

Croatia: Proposed Circular Economy Action Plan on Construction and Demolition Waste

Deliverable 1.b CE Action Plan and its Roadmap



CIRCULAR ECONOMY
APPROACHES IN
SOLID WASTE
MANAGEMENT

Abbreviations and Acronyms

BAT	Best Available Techniques
BREF	BAT Reference Document
CDW	Construction and Demolition Waste
CE	Circular Economy
CEAP	Circular Economic Action Plan
CEC	Circular Economy Committee
EEA	European Environment Agency
EPR	Extended Producer Responsibility
EoW	End of Waste
EU	European Union
FZOEU	Environmental Protection and Energy Efficiency Fund
GHG	Green House Gases
GoC	Government of Croatia
GPP	Green Public Procurement
HGK	Croatian Chamber of Economy
HR PSOR	Croatian Business Council for Sustainable Development
HUP	Croatian Employers' Association
ITC	Information and Communication Technologies
JLS	Local Government
JLR	Regional Administration
JRC	Joint Research Centre
MCPPSA	Ministry of Construction, Physical Planning and State Assets
MoESD	Ministry of Economy and Sustainable Development
MMW	Mixed Municipal Waste
MRRFEU	Ministry of Regional Development and EU Funds
MS	Member States
NGO	Non-Governmental Organization
NWMP	National Waste Management Plan
R&D	Research & Development
RG	Regional Government
ROO	Environmental Pollution Register of the Ministry of Economy and Sustainable Development
SC	Steering Committee
SME	Small and Medium-Sized Enterprises
SRM	Secondary Raw Materials
TOR	Term of Reference
UN	United Nations
WMC	Waste Management Centre
WMP	Waste Management Plan

Disclaimer

This report was developed by the World Bank. The findings, interpretations and conclusions expressed in this report do not necessarily reflect the views of the Executive Directors of the World Bank or the governments they represent. The report was produced to provide advisory support to the Croatian Ministry of Economy and Sustainable Development (MoESD) and does not necessarily represent the views of the Government of Croatia or of MoESD.

Acknowledgements

This report was prepared as an output of the Activity 1.2. *Support to formulation of a sectoral Circular Economy Action Plan* for the World Bank's *Circular Economy approaches in Solid Waste Management* Reimbursable Advisory Services in support of the Ministry of Economy and Sustainable Development of Croatia. The CDW sector in Croatia has been identified as a potential sector to improve its circularity and Global Factor was chosen to carry out the task of *Development of a Circular Economy Action Plan on Construction and Demolition Waste*.

The Report was prepared by the World Bank core team led by Sameer Akbar (Senior Environmental Specialist, Task Team Leader), Rieko Kubota (Senior Environmental Engineer), Vladimir Kalinski (Senior Environmental Specialist, Local Project Coordinator), Arno Behrens (Senior Environmental Economist), and Jiyoun Christina Chang (Environmental Specialist). The report was developed in cooperation with experts from the Global Factor team, including Ximena Franco, Joana Asua, Francesco Loro, Edi Perović, Hrvoje Dokoza and Vesna Petrović. The report has benefited from inputs and documents provided by the MoESD, Directorate for Environmental Impact Assessment and Sustainable Waste Management (SWM) and Institute for Environmental and Nature Protection. Valuable information was also obtained from various stakeholders during group and individual consultations.

The team is grateful to Jehan Arulpragasam (Country Manager, Croatia), Kseniya Lvovsky (Practice Manager, Europe and Central Asia) and Marc Peter Sadler (Program Leader) for their valuable support and overall guidance.

Executive Summary

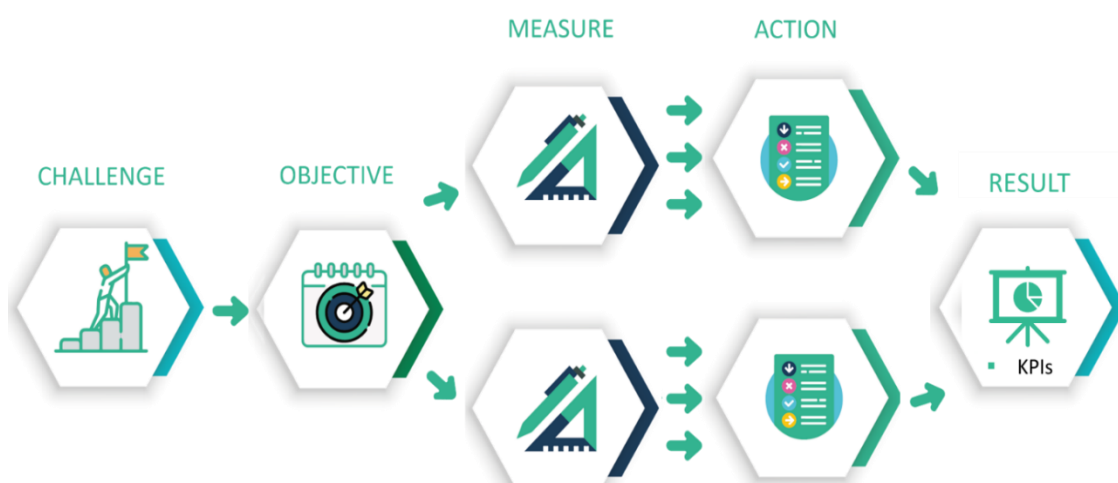
The Croatian government has made commendable efforts to create a sound regulatory framework for materials use and waste management, yet the country's performance continues to fall short of the expected targets. Croatia has set the goal to reduce CDW generation by 2030 in its National Development Strategy. This vision is embodied in several policy instruments such as the Croatian Recovery and Resilience Plan 2021-2026, the WMP of the Republic of Croatia for the 2017–2022 period and the Waste Management Act. All of them present ambitious objectives in energy efficiency, GHG emissions, waste management, and efficient use of materials in the CDW sector. The EU Waste Framework Directive (WFD) defines as a target the recovery of 70% of Construction and Demolition Waste (CDW¹) by 2020, as well as the minimization of downcycling and backfilling. According to data collected and reported by the Ministry of Economy and Sustainable Development (MoESD), in 2020 Croatia generated about 1.4 million tons of CDW with a recycling rate of 60%. Adopting the EU legislative frameworks at the national level supports the establishment of the country's legislation system that is comparable with that of the other member states, but the achieved results in terms of the Circularity Index remain below the European average.

The analysis carried out to define the current CDW management scenario in Croatia confirmed that the construction sector generates about 24% of the total waste generated by the country and it is expected that this percentage may grow. Due to the expected expansion of tourism and infrastructure, the construction sector is expected to grow, and with it the generation of CDW. Therefore, the transition to the circular economy (CE) in this sector is essential to reducing the consumption of natural resources, the import of construction materials and the generation of waste.

This report, which proposes the first Circular Economy Action Plan (CEAP) for the CDW sector in Croatia, aims to illustrate the sector-specific challenges that Croatia is facing in realizing CE in the construction and demolition waste sector and to recommend the potential measures and actions that may help Croatian CDW sector to transition into CE. The CEAP development started with a diagnostic analysis of the CDW sector to understand the current status of CDW management in Croatia. Based on the analysis and multiple stakeholder consultation meetings, the diagnostic extracted the six major challenges in the sector and translated them into the corresponding objectives of the CEAP. To propose the best available measures and actions for CE transition in Croatia, stocktaking of international good practices and policy examples on CE in the CDW sector was conducted to provide guiding principles for the development of the CEAP in Croatia. The framework of the proposed CEAP is shown below as a flowchart.

¹ Construction and demolition waste (CDW) includes all the waste produced by the construction and demolition of buildings and infrastructure, as well as road planning and maintenance. It contains a wide variety of materials such as concrete, bricks, wood, glass, metals and plastic.

Figure ES1: Framework of the proposed CDW CEAP



The proposed CEAP is addressed to governmental bodies, the CDW value chain and its related stakeholders. It integrates aspects of the CE in the CDW management in line with the EU WFD, the European Green Deal and the EU CEAP, as well as the current and future Croatian National Waste Management Plan (NWMP). It also incorporates elements of international best practices.

The management of CDW in Croatia raises enormous challenges from institutional, operational, and waste flow management points of view. A shared vision of concepts and realities around the CE and CDW management needs to be developed and the information about the generation and management of CDW is very limited. Furthermore, there is an increase in CDW generation, while the country has limited capacity for CDW recovery and recycling. Also, the country faces uncontrolled flows of CDW amid a low formal market share of secondary raw materials (SRM) of CDW. Some of the challenges are elaborated upon below.

While progress has been made in adoption of specific IT tools, the lack of detailed information on CDW generation and management remains a critical issue. The lack of knowledge by operators, often represented by small construction companies with limited technological skills, is one cause of many data entry errors. They can be reduced through specific training courses and the adoption of simple user interfaces, among other suggested solutions proposed in the measures developed by CEAP.

There is urgent need to reduce the practice of illegal CDW dumping, which causes direct environmental harm and reduces the availability of material to be sent to the recycling process. The related measures include training courses for public administration personnel, providing new control tools through strengthening institutions' powers and adopting new technologies for remote and automatized controls. The creation of a fund for the removal of abandoned CDW is also considered.

The projected growth in the construction sector necessitates the development of a wide network of recycling yards since the current network of collection and recycling facilities will not be able to absorb the CDW. In addition, the peculiar geographical configuration, with many islands along the coast and large rural areas in the south of the country, a strong seasonal influx related to tourism and the development of urban areas, especially around Zagreb, require the reinforcement of existing recycling yards. The estimated number of recycling yards and all measures necessary for facing the expected growth have been defined using as a basis the official data on CDW generation reported by MoESD.

In the longer term, CE will need to be integrated with the way products are constructed and manufactured by including the necessary adjustments to facilitate their reuse, repair and recycling from the design. As the construction sector is traditionally resistant to change, the measures related to green public procurement and eco-design (both already introduced in Croatian legislation) will need to be

strengthened by developing guidelines to support operators in the CDW value chain, strengthening regulations and activating pilot projects to forge a specific technical base.

To overcome the numerous challenges and to complement the NWMP developed by Croatia, six objectives were proposed with associated twenty operational measures and forty-seven concrete actions. The technical content, the authority responsible for implementation, and the parties involved have been defined for each action along with a key performance indicator (KPI), a specific deadline and an estimated budget. Since some measures have a broad scope to facilitate their implementation, they have been associated with specific actions. Each action defines operational aspects such as the Responsible Authority and associated Major Implementers. To monitor the enforcement of a CEAP and to adapt the future measures based on the results achieved, each action is associated with a specific key performance indicator (KPI) and target values that should be achieved to ensure effective implementation. The target values have been defined based on the best available knowledge. The table below shows the six objectives and the nineteen measures.

Table ES1: Suggested Objectives and Measures of the CDW CEAP

Objective	Measure
OBJECTIVE 1: Increased cooperation among CDW stakeholders	M.1.1. Enhance dialogue and cooperation among CDW stakeholders
	M.1.2. Enhance education and support for research, innovation, and development
OBJECTIVE 2: Improved availability and quality of CDW data	M.2.1. Implement educational and informative activities related to CDW reporting
	M.2.2. Improve CDW management information system applications
	M.2.3. Improve availability and quality of CDW management data before and during operating sites
	M.2.4. Implement pre-demolition audit for construction sites
OBJECTIVE 3: Reduced illegal CDW dumping	M.3.1. Increase education of relevant bodies involved in CDW management inspection processes
	M.3.2. Strengthen regulation and controls to reduce illegal dumping of CDW
	M.3.3. Remove CDW from illegal dumpsites
OBJECTIVE 4: Increased effectiveness and efficiency in the CDW management including its recovery	M.4.1. Improve EoW status legislation for CDW
	M.4.2. Improve hazardous waste removal and asbestos disposal system
	M.4.3. Construct and equip recycling yards for construction and demolition waste "Type A"
	M.4.4. Construct and equip recycling yards for construction and demolition waste "Type B" for processing CDW
	M.4.5. Build and equip facilities for CDW analysis and quality control
OBJECTIVE 5: Stimulated growth of a green market in construction materials	M.5.1. Improve the existing application to develop a CDW Exchange
	M.5.2. Create guidelines on Green Public Procurement (GPP)
OBJECTIVE 6: Reduced generation of CDW	M.6.1. Develop guidelines for the reuse of building components, conversion, and renovation of buildings
	M.6.2. Enhance take-back systems in CDW to increase reused and recycled content
	M.6.3. Implement educational and informative activities on eco-design in public and private buildings
	M.6.4. Develop guidelines for sharing, conversion and renovation of buildings

The estimated cost of the CEAP over 2023-2027 is assessed at EUR 120.5 million based on the best available estimates. These estimations also take into account the stakeholders' contributions collected

during the consultation meetings and through the collaborative online tools. This cost estimates for each of the five years are estimated at EUR 13.3 m, EUR, 23.2 m, EUR 30 m, EUR 26.4, and EUR 29.1.

The actions aimed at creating greater collaboration between public and private stakeholders were considered the most important elements of CEAP. The forty-seven proposed actions were indexed with the help of an impact factor calculated based on five criteria: environmental impact; technical and economic feasibility; alignment with regulation and policies; scalability; and stakeholders' interest. While greater collaboration between public and private stakeholders was ranked highest, the impact indexes associated with the various actions showed little difference between them, and many actions have the same impact factor. This result is explained by linkages and temporal coordination between the actions themselves. The proposed CEAP includes a plan for a model that would manage the engagement of stakeholders during the enforcement phase.

The proposed CEAP considers best practices in municipal solid waste management developed internationally and has selected and adapted a set of measures and actions to the Croatian context. However, some actions, to be implemented, require the approval of several amendments to the Construction Law and the Waste Management Law, and a revision of the mandates and competencies assigned to each entity involved in the implementation of the CEAP and currently based on the Law on Organization and Scope of State Administration Bodies (Official Gazette 85/2020). The adoption of these changes requires specific negotiations with the different institutions and agencies and needs additional time, which may limit the achievement of effective results within the timeframe initially envisaged for the implementation of the CEAP. For these reasons, the proposed measures and actions, are presented according to their applicability within the existing legislative framework and considering the current mandate of the implementing bodies. The GoC may adopt a gradual approach to the implementation of the CEAP, starting with measures for immediate implementation and postponing the application of those actions that require the modification of the legal framework.

The full implementation of the CEAP will be necessary for an advanced transformation of the CDW value chain into a circular economy model. The proposed vision for Croatia is to be a country with a mature circular economy model, and a consistent and compliant legislative framework being above the EU average level of CDW recovery and waste generation rate in 2030 in the CDW sector.

