Interreg Danube Region

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Circular DigiBuild

Ministarstvo regionalno-investicionog razvoja i saradnje sa nevladinim organizacijama

Territorial Action Plan (TAP)

for Digital Innovation in Circular Construction

MONTENEGRO

Circular DigiBuild Project

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Ministarstvo regionalno-investicionog razvoja i saradnje sa nevladinim organizacijama

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Project Partner: ZWMNE – Zero Waste Montenegro (PP13)

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1. Introduction / Executive Summary

Purpose

The elaboration of **the Montenegrin Territorial Action Plan for Digital Innovation in Circular Construction (TAP)** is managed by the NGO Zero Waste Montenegro (ZWMNE) as the partner on the Circular DigiBuild project supported by the Interreg Danube Region Programme co-funded by the European Union. By speeding up the usage of circular economy principles and digital solutions in construction and building industry, the project supports the twin transition helping the sector become more sustainable, efficient, and climate-friendly. Under this project representatives of the 13 countries within the Danube region collaborate together to develop "2030 Danube Region Digital Innovation Strategy for Circular Construction," referred to in this document as the Strategy. It is based on four comprehensive studies carried out in 2024–2025 and identifies both the urgent need for transformation of the construction sector and the pathways to achieve it.

The Montenegrin Territorial Action Plan for Digital Innovation in Circular Construction supports the shared vision of positioning the Danube Region as a European leader in digital and circular construction by 2030. At the same time, this TAP is tailored to Montenegro's specific context, reflecting the country's level of digitalization and innovation potential, its challenges and the strategic importance of construction sector for the national economy development. It sets out objectives and KPI's that reflect national needs and possibilities and at the same time contribute to the broader transnational strategy.

The TAP is closely aligned with Montenegro's national and local initiatives, as well as the country's Smart Specialization Strategy (S3), which increasingly recognizes construction as a priority area. This creates an exceptional opportunity to strengthen the sector by investing in digital innovation enabling implementation of circular models to Montenegrin construction industry. Innovative digital technologies, such as big data, artificial intelligence (AI), blockchain and the Internet of things (IoT) will help make construction more resource-efficient, transparent, and environmentally sustainable.

The TAP proposes initiatives such as creation of national construction and demolition waste (CDW) recycling center, establishment of the reuse hub for recycled materials and industrial byproducts in combination with digital tools for tracking material flows and circular procurement practices. These measures will not only enhance resource efficiency and significantly reduce landfilling but also transform the entire paradigm of CDW management in the country. This integrated approach will help prevent illegal dumping nationwide and mitigate its adverse environmental impacts on land, water resources, air quality, greenhouse gases (GHG) emissions and followed it natural disaster risks (excessive heating and urban flooding).

The expected impacts from the TAP implementation include a measurable reduction in construction and demolition waste (national target for CDW is 70% till 2030), positive economic effects from recycling and reuse of secondary materials. Moreover, stimulation of the local production of building materials with the use of industrial byproducts, and the widespread adoption of modern approaches supported by digital tools and technologies (BIM roadmap development and implementation) will enhance efficiency and transparency of the construction and building industry.

Alignment

The Montenegrin TAP is fully aligned with the vision, mission, and strategic pillars of the 2030 Danube Region Digital Innovation Strategy for Circular Construction (the Strategy). This vision fosters sustainable economic growth, strengthens environmental resilience, and enhances social well-being. The TAP reflects the Strategy's mission **t**o facilitate collaboration, knowledge sharing, and encouraging the adoption of innovative solutions among stakeholders in Montenegro and across the wider region. Through cooperation with partner countries in the Danube Region, it supports the transformation of Montenegro's construction sector towards a circular economy.

This document sets out tangible objectives and key performance indicators (KPIs) which, once achieved, will provide a stable fundament for circular construction

within the national level. The proposed objectives completely alight with the Strategy's five pillars and contribute meaningfully to achieving its overall goals for sustainable construction in the Danube region.

Current Status

Montenegro's construction sector has a significant role in the national economy and also plays a crucial role in the development of other sectors such as tourism and energy. The sector contributed approximately 3.2% to GDP in 2023 with its share remained broadly stable in 2024, while in 2025 the sector continued to grow. This sector includes both building construction and infrastructure construction (civil engineering), with important projects in transportation infrastructure and utilities. The primary market for Montenegrin construction companies remains Montenegro itself, with some limited presence in the regional market of Serbia and Slovenia where Montenegrin firms were engaged in construction projects[1]. On the other hand, Montenegro attracts a certain level of foreign capital, primarily from companies investing in construction projects.

While traditional practices remain prevalent, the industry is gradually transitioning toward sustainability and circularity as part of a broader national strategies aligned with EU goals. In recent years, Montenegro has made limited progress in adopting circular construction practices. The National Strategy for Circular Transition to 2030 identifies construction as a critical area for integrating circular economy (CE) principles, focusing on waste reduction, resource efficiency, and material reuse. The National Strategy for Sustainable Development by 2030 reinforces these objectives by incorporating CE principles into Montenegro's overall sustainability framework. It emphasizes eco-friendly construction practices aimed at reducing environmental impact and supports the transition to low-carbon, resource-efficient building methods. The Law on Waste provides a foundational regulatory framework for waste reduction, reuse, and recycling, particularly concerning construction and demolition waste management. Furthermore, the National Climate Change Strategy until 2030 and the Energy Development Strategy of Montenegro until 2030 are also

[1] S3-Montenegro-In-depth-analysis-of-priority-domains-qualitative

playing an important role in the transition of the construction industry in Montenegro to more sustainable practices.

Despite the established legislative framework, for Montenegro major challenges for implementing circularity in construction industry remain in the effective enforcement of these policies, inter-ministerial coordination, and the development of infrastructure and market conditions that would enable large-scale reuse of secondary construction materials and proper construction and demolition waste management.

