supply chains and inclusive community approaches, as well as training systems, ultimately positioning GI/NBS as essential urban infrastructure rather than optional features.

3.1.2 Green Buildings – Czech Republic

Pilot Introduction

The Czech Republic participates in the GoNaturePositive! project as one of the national pilot countries, together with Austria and Portugal. The Czech pilot is represented by the Czech Association of Green Roofs and Facades (AZSF), a specialised organisational unit of the Czech Association for Landscape Establishment and Maintenance (SZÚZ) and a member of the European Federation of Green Roof and Living Wall Associations (EFB). AZSF brings together professionals, companies and institutions active in the field of green roofs, green facades and vegetation on buildings. Its long-term work includes professional standards for green roofs, methodology for green facades, education and training, expert events, awareness raising, the Green Roof of the Year competition and the Certified Green Roof Installer programme.

The Czech pilot focuses on green roofs, green facades and related elements of blue-green infrastructure as climate adaptation measures in the building sector and as part of the transition towards a nature-positive economy. The scale of the pilot is national. This report presents the outcomes of the stakeholder engagement and roadmapping process carried out in the Czech Republic and reflects the views,



experience and priorities of Czech stakeholders involved in the sector, including professional associations, designers, implementation companies, municipalities, researchers and public-sector.

Vision

By 2050, a nature-friendly economy will be based on the premise that green roofs, green facades, and other elements of blue-green infrastructure are a standard feature of new construction, renovations, and urban planning, and are no longer viewed as a luxury or as an exception. Their benefits are incorporated into technical standards, energy calculations, building operating economics, and financial decisions, so that sustainable solutions have better access to loans and other financial instruments, while direct subsidies are phased out because the market now considers these measures standard practice. Companies, investors, researchers, and public administration work with ample data, verified standards, and integrated designs that combine environmental, technical, and economic benefits and do not rely on one-size-fits-all solutions regardless of content. Also, societal thinking is changing: the unnecessary use of primary raw materials where recycled materials suffice is considered unacceptable, and green building is no longer associated with concerns that it is unnecessary, expensive, or technically problematic. The result is an economy that not only reduces the negative environmental impacts of construction but also actively increases the resilience of cities, improves quality of life, and treats nature as a full-fledged component of economic development.

Baseline

During the Baseline workshop, the stakeholders have identified different challenges. For each one, they provided details on the state-of-the-art of the challenge, giving an overview of the baseline (policy, technology, social adaptation, finance, etc.). Here below each challenge is reported.

1. The economy of green roofs: Costs, Benefits, Return on investment

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- The common idea is that green roofs have high initial costs, which investors perceive as making construction more expensive without a clearly quantified return on investment.
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- Lack of reliable quantified data on cooling performance and water savings. In addition, public contracts are often subject to lowest price competition, ignoring life cycle costs (LCC).
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- Concerns about maintenance costs, pressure to remain competitive (preference for inexpensive “white roofs”), and a conservative management approach focussed on
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short-term profits rather than ESG goals

2. Finance, Subsidies and Incentives

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- High initial investment costs, which, together with unclear economic return, discourage developers of industrial buildings in particular.
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- Investors are not interested in increasing investments beyond the necessary limit.
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- Public procurement suffers from bad practice, where, despite the legal obligation to take environmental aspects into account, tenders are primarily based on the lowest price, regardless of life cycle costs (LCC).
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- Investors are also concerned about unclear follow-up care and lack quantification of benefits (e.g. water savings). In large companies, investment is hampered by management's focus on profit rather than ESG goals, and the overall burden is increased by the administrative and legislative complexity of permitting processes.
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3. Where do Green Roofs make the most sense

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- Disagreement over prioritisation, whether green roofs are more beneficial on large halls (impact on the global heat island) or in city centres (impact on the microclimate for people).
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- In logistics centres, implementation is hampered by the technical and static limitations of lightweight structures.
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- There is often a misconception of competition with photovoltaics or a preference for parking spaces over greenery.
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- Cities do have strategies, but in practice they use them inconsistently.
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- There is a lack of public data on failures that would allow lessons to be learned from mistakes.
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4. The Role of the City: Leading by Example and Systemic Support