Contents

Abbreviations and Acronyms	2
Disclaimer	3
Acknowledgements	3
Executive Summary	4
1. INTRODUCTION	1
2. CURRENT SITUATION OF CROATIA WITH RESPECT TO EU CIRCULAR ECONOMY TARGETS... 4	
2.1 EU policy framework and motivation to develop the Construction and Demolition Waste Circular Economy Action Plan.....	4
3. FORMULATION OF THE CIRCULAR ECONOMY ACTION PLAN FOR THE CONSTRUCTION AND DEMOLITION WASTE SECTOR	8
3.2 Stakeholders consultation process for the formulation of the CEAP	10
3.3 Challenges.....	12
3.4 Objectives	13
4. IDENTIFICATION OF THE CIRCULAR ECONOMY ACTION PLAN MEASURES.....	16
4.1 OBJECTIVE 1: Increased Cooperation Among Construction and Demolition Waste Stakeholders	25
4.2 OBJECTIVE 2: Improved Availability and Quality of Construction and Demolition Waste Data	28
4.3 OBJECTIVE 3: Reduced Illegal Construction and Demolition Waste Dumping	34
4.4 OBJECTIVE 4: Increased Effectiveness and Efficiency in the Construction and Demolition Waste Management Including its Recovery	38
4.5 OBJECTIVE 5: Stimulated Growth of a Green Market in Construction Materials	48
4.6 OBJECTIVE 6: Reduced Generation of Construction and Demolition Waste	51
5. PRIORITISATION OF MEASURES	55
5.1 Results of Prioritization	56
6. ROADMAP AND STAKEHOLDERS' ENGAGEMENT	58
6.1 Roadmap.....	58
6.2 Governance of the Circular Economy Action Plan	61
7. CONCLUSIONS.....	63
8. REFERENCES.....	65
Annex I – Report on priority measure analysis	67
Annex II - European Best Practices on CDW Management.....	68
Annex III - Description of Gaps, Drivers and Barriers.....	72
Annex IV – Comments to first draft of CEAP measures	77
Annex V – Estimation of CEAP Costs	115
Annex VI- Methodological framework of MCA	122
Annex VII – Results of the MCA	123
Annex VIII Roadmap design considerations.....	128

List of Figures

Figure 1: CDW Generation in Tons in Croatia 2015-2020.....	6
Figure 2: CDW Management Operation in Croatia	6
Figure 3: Flowchart of the CEAP Development Methodology.....	10
Figure 4: Stakeholder Consultation Process in Numbers	11
Figure 5: Identified Challenges and Objectives for the CDW sector CEAP for Croatia	15
Figure 6: Flowchart Describing the Structure of Action – Measure – Objective – Challenge.....	17
Figure 7: Actions Ranked Based on Their Impact Score	57
Figure 8: Roadmap Scheme	59
Figure 9: Operational Structure to Support the Implementation of the CEAP.....	62
Figure 10: EU Countries that approved pre-demolition audits	68
Figure 11: EU Country that approved CDW sorting procedures	69
Figure 12: EU Country that approved separate collection of CDW procedures.....	70
Figure 13: EU Country that approved GPP procedures	71

List of Tables

Table 1: List of Identified Objectives and Related Measures	16
Table 2: Estimated Costs of Each Action and Timeline for Implementation	17
Table 3: Actions classified according to their immediate applicability	21
Table 4: Barriers and drivers related to Stakeholder Communication	72
Table 5: Barriers and drivers related to low recycling and recovery rate.	73
Table 6: Barriers and drivers related to Increasing of treatment capacity.....	73
Table 7: Barriers and drivers related to CDW generation	74
Table 8: Barriers and drivers related to low technical knowledge of CE and low rate of R&D.	75
Table 9: Barriers and drivers related to low market share of SRM.	76
Table 10: Annex IV – A Comments from the Ministry of Agriculture.....	77
Table 11: Annex IV – B Comments from the Croatian Business Council for Sustainable development – HR BCSD	79
Table 12: Annex IV – C Comments from the Service for harmonization with EU strategies and international obligations.....	81
Table 13: Annex IV – D Comments uploaded on the collaborative platform “Padlet”. The comments are anonymous.....	86
Table 14: Annex IV – E Comments from the Directorate for climate activities.....	87
Table 15: Annex IV – F Comments from Strabag.....	89
Table 16: Annex IV – G Comments from MCPPSA to CEAP proposal – first draft	91
Table 17: Annex IV – H Comments from MoESD to CEAP proposal – first draft	92
Table 18: Number of Points for Each Action Scored by Consultants.....	123

Table 19: Defined criteria to assess the measures126

List of Boxes

Box 1: Description of Activities for Stakeholder Consultation 10

Box 2: Croatia CDW Sector Key Insights from Available Information and Key Stakeholders’ Inputs 12

Box 3: Brief Description of MCA Methodology 55

1. INTRODUCTION

1. This Report presents the initial Circular Economy Action Plan (CEAP) approach for the construction and demolition waste (CDW) sector in Croatia. The analysis was conducted by the World Bank in 2022 as part of the Reimbursable Advisory Service (RAS) for the Government of Croatia on Circular Economy Approaches in Solid Waste Management (CERCLE). The RAS is financed by the European Union's (EU) Cohesion Fund. It started in September 2020 and is scheduled to last until the end of November 2022.

2. A circular economy decouples economic activity from the consumption of finite resources, by i) eliminating waste and pollution, ii) circulating products and materials, and iii) regenerating nature. The construction sector affects all the aspects underlined in this definition; therefore, its transformation from a linear to a circular approach means multiple positive effects. The EU Commission, since 2015, embraced this position and adopted the Action Plan to tackle the global changes. The adoption in 2018 of the Circular Economy Package² aims to transpose this vision into the European legislative framework. The European Commission's activities to transform the economy took a further step forward with the adoption, in March 2020, of the new Circular Economy Action Plan (CEAP).

3. Within this framework the building and the CDW management sectors play a pivotal role in the achievement of the targets defined by the EU in the CE Package. As reported by the EU CEAP, they require "a vast amount of resources and accounts for about 50% of all extracted material. The construction sector is responsible for over 35% of the EU's total waste generation". The result of the analysis conducted by the European Environment Agency (EEA) in 2020³ on the impact of CE on CDW management and the link to reducing greenhouse gas (GHG) emissions shows that a potential reduction of up to 61% over the life cycle of buildings is possible. Based on these figures the Waste Framework Directive (WFD) defines as a goal the recovery of 70% of CDW by 2020⁴.

4. The vision of the EU towards CE is embodied in several policy instruments in the country, such as Croatia's National Recovery and Resilience Plan 2021-2026, the National Waste Management Plan (NWMP) of the Republic of Croatia for the 2017-2022 period and the Waste Management Act. According to Environment Agency Austria, "strategies in Croatia are based on closing flows by reusing building materials, designing for disassembly, adaptability and reduced energy consumption, and maximising the use and lifetime of current stocks"⁵. All of them present ambitious objectives in energy efficiency, GHG emissions, waste management, and efficient use of materials in the CDW sector.

5. Construction sector is the major contributor to material footprint and waste generation in Croatia, generating around 1,400 Mt/y (official estimation in 2020)⁶, or 24 % of total waste generated in Croatia (6,003 Mt/y)⁷. *The Material Flow Analysis for Circular Economy in Croatia*⁸ highlights that

² The Circular Economy Package is a pool of four Directives: Directive (EU) n.02018/849, Directive (EU) n.2018/850, Directive (EU) n.2018/851, Directive (EU) n.2018/852, that amended a the following directives Directive n.2008/98/EC WFD and the Directive 1999/31/EC on landfills, Directive 94/62/EC on packaging waste, Directives on end-of-life vehicles (2000/53/EC), on batteries and accumulators and waste batteries and accumulators (2006/66/EC), and on waste electrical and electronic equipment (2012/19/EU) that strengthen the CE approach to waste management.

³ EEA greenhouse gases - data viewer — European Environment Agency. (n.d.). Retrieved August 1, 2022, from <https://www.eea.europa.eu/data-and-maps/data/data-viewers/greenhouse-gases-viewer>.

⁴ Council of the European Union. (2008). Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste. <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32008L0098&from=EN>.

⁵ Environment Agency Austria [UBA], (2022). Circular Economy Approaches in Solid Waste Management Material Flow Analysis for Circular Economy in Croatia.

⁶ https://www.hoop.hr/sites/default/files/uploads/dokumenti/021_otpad/Izvjesca/OTP_2021_Gradjevni_izvjesce_2020.pdf

⁷ <https://ec.europa.eu/eurostat/databrowser/view/ten00106/default/table?lang=en>.

⁸ Environment Agency Austria [UBA], (2022). Circular Economy Approaches in Solid Waste Management Material Flow Analysis for Circular Economy in Croatia.

construction consumes up to 11.5 million tonnes of materials. It accounts for one-third of Croatia's waste stream, and about 13% of GHG emissions, producing 3.64 million tonnes of CO_{2e}. The sector is also characterized by high energy and water use, making it an especially potent hotspot. The current linear model in this sector involves intensive use of natural resources and puts a high level of pressure on the environment, which is one of the causes behind the global ecological crisis the world is immersed in, including climate change or biodiversity loss.

6. According to the Ministry of Economy and Sustainable Development (MoESD), a total of 1.144.214,2 t of CDW was treated (R⁹ and D¹⁰ operations) in the territory of the Republic of Croatia in 2020. Out of the total amount of treated waste, the stated official recovery rate (R operation excluding backfilling) of CDW was 60% (688,485.50 Mt) – despite growth in CDW management since 2016 – it has not achieved the EU's target set by the WFD at 70% recovery rate.¹¹ It is also necessary to consider that part of CDW, especially in rural areas, is used as filler material in informal recovery (e.g., for rural road maintenance). The expected development of construction projects in Croatia indicates an increase in CDW generation until 2050. The expected increase in the residential and non-residential buildings by 2050 is about 52 million m², and the Government of Croatia (GoC) is planning various initiatives related to the creation of new communication infrastructure and services by 2030¹². In addition, it is necessary to consider the CDW generation of reconstruction activities to fix damages caused by the earthquakes in 2020.

7. The diagnostic study of CE in Croatia highlighted specific gaps and challenges related to information on CDW, illegal streams, recycling, recovery and management capacity, secondary raw materials market and CDW generation and GHG emissions of CDW sector, that hinder it from circularity. Unofficial and illegal CDW streams, one of the main problems in the country, hasn't been considered by official statistics (260 kt according to the analysis conducted of this activity); they are composed mainly of unsorted CDW materials and excavated soils. A large part of CDW is still illegally dumped, according to the stakeholders consulted as part of this study. The illegal management of CDW reduces costs compared to the official CDW management system, and the phenomenon is not effectively prosecuted due to its low-value, limited awareness about the environmental impact of CDW, and the absence of a reliable and affordable legal solution close to the production sites. CDW generation increases yearly and is directly related to the strong demand for housing over the past few years. The CDW generated could be effectively recycled, reducing the demand on natural resources, however they are for the most part downcycled, with significant amounts still ending up in landfills. In addition, currently the quality of CDW recovered materials often does not meet the requirements of the markets due to the lack of selective demolition capable of removing at source the undesired and hazardous components and the need for improved recovery/recycling¹³ process.

8. The main purpose of this Report is to propose the initial CEAP approach for the CDW sector to MoESD and related actors, integrating CE aspects in CDW management, in line with present and future National Waste Management Plan (NWMP) and EU's WFD, Green Deal and CEAP. The process of developing the CEAP has started with a comprehensive analysis of the country's situation in terms of CE in the sector to be addressed, followed by a study of the situation in the EU and its MS. Both analyses provided the framework for identifying the main gaps and challenges the country needs to address to eliminate the identified difficulties. On the basis of this diagnosis, the general objectives to be achieved in

⁹ Recovery operation as defined by at the Annex II of Directive 2008/9E/EC

¹⁰ Discharge operation as defined by at the Annex II of Directive 2008/9E/EC

¹¹ Croatian Government, (2016). *The Decision on the Adoption of the Waste Management Plan of the Republic of Croatia for the period 2017-2022.*

<https://vlada.gov.hr/UserDocsImages//2016/Sjednice/2017/01%20sije%C4%8Danj/15%20sjednica%2014%20VRH//15%20-%202.pdf>.

¹² https://mmpi.gov.hr/UserDocsImages/arhiva/MMPI/Strategija_prometnog_razvoja_RH_2017.-2030.-final.pdf.

¹³ Recycling means any recovery operation by which waste materials are reprocessed into products, materials or substances whether for the original or other purposes. Backfilling operation, based on Directive 2008/98/CE cannot be considered as recycling.

Croatia were set. Aligned with these objectives, the first draft of the measures and corresponding actions were prepared. The draft of the action plan was presented to the local stakeholders, with whom it was adapted to the local needs and consolidated. Once the measures and actions were defined and concretized, they were prioritized following a multi-criteria analysis (MCA), which assessed the environmental impact, technical and economic feasibility, alignment with existing regulations and policies, scalability, and stakeholder interest in each of the measures. Finally, with this prioritization, the CDW CE roadmap for 2023-2027 was defined – the CDW CEAP. Throughout the process, a series of consultation and discussion meetings was held with local stakeholders from ministries, local engineering, construction and waste management companies, businesses, and other public and private entities such as universities and research centers, to test and validate the design of the CEAP.

9. The structure of the Report outlines the key tasks of the CEAP development process, which includes a review of the current international policy landscape and good practises of the existing CE in the CDW sector, introducing the rationale for the CEAP in the CDW in Croatia (Chapter 2), challenges and objectives definition for Croatia (Chapter 3), the identification of measures and actions needed to achieve the previous (Chapter 4), the prioritisation of measures to implement in Croatia following an MCA (Chapter 5), roadmap of the CEAP and stakeholder engagement activities undertaken during this activity (Chapter 6), and the conclusions (Chapter 7). Activities also include strengthening of coordination among various stakeholders and promotion of joint ownership of the CEAP. The accompanying Appendix outlines the Report's findings with detailed data, results and recommendations on which each of the key chapters of this Report is based.

10. This CEAP proposed measures that have been defined, starting from the gaps identified through to the diagnostic report, aim to strengthen the activities defined by the Croatian Government and achieve, within five years, the EU targets on CDW management. Specific measures have been proposed in order to create a strong cooperation among the CDW value chain actors, since only through a common vision between the public and private sectors will it be possible to lead the country to a new mentality on CDW management. For the same reason, remediation of illegal CDW dumping sites and reinforcement of a network of collection and recycling facilities are proposed to provide a legal and reliable alternative to CDW producers. Additional aims are to increase awareness about the opportunities related to the CE and fruitful use of CDW. Specific measures are focused on the introduction of innovative criteria for the construction and restoration of buildings based on eco-design, allowing the reduction of demand for building materials in the market. The positive effects related to the enforcement of CEAP will not be limited to the green performances of Croatia through the reduction of the pressure on the environment, but also will be able to boost the growth of new economic opportunities thanks to the development of technical knowledge related to the use of innovative recycled material, the application of new construction paradigms and recycling technologies.

2. CURRENT SITUATION OF CROATIA WITH RESPECT TO EU CIRCULAR ECONOMY TARGETS

2.1 EU policy framework and motivation to develop the Construction and Demolition Waste Circular Economy Action Plan

11. The European Union (EU) has defined a Circular Economy Action Plan (CEAP) to reduce the consumption of resources and materials, and thus provide a solution to the global environmental crisis we are facing. In a business-as-usual scenario, by 2050 material consumption is expected to double and waste generation to increase by 70%.¹⁴ EU's CEAP provides a roadmap for achieving a cleaner and more competitive Europe in collaboration with all the actors in the territory, following three principles: making products sustainable, empowering consumers, and ensuring less waste. The Action Plan also steers the regulatory framework towards a sustainable future. Throughout the Plan, the EU also seeks to achieve the 2030 Sustainable Development Goals (SDGs), to ensure that circular economy's (CE) work for people, regions and cities, fully contributes to climate neutrality and harnesses the potential of research, innovation and digitalization.¹⁵

12. Construction sector consumes the largest part of natural resources in Europe, and construction and demolition waste management (CDW) is its biggest challenge, as the volume of waste is increasing, requiring action to meet future goals¹⁶. Cement, iron, and steel production accounts for 40 percent of greenhouse gas (GHG) emissions, and CDW is the major waste stream, which represents 35.9 percent of the waste generated in 2018 in Europe.¹⁷ There is room for improvement to reduce CO₂ emissions and wasted materials in the construction sector through circularity measures. While recycling rates of construction materials are high across the EU, most of its value is lost after the first cycle as 70% of this recycling can be defined as downcycling.

13. To undertake the cited challenges the CDW sector shows, EU has launched specific measures under the Green Deal, such as the Renovation Wave and the Sustainable Built Environment strategies. The Renovation Wave strategy aims to contribute to 2050 climate neutrality goals and to achieve the targets set by Fit for 55 Package.¹⁸ The Renovation Wave also supports CE since it makes buildings more durable and reduces the consumption of material. The strategy for a Sustainable Built Environment 2021 is aimed at increasing material efficiency and reducing climate impacts of the built environment, particularly promoting circularity principles throughout the life cycle of buildings and the development of digital logbooks for buildings.¹⁹ The Revision of the Construction Product Regulation is another measure included in the EU's CEAP.

¹⁴ European Environmental Agency (2022). *Linking circular economy and climate change mitigation in building renovation*. ISSN: 2467-3196 - doi: 10.2800/416573.

¹⁵ European Commission, Directorate-General for Environment, (2020). *A new Circular Economy Action Plan For a cleaner and more competitive Europe*. <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM:2020:98:FIN>.

¹⁶ Sáez-de-Guinoa, A.; Zambrana-Vasquez, D.; Fernández, V.; Bartolomé, C. Circular Economy in the European Construction Sector: A Review of Strategies for Implementation in Building Renovation. *Energies* **2022**, *15*, 4747.

¹⁷ Sáez-de-Guinoa, A.; Zambrana-Vasquez, D.; Fernández, V.; Bartolomé, C. Circular Economy in the European Construction Sector: A Review of Strategies for Implementation in Building Renovation. *Energies* **2022**, *15*, 4747.

¹⁸ European Environmental Agency (2022). *Linking circular economy and climate change mitigation in building renovation*. ISSN: 2467-3196 - doi: 10.2800/416573.

¹⁹ European Parliament (2022). *Strategy for Sustainable Built Environment*. <https://www.europarl.europa.eu/legislative-train/carriage/strategy-for-a-sustainable-built-environment/report?sid=6001>.