As typical construction practices in Montenegro largely reflect traditional methods, influenced by the country's geographic and cultural context, in recent years, there has been a gradual introduction of modern digital tools and technologies. Building Information Modeling (BIM) is being promoted through Montenegro's National Strategy for Circular Transition to 2030, aimed at enhancing resource management, project planning, and waste reduction. However, the adoption of digital tools remains limited, and most projects are still managed using traditional project management techniques. Prefabrication and modular construction are also emerging but are not widely adopted, partly due to workforce training gaps and higher upfront costs. Recycling and reuse of materials in construction are still in the early stages. The Law on Waste Management mandates certain recycling practices, but reuse remains minimal due to a lack of specialized facilities and infrastructure for processing construction and demolition waste.

In the first round of the "Smart Specialization Strategy of Montenegro 2019-2024" (S3 Strategy) the Construction industry was not identified as the priority area, but it was partly mentioned in the area of "Energy and sustainable environment". As a result, during that period the Innovation Fund of Montenegro co-financed three projects under the Collaborative Grants Programme, totaling more than €0,5M investment, which have significant applications in the construction sector, also confirming the relevance of cross-sectoral innovation. Due to it, one of the projects named "New environmentally friendly thermal insulation materials based on ash and waste plastic" is now executed by private Montenegrin entrepreneur "Mont Way DOO Podgorica" in collaboration with the Faculty of Metallurgy and Technology

of the University of Montenegro. It is expected that the optimal recipe for the production of this material will be developed as part of the project, which will use plastic waste and industrial waste from the Thermal Power Plant in Plevlja in the production of the new building material which can be offered to the Montenegrin construction market.

Noteworthy to mention that recent Quantitative report on the mapping of S3 potential in Montenegro[2] provided in 2025 already identify "Construction" as one of the priority areas and there are high expectations that new cycle of RIS3 Strategy for 2026-2031 will give green light for digital innovations in construction sector of Montenegro.

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2. Vision and Mission (Territorial Adaptation)

Vision (National)

To strengthen Montenegrin construction and building sector with circular and digital construction practices as a part of Danube Region community to fostering sustainable economic growth, environmental resilience, and social well-being nationwide.

Mission (National)

To facilitate collaboration, knowledge sharing, and adoption in full capacity of innovative digital solutions among Montenegrin stakeholders in order to transform the national construction sector towards a circular economy, while actively contributing to the Danube Region's collective 2030 vision of becoming a European leader in digital and circular construction.

[2] Quantitative report on the mapping of S3 potential in Montenegro

Montenegro's construction sector is a key driver of the national economy, contributing steadily to GDP and supporting tourism, energy, and infrastructure development. At the same time, the construction and building industry is one of the most resource-intensive sectors of the Montenegrin economy with the dramatic impacts on global warming processes. While the industry remains largely traditional, recent years have seen a gradual shift toward sustainability and circularity, guided by national strategies aligned with EU goals. Despite progress, challenges persist in policy enforcement and spatial planning, inter-ministerial coordination, and the lack of infrastructure for proper construction and demolition waste management, including its recycle and reuse cause devastation of local ecosystems. Digital innovations such as Building Information Modeling (BIM), digital Twins and Material Passports are emerging but remain underutilized due to limited adoption and workforce training gaps. Innovation initiatives, including projects funded under the Smart Specialization Strategy (S3), demonstrate the potential of cross-sectoral collaboration, with recent recognition of construction as a priority domain in the upcoming S3 cycle (2026–2031).

Overall, Montenegro's construction sector is at a pivotal stage: balancing traditional practices with the need for digital transformation and circular economy integration. This creates a strong foundation for territorial action plans that can accelerate the transition toward sustainable, resource-efficient, and innovative construction practices.

3. Alignment with EU Strategy for the Danube Region (EUSDR)

The EU Strategy for the Danube Region (EUSDR) is a macro-regional strategy seeks to create synergies and coordination between existing policies and initiatives taking place across the 14 countries of the Danube Region. Montenegro, as one of the participants, actively aligns with the EUSDR to strengthen regional cooperation, boost socio-economic growth, and accelerate EU integration.

This TAP contributes directly to the implementation of the EU Strategy for the Danube Region (EUSDR), particularly under the following pillars:

Pillar: Connecting the Region

Wider promotion and full adoption of digital tools such as BIM modeling and Digital Twins, as well as implementation of Material Passports in Montenegrin construction industry, especially in public infrastructure projects, will allow for more efficient project design, construction and future project's maintenances that will contributes to improvement of the physical and digital links between Montenegro and other Danube countries and will allow to create a more integrated and competitive European corridor.

Pillar: Protecting the Environment

The TAP proposes initiatives such as creation of national construction and demolition waste (CDW) recycling center, establishing reuse hub for recycled materials and industrial byproducts in combination with digital tools for tracking material flows and circular procurement practices. These measures will not only enhance resource efficiency and significantly reduce landfilling but also transform the entire paradigm of CDW management in the country. This integrated approach will help prevent illegal dumping nationwide and mitigate its adverse environmental impacts on land, water resources, air quality, Greenhouse Gases (GHG) emissions and followed it natural disaster risks (excessive heating and urban flooding) thus contributing directly to environmental protection and climate change on Danube regional level.

Pillar: Building Prosperity

Montenegrin TAP fostering the development of local market for innovative construction materials and products—supported by enhanced national policies on green procurement and design, as well as RIS3 and digitalization initiatives—will increase the value of raw materials and by-products that Montenegro currently does not process, provide micro, small and medium enterprises (MSME) growth, strengthening their innovation capacities by adopting digital and circular construction practices and providing local and regional collaborative R&D

initiatives. Such approach will not just strengthen Montenegrin construction industry and make it more competitive on regional level, but rising prosperity of Montenegrin society by fostering green jobs employment and strengthening supply chain resilience.