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- Discrepancy between political leadership and the bureaucracy, where the enthusiasm of politicians' clashes with the passivity of civil servants (or vice versa).
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- There is often anonymity of responsibility within the authorities, with no specific guarantor of the green roof agenda.
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- Mayors encounter their own incompetence in awarding contracts, which leads to safe but ineffective competition for the lowest price.
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- Cities work with their strategies in an uncoordinated manner and are often concerned about discouraging investors with stricter requirements.
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- The overall situation is exacerbated by the demotivation of officials by bureaucracy and, in some cases, political denial of climate change, which threatens the continuity of subsidy programs.
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5. Expertise, Education and Know How

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- The main obstacle is low awareness outside the professional community, with information spreading mainly among already convinced supporters.
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- Implementation is hampered by a lack of commissions from architects and investors' concerns about the insufficient expertise of implementation companies.
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- Negative perceptions are exacerbated by the volume of “bad practice”, where even isolated failures generate more mistrust than dozens of successful projects.
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- Public administration often lacks the competence to assess quality, which leads to ineffective price competition.
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- Rigid education system, which integrates the topic of green roofs into teaching only to a limited extent.
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6. Legislation and Technical Barrier

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- The development of green roofs is hampered by unclear and burdensome legislation, which, together with the demanding building permit process, increases the economic burden of projects. In the case of industrial buildings, a critical limitation is the statics of lightweight structures, which are often not designed to bear the load of vegetation layers.
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- In urban planning, there is a persistent conflict with parking spaces, with authorities rigidly requiring paved areas at the expense of greenery.
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- The myth of competition with photovoltaics persists, as does the poor application of
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public procurement law – contracting authorities ignore environmental aspects and compete only on the lowest price because they lack clear technical standards to rely on.

Pathways

The identification of the challenges has helped the participants to also identify possible solutions to overcome the existing barriers. Furthermore, a prioritisation exercise has been conducted, considering feasibility and impact, which has led to the identification of one solution for each TG.

Solutions have then been analysed in detail, identifying objective, current state, scope of the initiative, expected outcomes, key activities necessary to reach the objective, milestones by 2030 and 2050, indicators, and risks and mitigation strategy.

While a comprehensive overview of all initiatives is presented in the Annex 2, here are reported the initiatives for reaching the vision.

1. The City's Role as a Leader in the Development of Green Roofs and Residential Housing

Objective	To create a fully circular built environment where the city leads by example in promoting the green economy and sustainable construction, thereby motivating private investors and ensuring the prosperity of both people and nature.
Expected Outcome	An enlightened approach by city leadership, where green roofs are a standard requirement in zoning plans, supported by high-quality specifications and effective interdisciplinary cooperation among agencies.
Plans	- By 2030: training of building authority officials in key regions, introduction of mandatory green space rations, and pilot use of planning agreements. - By 2050: green roofs are a standard component of zoning plans for all cities with over 5,000 residents and full integration of green infrastructure into municipal budgets.

2. Economic Transformation and Financing of Blue-Green Infrastructure

Objective	To create a functional economic system in which investments in green spaces (especially public ones) are a priority in municipal budgets, and where the costs of implementation and maintenance are offset by demonstrable benefits and systemic incentives. The goal is to transform the perception of maintenance from a “costly burden” to an investment in long-term prosperity.
Expected Outcome	Green infrastructure is systematically integrated into municipal budgeting, and the market offers preferential green loans backed by data on climate risk reduction.