14. CDW represents a focal point of the EU strategy and is considered a priority waste stream that should be recovered. At the EU level, as reported by Eurostat data, the CDW generation is at about 870 million tonnes in 2018²⁰ – which accounts for 30% to 40% of the total waste generation in industrialized countries. Therefore, their valorization can represent a great opportunity to reduce the environmental impact of human activities. For this reason, the Circular Economy Package Directive sets as specific targets: a share of 70% of recycling by 2020²¹ and minimization of downcycling and backfilling. To support the achievement of these goals, the EU Commission developed guidelines and protocols that collected and analyzed the best practices developed by all the MS, in order to provide to the countries like Croatia, that are working to transform their economy from linear to circular, a set of dedicated legislative tools that include the introduction of systems to remove hazardous components and undesired materials through the preliminary audit and selective demolitions.

15. Croatia has made many efforts in the recent past to increase its circularity, in particular by defining a modern legislative framework based on the EU directive, but its enforcement is limited. The evolution of the legislative framework has not yet shown its full effects due to limited implementation and the lack of tools, such as guidelines and training, capable of supporting public bodies and the private sector in the application of the new rules. For example, End of Waste (EoW)²², Positive List of Reusable Materials and Green Public Procurement (GPP)²³, three of the main tools defined by the EU to promote circularity in CDW management, have been introduced in the Croatian legislative framework, but present limited implementation, as reported by stakeholders involved in this Action Plan.

16. CDW represents one of the largest waste streams generated by Croatia, but the lack of solid data and information makes it difficult to define adequate policies for its efficient management. CDW generation is increasing year over year as a consequence of the urbanization process and the construction of new buildings in response to the tourism boom. Data collected by Ministry of Economy and Sustainable Development (MoESD) on CDW generation and reported annually indicate that this trend continues; in 2020, 1,400 kt of CDW were generated (**Figure 1**), that is, 24% of the whole waste generation²⁴. The CDW sector has a high potential in terms of circularity if a better management is implemented. Given that construction is the sector that consumes the most raw materials, the adoption of specific policies to reduce the generation of CDW and the increase of recycling with the production of SRM can have strong positive impacts on the environment. However, the value of CDW generated is an estimate of the actual production due to the lack of actual data provided by CDW producers. This lack of data is related to some specific exclusions defined by the law on the transmission of waste data, but also due to limited enforcement of legislation and the limited number of controls and related sanctions. The data also includes an estimate of the amount of illegally dumped CDW (about 260 kt in 2020 – Source: MoESD). Illegal dumping of CDW represents one of the challenges faced by Croatia. The information collected from local stakeholders, reported in **Annex I**, leads to considering the hypothesis that the reported value underestimates the actual amount of illegal dumping.

²⁰ Source EUROSTAT: https://ec.europa.eu/eurostat/databrowser/view/env_wasgen/default/table?lang=en.

²¹ The targets are currently under review: https://environment.ec.europa.eu/news/waste-framework-directive-revision-2022-02-14_en.

²² End of Waste (EoW): Material obtained from the recycling that ceased the status of waste. The EoW has to meet specific technical and environmental criteria defined at the European level or national level according to Art. 6 of WFD. Croatia has adopted a dedicated ordinance (OG 117/14) on EoW status for CDW recovered materials.

²³ Green Public Procurement (GPP): is defined in the Communication (COM (2008) 400) "Public procurement for a better environment" as "a process whereby public authorities seek to procure goods, services and works with a reduced environmental impact throughout their life cycle when compared to goods, services and works with the same primary function that would otherwise be procured."

²⁴ Source MoESD: Assessment of the state of waste management in the Republic of Croatia - <https://www.hoop.hr/hr/tematska-podrucja/otpad-registri-oneciscavanja-i-ostali-sektorski-pritisci/gospodarenje-otpadom-0>.

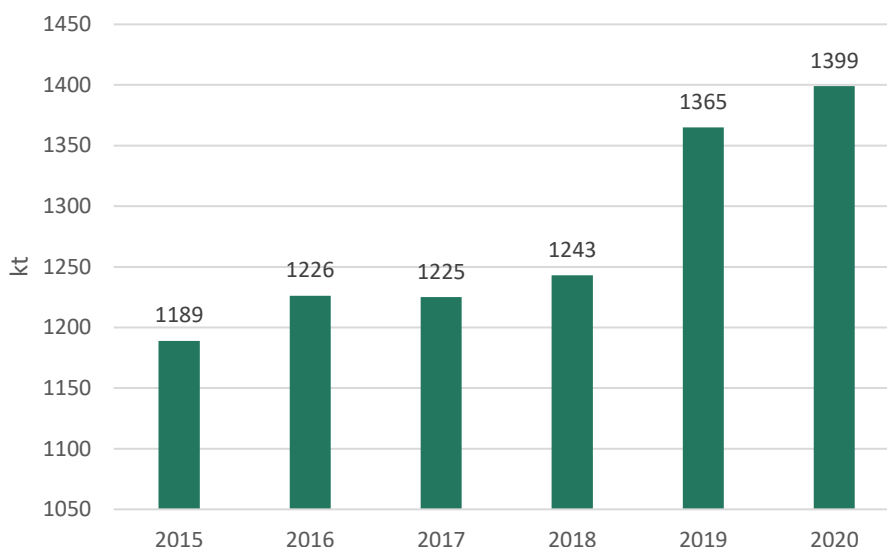


Figure 1: CDW Generation in Tons in Croatia 2015-2020

Source: MoESD

17. The CDW management in Croatia still faces enormous challenges given the growth in the sector. It is mostly based on recovery, and, despite continuous growth, it has not reached the recovery targets defined by the Waste Framework Directive (WFD) of 70%. Based on data reported by MoESD²⁵ the amount of CDW recovered in 2020 was 60%. Landfilling and the use of CDW as backfill material cover 40% of waste management (**Figure 2**). The diagnostic phase conducted for this CEAP (**Annex I**) reveals that the current generation of CDW is greater than the amount collected and treated in authorized facilities. Finally, most Croatian CDW management plants are in the north of the country²⁶, resulting in regional disparities. Collection of CDW is also a critical point. The high weight of these materials and their low value have an impact on transport costs. The European guideline states that the distance between two collection centers should be less than 35 km. The analysis conducted, detailed in **Annex I**²⁷, shows that Croatia has not developed this capacity especially in the rural areas of the country. The effect of this deficiency leads some CDW producers to an informal use of CDW in road maintenance or, in the worst case, to illegal dumping.

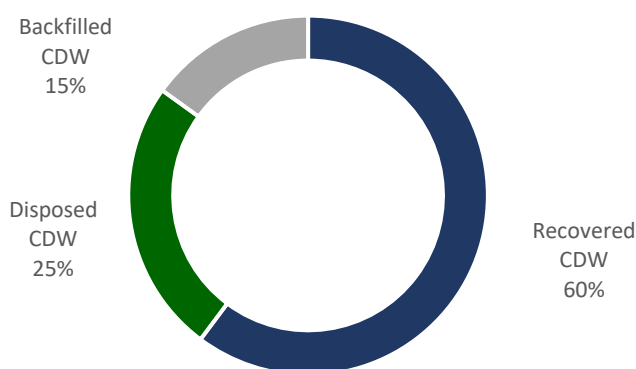


Figure 2: CDW Management Operation in Croatia

Source: MoESD

²⁵

https://www.haop.hr/sites/default/files/uploads/dokumenti/021_otpad/lzviezca/ostalo/OTP_lzvie%C5%A1%C4%87e_ambala%C5%BEni%20otpad_2019_WEB.PDF

²⁶ A map is available in Annex I Chapter 3.5 “Treatment Capacity and Type of Waste Treated”

²⁷ See Annex I Chapter 7.8 “National Capacity of Recycling”

18. Croatia has described in its national strategies and plans the willingness to advance CE approaches in Croatia. The management of CDW plays an important role in this development and, as reported in **Annex I** Chapter 2 “*CDW and CE policies in Croatia*”, several policy documents drafted by GoC point their attention on this topic. In particular, CDW management is included in the following documents:

- The Low Carbon Development Strategy of the Republic of Croatia until 2030, looking at 2050 (OG 63/21)
- National Development Strategy 2030 (OG 13/2021)
- Croatian Recovery and Resilience Plan 2021-2026
- Waste Management Plan (WMP) of the Republic of Croatia for the period 2017-2022 (OG 3/17, 1/2022) and Decision on the Implementation of WMP of the Republic of Croatia (2017-2022)
- Integrated National Energy and Climate Plan 2021-2030 (OG 123/17)
- Waste Management Strategy of the Republic of Croatia (OG 130/05)
- Strategy for Sustainable Development of the Republic of Croatia (OG 30/09)

19. Research conducted through data analysis and stakeholders’ consultations led the team to identify six challenges that hinder the full development of CE in Croatia. Considering the challenges, the main objective of this CEAP is to provide operational instruments capable of transposing the principles included in the current legislation into concrete actions that can change the view of CDW, from a problem to a resource. The challenges identified are:

- Absence of a shared vision among stakeholders
- Limited information about CDW generation and management
- Uncontrolled streams of CDW
- Limited capacity for CDW recovery and recycling –
- Low market share on CDW secondary raw materials (SRM)
- Increasing generation of CDW

NOTE: A deeper description of the challenges is reported in Chapter 3.

3. FORMULATION OF THE CIRCULAR ECONOMY ACTION PLAN FOR THE CONSTRUCTION AND DEMOLITION WASTE SECTOR

20. The CEAP on CDW in Croatia is a key operational tool operating along the entire CDW value chain and involved stakeholders in order to concretize the CDW management vision outlined in national strategies on sustainable development. A complete transformation of the CDW value chain implies reducing pressure on the environment caused by the inefficient use of natural resources and, at the same time, creating new opportunities such as the formation of green markets based on sustainable materials derived from the recycling of CDW – or the promotion of new approaches that extend the lifespan of buildings and reduce the demand for new construction, for example.

21. The objective of a CEAP on CDW is to provide a set of measures accompanied by concrete and measurable actions, that are able to fill the existing gaps in the current CDW system in Croatia in the short term, and prepare, in the long term, a favorable environment for the adoption of construction techniques that reduce the production of CDW throughout the entire life of the building. The CEAP on CDW also aims to minimize the use of natural resources and reduce the pressure on the environment caused by landfilling. Achieving these results requires the commitment of all operators involved in the CDW value chain, and the measures defined in CEAP must be fully shared by both public and private operators.

3.1 Methodology

22. Based on the diagnosis done in Croatia (see Annex I), and after a validation process with the stakeholders, five steps were defined for the design of the CEAP, which are detailed below:

- **Stakeholders' contribution in the formulation of the CEAP**

Stakeholders were involved throughout the entire process in a series of consultation meetings and peer-to-peer interviews; they participated at an early stage for the identification of gaps and definition of challenges. All the above-mentioned elements (gaps, challenges) as well as measures and actions were consulted on with key stakeholders, and comments and request for amendments were submitted through collaborative platforms (Padlet, Google Forms) and email. The consulting team evaluated all the information collected and used it to define a consolidated list of measures.

- **Identification of challenges**

The gaps, barriers and drivers identified in the CEAP diagnostic report (**Annex I**) were analyzed by applying a Root Cause Analysis (RCA) procedure in order to identify the true cause of the problem. The technique adopted for the RCA on the Croatian CDW CEAP gap analysis is known as the “five whys”²⁸. The use of RCA led the Team to the definition of six challenges that Croatia will need to address to transform the CDW management chain from linear to circular. These challenges were presented and discussed during consultation meetings. The baseline data used for the diagnostic report used to identify the challenges are from 2020 and were taken from official sources (MoESD) in its most recent published version of 2021²⁹.

- **Definition of objectives**

²⁸ <https://www.adb.org/sites/default/files/publication/27641/five-whys-technique.pdf>.

²⁹ https://www.haop.hr/sites/default/files/uploads/dokumenti/021_otpad/izvjesca/OTP_2021_Gradjevni_izvjesce_2020.pdf

The information collected by the team supported the analysis of the literature on the management of CDW in Europe and allowed the definition of six objectives that are aligned with the challenges and are complementary to the targets defined in the NWMP. The definition of objectives contains a precise reference to the targets that have to be achieved allowing the identification of dedicated measures. The objectives were developed based on the analysis of CEAP adopted by other EU countries³⁰, considered as benchmarks, which allowed identifying the objectives defined by each country to overcome its challenges. Based on their best knowledge, the team defined an initial list of objectives that could be adopted for the Croatian scenario. This list represented the first proposal that was presented to the stakeholders to initiate the discussion. Consultations resulted in the definition of a set of objectives that take into account the specific needs of Croatia and are harmonized with the NWMP.

- **Identification of measures and actions**

Starting from the definition of objectives, an analysis based on gap assessment, stakeholder's consultations and collection of the best practices adopted by other EU countries were carried out in order to identify the most suitable measures to achieve the objective and overcome the challenge. Each measure includes specific detailed actions that have to be implemented and monitored. Actions were developed or adapted based on those of other EU countries, recognized as the most effective for improving CDW management. The adaptation process, based on continuous discussion and active participation of stakeholders, was considered crucial to define a proposal adapted to local needs. Specific meetings and digital platforms were used to facilitate the process of sharing opinions and proposals. Thus, each action is associated with a specific key performance indicator (KPI) and a responsible authority in charge of its enforcement. The technical team proposed the responsible authority based on technical capabilities and administrative competencies required for the proper implementation of the action. The measures and actions were developed based on official data on CDW generation and management, dated 2020, and prepared by MoESD and published in the latest available report from 2021.³¹

- **Prioritization of measures**

Adopting a multi criteria analysis (see also Chapter 6), a prioritization of measures was carried out. The result of this process made it possible to identify the measures of high environmental benefit for the CDW value chain, those of greatest applicability and those considered most valuable by stakeholders.

The following flow chart (**Figure 3**) shows how the different steps of the adopted methodology are related.

³⁰The CEAP analyzed are listed in Chapter 8 „References“. The countries used as benchmarks, are the UK, France, Denmark, Slovenia, Ireland, Germany, Netherlands and Finland.

³¹https://www.haop.hr/sites/default/files/uploads/dokumenti/021_otpad/lzvjesca/OTP_2021_Gradjevni_izvjesce_2020.pdf

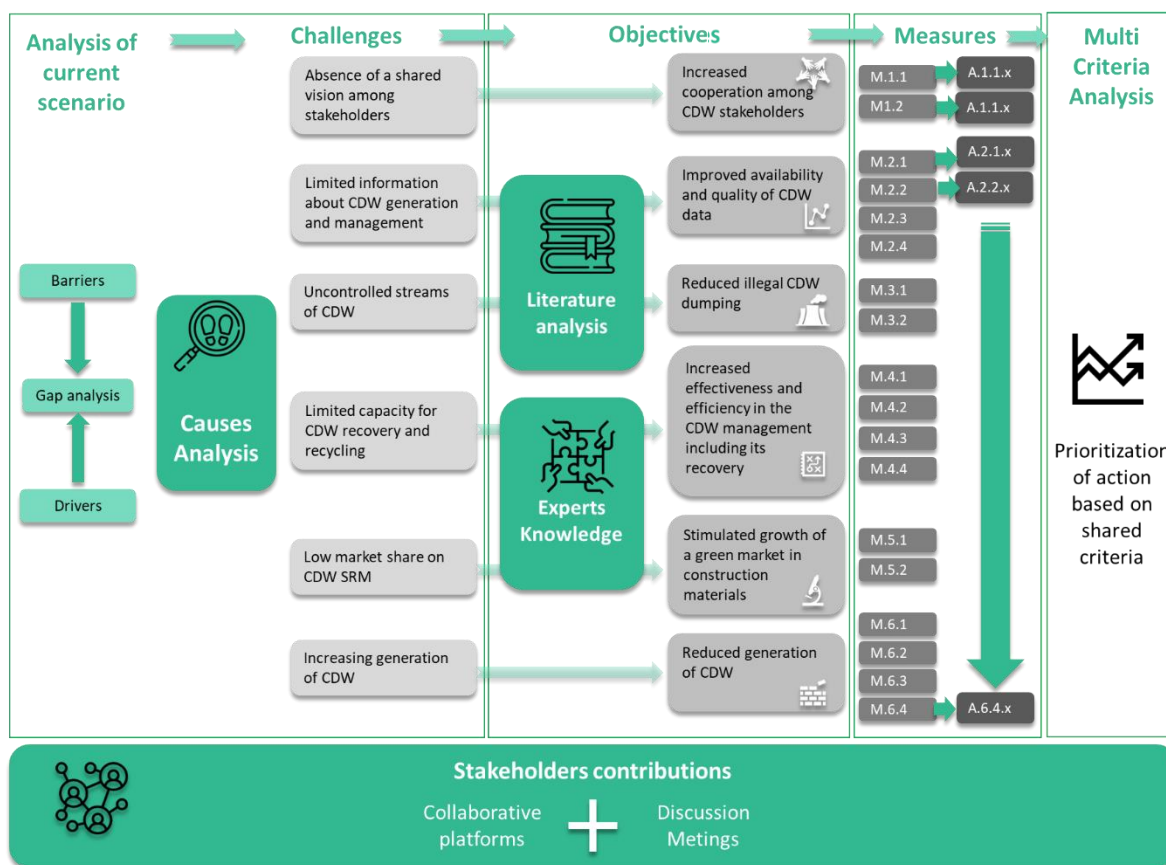


Figure 3: Flowchart of the CEAP Development Methodology

3.2 Stakeholders consultation process for the formulation of the CEAP

23. An important component of the CEAP drafting activity was the dialogue with the value chain’s stakeholders regarding the analysis of the current situation, addressing obstacles and opportunities and obtaining proposals for improving circularity in the CDW sector. To gather stakeholders’ inputs and feedback, during the period between March and July 2022, a series of meetings with key stakeholders in the CDW sector in Croatia were organized and conducted. **Box 1** describes and summarizes the different activities adopted to engage the stakeholders.