Pillar: Strengthening the Region

This TAP supports quadra helix collaboration between different groups of stakeholders on local and regional levels by providing knowledge-sharing mechanisms (B2B DigiBuild platform) and cross-border collaboration platform. Participation in Danube-wide Cluster for circular construction that united multi-stakeholder from 13 countries all over the region, and engage research institutions, industry associations, and financial actors, boosts policy coherence and institutional learning. Improved coordination between all stakeholders will help Montenegro to align national industry objectives with transnational strategy goals.

4. Strategic Pillars, Objectives, and Key Actions (National KPIs)

This section details Montenegro's country-specific implementation for each of the five strategic pillars defined in the Danube Region Digital Innovation Strategy for Circular Construction.

Please note that the KPI numbering in this document does not follow sequential order but instead reflects the numbering established in the Strategy.

Pillar 1: Enabling Policy & Regulatory Frameworks

Objective 1.1: Harmonize circular construction standards and regulations related to digitalization.

National Actions:

- Review existing national construction regulations and identify gaps/barriers for circularity and digitalization.

- Establish a national working group (involving relevant ministries, industry, and research) to propose amendments or new legislation aligning with the Danube Region best practices and EU directives.
- Develop national guidelines or recommendations for integrating digital tools (e.g., BIM, material passports) into regulatory compliance.
- Participate actively in transnational initiatives for standard harmonization.

National KPIs & Targets:

KPI 1.1.2 (National): Reduction in regulatory barriers for secondary material use in construction by 2028.

Target: At least 3 revised regulations by 2028.

Comments: Montenegro is working on building the foundation for circular construction standards that integrate digitalization (through BIM, material passports, and data-driven procurement), but these are still initiatives, not formalized technical standards.

Objective 1.2: Develop and implement financial incentives for circular construction practices.

National Actions:

- Analyze existing national funding instruments for their suitability to support circular and digital construction.
- Develop new, targeted national grant schemes, tax incentives, or loan programs for circular construction projects and digital adoption, especially for SMEs.
- Integrate circularity and digitalization criteria into public procurement policies for construction projects.
- Establish a national dedicated support program for green and digital construction startups.

National KPIs & Targets:

KPI 1.2.2 (National): Number of SMEs utilizing national financial incentives for circular construction by 2030.

Target: At least 10 of SMEs by 2030

Comments: This target could be reached through implementation of the S3 Strategy 2026-2031.

Pillar 2: Fostering Digital Innovation & Technology Adoption

Objective 2.1: Promote the adoption of Building Information Modeling (BIM) and other digital technologies.

National Actions:

- Launch national awareness campaigns and workshops targeting construction companies, public authorities, and educational institutions on the benefits of BIM and digital tools.
- Support demonstration projects and pilot initiatives showcasing the practical application of BIM, AI, digital twins, and IoT in circular construction.
- Develop national roadmaps for BIM implementation in public and private projects.
- Provide technical assistance and consulting services for companies adopting these technologies.

National KPIs & Targets:

KPI 2.1.2 (National): Number of professionals trained in BIM and other digital construction tools by 2030.

Target: At least 100 of professionals by 2030.

Comments: Regarding latest Montenegro S3 In-depth analysis of priority domains (qualitative) (2025) in country exist just partial use of BIM Technology – while BIM is used in some design segments, it isn't fully implemented across the construction phase in Montenegro.

Montenegro's institutions (the Ministry of economic development, the Chamber of Economy (Association of Construction and Building Material Industry), Institute for Standardization of Montenegro, University of Montenegro, United Nations Development Programme in Montenegro, Deponija LLC, the Innovation Fund etc.) are already jointly building awareness and capacity for BIM and digital tools. Through workshops, campaigns, pilot projects, and innovation hackathons, they aim to equip SMEs, students, public authorities, and educational institutions with the skills and knowledge needed for circular and digital construction.

KPI 2.1.3 (National): Number of best practices (pilot projects, other initiatives) demonstrating innovative digital applications in circular construction launched by 2030.

Target: At list 10 of projects by 2030.

Comments: This target can be reached through implementation of the S3 Strategy 2026-2031programmes within the priority areas "Construction in accordance with nature and man" and "ICT and digital innovations".

Objective 2.2: Support the development and deployment of digital platforms for material tracking and waste management.

National Actions:

- Invest in the development or adoption of national digital platforms/marketplaces for tracking and exchanging secondary construction materials.
- Implement national data standards and material passports consistent with EU and Danube Region guidelines.
- Provide financial and technical support for SMEs to integrate digital tracking systems.
- Collaborate with national waste management companies to integrate digital solutions for CDW tracking.

National KPIs & Targets:

KPI 2.2.1 (National): Number of national digital platforms implemented for circular construction and their interoperability by 2030.

Target: At least 1 operational national platform by 2030.

Comments: Such platforms should increase the efficiency of state administration and enhancing transparency through the digitalization of the construction permit process (e-permit), e-monitoring of inspections on-site, e-integration of projects, land registry, and tax administration, digitalization of construction materials tracking, waste management and the processes for CDW recycling and reuse.

Pillar 3: Building Skills & Capacity

Objective 3.1: Develop education and training programs for digital skills within circular construction.

National Actions:

- Integrate circular economy principles and digital construction modules into university curricula (architecture, engineering) and vocational training programs.
- Develop national certification programs for professionals in circular and digital construction.
- Establish partnerships between educational institutions and industry for internships and practical training.
- Launch national online learning platforms for continuous professional development.