Plans	• By 2030: launching stable grant programs and introducing discounts on stormwater sewer fees in the residential sector; at least 3 banks offer green loans; pilot tax breaks in at least 3 cities; Development of an economic return calculator and a methodology for evaluating LCC including maintenance requirements. • By 2050: green financing is a fully automated component of municipal budgets; green loans are standard; the cost premium for green solutions has fell below 5%.
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3. Legislative lobbying and systemic financial incentives for green infrastructure

Objective	To create a stable and predictable environment for investors through professional lobbying, the introduction of tax breaks, and simplified access to grants, leading to a fully circular built environment.
Expected Outcome	Green roofs are supported by a harmonised regulatory framework where incentives (subsidies, tax breaks) outweigh the administrative burden.
Plans	• By 2030: Professional lobbying and advocacy for the creation of strategic documents with regional and municipal leadership; Launch of stable SFZP grant programs; pilot implementation of tax breaks in at least 3 cities; amendment of the Public Procurement Act. • By 2050: Tax breaks implemented nationwide; grants replaced by systemic tools (breaks, discounts); fully harmonised regulatory framework with the EU.

Summary

The roadmapping process consisted of three workshops. The first workshop was held online on 25 November 2025 and was attended by 17 participants. All key stakeholder groups were represented by at least one participant, which made it possible to gather a broad range of perspectives from the outset. The second and third workshops, focused on Baseline and Pathways, were combined into one in-person meeting held in Ostrava on 4 March 2026, with 18 participants.

The process showed a high level of engagement among those stakeholders who agreed to participate. Participants generally perceived the initiative very positively and appreciated the opportunity to contribute to a wider discussion on the future role of green roofs, green facades and blue-green infrastructure in the transition towards a nature-friendly economy. At the same time, the process revealed a practical challenge: although stakeholders are often interested in the topic, it is difficult to identify and involve suitable representatives, and securing their participation in an in-person meeting is particularly demanding due to their limited time availability.

One limitation of the in-person workshop was that no representatives from the political sphere or the banking sector were unable to attend but attempts will be made to



follow-up with these critical stakeholders. Nevertheless, the workshops provided valuable input from professional, technical, municipal and implementation perspectives. A particularly important takeaway was that the barriers to wider implementation of green roofs are not isolated, but interconnected across economics, legislation, public procurement, education, technical standards and municipal practice.



3.1.3 Green Buildings – Portugal

Pilot Introduction

Portugal is participating in the GoNaturePositive! project as one of the pilot countries, together with Austria and the Czech Republic. The national pilot is led by the National Association of Green Roofs (ANCV), a non-profit Environmental Non-Governmental Organisation and a partner of the European Federation of Green Roof and Living Wall Associations (EFB). ANCV's mission is to promote the integration of green infrastructure in Portuguese cities, with a strong focus on green roofs as key solutions to improve environmental quality, increase urban resilience and support biodiversity.

The association currently brings together around 180 members, including companies, professionals, academic institutions and other stakeholders active in the sector. ANCV plays a key role in connecting municipalities, the private sector, education and research institutions, and the wider community, helping to foster collaboration and share knowledge across different fields.

Within the GoNaturePositive! project, ANCV is focused on bringing forward national perspectives, particularly in relation to green roofs and living walls as nature-based solutions. These solutions are seen as important tools to address climate challenges, improve the environmental performance of buildings and support the transition of different sectors towards more sustainable and nature-positive urban models. This report presents the outcomes of the stakeholder engagement and roadmapping process carried out in Portugal, bringing together more than 600 contributions from a wide range of actors, including public authorities, businesses, researchers and civil society.

Vision

By 2050, Portugal's cities and buildings will have transformed into living, resilient, and circular urban ecosystems, where people, nature, and community thrive in balance. The built environment contributes to the regeneration of the territory, reinforcing environmental health and social well-being, while promoting sustainable economic opportunities. Public policies, municipal plans, and national regulations incorporate green roofs and facades as standard urban infrastructure, promoting climate resilience, biodiversity, and urban comfort. Strategic tax incentives and public and private financing systems support the expansion of domestic production of biomaterials and NBS solutions, ensuring that companies and developers have the necessary resources to innovate and grow. The business sector leads with transparency, innovation, and technical capacity, adopting circular practices and integrating green technologies into its projects. Intelligent systems, urban digital platforms, and artificial intelligence tools enable the integration of NBS with energy, water, and urban management, making solutions more accessible, efficient, and scalable.