Box 1: Description of Activities for Stakeholder Consultation

Consultation meetings with stakeholders

- In March 2022, the first online consultation meeting was conducted. Seventy-four external participants attended the meeting. The aim of the consultation was to gather stakeholders’ input and feedback on current CDW management practices in Croatia such as CDW production, recovery process, and (re)use, with the aim to better understand the current situation in the CDW sector in Croatia.
- In May 2022, four focus groups participated in consultation meetings: public administration (local and central), construction companies and building material producers, waste management companies, universities and non-government organizations (NGOs). The aim of the consultation meetings was to present the results of the CDW diagnostic in order to define objectives and actions

among stakeholders.

- In July 2022, the last consultation meeting was held to present the first draft version of the CEAP. The objective of the meeting was to collect specific information about the proposed actions, their enforcement and prioritization with specific reference to the targets set by the EU on CDW management.

Individual interviews

From April to June 2022, individual interviews were conducted with key stakeholders from government, industry and economy, interest groups and experts from individual fields.

Collaborative platforms

Continuous feedback from stakeholders was collected through online platforms:

- Google Forms survey – to answer a questionnaire and collect specific information
- Padlet application – to answer open-ended questions
- Email comments and proposals – to collect feedback from the defined actions in the CEAP



Figure 4: Stakeholder Consultation Process in Numbers

24. **Croatian CDW stakeholders, aware of the positive impact the CE would have, committed to participate in its development, underlined the need for cross-sectoral cooperation and for a functional, useful and simple legislation for all stakeholders, and reported limited SRM market.** The analysis of contributions from stakeholders during the consultation phase highlighted the following:

- For the successful implementation of CE in the CDW sector, intersectoral cooperation is essential³².
- Interviewed stakeholders shared the concerns that citizens' input in public consultation processes is often not valued or is rejected without sufficient explanation, leading to a perception of poor public-private cooperation. Some stakeholders also highlighted, that comments can be provided only at the end of the legislative process and so it is not possible to discuss in advance the adoption or amendment of legislative acts, as pointed out for EoW legislation.

³² Studies conducted over the countries where the waste management shows some failures confirm that this point is often the bottleneck in the implementation of planned activities, see as example the report of EEA - <https://www.eea.europa.eu/publications/municipal-waste-management-in-western>.

- There is a lack of cooperation among private sector operators and limited capability to connect the demand of SRM and the supply, as confirmed by the limited operation of the web marketplace for EoW materials developed by Chamber of Commerce (HGK). On the other hand, there is scattered lack of trust in the technological performances of CDW SRM among the designer and project manager communities, despite the adoption of the same product standards. Often the construction materials derived from waste are considered as low-quality materials due to their origin.
- The current legislative framework needs some amendments, detailed in Chapter 4, in order to better meet the needs of industry and obtain a stronger response and cooperation related to the enforcement of CE principles in the CDW supply chain.
- CDW stakeholders are fully aware of the potential opportunities related to CE and consider the evolution into a greener economy as mandatory. For these reasons, they confirmed their readiness to participate in the decision-making process for CE transition, supporting the MoESD and MCSPPA with reliable information and sharing their knowledge in order to strengthen and improve the instruments already in place, and to collaboratively develop the measures proposed by CEAP.

The list of all the comments collected is reported in **Annex III**.

3.3 Challenges

25. As shown in **Figure 3**, Croatia faces six challenges to achieve the CE targets set by EU. The six challenges identified during the preliminary analysis and stakeholder consultation meetings encompass the gaps of Croatia towards circularity in the CDW sector (see **Annex I** and **Box 2**).

Box 2: Croatia CDW Sector Key Insights from Available Information and Key Stakeholders' Inputs

The preliminary analysis of Croatia's territorial, economic and regulatory background and stakeholders' information highlighted key insights regarding the situation in the sector:

- **Croatia is experiencing a demographic decline**, however, a growth in real estate is expected due to (i) tourism and (ii) the displacement of populations from rural to metropolitan areas.
- **The geographic structure of the territory**, as well as the presence of islands, **makes CDW management uneconomical due to high logistical costs**.
- **The cost of natural excavated material is**, in many cases, **lower** than the price of **materials produced from the recycling of CDW**.
- **Croatia has a set of regulations aligned with EU provisions** regarding CDW management. However, **implementing decrees need to be developed**.
- **Construction sector is highly regulated**, and **enforcement needs a specific technical background**. Local authorities and small companies are often not able to apply the regulations due to a low degree of technical preparation.
- **Croatia developed specific legislation on the collection of data on waste** including CDW. **However, the quality of data on CDW** collected by Ministry of Economy and Sustainable Development (MoESD) **is low due to limited enforcement** of the legislation.
- **Comparisons with other European countries'** specific production indicators **highlighted** how the **generation of CDW in Croatia is probably underestimated**.
- There is a **gap between the ability to collect and manage CDW** and its actual generation, which often **leads to illegal landfilling**.
- There is **limited knowledge** on the **obligations** under **environmental legislation from small companies** that deal with construction work. However, bigger, typically multi-national companies have developed adequate management systems.

- **Green public procurement (GPP) implementation is usually voluntary and limited to a few cases due to the little knowledge on the matter** and on its adoption from the local authorities. These further limits the development of a market for recovered materials.

26. Overcoming these challenges will lead Croatia to achieve the targets set by the EU and close the gaps:

- 1. Absence of a shared vision among stakeholders** – the lack of cooperation among stakeholders, in particular, between industry and government, and the limited share of information, hinders the definition of common vision about the management of CDW. Consequently, the legislative framework doesn't include the needs of the CDW value chain stakeholders and limits its enforcement.
- 2. Limited information about CDW generation and management** – the data on CDW generation and management is not fully reliable due to the limited enforcement of the legislation and the absence of controls. Reliable and detailed data represent the pillar for future planning, and proper monitoring of the measures proposed by CEAP depends on them.
- 3. Uncontrolled streams of CDW** – the report on CDW management in 2020 prepared by MoESD underlines that about 256 kt of CDW are not properly addressed and are probably illegally dumped. CDW illegal dumping represents a critical aspect in CDW management and specific measures should be adopted to prevent this phenomenon.
- 4. Limited capacity for CDW recovery and recycling** – to bridge the gap between recovery rate of Croatia and other MS countries by increasing the capacity to process and recycle CDW by increasing the number of recycling yards for CDW, increasing their capacity and renewing existing technology to generate valuable materials for the market. The absence of a reliable alternatives is considered the moral justification for illegal dumping.
- 5. Low market share on CDW secondary raw materials (SRM)** – to address the barriers related to the quality of products from recycled materials and increase waste separation and hazardous waste removal (decontamination) of CDW.
- 6. Increasing generation of CDW** – despite the reduction in the number of inhabitants in Croatia the amount of CDW is increasing year over year.

27. The achievement of a fully circular economy starts with availability of quality data. “You Can't Manage What You Don't Measure”, and therefore the strengthening of existing data collection system represents a priority. In the absence of reliable data, the planning of future actions will be affected by evaluation mistakes, and the estimation of the effects related to an implemented measure will not be possible. The current data collection system was adopted in 2015, however the controls of its enforcement are very limited and, as reported by the stakeholders, CDW producers are in many cases not aware of the reporting duty or don't report the data properly. This deficiency represents the first obstacle for CEAP enforcement.

28. The National Waste Management Plan (WMP) 2017-2022 proofs the continuous increase in the amount of collected CDW since 2015 compared to previous analyzed periods, as a result of the growth in the number of construction projects across the country. Accordingly, the processing of construction waste records a continuous increase and in 2020, 26% more waste was collected and treated than in 2015 (1,114 kt³³ in 2020, compared to 881 kt processed in 2015). On the other hand, the data analysis reveals that recovery rate is stable and floats around 60% as reported by MoESD³⁴. Therefore, despite the continuous progress in CDW collection, the set goal by the EU³⁵ has not been achieved yet.

3.4 Objectives

29. The objectives set for the development of the CEAP in the CDW sector in Croatia, aligned and complementary to the NWMP, aim to address the identified challenges. Figure 5 shows the challenges

³³ https://www.haop.hr/sites/default/files/uploads/dokumenti/021_otpad/Izvjescja/OTP_2021_Gradjevni_izvjescje_2020.pdf.

³⁴ <https://www.haop.hr/hr/tematska-podrucja/otpad-registri-oneciscavanja-i-ostali-sektorski-pritisci/gospodarenje-otpadom-0>.

³⁵ Council of the European Union. (2008). Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste. <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32008L0098&from=EN>.

identified as a result of the CDW analysis of Croatia and the correlation between the challenges and the proposed objectives. The proposed objectives are the following:

1. Increased cooperation among CDW stakeholders

The CE requires a change of culture in businesses and among people. The purpose of increasing cooperation and collaboration between CDW stakeholders is to enable new networks, business models and initiatives in Croatia in order to implement CE. To that end, public and private actors have to cooperate and define common targets and policy. In addition, strengthening cooperation means an active contribution of CDW value-chain stakeholders to the improvement of the existing legislative framework, and therefore to its enforcement and compliance.

2. Improved availability and quality of CDW data

Data on CDW generation represents one of the main issues; a part of CDW operators is not aware of their obligations in term of data reporting and quality. These lacks cause a reduced capability to define local management plans for CDW and to identify management needs.

3. Reduced illegal CDW dumping

The gap analysis also showed that there is a divide between the regulation and the unofficial CDW flow in Croatia. This objective focuses on defining clear measures and actions to reduce and mitigate the illegal dumping of CDW through the creation of a reliable and affordable legal and economic alternative and at the same time a more effective system of controls at local level. The introduction of a specific tax on CDW landfills can be considered as a fiscal tool to provide financial support for actions against illegal landfills, the construction of recycling yards or to support information campaigns on the proper management of CDW.

4. Increased effectiveness and efficiency in the CDW management including its recovery

The current CDW management system shows inefficiencies in terms of waste collection and treatment, with differences between regions. For example, the southern part of the country has a lack of CDW management installations. This objective is aimed to improve the collection and recycling points for CDW, by:

- **Improved collection of CDW**

Illegal dumping of CDW represents a scattered environmental offence as confirmed during the interviews and consultations with stakeholder. The main cause is the lack of an accessible CDW collection network, due to the large distances between collection points and citizens and small businesses. The lack of awareness about CDW and the tendency towards reducing management costs create the conditions for a diffuse acceptance of illegal behaviors related to CDW.

- **Improved recycling of CDW**

The current recycling capacity is not enough to cover the future needs, especially if the CDW production will increase due to creation of new infrastructures. The creation of recycling plants is also necessary to provide enough CDW-recovered materials for the building sector and to create a SRM market.

5. Stimulated growth of a green market in construction materials

The role of procurement as a system to sustain the CE is recognized and the booster effect related to its enforcement represents one of the most effective measures to promote the SRM market. Tools such as GPP can boost the CE in the construction sector. This tool should not be limited to a fixed percentage of recovered material, but rather should embrace a wider approach that includes mandatory eco-design in any form, from application of used components to the forecast of dismantling procedures.

6. Reduced generation of CDW

The aim of this objective is to decouple the direct relation between CDW generation and GDP. The reduction of CDW generation can be achieved through measures that can have an impact in a mid-term scenario, such as the creation of a market for reusable components, and in a long-term scenario, such as the mandatory adoption of eco-design criteria that facilitate the dismantling of buildings.

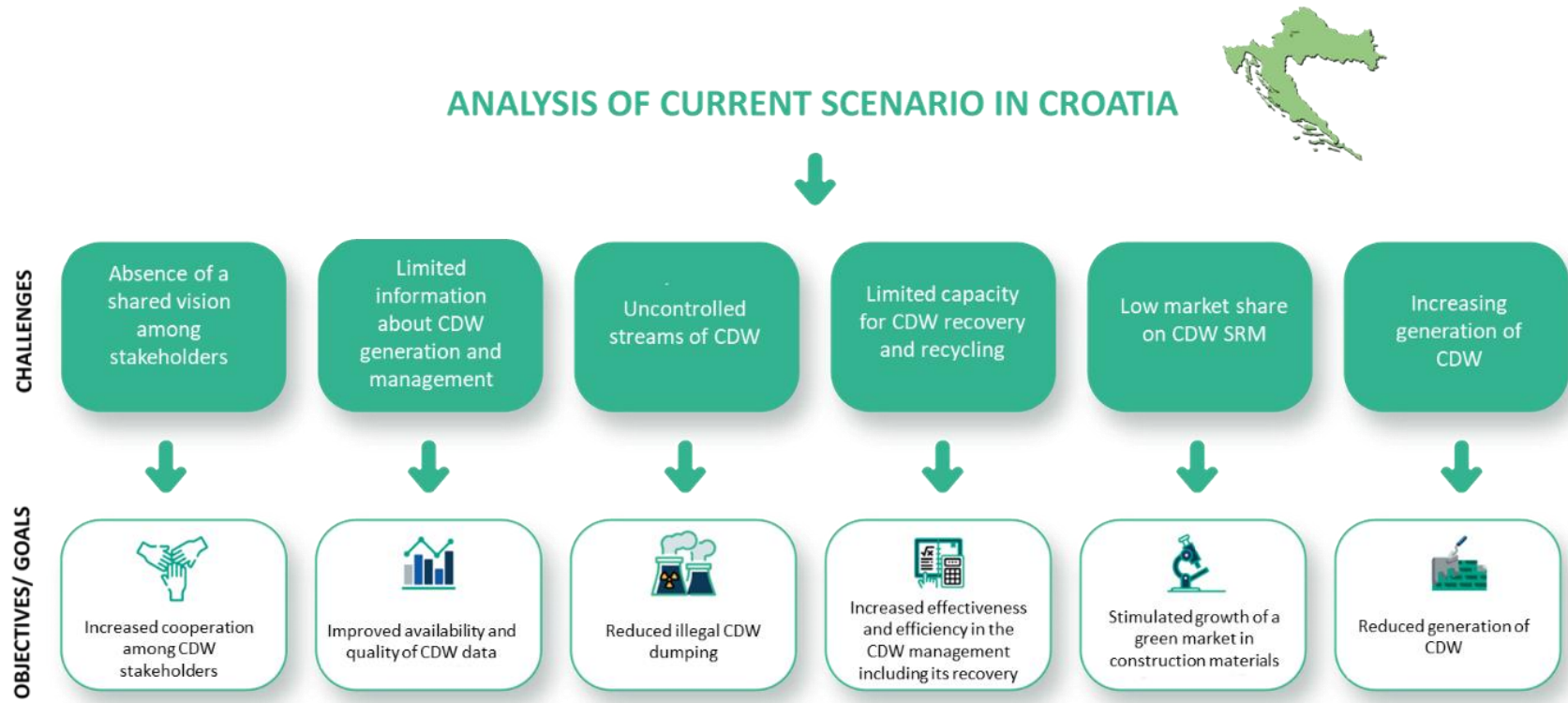


Figure 5: Identified Challenges and Objectives for the CDW sector CEAP for Croatia

4. IDENTIFICATION OF THE CIRCULAR ECONOMY ACTION PLAN MEASURES

30. The measures that should be developed to achieve the objectives defined in **Chapter 3** are summarized in **Table 1** below. Also, the actions to achieve each measure are described on the following pages, as well as the details for the implementation.