National KPIs & Targets:

KPI 3.1.1 (National): Number of education and training programs in digital technologies for circular construction by 2030.

Target: At least 3 of programs by 2030.

KPI 3.1.2 (National): Number of national universities and vocational schools incorporating digital technologies for circular construction into their curricula by 2030.

Target: 2 of institutions by 2030.

Comments: It is proposed to start Introduction to digital technologies for circular construction (BIM etc.) at all levels of education, starting from secondary construction schools and all vocational schools related to the construction sector (mechanical, civil engineering, etc.). It is underlined that, two main national Universities: University of Montenegro UCG (Faculty of Architecture, Faculty of Civil Engineering and Faculty of Metallurgy and Technology) and University of Donja Gorica UDG (Faculty of Polytechnics) are actively involved in science and innovation projects, participating in S3 Strategy projects. Moreover, the Faculty of Civil Engineering UCG is playing an important role in implementing BIM in the construction sector in cooperation with the Institute for Standardization of Montenegro, Association of Construction and Building Materials, the Chamber of Engineers of Montenegro.

Objective 3.2: Promote knowledge transfer and best practice sharing among stakeholders.

National Actions:

- Organize regular national workshops, conferences, and seminars on circular and digital construction.
- Establish a national online knowledge hub or repository for best practices, case studies, and research findings.
- Facilitate national peer-to-peer learning networks and mentorship programs for companies.
- Encourage participation of national stakeholders in transnational knowledge-sharing events.

National KPIs & Targets:

KPI 3.2.1 (National): Number of national knowledge-sharing events (workshops, conferences) organized annually.

Target: At least 2 of events annually.

KPI 3.2.2 (National): Increase in the number of national cluster members or companies participating in cross-border circular construction projects by 2030.

Target: 10% by 2030.

Comments: This target can be reached through Danube CiDiCon Cluster cooperation, as well as through other international projects, like EURECA supported by the Ministry of education, science and innovations.

Pillar 4: Strengthening Collaboration & Supply Chains

Objective 4.1: Facilitate the development of digital regional supply chains for recycled and secondary construction materials.

National Actions:

- Create the conditions for recycling of CDW on local and national level, as well as opportunities for secondary and recycled materials to be put on the local market.
- Map national producers, recyclers, and designers of secondary materials to identify collaboration potential.
- Implement national data standards and material passports for better traceability and reuse.
- Engage national Digital Innovation Hubs (DIHs - Science and Technology Park of Montenegro (NTP), Tehnopolis (Niksić)) and construction clusters (Association of Construction and Building Materials, the Chamber of Engineers of Montenegro etc.) to support SMEs in adopting digital tools for supply chain management.

National KPIs & Targets:

KPI 4.1.1 (National): Increase in the volume of recycled and secondary materials used in national construction projects by 2030.

Target: At least 5% increase by 2030

Comments: High intensity of infrastructure investment: The announcement of a major investment wave in civil engineering works (traffic infrastructure) presents an opportunity for growth. This could serve as a foundation for the development of the construction materials industry, focusing on the principles of sustainability and the use of recycled materials (rubber, ash, slag), which can enhance the competitiveness of Montenegro's Construction sector.

Creation of a CDW recycling center that is identified in the LLC Deponija programme for 2026 and connected with it secondary material hub can make significant input.

KPI 4.1.2 (National): Number of national companies involved in regional/national circular supply chains by 2030.

Target: At least 3 companies by 2030.

Comments: This target can be reached through implementation of green procurement reform planned in The National Strategy for Circular Transition to 2030 Action Plan, if % usage of recycled or secondary material will be mandatory for national companies.

Objective 4.2: Promote collaboration between research institutions, industry, and governments.

National Actions:

- Create a national "Network for Digital and Circular Construction Innovation," linking academia, industry, and government.

- Launch national R&D funding calls for projects focusing on advanced materials, AI-driven resource management, and digital twins in construction.
- Establish national demonstration sites (Living Labs) for testing and sharing best practices.
- Foster national public-private partnerships (PPPs) for circular construction initiatives and facilitate participation in EU programs (Horizon Europe, Digital Europe).

National KPIs & Targets:

KPI 4.2.1 (National): Number of collaborative research and development projects focused on digital technology for circular construction by 2030.

Target: At least 5 of projects by 2030.

KPI 4.2.2 (National): Number of national public-private partnerships established for the digitalization of circular construction initiatives by 2030.

Target: At least 3 of partnerships by 2030.

Comments: These targets are installed based on indicators for 2026-2030 identified in The Science and Innovation Programme 2026-2030 provided by The Ministry of education, science and innovation.

As an example of good practice, the project named “New environmentally friendly thermal insulation materials based on ash and waste plastic” is now executed by private Montenegrin entrepreneur “Mont Way DOO Podgorica” in collaboration with the Faculty of Metallurgy and Technology of the University of Montenegro within the S3 Strategy 2019-2024 programme.

Pillar 5: Raising Awareness & Changing Mindsets

Objective 5.1: Implement awareness campaigns to promote the benefits of digitalization within circular construction.

National Actions:

- Design and execute targeted national communication campaigns for construction companies, policymakers, and the public.
- Utilize various channels (social media, national media, industry events, educational programs) to disseminate information.
- Highlight national success stories and economic/environmental benefits of circular and digital practices.

National KPIs & Targets:

KPI 5.1.1 (National): Reach of national awareness campaigns (number of people informed through various channels) by 2030.

Target: At least 20000 of people by 2030 (3% of country's population).

Objective 5.2: Encourage the adoption of digital technologies focusing on circular economy principles used in construction business models.

National Actions:

- Provide support programs (e.g., coaching, mentorship, toolkits) for construction companies to integrate digital solutions into their business models.
- Organize workshops and masterclasses on circular business model innovation enabled by digital tools.
- Showcase successful national examples of companies adopting digitalized circular business models.