Portuguese society is informed, aware, and demanding regarding green infrastructure. Formal education includes content on NBS, and green professions are well-established, with certified technicians and consultants guaranteeing quality, safety, and effectiveness in the implemented solutions. Technical standards and national guidelines ensure standardization, while collaboration between the public, private, and academic sectors drives innovation and large-scale implementation.

This is the future of Portugal: a construction and urban rehabilitation market fully integrated with nature, sustainable, regenerative and inclusive, in which companies, citizens and financial institutions work together so that nature and communities thrive side by side.

Baseline

During the Baseline workshop, the stakeholders have identified different challenges. For each one, they provided details on the state-of-the-art of the challenge, giving an overview of the baseline (policy, technology, social adaptation, finance, etc.). Here below each challenge is reported.

1. Limited integration into public policies and urban regulations

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- As Nature-Based Solutions, including green roofs and green walls, are not yet clearly integrated into the national Government Plan, which limits their prioritisation in public policies.
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- Integration of NbS into Municipal Master Plans (PDM) and municipal regulations on urbanisation and building is still limited.
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- Lack of national standards, installation and maintenance of these solutions.
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- Lack of fiscal instruments and structured incentives that promote the adoption of NbS.
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2. Economic barriers and lack of dedicated financial instruments

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- Initial implementation costs for NbS, including green roofs and walls, are still perceived as high by developers, companies, and property owners.
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- The absence of structured financial instruments hinders the widespread adoption of NbS solutions.
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- Lack of consistent tax incentives, such as Green Property Tax or reduced VAT, that
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encourage investment in green infrastructure.

- Banks and financial institutions do not incorporate biodiversity and environmental impact metrics into credit assessments and investments.
 - Limited funding specifically for demonstrator projects, technological innovation, and support for NbS companies, making the sector dependent on one-off initiatives.
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3. Challenges in NbS solution innovation

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- Investment is still limited in research and development (R&D) of NbS solutions adapted to the Portuguese context, including biomaterials and technical systems.
 - Life Cycle Analysis (LCA) and tools such as the Digital Product Passport are still underutilised in the green infrastructure sector
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4. Market structure still consolidating and a shortage of specialised skills

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- Shortage of qualified professionals and technicians specialised in the planning, installation, and maintenance of these solutions.
 - NBS sector, including green roofs and walls, is still in the consolidation phase in Portugal, with a limited number of specialised companies.
 - Implementation and maintenance costs remain relatively high, hindering competitiveness compared to conventional solutions.
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5. Low environmental literacy and limited societal involvement

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- Lack of consistent integration of NbS into school curricula and educational programs, limiting the knowledge from an early age.
 - Limited awareness of the societal, environmental, and health benefits associated with NbS.
 - Lack of structured mechanisms for citizen participation and community involvement in sustainable urban projects.
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Pathways

The identification of the challenges has helped the participants to identify possible solutions to overcome the existing barriers. Solutions have been clustered according to the Target Group mostly responsible or suitable for carrying out the activities proposed. Furthermore, a prioritisation exercise has been conducted, considering feasibility and impact, which has led to the identification of one solution for each TG.

Solutions have then been analysed in detail, identifying objective, current state, scope of the initiative, expected outcomes, key activities necessary to reach the objective, milestones by 2030 and 2050, indicators, and risks and mitigation strategy.