Table 1: List of Identified Objectives and Related Measures

Objective	Measure
OBJECTIVE 1: Increased cooperation among CDW stakeholders	M.1.1. Enhance dialogue and cooperation among CDW stakeholders
	M.1.2. Enhance education and support for research, innovation, and development
OBJECTIVE 2: Improved availability and quality of CDW data	M.2.1. Implement educational and informative activities related to CDW reporting
	M.2.2. Improve CDW management information system applications
	M.2.3. Improve availability and quality of CDW management data before and during operating sites
	M.2.4. Implement pre-demolition audit for construction sites
OBJECTIVE 3: Reduced illegal CDW dumping	M.3.1. Increase education of relevant bodies involved in CDW management inspection processes
	M.3.2. Strengthen regulation and controls to reduce illegal dumping of CDW
	M.3.3. Remove CDW from illegal dumpsites
OBJECTIVE 4: Increased effectiveness and efficiency in the CDW management including its recovery	M.4.1. Improve EoW status legislation for CDW
	M.4.2. Improve hazardous waste removal and asbestos disposal system
	M.4.3. Construct and equip recycling yards for construction and demolition waste "Type A"
	M.4.4. Construct and equip recycling yards for construction and demolition waste "Type B" for processing CDW
	M.4.5. Build and equip facilities for CDW analysis and quality control
OBJECTIVE 5: Stimulated growth of a green market in construction materials	M.5.1. Improve the existing application to develop a CDW Exchange
	M.5.2. Create guidelines on Green Public Procurement (GPP)
OBJECTIVE 6: Reduced generation of CDW	M.6.1. Develop guidelines for the reuse of building components, conversion, and renovation of buildings
	M.6.2. Enhance take-back systems in CDW to increase reused and recycled content
	M.6.3. Implement educational and informative activities on eco-design in public and private buildings
	M.6.4. Develop guidelines for sharing, conversion and renovation of buildings

Since some measures have a broad scope to facilitate their implementation, they have been associated with specific actions. Each action defines operational aspects such as the Responsible Authority and associated Major Implementers (**see Section 6.2**).

To monitor the enforcement of a CEAP and adapt the future measures based on the results achieved, each action is associated with a specific key performance indicator (KPI) and target values that should be achieved to ensure effective implementation. The target values have been defined based on the best knowledge of the experts' team.

The flow chart explaining how each action contributes to overcoming the related challenge is shown in **Figure 6**.

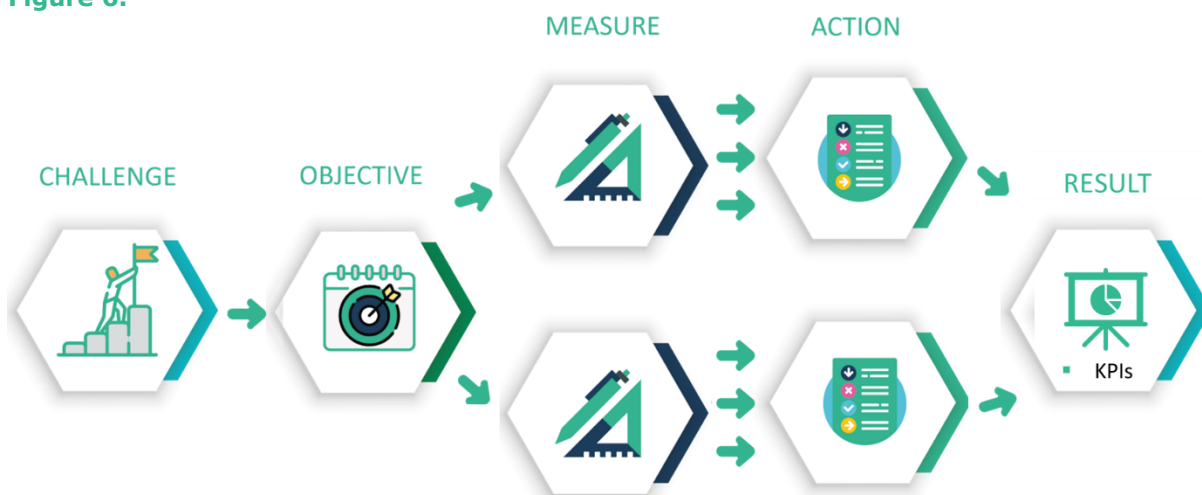


Figure 6: Flowchart Describing the Structure of Action – Measure – Objective – Challenge

31. The enforcement of CEAP's measures requires dedicated economic funds and a financing program. In order to ease the budget planning all along the duration of CEAP, the cost of each action has been estimated by the expert team. These estimations have been done on the basis of the best knowledge of experts and take into account the stakeholders' contributions collected during the consultation meetings and through the collaborative online tools. **Table 2** synthesizes the estimated cost of each measure and the total estimated cost of CEAP. A detailed description of estimated costs and how they were evaluated is reported in **Annex V**.

Table 2: Estimated Costs of Each Action and Timeline for Implementation

Related actions	2023	2024	2025	2026	2027	Estimated costs EUR (without VAT)
OBJECTIVE 1: Increased cooperation among CDW stakeholders						5.250.000
M.1.1. Enhance dialogue and cooperation among CDW stakeholders						250.000
A.1.1.1. Creation of CE platform for CDW management to discuss regulatory provisions, new opportunities and share information.	50.000	50.000	50.000	50.000	50.000	250.000
M.1.2. Enhance education and support for research, innovation, and development						5.000.000
A.1.2.1. Organization of specific annual educational programs including meetings with local administrations and the drafting of a handbook related to innovative recovered materials, reuse, and recycling within the framework of CE and CDW regulatory requirements.	100.000	100.000	100.000	100.000	100.000	500.000
A.1.2.2. Development of R&D program for CE in CDW sector through the creation of nation or EU funds.			1.500.000	1.500.000	1.500.000	4.500.000
OBJECTIVE 2: Improved availability and quality of CDW data						3.890.000
M.2.1. Implement educational and informative activities related to CDW reporting						750.000
A.2.1.1. Educational activities, including training, guidelines, and handbook, on the topic of CDW management reporting data within the framework of the CE.	150.000	150.000	150.000	150.000	150.000	750.000
M.2.2. Improve CDW management information system applications						2.300.000

Related actions	2023	2024	2025	2026	2027	Estimated costs EUR (without VAT)
A.2.2.1. Enhanced interoperability between EONTO and ROO for data collection regarding CDW quantities and treatment.	200.000	300.000				500.000
A.2.2.2 Enhanced the usability of EONTO through the creation of a mobile application.		100.000	100.000			200.000
A.2.2.3. Integration of recovered material data generated on-site in the construction permit database for building sites with an expected CDW generation greater than 200 t.			100.000	150.000	150.000	400.000
A.2.2.4. Integration of digital applications related to CDW on the joint IT platform of waste management in the Republic of Croatia, as part of the national environmental protection and circular economy platform.	100.000	150.000	150.000	150.000	150.000	700.000
A.2.2.5. Creation of a Materials Passport and a related database to register materials used in construction projects in order to ease the recognition of hazardous material, future dismantling phase and recovery of resources.				250.000	250.000	500.000
M.2.3. Improve availability and quality of CDW management data before and during operating sites						450.000
A.2.3.1. Introduction of obligations to prepare CDW Management Report as part of Main Project before issuing Construction Permit for sites with an expected CDW generation greater than 200 t.			50.000	50.000	50.000	150.000
A.2.3.2. Drafting of standard forms and an on-line tool for compiling and submitting the CDW Management report.			50.000	50.000	50.000	150.000
A.2.3.3. Approval of a bylaw for the enforcement of a mandatory financial bond or bank surety for construction projects to cover the cost in case of mismanagement of CDW on the building site.			50.000	50.000	50.000	150.000
M.2.4. Implement pre-demolition audit for construction sites						390.000
A.2.4.1. Amendment to Law on Construction to include pre-demolition audit based on EC guidelines for construction sites with an expected CDW generation greater than 200 t.		75.000	75.000			150.000
A.2.4.2. Definition of guidelines on Selective and Removal of Hazardous Components based on the European Guideline.		50.000	50.000			100.000
A.2.4.3. Training for the enforcement of guidelines on Selective and Removal of Hazardous Components (the guidelines developed in A.2.4.2.).			70.000	70.000	70.000	140.000
OBJECTIVE 3: Reduced illegal CDW dumping						14.450.000
M.3.1. Increase education of relevant bodies involved in CDW management inspection processes						450.000
A.3.1.1. Training programs for CDW management supervision and inspection bodies and parties.	150.000		150.000		150.000	450.000
M.3.2. Strengthen regulation and controls to reduce illegal dumping of CDW						1.500.000
A.3.2.1. Enforcement of waste management regulation to strengthen the control powers of local authorities and state inspectorate on environmental crimes related to illegal waste management.		50.000	50.000			100.000
A.3.2.2. Enforcement of construction law and introduction of mandatory cost breakdown for CDW management in technical project proposals to support companies that propose proper CDW management.		50.000	50.000			100.000
A.3.2.3. Investment in technological equipment such as capturing cameras and remote cameras to increase and automatize controls against illegal dumping.	200.000	200.000	200.000	200.000	200.000	1.000.000
A.3.2.4. Improvement of ELOO mobile application for citizens to ease the anonymous reporting of CDW illegal dumping.	100.000	100.000				200.000
A.3.2.5. Strengthen of sanctions and fines against illegal dumping.			100.000	100.000		100.000
M.3.3. Remove CDW from illegal dumpsites						12.500.000
A.3.3.1. Removal of CDW (or mixed waste) from locations contaminated by waste dumped into the environment.	2.500.000	2.500.000	2.500.000	2.500.000	2.500.000	12.500.000
OBJECTIVE 4: Increased effectiveness and efficiency in the CDW management including its recovery						86.750.000
M.4.1. Improve EoW status legislation for CDW						450.000

Related actions	2023	2024	2025	2026	2027	Estimated costs EUR (without VAT)
A.4.1.1. Feasibility study for the identification of potential "by-product for non-contaminated excavated soil" and "EoW status for specific CDW streams."		60.000	70.000	70.000		200.000
A.4.1.2. Definition of a guideline on the enforcement of EoW and relevant Ordinance No. 117/14.			50.000	50.000		100.000
A.4.1.3. Training sessions on the guideline on the enforcement of EoW (A.4.1.2.).				50.000	100.000	150.000
M.4.2. Improve hazardous waste removal and asbestos disposal system						16.300.000
A.4.2.1. Analysis and assessment (report) of the existing and required number and capacity of areas for the disposal of CDW containing asbestos and treatment of hazardous CDW.		150.000	150.000			300.000
A.4.2.2. Grants for the development of installation for the recycling of contaminated soils (EWC 170503*) based on BAT.		2.000.000	2.000.000	2.000.000	2.000.000	8.000.000
A.4.2.3. Financial support for the collection and disposal of asbestos-containing material from existing buildings.	1.500.000	1.500.000	2.000.000	1.500.000	1.500.000	8.000.000
M.4.3. Construct and equip recycling yards for construction and demolition waste "Type A"						23.000.000
A.4.3.1. Construction and equipping of municipal or regional "Type A" recycling yards for CDW on the mainland.	1.500.000	3.000.000	3.000.000	3.000.000	4.500.000	15.000.000
A.4.3.2. Construction and equipping of municipal or regional "Type A" recycling yards for CDW on the most populated island.	1.200.000	1.600.000	1.600.000	1.600.000	2.000.000	8.000.000
M.4.4. Construct and equip recycling yards for construction and demolition waste "Type B" for processing CDW						46.000.000
A.4.4.1. Construction and equipping of "Type B" recycling yards for processing CDW, equipped with mobile equipment to service municipal and regional requirements.	2.000.000	4.000.000	6.000.000	4.000.000	4.000.000	20.000.000
A.4.4.2. Construction and equipping of "Type B" recycling yards for processing CDW, as part of waste management centers equipped with mobile equipment to service municipal and regional requirements.	2.600.000	5.200.000	5.200.000	5.200.000	7.800.000	26.000.000
M.4.5. Build and equip facilities for CDW analysis and quality control						1.000.000
A.4.5.1. Financial funds for the development of authorized quality control infrastructure for CDS SRM.			300.000	300.000	400.000	1.000.000
OBJECTIVE 5: Stimulated growth of a green market in construction materials						3.750.000
M.5.1. Improve the existing application to develop a CDW Exchange						300.000
A.5.1.1. Improvement, development, and implementation of a web-based tool such as CDW Exchange or marketplace for materials recovery and secondary materials exchange.	100.000	100.000	100.000			300.000
M.5.2. Create guidelines on Green Public Procurement (GPP)						3.450.000
A.5.2.1. Creation of guidelines for GPP of the office building design, construction and management.	150.000					150.000
A.5.2.2. Implementation of GPP pilot project in accordance with guidelines for office building design, construction and management.		1.000.000	1.000.000			2.000.000
A.5.2.3. Creation of guidelines for GPP of road design, construction and maintenance.		150.000				150.000
A.5.2.4. Implementation of GPP pilot project in accordance with guidelines for road design, construction and maintenance.			500.000	500.000		1.000.000
A.5.2.5. Feasibility study for the introduction of a minimum quantity of recycled/reused materials in public constructions and infrastructures in the construction law.				75.000	75.000	150.000
OBJECTIVE 6: Reduced generation of CDW						6.500.000
M.6.1. Develop guidelines for the reuse of building components, conversion, and renovation of buildings						2.250.000
A.6.1.1. Drafting of a guideline on identification of reusable component including a positive list of elements such as doors, windows, and other non-structural parts.	75.000	75.000				150.000
A.6.1.2. Development of guidelines for sharing, conversion and renovation of buildings including recommendation for amendments and supplements to spatial plans.			50.000	50.000		100.000
A.6.1.3. Dedicated grants to support the local administration and private companies on restoring			1.000.000	1.000.000		2.000.000

Related actions	2023	2024	2025	2026	2027	Estimated costs EUR (without VAT)
buildings instead of demolition in accordance with guidelines and to promote sharing, conversion, and multifunctional uses of the public buildings.						
M.6.2. Enhance take-back systems in CDW to increase reused and recycled content						700.000
A.6.2.1. Feasibility study for the introduction of "take back system" on specific CDW scraps and unused materials as: 17 01 concrete, bricks, tiles and ceramics; 17 03 bitumen mixtures, coal tar and products containing tar; 17 08 building material based on gypsum.	100.000	100.000				200.000
A.6.2.2. Pilot project to enhance "take back system" on select CDW stream based on result of the study set out in A.6.2.1.			250.000	250.000	250.000	500.000
M.6.3. Implement educational and informative activities on eco-design in public and private buildings						1.900.000
A.6.3.1. Implementation of educational and informative activities on the topic of eco-design in public and private buildings to raise technical knowledge and education for engineers, architects, technicians, contractors and public administration.	50.000	50.000	50.000	50.000	50.000	250.000
A.6.3.2. Design and construction of an eco-design pilot project in a public building.			500.000	500.000	500.000	1.500.000
A.6.3.3. Reduction of planning fees for construction projects that use recycled or reused materials or adopt eco-design criteria focused on future reduction of CDW generation.			50.000	50.000	50.000	150.000
M.6.4. Develop guidelines for sharing, conversion and renovation of buildings						1.650.000
A.6.4.1. Development of guidelines for sharing, conversion and renovation of buildings including recommendation for amendments and supplements to spatial plans.	75.000	75.000				150.000
A.6.4.2. Dedicated grants to support the local administration and private companies on restoring buildings instead of demolition in accordance with guidelines and to promote sharing, conversion, and multifunctional uses of the public buildings.			500.000	500.000	500.000	1.500.000
TOTAL	13.200.000	23.235.000	30.115.000	26.415.000	29.125.000	120.590.000

32. The report developed the measures and actions based on expert perspective considering the best practice at international level, but a phased approach could be adopted. The best practices on municipal solid waste management developed at the international level, selected and adapted a set of measures and actions to the Croatian scenario. These proposed measures, if fully implemented, can fill the gaps described in Chapter 3. However, some actions, to be implemented, require the approval of several amendments to the Construction Law and the Waste Management Law, and a revision of the mandates and competences assigned to each entity involved in the implementation of the CEAP and currently based on the Law on Organization and Scope of State Administration Bodies (Official Gazette 85/2020). The adoption of these changes requires specific negotiation with the different institutions and agencies and needs additional time that cannot be estimated. This additional time may limit the achievement of effective results within the timeframe initially envisaged for the implementation of the CEAP. For these reasons, the proposed measures and actions, have been classified according to their applicability within the existing legislative framework and considering the current mandate of the implementing bodies, as shown in **Table 3**. The GoC may adopt a gradual approach in the implementation of the CEAP, starting with measures for immediate implementation and postponing the application of those actions that require the modification of the legal framework. It is important to underline that only through the full implementation of the CEAP will a complete transformation of the CDW value chain into a circular economy model be made.