National KPIs & Targets:

KPI 5.2.1 (National): Number of national construction companies adopting digital technologies in their circular business models by 2030.

Target: At least 5 of companies by 2030.

Comments: This target can be reached through the digitalization of the construction permit process (e-permit), e-monitoring of inspections on-site,

e-integration of projects, land registry, and tax administration, digitalization of CDW waste tracking

5. National Context and Challenges

SWOT Analysis

Based on four comprehensive studies carried out in 2024–2025 withing Circular DigiBuild Project and the latest in-depth analysis of the Construction industry[3] provided for the development of the National S3 Strategy for the 2026-2031 period the following specific strengths, weaknesses, opportunities, and threats relevant to Montenegrin construction industry were identified:

Strengths:

- **Strategic orientation towards the EU: Montenegro** has made significant progress on its EU accession path, which includes aligning legislation and standards with European norms across all sectors, including Construction.
- **Significance of the Construction sector in the economy:** Construction is among key sectors of Montenegro's economy. There is strong investment interest for this sector, which plays a crucial role in the development of other sectors such as tourism and energy.
- **High intensity of infrastructure investment:** The announcement of a major investment wave in civil engineering works (traffic infrastructure) presents an opportunity for growth. This could serve as a foundation for the development of the construction materials industry, focusing on the principles of sustainability and the use of recycled materials (rubber, ash, slag), which can enhance the competitiveness of the Montenegro's Construction sector.
- **Natural resources**: Montenegro possesses certain raw materials, such as stone and wood, which present significant potential for the local production of construction materials and products.

[3] Montenegro S3 In-depth analysis of priority domains (qualitative) – June 2025

- **Staff education:** The education system produces a sufficient number of high educated professionals to meet the needs of the Construction sector in Montenegro. The quality of this workforce is high.

Weaknesses:

- **Lack of vision:** Spatial planning often lacks a long-term vision, with projects driven by current circumstances, or even individual interests, rather than future needs and public benefit (e.g., construction within future transport corridors).
- **The lack of advanced technologies for efficient recycling and material recovery:** Montenegro currently lacks advanced recycling technologies and modern material recovery facilities, which limits the country's ability to efficiently process CDW. As a result, valuable raw materials and by-products remain underutilized, while reliance on landfilling continues to generate environmental pressures.
- **Reliance on imported construction materials and products**: Montenegro has an extremely low level of domestic production of construction materials and products, with minimal involvement of local companies in this sector. As a result, there is a heavy reliance on imports, leading to increased construction costs and higher final prices of buildings.
- **Reluctance to innovate**: There is significant inertia and reluctance to adopt innovations, particularly within the business sector and even in the helix of government when the state acts as an investor, who decides (non) to accept innovative solutions.
- **Economic instability**: Due to Montenegro's small market size, the Construction industry is highly sensitive to external and internal geopolitical and economic crises. In recent years, this has resulted in a decline in foreign direct investments and a slowdown in project implementation.
- **Slow bureaucracy and inefficient administrative procedures:** The process of adopting new laws that define the Construction sector has been prolonged, which in turn delays the development of new spatial plans. The

procedures for obtaining building permits, expropriation, etc., are also slow and inefficient.

- **Weak internationalization:** High costs and a lack of workforce limit Montenegrin construction companies from expanding into foreign markets.

Opportunities:

- **Integration of Digital Tools:** Implementation of BIM and Digital Twins technologies in their full capacity, using big data, artificial intelligence (AI), blockchain and Internet of Things (IoT) tools to enhance planning, efficiency, and circularity of the construction industry through digitization.
- **Increasing the efficiency of state administration** through the digitalization of the construction permit process (e-permit), e-monitoring of inspections on-site, e-integration of projects, land registry, and tax administration, etc.;
- **Digitalization and automation of various administrative activities**, such as site reporting, keeping construction log, etc.
- **Modular & Prefabricated Construction:** implement 3D printing, robotic assembly, and adaptive design tools to speed up construction and enable circular designs, producing prefab systems using local materials.
- **Digital tools for tracking material flows**: material passports and it's integration to BIM, digital instruments for lifecycle analysis (LCA) of materials.
- **Circular procurement practices**: determine quoters for reused and recycled materials in tender specifications, require material passports and digital tracking of construction materials and CDW, support brownfield investments and projects that demonstrate circular design principles.
- **Recycling of CDW and industrial by-products:** production of secondary materials from CDW, used rubber, plastic, glass, ash, slag, etc. which could replace consumption of natural raw materials and at the same time addressing waste management while conserving natural resources.
- **Creation of national construction and demolition waste (CDW) recycling center** establishing reuse hub for recycled materials and industrial byproducts in combination with digital tools for tracking material flows.

- **Establishment of the national reuse hub** for recycled materials and industrial byproducts.
- **Development of the green construction materials industry** based on local natural resources – an opportunity already recognized by foreign investors in Montenegro. Planned exploitation of stone and timber as part of the sustainable development of local resources.
- **Recycling of buildings and spaces** – giving new value to old structures. A significant number of buildings in Montenegro, representing cultural heritage and national or city identity, dating back several hundred years or from the 20th century, are currently out of use. Through appropriate "recycling," i.e., reconstruction and repurposing, they can gain and generate new value.