While details are reported in the Annex 3 here are reported the initiatives for “a construction and urban rehabilitation market fully integrated with nature sustainable, regenerative and inclusive, in which companies, citizens and financial institutions work together so that nature and communities can thrive side by side”:

1. Integration of NbS into the Portuguese national political and regulatory framework	
Objective	To integrate green roofs and walls into public policies, urban regulations, and national strategies, making them a standard solution in urban planning (based on European Directives EED, NRL, EPBD, UWTD).
Expected Outcome	• Clear integration of NbS into the national and municipal policy framework, with defined requirements for their application in buildings and urban planning. • Existence of technical standards and certification systems for green roofs and walls ensures quality, safety and consistency in implementation. • Definition of national metrics and indicators that allow for the evaluation of the environmental, economic, and social performance of NbS. • Municipalities and public entities will have the technical capacity and regulatory framework to plan, implement, and monitor urban green infrastructure.
Plans	• By 2027: mandatory integration of green roofs into new buildings in the Master Plan and Municipal Urbanisation and Building Regulations; Creation of a national platform for registering green roofs; New reform of the Portuguese Green Tax System to include NbS. • By 2030: NbS in the National Government Plan; more public buildings with NbS; mandatory integration in new and renovated buildings (whether public or private); Tax incentives for sustainable companies. • By 2050: full integration of NbS, namely green roofs and walls, into climate, water and energy adaptation plans.



2. Structuring financial mechanisms and incentives for NbS in Portugal

Objective	To create a stable and attractive financial framework that allows for scaling up the implementation of NbS, reducing costs and increasing public and private investment.
Expected Outcome	• Reduced implementation and maintenance costs over time. • Significant increase in public and private investment in NbS solutions • A more competitive market, with domestic production and economically viable solutions.
Plans	• Develop green credit lines and dedicated funds; integrate environmental impact metrics into the banking sector; support domestic production of biomaterials. • Develop cost-benefit and lifecycle assessment tools; support low-cost solutions and performance monitoring.

3. Market capacity building and societal engagement in Portugal

Objective	To strengthen technical and professional skills in the NbS sector and increase literacy, participation, and societal demands.
Expected Outcome	• An informed and demanding society regarding the integration of green infrastructure in cities. • Availability of specialised training and qualified professionals throughout the country. • Recognition and appreciation of green professions associated with NbS. • Increased community involvement in green roof and green wall projects.
Plans	• By 2027: integration of NbS into curricula; technical training programs; increased environmental literacy. • By 2030: consolidated community programs; green roofs as inclusive and educational spaces. • By 2050: Green professions fully recognised; an active and engaged society; cultural integration of NbS into daily urban life.

Summary

The roadmapping process in Portugal was carried out through two in-person workshop sessions held in Lisbon and Porto. A total of 63 participants took part, representing a wide range of stakeholders, including municipalities, companies, research and academic institutions, experts, and members of civil society.

The first session took place in Lisbon on 27 November, with the support of Instituto Superior Técnico (IST). The second session was held in Porto on 5 December, with the



support of CIIMAR – Interdisciplinary Centre of Marine and Environmental Research. This session also included professional facilitation, which played an important role in supporting interaction among participants, encouraging discussion, organising working groups, and facilitating networking and exchange of ideas.

Participants showed a strong connection to sectors linked to a nature-positive economy, with significant representation from municipal technicians, experts in areas such as environment, water and biodiversity, companies involved in construction, materials and maintenance, as well as researchers and students. This diversity enabled a multidisciplinary approach, combining practical, technical, academic and institutional perspectives.

The process demonstrated a high level of interest and engagement, particularly regarding the role of nature-based solutions, including green roofs and green walls, in addressing urban and climate challenges. It was also observed that many of the contributions collected were aligned with the themes and priorities identified in the EFB workshop, showing a clear convergence of perspectives at the European level.

At the same time, the process highlighted the need to strengthen collaboration across sectors and to more consistently involve key actors, particularly policymakers and the financial sector, in future stages. A key takeaway from the sessions was that the challenges related to the implementation of NBS are not isolated, but interconnected across several dimensions, including regulation, financing, technical capacity, market development and public awareness.

The discussions reinforced the need for a coordinated and integrated approach across sectors to support the transition towards more sustainable and nature-positive urban environments in Portugal.

For the complete report and supporting data, scan the QR code