Table 3: Actions classified according to their immediate applicability

OBJECTIVE	MEASURE	ACTION INDEX	ACTION DESCRIPTION	IMMEDIATELY APPLICABLE
Increased cooperation among CDW stakeholders	M.1.1. Enhance dialogue and cooperation among CDW stakeholders	A.1.1.1.	Creation of CE platform for CDW management to discuss regulatory provisions, new opportunities and share information.	YES
	M.1.2. Enhance education and support for research, innovation, and development	A.1.2.1.	Organization of specific annual educational programs including meetings with local administrations and the drafting of a handbook related to innovative recovered materials, reuse, and recycling within the framework of CE and CDW regulatory requirements.	YES
		A.1.2.2.	Development of R&D program for CE in CDW sector through the creation of nation or EU funds.	NO
Improved availability and quality of CDW data	M.2.1. Implement educational and informative activities related to CDW reporting	A.2.1.1.	Educational activities, including training, guidelines, and handbook, on the topic of CDW management reporting data within the framework of the CE.	YES
	M.2.2. Improve CDW management information system applications	A.2.2.1.	Enhanced interoperability between EONTO and ROO for data collection regarding CDW quantities and treatment.	YES
		A.2.2.2	Enhanced the usability of EONTO through the creation of a mobile application.	YES
		A.2.2.3.	Integration of recovered material [1] data generated on-site in the construction permit database for building sites with an expected CDW generation greater than 200 t.	YES
		A.2.2.4.	Integration of digital applications related to CDW on the joint IT platform of waste management in the Republic of Croatia, as part of the national environmental protection and circular economy platform.	YES
		A.2.2.5.	Creation of a Materials Passport and a related database to register materials used in construction projects in order to ease the recognition of hazardous material, future dismantling phase and recovery of resources.	NO
	M.2.3. Improve availability and quality of CDW management data before and during operating sites	A.2.3.1.	Introduction of obligations to prepare CDW Management Report [3] as part of Main Project before issuing Construction Permit for sites with an expected CDW generation greater than 200 t.	YES
		A2.3.2.	Drafting of standard forms and an on-line tool for compiling and submitting the CDW Management report.	YES
		A.2.3.3.	Approval of a bylaw for the enforcement of a mandatory financial bond for construction projects to cover the cost in case of mismanagement of CDW on the building site.	NO

OBJECTIVE	MEASURE	ACTION INDEX	ACTION DESCRIPTION	IMMEDIATELY APPLICABLE
	M.2.4. Implement pre-demolition audit for construction sites	A.2.4.1.	Amendment to Law on Construction to include pre-demolition audit based on EC guidelines [5] for construction sites with an expected CDW generation greater than 200 t.	NO
		A.2.4.2.	Definition of guidelines on Selective and Removal of Hazardous Components based on the European Guideline [6].	YES
		A.2.4.3.	Training for the enforcement of guidelines on Selective and Removal of Hazardous Components (the guidelines developed in A.2.4.2.).	YES
Reduced illegal CDW dumping	M.3.1. Increase education of relevant bodies involved in CDW management inspection processes	A.3.1.1.	Training programs for CDW management supervision and inspection bodies and parties including the aspect of occupational health and safety.	YES
	M.3.2. Strengthen regulation and controls to reduce illegal dumping of CDW	A.3.2.1.	Enforcement of waste management regulation to strengthen the control powers of local authorities and state inspectorate on environmental crimes related to illegal waste management.	NO
		A.3.2.2.	Enforcement of construction law and introduction of mandatory cost breakdown for CDW management in technical project proposals to support companies that propose proper CDW management.	NO
		A.3.2.3.	Investment in technological equipment such as capturing cameras and remote cameras to increase and automatize controls against illegal dumping.	YES
		A.3.2.4.	Improvement of ELOO [1] mobile application for citizens to ease the anonymous reporting of CDW illegal dumping.	YES
		A.3.2.5.	Strengthen of sanctions and fines against illegal dumping.	NO
	M.3.3. Remove CDW from illegal dumpsites	A.3.3.1.	Removal of CDW (or mixed waste) from locations contaminated by waste dumped into the environment.	NO
	Increased effectiveness and efficiency in the CDW management including its recovery	M.4.1. Improve EoW status legislation for CDW	A.4.1.1.	Feasibility study for the identification of potential "by-product for non-contaminated excavated soil" and "EoW status for specific CDW streams."
A.4.1.2.			Definition of a guideline on the enforcement of EoW and relevant Ordinance No. 117/14.	YES
A.4.1.3.			Training sessions on the guideline on the enforcement of EoW (A.4.1.2.).	YES

OBJECTIVE	MEASURE	ACTION INDEX	ACTION DESCRIPTION	IMMEDIATELY APPLICABLE	
	M.4.2. Improve hazardous waste removal and asbestos disposal system	A.4.2.1.	Analysis and assessment (report) of the existing and required number and capacity of areas for the disposal of CDW containing asbestos and treatment of hazardous CDW.	YES	
		A.4.2.2.	Grants for the development of installation for the recycling of contaminated soils (EWC 170503*) based on BAT.	NO	
		A.4.2.3.	Financial support for the collection and disposal of asbestos-containing material from existing buildings.	YES	
	M.4.3. Construct and equip recycling yards for construction and demolition waste "Type A"	A.4.3.1.	Construction and equipping of municipal or regional "Type A" recycling yards for CDW on the mainland.	YES	
		A.4.3.2.	Construction and equipping of municipal or regional "Type A" recycling yards for CDW on the most populated island.	YES	
	M.4.4. Construct and equip recycling yards for construction and demolition waste "Type B" for processing CDW	A.4.4.1.	Construction and equipping of "Type B" recycling yards for processing CDW, equipped with mobile equipment to service municipal and regional requirements.	NO	
		A.4.4.2.	Construction and equipping of "Type B" recycling yards for processing CDW, as part of waste management centers equipped with mobile equipment to service municipal and regional requirements.	NO	
	M.4.5. Build and equip facilities for CDW analysis and quality control	A.4.5.1.	Financial funds for the development of authorized quality control infrastructure for CDS SRM.	NO	
	Stimulated growth of a green market in construction materials	M.5.1. Improve the existing application to develop a CDW Exchange	A.5.1.1.	Improvement, development, and implementation of a web-based tool such as CDW Exchange or marketplace for materials recovery and secondary materials exchange.	YES
		M.5.2. Create guidelines on Green Public Procurement (GPP)	A.5.2.1.	Creation of guidelines for GPP of the office building design, construction and management.	YES
			A.5.2.2.	Implementation of GPP pilot project in accordance with guidelines for office building design, construction and management.	NO
A.5.2.3.			Creation of guidelines for GPP of road design, construction and maintenance.	YES	
A.5.2.4.			Implementation of GPP pilot project in accordance with guidelines for road design, construction and maintenance.	NO	

OBJECTIVE	MEASURE	ACTION INDEX	ACTION DESCRIPTION	IMMEDIATELY APPLICABLE
		A.5.2.5.	Feasibility study for the introduction of a minimum quantity of recycled/reused materials in public constructions and infrastructures in the construction law.	YES
Reduce generation of CDW	M.6.1. Develop guidelines for the reuse of building components, conversion, and renovation of buildings	A.6.1.1.	Drafting of a guideline on identification of reusable component including a positive list of elements such as doors, windows, and other non-structural parts.	YES
		A.6.1.2.	Development of guidelines for sharing, conversion and renovation of buildings including recommendation for amendments and supplements to spatial plans.	YES
		A.6.1.3.	Dedicated grants to support the local administration and private companies on restoring buildings instead of demolition in accordance with guidelines and to promote sharing, conversion, and multifunctional uses of the public buildings.	YES
	M.6.2. Enhance take-back systems in CDW to increase reused and recycled content	A.6.2.1.	Feasibility study for the introduction of "take back system" on specific CDW scraps and unused materials as: 17 01 concrete, bricks, tiles and ceramics; 17 03 bitumen mixtures, coal tar and products containing tar; 17 08 building material based on gypsum.	YES
		A.6.2.2.	Pilot project to enhance "take back system" on select CDW stream based on result of the study set out in A.6.2.1.	NO
	M.6.3. Implement educational and informative activities on eco-design in public and private buildings	A.6.3.1.	Implementation of educational and informative activities on the topic of eco-design in public and private buildings to raise technical knowledge and education for engineers, architects, technicians, contractors and public administration.	YES
		A.6.3.2.	Design and construction of an eco-design pilot project in a public building.	NO
		A.6.3.3.	Reduction of planning fees for construction projects that use recycled or reused materials or adopt eco-design criteria focused on future reduction of CDW generation.	NO
	M.6.4. Develop guidelines for sharing, conversion and renovation of buildings	A.6.4.1.	Development of guidelines for sharing, conversion and renovation of buildings including recommendation for amendments and supplements to spatial plans.	YES
		A.6.4.2.	Dedicated grants to support the local administration and private companies on restoring buildings instead of demolition in accordance with guidelines and to promote sharing, conversion, and multifunctional uses of the public buildings.	NO

4.1 OBJECTIVE 1: Increased Cooperation Among Construction and Demolition Waste Stakeholders

Measures	Description/Context	Action Index	Action description	Responsible Authority ³⁶	Major Implementer ³⁷	Potential funding sources	KPIs			Time frame
							Name	Unit/measure used	Target value	
M.1.1. Enhance dialogue and cooperation among CDW stakeholders	<p>This measure will increase sharing of vision and cooperation among stakeholders within the CE framework. It will provide the ability to infer the legal principles on a practical and operational level among (i) the local authorities in charge of the implementation of the regulations, (ii) the ministerial bodies that issue such regulations, and (iii) the final recipients of the regulations themselves. This will strengthen coordination among the relevant ministerial bodies such as MoESD, MMPI and MCPPSA.</p> <p>This measure includes annual roundtable meetings on a regular basis of the stakeholders in CDW management in the public and private sectors coordinated by the Circular Economy Committee. Topics of discussion should include the implementation of the objectives, measures and activities as specified in the Action Plan.</p> <p>According to the Waste Management Act (OG 84/21) it will include discussions for the purpose of</p>	A.1.1.1.	<p>Creation of CE platform for CDW management to discuss regulatory provisions, new opportunities and share information.</p> <p>The project includes periodic roundtables each year with selected members divided into “working groups” focused on a specific CDW topic. The topics encountered on a yearly basis will be set out by the Steering Committee. The results will include meeting reports, handbooks, training and/or educational activities.</p>	MoESD	Public and private sector/ Academia	EU Funds/ FZOEU	Roundtable between stakeholders	number	20 (4 events/year)	2023-2027

³⁶ The responsible authority is equivalent to the “Activity Holder” - Nositelj as defined in the NWMP

³⁷ The Major Implementer is equivalent to the “Activity Coholder” - Sunositelj as defined in the NWMP

Measures	Description/Context	Action Index	Action description	Responsible Authority ³⁶	Major Implementer ³⁷	Potential funding sources	KPIs			Time frame
							Name	Unit/measure used	Target value	
	protecting the environment and human health by preventing or reducing the generation of waste, reducing the negative effects of waste generation and waste management, reducing the overall effects of the use of raw materials, improving the efficiency of raw material use and increasing the recycling and reusing of recycled materials. All these activities are necessary to transition to a circular economy and ensure the long-term competitiveness of Croatia and the EU.									
M.1.2. Enhance education and support for research, innovation, and development	Organization of specific educational programs related to innovative recovered materials, reuse, and recycling of CDW within the framework of CE and regulatory requirements by the Chamber of Commerce and Trade Associations. Publication of technical documents and operational guidelines on the application of these practices and related regulations. FZOEU will develop a program to support R&D for CE in the CDW sector such as innovative equipment for CDW recycling, CDW SRM production or reuse of building elements. The program will include representatives from academia and the public and private sectors. The goal of this measure is to assess potential to increase the reuse of specific types of CDW specified in the	A.1.2.1	Organization of specific annual educational programs including meetings with local administrations and the drafting of a handbook related to innovative recovered materials, reuse, and recycling within the framework of CE and CDW regulatory requirements.	MoESD	Academia/ Chamber of Commerce/ MCPPSA/ MRRFEU	EU Funds/ FZOEU/ Chamber of Commerce	Number of participants to the educational programs completed	number	5 (1 event/year)	2023-2027
		A.1.2.2	A.1.2.2. Development of R&D program for CE in CDW sector through the creation of nation or EU funds.	MoESD	Academia/ MoESD/ MCPPSA/ MRRFEU	EU Funds/ FZOEU/ Chamber of Commerce	Developed innovative projects	number	3	2025-2027

Project co-financed by the European Union from the Cohesion Fund

Measures	Description/Context	Action Index	Action description	Responsible Authority ³⁶	Major Implementer ³⁷	Potential funding sources	KPIs			Time frame
							Name	Unit/measure used	Target value	
	Ordinance on the waste catalogue, within the framework of CE. The types of construction waste should include following groups: 17 01 concrete, bricks, tiles, and ceramics; 17 03 bitumen mixtures, coal tar and products containing tar; 17 08 building material based on gypsum.									

4.2 OBJECTIVE 2: Improved Availability and Quality of Construction and Demolition Waste Data

Measures	Description/Context	Action Index	Action description	Responsible Authority	Major Implementer	Potential funding sources	KPIs			Time frame
							Name	Unit/measure used	Target value	
M.2.1. Implement educational and informative activities related to CDW reporting	<p>The reliability and thoroughness of the data are necessary requirements when clearly defining the current status of CDW management and implementing improvement actions. The education projects, including specific training and handbooks on waste data reporting, will improve the awareness of CDW recycling's environmental role and reduce the risk of lack of environmental data information. This measure is related to WMP (OG 3/17, 1/22) and measure 5.2. on GPP.</p> <p>This measure includes the implementation of educational and informative activities on CDW data collection and reporting within the framework of the CE, to improve the availability and quality of the CDW data. All the materials will be shared online on public platforms.</p> <p>An integral part of reporting is a database with an associated application for data entry, verification, review, analysis, and exchange, as well as browsers and portals that allow the public to access data directly.</p>	A.2.1.1	Educational activities, including training, guidelines, and handbook, on the topic of CDW management reporting data within the framework of the CE.	MoESD	Chamber of Commerce/ JRS/ JLS	EU Funds/ FZOEU/ MoESD/ JRS/ JLS	Educational programs completed	number	5 (1 event/year)	2023-2027
M.2.2. Improve CDW management information	<p>The CDW data represents an issue especially for small CDW producers and managers and could result in gaps in available production and management information. This measure is related to</p>	A.2.2.1	Enhanced interoperability between EONTO and ROO for data collection regarding CDW	MoESD	Chamber of commerce/Waste management companies	MoESD/ FZOEU	Functional electronic ROO system	number	1	2023-2024

Measures	Description/Context	Action Index	Action description	Responsible Authority	Major Implementer	Potential funding sources	KPIs			Time frame
							Name	Unit/measure used	Target value	
system applications	<p>WMP (OG 3/17, 1/22) and measure 6.1. On site reuse represents the best solution to reduce CDW production and it is often adopted by construction companies. However, the amount of reused material is not currently being tracked.</p> <p>This measure includes the establishment and improvement of the interoperability between digital applications Environmental Pollution Register of the Ministry of Economy and Sustainable Development (ROO) and EONTO for CDW data collection. The improvement of applications will standardize data and information management for the use, reuse, and recycling of materials, as well as CDW management. In particular, a stronger interoperability will allow the sharing of common information between databases, reducing the data-entry errors and making cross control easier. The improvement will also include the shortcomings identified by the project "Improving the flow and quality of data on CDW" which was carried out by MoESD and the Faculty of Civil Engineering.</p> <p>The collection and transmission of data will be linked to the construction permit database to ease the cross-controls and</p>		quantities and treatment.							
		A.2.2.2	Enhanced the usability of EONTO through the creation of a mobile application.	MoESD	Chamber of commerce/Waste management companies	MoESD/ FZOEU	EONTO Mobile app	number	1	2024 - 2025
		A.2.2.3	Integration of recovered material³⁸ data generated on-site in the construction permit database for building sites with an expected CDW generation greater than 200 t.	MCPPSA	Chamber of commerce/Building Companies/JLS	MCPPSA/ EU Funds	Functional IT tools linked to the construction permit	number	1	2025- 2027
		A.2.2.4	Integration of digital applications related to CDW on the joint IT platform of waste management in the Republic of Croatia, as part of the national environmental protection and circular economy platform.	MoESD	MCPPSA	EU Funds/ FZOEU	Functional IT platform of CE and environmental protection	number	1	2023- 2027
		A.2.2.5	Creation of a Materials Passport and a related database to register materials used in construction projects in order to ease the recognition of hazardous material, future	MoESD	Chamber of Commerce/ JRS/ JLS	EU Funds/ FZOEU/ MoESD/ JRS/ JLS	Material Passport IT Tool	number	1	2026- 2027

³⁸ Recovered material refers to on-site materials that are reused or recycled on-site. If these materials were to leave the site, they would be considered as CDW.