Threats:

- **Slow adaptation of state institutions** to new technologies and materials, which delays the implementation of innovations.
- **Lack of a legislative framework** for the standardization and regulation of new materials and processes.
- **High initial costs for introducing digitalization** or new technologies, and especially for launching local production of construction materials and products. A new domestic manufacturer needs time to gain market trust with quality and price, both in Montenegro and the region, which raises concerns about the profitability and justification of such investments.
- **Limited availability of qualified workforce** for the application of advanced technologies. - Climate changes and seismic activity, which may increase risks for infrastructure.
- **Unplanned exploitation of natural resources**, such as wood and stone, which can threaten ecosystems.
- **Dependence on imported technologies, materials, and products**, instead of fostering local innovations – leading to full reliance on the global market.
- **Lack of consumer awareness and insufficient collaboration between stakeholders**

Addressing National Gaps:

Gaps and barries on national level identified in the "Consolidated Findings from the Four Studies"	How this TAP specifically addresses these gaps and barriers
- **Limited Adoption of Digital Tools:** The adoption of digital tools remains limited, and most projects in the construction industry are still managed using traditional project management techniques	Pillar 2 is focused on: - establishment of national BIM roadmap, - support in technical assistance and consulting services for construction companies adopting digital technologies; - establishment of campaigns and workshops on the benefits of BIM and digital tools.
- **Workforce Training Gaps**: Lack of skilled personnel and higher upfront costs hinder wider adoption of prefabrication and modular construction.	Pillar 3 is focused on: - integration of "digitalization in construction" in university curricula (architecture, engineering) and vocational training programs. - development of national certification programs for professionals in circular and digital construction.
- **Recycling and Reuse in Early Stages**: Reuse remains minimal due to a lack of specialized facilities and infrastructure for processing	Pillar 4 is focused on: - Establishment of the conditions for recycling of CDW, opportunities to secondary and recycled materials on the local market.

construction and demolition waste.	- Map CDW flows, establishing circular supply chains, and digital tracking platforms to improve CDW management efficiency.

6. Financial Strategy (National Level)

Funding Sources

Implementation of activities needed to achieve Objectives and KPIs identified in this TAP will be budgeted under different financing instruments: ministries, local municipalities and national and local institutions budgets, grants and co-financing instruments financed by national budget, donor programmes, EU programmes and private sector investments.

On **national level** it will be financed under:

- Ministry of Economy Development programmes;
- Ministry of Education, Science and Innovation programmes (Programme for science and innovation 2026-2030);
- Ministry of Ecology, Sustainable Development and Northern Region Development;
- Innovation Fond of Montemengro;
- Environmental Protection Fund (the Eco-Fund);
- Local projects (LLC Deponija from Podgorica is planning to create CDW recycling center).

On the topics of research and innovations (S3) Montenegro takes part at the following **international programmes**:

- Interreg IPA Adrion;
- Interreg VI-A IPA CBC Croatia – Bosnia and Herzegovina – Montenegro 2021-2027;
- ERASMUS-EDU-2022-CBHE-STRAND-2;
- European Commission, Western Balkan Fund;

- Interreg MED programme;
- Horizon Europe;
- COST;
- EUREKA;
- EIC;
- Single market program;
- COSME.

Private investments:

- Direct investment by construction companies in BIM adoption and stuff training
- Targeted co-financing by motivated SMEs from construction and IT sectors

Budget Allocation

As this TAP is not an official government document, the indicative funding shares are provided solely as estimates of potential funding sources for the proposed activities, rather than as formal budget allocations.

TAP's Pillar	Share (%)
Pillar 1: Policy & Regulatory Frameworks	**10%**
Pillar 2: Digital Innovation & Technology	**40%**
Pillar 3: Skills & Capacity	**15%**
Pillar 4: Collaboration & Supply Chains	**30%**
Pillar 5: Awareness & Mindsets	**5%**

7. Implementation Plan (National Level)

Governance Structure

The implementation of the Montenegrin TAP would be under surveillance of the task force composed of relative national representatives who were participating in the Circular DigiBuild Project and new national representatives joining the Trans-Danubian Cluster for Circular Digitalized Construction. Zero Waste Montenegro as the member of the Trans-Danubian Cluster for Circular Digitalized Construction – "DANUBE CiDiCon CLUSTER" will oversee the Montenegrin TAP's implementation and provide support in coordination of the monitoring activities at the national level, including progress tracking and reporting.

Timeline

Pillar	Objective	KPI	2026	2027	2028	2029	2030
Pillar 1: Enabling Policy & Regulatory Frameworks	Objective 1.1: Harmonize circular construction standards and regulations related to digitalization.	KPI 1.1.2 (National): Reduction in regulatory barriers for secondary material use in construction by 2028.					
	Objective 1.2: Develop and implement financial incentives for circular construction practices.	Number of SMEs utilizing national financial incentives for circular construction by 2030.					
Pillar 2: Fostering Digital Innovation & Technology Adoption	Objective 2.1: Promote the adoption of Building Information Modeling (BIM) and other digital technologies.	KPI 2.1.2 (National): Number of professionals trained in BIM and other digital construction tools by 2030.					

		KPI 2.1.3 (National): Number of best practices (pilot projects, other initiatives) demonstrating innovative digital applications in circular construction launched by 2030.					
	Objective 2.2: Support the development and deployment of digital platforms for material tracking and waste management.	Number of national digital platforms implemented for circular construction and their interoperability by 2030.					
Pillar 3: Building Skills & Capacity	Objective 3.1: Develop education and training programs for digital skills within circular construction.	KPI 3.1.1 (National): Number of education and training programs in digital technologies for circular construction by 2030.					
		KPI 3.1.2 (National): Number of national universities and vocational schools incorporating digital technologies for circular construction into their curricula by 2030.					
	Objective 3.2: Promote knowledge transfer and best practice sharing among stakeholders.	KPI 3.2.1 (National): Number of national knowledge-sharing events (workshops, conferences) organized annually.					