Measures	Description/Context	Action Index	Action description	Responsible Authority	Major Implementer	Potential funding sources	KPIs			Time frame
							Name	Unit/measure used	Target value	
	automatic request of data transmission regarding CDW. The digital application will be adopted for CDW data collection on reused materials and on-site recycling for the building site with an expected CDW generation over 200 t.		dismantling phase and recovery of resources.							
M.2.3. Improve availability and quality of CDW management data before and during operating sites	This measure introduces obligations to prepare CDW Management Reports ³⁹ as a part of the Main Project required to issue a Construction Permit for sites with an expected CDW generation greater than 200 t. The Report will contain information about how the different steps of the demolition will be performed, by whom they will be performed, which materials will be collected selectively at the source, where and how they will be transported, what will be the recycling, re-use, or final treatment and how to follow up.	A.2.3.1	Introduction of obligations to prepare CDW Management Report⁴⁰ as part of Main Project before issuing Construction Permit for sites with an expected CDW generation greater than 200 t. The report ⁴¹ must include the following information: 1) expected CDW generation 2) how they will be managed; 3) a preliminary agreement with an authorized waste management company	MCPPSA	JLS	MCPPSA/JLS	Completion of harmonization of legislation re: CDW Management Report	Number	1	2025-2027
	The study will set out to explain how the non-hazardous and hazardous waste will be managed. The report shall include a preliminary agreement between the CDW produced and a CDW authorised	A.2.3.2	Drafting of standard forms and an on-line tool for compiling and submitting the CDW Management report.	MCPPSA	JLS	MCPPSA/JLS	CDW Management Report – Standard form	Number	1	2025-2027

³⁹ CRO: Elaborat gospodarenja otpadom

⁴⁰ CRO: Elaborat gospodarenja otpadom

⁴¹ CRO: Elaborat gospodarenja otpadom

Measures	Description/Context	Action Index	Action description	Responsible Authority	Major Implementer	Potential funding sources	KPIs			Time frame
							Name	Unit/measure used	Target value	
	installation and a mandatory financial guarantee in favor of the Competent Authority to cover the costs of possible mismanagement.						and online tool			
		A.2.3.3	<p>A.2.3.3. Approval of a bylaw for the enforcement of a mandatory financial bond for construction projects to cover the cost in case of mismanagement of CDW on the building site.</p> <p>The bylaw should adopt mechanisms as financial incentives, based on cost breakdown analysis (see A. 3.1.3) to promote CE on CDW as reduced fee for recycled CDW or limited access to public tenders in case of CDW discharge.</p>	MCPPSA	MoESD/JLS	MCPPSA/JLS	Financial Surety for CDW producers	Number	1	2025-2027

Measures	Description/Context	Action Index	Action description	Responsible Authority	Major Implementer	Potential funding sources	KPIs			Time frame
							Name	Unit/measure used	Target value	
M.2.4. Implement pre-demolition audit for construction sites	<p>The Construction Act (OG 153/13, 20/2017, 39/19, 125/19), article 76, specifies the obligation to have a “Demolition project”. This is the project that technically elaborates solutions, the procedure and method of the building demolition including the items in the building. Part of the project is waste management measures, recovery and/or disposal of construction waste and waste resulting from the removal of the building in accordance with the regulations governing waste management and the removal and disposal of construction material resulting from the removal of the building.</p> <p>A pre-demolition audit (or waste management audit) is to be carried out as a part or in addition to the “Demolition project”, before any renovation or demolition project and for any materials to be reused or recycled, as well as for hazardous waste.</p> <p>A pre-demolition audit consists of two parts. Part 1 includes collecting information on the site such as: identification of all waste materials that</p>	A.2.4.1	A.2.4.1. Amendment to Law on Construction to include pre-demolition audit based on EC guidelines⁴² for construction sites with an expected CDW generation greater than 200 t.	MCPPSA	JLS	MCPPSA/JLS	Completion of harmonization of legislation re: Pre-demolition audit	Number	1	2024-2025
		A.2.4.2	A.2.4.2. Definition of guidelines on Selective and Removal of Hazardous Components based on the European Guideline⁴³.	MCPPSA	JLS	MCPPSA/JLS	Guideline on selective demolition and hazardous elements removal	Number	1	2024

⁴² European Commission. (2018). *Guidelines for the waste audits before demolition and renovation works of buildings, EU Construction and Demolition Waste Management.*

⁴³ European Commission. (2016). *EU Construction & Demolition Waste Management Protocol.*

Measures	Description/Context	Action Index	Action description	Responsible Authority	Major Implementer	Potential funding sources	KPIs			Time frame
							Name	Unit/measure used	Target value	
	<p>will be generated during the demolition with specification of the quantity, the quality and location in the building or civil infrastructure. All materials should be identified and an accurate estimation on the quantity to be collected should be given. Part 2 will provide Information about: which materials should (mandatory) be separated at source (such as hazardous waste); which materials can/cannot be re-used or recycled; give information about how the waste (non-hazardous and hazardous) will be managed and the recycling possibilities.</p> <p>A pre-demolition audit takes full account of local markets for C&D waste and re-used and recycled materials, including the available capacity of recycling installations.</p> <p>The actions based on the audit will ensure the safety of workers and lead to an increase in the quality and quantity of recycled products. It will also help to increase the amount of materials to be re-used close to or at the construction site. The implementation of these audits will help the clients with setting performance levels for demolition contractors, support a site-specific CDW Management Study, demonstrate environmental credentials, increase material and labor efficiency, and reduce waste</p>	A.2.4.3	<p>A.2.4.3. Training for the enforcement of guidelines on Selective and Removal of Hazardous Components (the guidelines developed in A.2.4.2.).</p>	MCPPSA	JLS	MCPPSA/ JLS	Number	Number	21	2025-2027

4.3 OBJECTIVE 3: Reduced Illegal Construction and Demolition Waste Dumping

Measures	Description/Context	Action Index	Action description	Responsible authority	Major Implementer	Potential funding sources	KPIs			Time-frame
							Name	Unit/measure used	Target value	
M.3.1. Increase education of relevant bodies involved in CDW management inspection processes	This measure includes the education and training of employees of the municipal warden service of the local self-government unit (JLS), and environmental protection inspectors and State Inspectors. The executive body of the local self-government unit is obliged to ensure the prevention of discarding of CDW and the removal of such discarded CDW in the territory. The implementation of the aforementioned obligations is by the office responsible for the communal/municipal order of the local self-government unit (the municipal warden), in two ways: by measures to prevent improper disposal of waste, and measures to remove waste dumped into the environment.	A.3.1.1	Training programs for CDW management supervision and inspection bodies and parties.	MoESD	DIRH/JLS/JRS/ Association of cities	MoESD/DIRH	Number of participants to the educational programs completed	Number	3 (1 event every two years)	2023, 2025, 2027
M.3.2. Strengthen regulation and controls to reduce illegal	The Waste Management Act defines the obligations of the local self-government unit. The executive body of the local self-government unit is obliged to ensure the prevention of discarding of CDW and other waste, including the removal of such discarded waste in its	A.3.2.1	Enforcement of waste management regulation to strengthen the control powers of local authorities and state inspectorate on environmental crimes	MoESD	DIRH/JRS/JLS	MoESD	Numbers of amendments	Number	1	2024-2025

dumping of CDW	territory. The implementation of these obligations is ensured by the persons who performs the duties of the office responsible for communal /municipal order of the local self-government unit by two types of measures: (1) measures to prevent improper disposal of CDW and other waste and (2) measures to remove CDW and other waste thrown into the environment. Enforcement is primarily the responsibility of local and/or regional government, and the impartiality of those involved needs to be secured. Local government needs to manage complaints about illegal dumping actively. This includes thorough investigations and follow-up of any such reporting. The State inspectorate (DIRH) has a leading role in supervision and control but its activity is limited by the lack of technologies able to ease the controls. Proportional sanctions for illegal activities need to be imposed, wherever they occur along the value chain of CDW (from illegal landfilling through to waste dumping). They need to be set at high levels to act as deterrents, especially when hazardous waste is concerned. In case of ineffective - particularly where hazardous waste legislation is concerned (in terms of the associated inherent dangers and risks) - higher government levels (regional, national) need to step in and combine this with		related to illegal waste management.							
		A.3.2.2	Enforcement of construction law and introduction of mandatory cost breakdown for CDW management in technical project proposals to support companies that propose proper CDW management.	MoESD	Construction Company association/JRS	MoESD	Numbers of amendments	Number	1	2024-2025
		A.3.2.3	Investment in technological equipment such as capturing cameras and remote cameras to increase and automatize controls against illegal dumping.	MoESD	DIRH/JLS/JRS	MOESD	Call for tender	Number	5 (1 per year)	2023-2027
		A.3.2.4	Improvement of ELOO⁴⁴ mobile application for citizens to ease the anonymous reporting of CDW illegal dumping.	MoESD	JLS/JRS	MoESD	ELOO mobile app	Number	1	2023-2024
		A.3.2.5	Strengthen of sanctions and fines against illegal dumping.	MoESD	JLS/JRS	MoESD	Sanctions review	Number	1	2025-2026

⁴⁴ <https://eloo.haop.hr/public/>

	<p>correctional measures targeting the local authorities involved.</p> <p>The analysis conducted using the online tool ELOO confirmed the presence of many illegal dumping sites all over the country. The improvement in terms of usability and the adoption of a user-friendly interface to the existing mobile application will make reporting easier and more efficient. Heavy financial penalties would constitute a deterrent, especially with illegal landfills. The revenues could be used to promote CDW reuse and recycling or to finance inspecting staff.</p>									
<p>M.3.3. Remove CDW from illegal dumpsites</p>	<p>According to the Act, environmental remediation at a location polluted by waste is provided by the polluter. If the polluter is unknown or has ceased to exist, and there is no legal successor, remediation is provided by the owner, or the owner of the real estate at the location. If the polluter has not carried out the remediation of the contaminated location, the remediation is carried out by the Republic of Croatia. In this case, the Republic of Croatia has the right to recover the costs of the rehabilitation. All tasks related to rehabilitation are carried out in the name and at the expense of the Republic of Croatia by the Fund for Environmental Protection and Energy Efficiency.</p> <p>This measure includes the removal of CDW waste (or mixed waste) dumped into the environment (illegal dumpsites), and the prevention of</p>	A.3.3.1	<p>Removal of CDW (or mixed waste) from locations contaminated by waste dumped into the environment.</p>	<p>Public authorities at local (JLS) and regional levels (JRS)</p>	<p>Municipal Warden</p>	<p>JRS/JLS/Private owner/FZOEU</p>	<p>Number of remediated locations polluted with CDW</p>	<p>Number</p>	<p>250</p>	<p>2023-2027</p>

	further waste being dumped on these and other locations. The executive body of the local self-government unit and the executive body of the regional self-government unit are obliged to ensure the conditions and implementation of prescribed CDW management measures in their territory including remediation of locations polluted by CDW. The list of CDW contaminated sites, the intervention criteria and a Gantt diagram of planned intervention will be published on a dedicated page of MoESD website									
--	---	--	--	--	--	--	--	--	--	--

4.4 OBJECTIVE 4: Increased Effectiveness and Efficiency in the Construction and Demolition Waste Management Including its Recovery

Measures	Description/Context	Action Index	Action Description	Responsible Authority	Major Implementer	Potential funding sources	KPIs			Time frame
							Name	Unit/measure used	Target value	
M.4.1. Improve EoW status legislation for CDW	Currently, end-of-waste status is only declared once sold to another person or if used by the person who recovered it. The goal is to improve the implementation of procedures, reduce permit waiting times, to review implementation of the number of contracts required in advance and to support the registration of new companies on the “Register of EoW status” that produce recycled aggregates through waste processing, and the “Register of by-products”. Guideline preparation will include standard formats for permitting documentation and examples on By-products and EoW status permitting procedures. The training sessions on the implementation of the Guideline on EoW Status and By-products will include a minimum of one training session per county, totaling at 21 counties/locations. Currently, the management system includes the checking, recording and appropriate documentation for each individual waste shipment and batch received, including: visual check of the waste shipment and the data specified in the corresponding accompanying	A.4.1.1	Feasibility study for the identification of potential "by-product for non-contaminated excavated soil" and "EoW status for specific CDW streams."	MoESD	FZOEU/ JLS/Private investors	JLS/ Private investors/FZOEU/EU Funds	Analysis of the “by-product and EoW status” system completed	Number	1	2024 - 2025
		A.4.1.2	Definition of a guideline on the enforcement of EoW and relevant Ordinance No. 117/14. The Guideline will include standard formats for permitting documentation and examples on EoW permitting process and by-product.	MoESD	CDW management plants, Building companies, Academia	MoESD	Guideline on EoW and byproducts	Number	1	2025-2026
		A.4.1.3	Training sessions on the guideline on the enforcement of EoW (A.4.1.2.).	MoESD	CDW management plants, Building companies	MoESD	Training programs complete	Number	21	2026-2027

Measures	Description/Context	Action Index	Action Description	Responsible Authority	Major Implementer	Potential funding sources	KPIs			Time frame
							Name	Unit/measure used	Target value	
	sheet, records of incoming waste shipments checks and accompanying documentation, records of chemical tests on SRM and batch verification records. In order to ease the CE, it is necessary to define quantity-based criteria to set the frequency of tests and mandatory registration in compliance with relevant EU regulation, for example, every 200 t or 3.000 m3 of SRM produced. The MoESD will prescribe the types of tests that prove no harm will be done to the environment / human health for different types of recycled aggregates depending on the purpose, including leaching test as proposed by JRC report ⁴⁵ .									
M.4.2. Improve hazardous waste removal and asbestos disposal system	The collection of asbestos waste decreased year by year due to the reduction of economic support by FZOEU for its removal. This could potentially cause an increase of illegal dumping and pollution risks. This measure is related to WMP (NN 3/17, 1/22), measure 2.3.4. Improvement of the disposal system of construction waste containing asbestos will continue after 2022. Decontamination is necessary so that hazardous particles will not contaminate the recyclable materials. Hazardous	A.4.2.1	Analysis and assessment (report) of the existing and required number and capacity of areas for the disposal of CDW containing asbestos and treatment of hazardous CDW.	FZOEU	MoESD	MoESD/FZOEU/EU Funds	Analysis and assessment of disposal of CDW containing asbestos completed	Number	1	2024-2025
		A.4.2.2	Grants for the development of installation for the recycling of contaminated soils	MoESD	FZOE, CDW management plants, Academia	MoESD/	Public tender	Number	1	2026-2027

⁴⁵ <https://publications.jrc.ec.europa.eu/repository/handle/JRC91036>

Measures	Description/Context	Action Index	Action Description	Responsible Authority	Major Implementer	Potential funding sources	KPIs			Time frame
							Name	Unit/measure used	Target value	
	waste needs to be removed correctly and systematically before demolition by trained and authorized companies. The CDW Management Study needs to foresee which actions are to be taken if unexpected hazardous waste materials are found. Throughout the process, hazardous waste removal needs to comply with existing national legislation. This measure also includes an assessment of the existing and required number and capacity of areas for the disposal of CDW containing asbestos. Asbestos containing materials and hazardous waste should be managed by trained people. The permitting authority should strengthen the controls in relation to the adoption of Organizational Health and Safety management practices based on international standards and promote the adoption of ISO 45001. In addition, it is necessary to foresee the development of specific installations for the recycling of contaminated soils. The support of “Recycling Facilities for recycling of contaminated soils” will include grants for the construction and equipment of specialized facilities for the recycling of contaminated soils (EWC 170503*) that adopt technologies classified as BAT ⁴⁶ on the most recent		(EWC 170503*) based on BAT.							
		A.4.2.3	Financial support for the collection and disposal of asbestos-containing material from existing buildings.	FZOEU	MoESD/ JLS	FZOUE/ EU Funds / Private investors	Analysis and assessment of disposal of CDW containing asbestos completed	tons	10.000	2023-2027