		KPI 3.2.2 (National): Increase in the number of national cluster members or companies participating in cross-border circular construction projects by 2030.					
Pillar 4: Strengthening Collaboration & Supply Chains	Objective 4.1: Facilitate the development of digital regional supply chains for recycled and secondary construction materials.	KPI 4.1.1 (National): Increase in the volume of recycled and secondary materials used in national construction projects by 2030.					
		KPI 4.1.2 (National): Number of national companies involved in regional/national circular supply chains by 2030					
	Objective 4.2: Promote collaboration between research institutions, industry, and governments.	KPI 4.2.1 (National): Number of collaborative research and development projects focused on digital technology for circular construction by 2030.					
		KPI 4.2.2 (National): Number of national public-private partnerships established for the digitalization of circular construction initiatives by 2030.					
Pillar 5: Raising Awareness &	Objective 5.1: Implement	KPI 5.1.1 (National): Reach of national					

Changing Mindsets	awareness campaigns to promote the benefits of digitalization within circular construction.	awareness campaigns (number of people informed through various channels) by 2030.					
	Objective 5.2: Encourage the adoption of digital technologies focusing on circular economy principles used in construction business models.	KPI 5.2.1 (National): Number of national construction companies adopting digital technologies in their circular business models by 2030.					

Monitoring and Evaluation:

A national framework for tracking progress will be provided by relevant public body on annual base. Progress will be reviewed through regular Danube CiDiCon meetings, discussed with partners from the Danube CiDiCon cluster.

Risk Management:

Identify potential national-level risks to the implementation of the TAP (e.g., funding delays, lack of political will, low industry uptake, skill shortages).

Propose specific mitigation measures for each identified risk.

Potential risks for the Montenegrin TAP implementation include:

- Political instability and limited political support,
- Delays in funding and economic instability,
- Reluctance to innovate, and
- Lack of skilled professionals in circular and digital construction.

Mitigation measures:

- Diversification of funding opportunities
- Alignment with existing national and EU initiatives,
- Continuous stakeholder engagement within quadra helix groups
- Awareness-raising and knowledge-sharing activities to increase Interest for innovation
- Government support for capacity-building programmers to professionals skills development in circular and digital construction practices.

8. Stakeholder Engagement (National Level)

Collaboration Mechanisms:

Communication and collaboration will be strengthened through national stakeholder exchanges within the Danube CiDiCon cluster and participation in working groups connected to the governance structures of the Danube Region.

The B2B platform created under the Circular DigiBuild project will serve as a central space to share progress and results, gather feedback, such for new partners and coordinate activities with regional partners. In addition, collaboration will be supported by the use of online communication tools, ensuring continuous dialogue and effective knowledge exchange.

Involvement of Key Groups:

Governments / Public Authorities: Engagement will take place through targeted consultations and knowledge-sharing activities coordinated by profile Ministries, involving relevant ministries and public bodies to support policy alignment and the integration of circular construction priorities into existing strategies and initiatives.

Industry Associations & SMEs: Industry stakeholders will be engaged through workshops, pilot activities, and knowledge exchange within the S3 Strategy implementation, encouraging innovation, testing of circular solutions, and practical implementation.

Research & Education Institutions: Collaboration with universities and research centres will support scientific input, development of methodologies and tools, and capacity-building activities related to circular and digital construction.

Financial Institutions & Investors: Dialogue with financial actors will focus on exploring opportunities for financing circular construction initiatives and supporting the scaling of circular-based business models.

Civil Society & NGOs: Public awareness and transparency will be supported through dissemination activities, stakeholder engagement, and cooperation with civil society organizations working on circular economy and sustainability.

Note: Key Stakeholders are identified in Annex A.

Communication Plan:

A national communication strategy will ensure transparency, visibility, and continuous dissemination of TAP activities and results within the Montenegro:

- Regional online platform for information, good practice exchange and participation opportunities (DigiBuild B2B Platform: https://www.circulardigibuild.eu/bg/)
- Participation in the Danube CiDiCon cluster's communication activities and events.
- Periodical newsletters from Danube CiDiCon Cluster distributed to all RMSG members and stakeholders.
- Social media awareness campaigns targeting both industry professionals and the general public.

9. Sustainability and Scalability

Sustainability Mechanisms

The outcomes and initiatives developed under the TAP will be sustained through continued collaboration of national and local stakeholders from the Quadruple Helix, as well as cooperation with partners from the Danube Region.

Ensuring the long-term sustainability of TAP outcomes:

- *Regulatory reforms*: Adopted standards and amendments will be permanently embedded in the national legal framework.
- *Educational integration*: Circular and digital construction concepts will be incorporated into university educational programmes and Chamber of Engineers programmes, securing a steady pipeline of skilled professionals.
- *Strategic funding*: Implementation of the S3 Strategy 2026–2031 (key areas for funding: construction, green energy transition and energy efficiency, ICT), progressive integration of BIM (development of BIM roadmap through InDiCo Global project), harmonization of circular construction practitioners to public procurement and creation of CDW recycling center by LLC Deponija will provide a foundation for circular construction in Montenegro.
- *Cooperation*: strengthening cooperation between local companies and SMEs through initiatives provided by Association of Construction and Building Materials; cooperation with The DANUBE CiDiCon Cluster network on Regional level.

Scalability Strategies

Successful pilot initiatives, implemented through S3 Strategy programmes or BIM roadmap will be proposed for replication and adaption in municipalities and on national level. Relevant information will be scaled through B2B platform, CiDICon Cluster and other stakeholder networks, workshops, and knowledge exchange activities.

10. Annexes

Annex A: List of key national stakeholders involved.

Governments / Public Authorities:

- Ministry of Spatial Planning, Urbanism and State Property

- Ministry of Ecology, Sustainable Development and Northern Region Development
- Environmental Protection Agency
- Ministry of Energy and Mining
- Ministry of Economic Development
- Ministry of Education, Science and Innovation
- Ministry of European Affairs (Danube Region)
- Deponija LLC
- Institute for Standardization of Montenegro

Research & Education Institutions:

- University of Montenegro UCG:
  - Faculty of Architecture,
  - Faculty of Civil Engineering
  - Faculty of Metallurgy and Technology
- University of Donja Gorica UDG:
  - Faculty of Polytechnics
- Science and technology park Montenegro
- Tehnopolis - Innovation and Entrepreneurship Center

Financial Institutions & Investors:

- Innovation Fund of Montenegro
- Environmental Protection Fund of Montenegro (Eco-Fund)
- Central Bank of Montenegro (CBCG)
- World Bank
- European Investment Bank (EIB)
- European Bank for Reconstruction and Development (EBRD)
- United Nations Development Programme in Montenegro (UNDP)

Industry Associations & SMEs:

- The Montenegrin Circular Economy Hub (Circular Hub)

- Chamber of Engineers of Montenegro
- Association of Construction and Building Materials Industry
- Telemont
- Altscape
- Ecoenergy Consulting
- ION Solution
- TM Invest
- Mep team
- Vigoris
- Concord
- Penta MNE
- Sectron Montenegro
- ARHETIP doo
- Preming d.o.o
- Cikom
- Fleka
- Mont Way DOO Podgorica
- DOO Meditera
- “Institut za građevinarstvo” d.o.o
- Monteput
- Adria Invest
- Rašketić doo
- Bemax
- Zetagradnja
- Čelebić
- Strabag/Crnagoraput
- IGP Fidija
- ETG inženjering
- Paten studio
- Maljat Stone
- NikCom
- Mehanizacija i programat

- LD gradnja
- Jela komerc
- MN BUILD DOO
- CEMA
- A.tim Studio
- ZETA MONT
- A12 project d.o.o

Civil Society & NGOs:

- ICT Cortex
- ADP ZID
- NGO “Gradionica”
- NVO "DigitalDen"
- NGO “Expeditio”
- NGO “KANA”
- NVO Europian Democratic initiatives AD
- NVO "Grupa građana BU2"
- Center of environmental initiatives
- NVU "Dr. Martin Schneider-Jacoby

Annex B: Detailed national project proposals linked to the objectives.

Name of project	National Partners	Connection to TAP’s objectives
“Driving Digital and Sustainable Transformation in Montenegro through ICT and BIM Standards”	Institute for Standardization of Montenegro (ISME) in partnership with Association of Construction and Building Materials, Chamber of engineers, UCG	- Objectives 1.1 (Integrate European standards for BIM, AI, IoT into national construction and digital innovation practices) - Objectives 2.1, 2.2 (BIM integration, introduction of IoT monitoring for smart resource use and CDW management) - Objective 3.1 (strengthen the skills of engineers, architects, and policymakers

	Faculty of civil engineering	through workshops, conferences, provide training for trainers) - Objective 4.2 (conduct a national BIM team); - Objective 5.1, 5.2 (rise BIM awareness)
"ReWaste – A New Era in Waste Management in Montenegro"	UNDP Montenegro, Deponija LLC Podgorica	Objectives 2.1. 2.2 (Integrate digital monitoring of waste collection, storage, and processingIncrease recycling rates, transform waste into secondary raw materials)
"Circular Transition and Responsible Business Conduct"	UNDP Montenegro, Ministry of Economic Development, International Labour Organization (ILO)	Objectives 2.2 (application of industrial symbiosis for CDW reuse, map resource flows, Identify by-products. exploring opportunities for resource exchange, shared infrastructure)
Set of programmes: - Innovation Development Programme (2023–2027 Framework) - "Startup Revolution" - Collaborative Innovation Grants - Innovation Vouchers	Innovation Fund of Montenegro	- Objectives 1.1, 4.1 (provide SMEs with accessible support to test prototypes, adopt digital tools such as IoT, and collaborate with research institutions; enable construction companies to deliver circular solutions like recycled materials and CDW reuse, strengthening competitiveness and alignment with EU sustainability standards) - Objective 4.2 (Promote collaboration between construction companies and research institutions, government)

Annex C: Data sources and methodologies for national KPIs.

The national KPIs presented in this TAP were defined through an analysis of Montenegro's strategic goals and policy objectives, as outlined in national documents and reports (Annex D), together with relevant projects and activities highlighted in Annex B. This integrated approach ensures that the KPIs reflect both policy priorities and practical implementation measures.

Annex D: Relevant national policy documents or reports.

- Law on Construction of Structures
- Rulebook on the Management of Construction Waste
- Law on Waste
- National Waste Management Plan 2025–2029
- Law on Energy Efficiency
- National Energy and Climate Plan (NECP, 2025)
- Law on Public Procurement
- Roadmap Towards the Circular Economy in Montenegro (2022)
- National Strategy for Circular Transition to 2030 with Action Plan 2023–2024
- National Strategy for Sustainable Development up to 2030 (NSSD)
- “MONTENEGRO ON THE ROAD TO THE CIRCULAR ECONOMY” (Needs Assessment Report)
- Smart Specialization Strategy (S3) 2019-2024
- Evaluation of the Smart Specialization Strategy (S3) 2019-2024 (report)
- Mapping Montenegro’s potential in the context of Smart Specialization (report)
- Strategy for Scientific Research Activity of Montenegro 2024-2028
- Montenegro Research Infrastructures Roadmap 2024-2028
- Montenegro S3 quantitative report on mapping potential
- Montenegro S3 In-depth analysis of priority domains (qualitative)
- Draft of the Smart Specialisation Strategy (S3) 2026–2031
- Montenegro's Science and Innovation Programme 2026-2030