⁴⁶ <https://eippcb.jrc.ec.europa.eu/reference>

Measures	Description/Context	Action Index	Action Description	Responsible Authority	Major Implementer	Potential funding sources	KPIs			Time frame
							Name	Unit/measure used	Target value	
	BREF on Waste Treatment. The awarding criteria for the grants should be based on potential amount of treatable contaminated soils, location of the plant, share of investment covered by private investors and other requirements that will be approved by the Steering Committee									
M.4.3. Construct and equip recycling yards for construction and demolition waste "Type A"	This measure includes the construction and equipping of new "Recycling Yard for CDW Type A" and increasing the capacity of existing ones on the mainland and islands. The "Recycling Yard for CDW Type A" represent the first step in the CDW management chain, and they should be located close to the production sites to ease the logistics. According to "good practice" the transportation longer than 35 km is considered not economically sustainable. Therefore, the distance between the two Recycling Yards for CDW should not be longer than 70 km. Public tenders will be initiated to provide financial support to the local municipalities and private waste management companies for the construction and equipping of municipal or regional "Recycling Yards for CDW Type A" on the mainland and islands for CDW with possibility to confer CDW. The awarding criteria and the awarding procedure will be published on MoESD. Recycling Yards for construction and	A.4.3.1	Construction and equipping of municipal or regional "Type A" recycling yards for CDW on the mainland.	JRS /JLS /Private investors	MoESD/ FZOEU	JRS /JLS / Private owner /FZOEU /EU Funds	Built and equipped Recycling Yard for CDW Type A on Mainland	Number	30	2023-2027
		A.4.3.2	Construction and equipping of municipal or regional "Type A" recycling yards for CDW on the most populated island.	JRS /JLS /Private investors	MoESD/ FZOEU	JRS /JLS / Private owner /FZOEU /EU Funds	Built and equipped Recycling Yard for CDW Type A on Islands	Number	20	2023-2027

Measures	Description/Context	Action Index	Action Description	Responsible Authority	Major Implementer	Potential funding sources	KPIs			Time frame
							Name	Unit/measure used	Target value	
	<p>demolition waste "Type A" will have development area between 3,000 to 5,000 m², including employee facilities, weighbridge, combined construction machine with loading shovel for material manipulation and miscellaneous tools.</p> <p>Target to build 30 locations (required between 60 and 80) in a 5-year period on the mainland. Target to build 20 locations (required up to 50 medium and small size) in 5 years period on the islands⁴⁷. The number of facilities required has been defined considering the current generation of CDW estimated by MoESD and their location should be defined based on the following criteria: (1) estimated local needs based on the expected growth of the CDW sector, (2) distance from another recycling yard, (3) the location and technologies applied in each recycling yard should be selected taking into account the minimization of impacts on the environment and human health and applying international occupational safety standards. The adoption of Good International Industry Practice should be reinforced⁴⁸.</p>									

⁴⁷ Croatia has 49 islands with permanent inhabitants in 2011 - <https://razvoj.gov.hr/o-ministarstvu/djelokrug-1939/otoci-i-priobalje/3834>

⁴⁸ As example World Bank Environmental, Health, and Safety General Guidelines - <https://www.ifc.org/wps/wcm/connect/29f5137d-6e17-4660-b1f9-02bf561935e5/Final%2B-%2BGeneral%2BEHS%2BGuidelines.pdf?MOD=AJPERES&CVID=nPtguVM>

Measures	Description/Context	Action Index	Action Description	Responsible Authority	Major Implementer	Potential funding sources	KPIs			Time frame
							Name	Unit/measure used	Target value	
M.4.4. Construct and equip recycling yards for construction and demolition waste "Type B" for processing CDW	Recycling Yard for CDW is a building intended for sorting, mechanical processing and temporary storage of CDW. The existing installations in Croatia are not sufficient to treat the real CDW produced and the expected increase. This measure is related to WMP (NN 3/17, 1/22), measure 2.1.2. Based on the ENVI Atlas data, in 2019, there were 35 authorized crushing CDW recycling plants. The location of the largest part of CDW treatment plants are in the northern part of the country. This geographical distribution reflects the regional disparities, and the existing recycling plants are not adequately	A.4.4.1	Construction and equipping of "Type B" recycling yards for processing CDW, equipped with mobile equipment to service municipal and regional requirements.	JLS/ JRS/ Private investors/ Public Companies	MoESD/ FZOEU	JLS / Private investors /FZOEU /EU Funds	Built and equipped Recycling Yard for CDW Type B	Number	10	2023-2027

Measures	Description/Context	Action Index	Action Description	Responsible Authority	Major Implementer	Potential funding sources	KPIs			Time frame
							Name	Unit/measure used	Target value	
	<p>distributed to cover the current and future needs of recycling capacity, particularly in South Croatia.</p> <p>This measure includes the construction and equipping of new and increasing the capacity of existing Recycling Yards for CDW Type B (mobile or stationary recycling equipment), and the improvement of the technology of existing facilities for processing construction waste. In particular, it is necessary to develop regional stationary or mobile plants with higher treatment capacity (suggested as part of Waste Management Centers as regional central point).</p> <p>In remote and rural areas and on the islands, with limited CDW generation, the creation of stationary plants is not feasible. The use of mobile recycling plants represents a reliable alternative to produce valuable aggregates that can be used directly on site.</p> <p>spatial analysis and planning for better locating CDW recycling facilities will be conducted.</p> <p>Public tenders will be initiated to provide financial support to the local municipalities and private waste management companies for the construction and equipping of municipal or regional “Recycling Yards for CDW Type B”. The awarding criteria and the awarding procedure will be published</p>	A.4.4.2	<p>Construction and equipping of "Type B" recycling yards for processing CDW, as part of waste management centers equipped with mobile equipment to service municipal and regional requirements.</p>	JLS/ JRS/ Private investors/ Public Companies	MoESD/ FZOEU	JRS /JLS /FZOEU /EU Funds	Built and equipped Recycling Yard for CDW Type B as a part of WMC	Number	10	2023-2027

Measures	Description/Context	Action Index	Action Description	Responsible Authority	Major Implementer	Potential funding sources	KPIs			Time frame
							Name	Unit/measure used	Target value	
	<p>on MoESD.</p> <p>Recycling Yards for construction and demolition waste "Type B" will have development area between 6,000 to 14,000 m2, including employee facilities, weighbridge, mobile plant with impact crusher, screener, combined construction machine for material manipulation, dump-truck, trailer for transporting mobile equipment and miscellaneous tools.</p> <p>Target is to build 10 independent RY at selected locations (required up to 21 locations) in 5 years period. Recycling Yards for CDW Type B as part of Waste Management Centers for processing CDW, the target is to build at 10 WMC locations (total 11 WMC in Croatia, 1 RY under construction) in 5 years period.</p> <p>The number o facilities required has been defined considering the current generation of CDW estimated by MoESD and their location should be defined based on the following criteria: (1) estimated local needs based on the expected growth of the CDW sector, (2) distance from another recycling yard, (3) the location and technologies applied in each recycling yard should be selected taking into account the minimization of impacts on the environment and human health and applying international occupational safety standards. The</p>									

Measures	Description/Context	Action Index	Action Description	Responsible Authority	Major Implementer	Potential funding sources	KPIs			Time frame
							Name	Unit/measure used	Target value	
	adoption of Good International Industry Practice should be reinforced.									
M.4.5. Build and equip facilities for CDW analysis and quality control	Regular controls on chemical and geotechnical properties of SRM derived from CDW is a mandatory requirement for the enforcement of EOW definition. The existing network of authorized laboratories in Croatia is limited in terms of number and requires support to develop a specific technical knowledge on the analysis of CDW and derived materials. The measure aims to support the strengthening of the laboratory network to cover the whole country through dedicated grants. The grant assignment criteria will be approved by the Steering Committee.	A.4.5.1	Financial funds for the development of authorized quality control infrastructure for CDS SRM.	MoESD	Private investor/authorized laboratories	Private owner/FZOEU/EU Funds	Built and equipped facilities for processing CDW	Number	5	2023-2027

4.5 OBJECTIVE 5: Stimulated Growth of a Green Market in Construction Materials

Measures	Description/Context	Action Index	Action description	Responsible Authority	Major Implementer	Potential funding sources	KPIs			Time frame
							Name	Unit/measure used	Target value	
M.5.1. Improve the existing application to develop a CDW Exchange	<p>The existing common platform of SRM derived from CDW and developed by Chamber of Commerce is underused and represents one of the factors that limits the increase of production and usage.</p> <p>The goal of the Waste Exchange is primarily to connect SRM providers with raw material buyers and at the same time, ensure technological criteria that must be met by a certain category of waste so that information can be published on the Exchange. The quality of the SRM market largely depends on the defined technological criteria and their application. Thus, CDW recycling market analysis for currently available recycled CDW and the necessary technological criteria and their application will also be conducted. CDW availability for recycling could be publicly announced once a construction permit has been obtained. It should be immediately visible in the entire system and to potential recoverers of said CDW – for example “HGK Burza otpada” can serve this purpose.</p> <p>This measure includes the improvement of the existing Waste Exchange application to develop a digital</p>	A.5.1.1.	Improvement, development, and implementation of a web-based tool such as CDW Exchange or marketplace for materials recovery and secondary materials exchange.	Chamber of Commerce	Private investors/Academia	EU Funds/FZOEU/Private investors	Functional applications to develop a digital marketplace	Number	1	2023-2025

Measures	Description/Context	Action Index	Action description	Responsible Authority	Major Implementer	Potential funding sources	KPIs			Time frame
							Name	Unit/measure used	Target value	
	marketplace for materials recovery and secondary materials exchange as “green market”. This platform (i) will encourage the establishment of a connection between suppliers and clients, and (ii) will integrate information on compliance with technical standards. To improve recycling and exchange, it will be necessary to establish “Minimum Technological Requirements” for CDW /secondary material so that it can be returned to production processes as easy as possible.									
M.5.2. Create guidelines on Green Public Procurement (GPP)	Green Public Procurement (GPP) seeks to reduce the environmental impact of the workings of government through the goods and services it purchases. Being the largest consumer, GoC can create a critical mass which makes it economically feasible for suppliers to invest accordingly. In doing so, it is hoped that the private sector will follow suit and shift its procurement towards greener products and CE. The European Green Deal has identified the construction sector as a priority sector for GPP. It focuses on public expenditure; potential impact on the supply side; example setting for private or corporate consumers; political sensitivity; existence of relevant and easy-to-use criteria; market availability and economic efficiency. Raw materials that are typically covered include wood,	A.5.2.1	Creation of guidelines for GPP of the office building design, construction and management. including: Design and performance requirements; Strip-out, demolition and site preparation works; Construction of the building or major renovation works; and Completion and handover.	MoESD	MCPPSA/Academia	EU Funds/FZOEU	Creation of guidelines for GPP for office building construction completed	Number	1	2023
		A.5.2.2	Implementation of GPP pilot project in accordance with guidelines for office building design,	FZOEU	JLS /Public companies	EU Funds/ FZOEU /JLS /Public companies	Implementation of GPP pilot project for office building construction completed	Number	1	2024-2025

Measures	Description/Context	Action Index	Action description	Responsible Authority	Major Implementer	Potential funding sources	KPIs			Time frame
							Name	Unit/measure used	Target value	
	aluminum, steel, concrete, glass as well as construction products such as windows, wall and floor coverings, heating and cooling equipment, operational and end-of-life aspects of buildings, maintenance services and on-site performance of works contracts.		construction and management.							
		A.5.2.3	Creation of guidelines for GPP of road design, construction and maintenance.	MoESD	MCPPSA/Academy	EU Funds/ FZOEU	Creation of guidelines for GPP for road construction completed	Number	1	2024
	This measure includes the creation of the guidelines on the GPP including the pilot projects within the framework of the circular economy. The guidelines and the pilot project will focus on use in (1) office building design, construction, and management; and (2) road design, construction, and maintenance. These guidelines will take a lifecycle approach that will address not only the use of recycled materials but also the ability to design buildings for disassembly – enabling high rates of reuse and recycling at the end of life.	A.5.2.4	Implementation of GPP pilot project in accordance with guidelines for road design, construction and maintenance.	FZOEU	JLS /Public companies	EU Funds/ FZOEU /JLS /Public companies	Implementation of GPP pilot project for road construction completed	Number	1	2025-2026
		A.5.2.5	Feasibility study for the introduction of a minimum quantity of recycled/reused materials in public constructions and infrastructures in the construction law.	MoESD	CDW management plants, Building companies, Chamber of commerce	EU Funds/FZOEU/Private investors/JLS	Completed Feasibility Study	Number	1	2026-2027

4.6 OBJECTIVE 6: Reduced Generation of Construction and Demolition Waste

Measures	Description/Context	Action Index	Action description	Responsible Authority	Major Implementer	Potential funding sources	KPIs			Time frame
							Name	Unit/measure used	Target value	
M.6.1. Develop guidelines for the reuse of building components, conversion, and renovation of buildings	<p>The reduction of future CDW generation will be possible through the extension of the lifespan of a building by adopting renovation techniques.</p> <p>This measure includes the development of guidelines for the reuse of building components removed before demolition, conversion and renovation of buildings within the framework of the CE and the enforcement of local marketplace for used components.</p> <p>The reuse of building components will include a positive list of elements such as doors, windows, and other non-structural parts. The guideline should develop a standard checklist to ease the reusability evaluation and to strengthen the centers for reuse.</p> <p>The reduction of CDW generation can be achieved by reducing the number of new buildings and construction. The adoption of the renovation process, instead of demolishing, represents the most common procedure to increase the lifespan of a building. Also, sharing the use of the building and conversion (e.g, the industrial building can be converted into offices or service areas) represent initiatives that should be supported by spatial planning.</p> <p>The renovation of buildings will be supported through dedicated grants for</p>	A.6.1.1	<p>Drafting of a guideline on identification of reusable component including a positive list of elements such as doors, windows, and other non-structural parts.</p> <p>The guideline should develop a standard checklist to ease the reusability evaluation and to strengthen the centers for reuse.</p>	MCPPSA	Academia	EU Funds/ MoESD	Creation of guidelines for mineral on reusable components	Number	1	2023-2024
		A.6.1.2	<p>Development of guidelines for sharing, conversion and renovation of buildings including recommendation for amendments and supplements to spatial plans.</p>	MCPPSA/ Croatian Institute for Spatial Development	JRS/ JLS/ Academia	EU Funds/ MCPPSA/ JRS/ JLS	Development of guidelines completed	Number	1	2025-2027
		A.6.1.3	<p>Dedicated grants to support the local administration and private companies on restoring buildings instead of demolition in accordance with guidelines and to promote sharing,</p>	MCPPSA	JRS/ JLS/ Academia/Building association	EU Funds/ MCPPSA/ JRS/ JLS	Design and renovation of pilot project completed	Number	1	2025-2027

Measures	Description/Context	Action Index	Action description	Responsible Authority	Major Implementer	Potential funding sources	KPIs			Time frame
							Name	Unit/measure used	Target value	
	restoring buildings instead of demolition in accordance with guidelines to promote sharing, conversion and multifunctional uses of the public buildings. The awarding criteria will be approved, and the procedure will be published on MCPPSA website.		conversion, and multifunctional uses of the public buildings.							
M.6.2. Enhance take-back systems in CDW to increase reused and recycled content	This measure includes a preliminary assessment for the identification of stakeholders that can be potentially involved in a “extended producer responsibility” and the analysis of applicability on specific CDW streams to enhance the take-back system of unused and non-polluted scraps produced during the construction phase. The measure includes the definition of a pilot project for the most promising material identified in the preliminary study. The types of construction waste will include the following groups: 17 01 concrete, bricks, tiles, and ceramics; 17 03 bitumen mixtures, coal tar and products containing tar; 17 08 building material based on gypsum.	A.6.2.1	Feasibility study for the introduction of "take back system" on specific CDW scraps and unused materials as: 17 01 concrete, bricks, tiles and ceramics; 17 03 bitumen mixtures, coal tar and products containing tar; 17 08 building material based on gypsum.	MoESD	Academia – Building companies	EU Funds/ FZOEU	Analysis of specific CDW management system completed	Number	1	2023-2024
		A.6.2.2	Pilot project to enhance "take back system" on select CDW stream based on result of the study set out in A.6.2.1.	MoESD	Academia – Building companies	EU Funds/ FZOEU	Identification of potential payers under EPR completed	Number	1	2025-2026
M.6.3. Implement educational and informative activities on eco-design in public and	The future reduction of CDW generation is directly related to the adoption of a range of construction techniques that facilitate component disassembly and recovery of building elements. Currently there are no specific national guidelines that would facilitate the adoption of these eco-design criteria. In addition,	A.6.3.1	Implementation of educational and informative activities on the topic of eco-design in public and private buildings to raise technical knowledge and education for	MCPPSA	JLS/ Academia	EU Funds/ FZOEU/ MCPPSA/ JLS	Number of a specific educational activities completed	Number	5	2023-2027

Measures	Description/Context	Action Index	Action description	Responsible Authority	Major Implementer	Potential funding sources	KPIs			Time frame
							Name	Unit/measure used	Target value	
private buildings	<p>the development of Eco-design will need additional economic resource due to the higher costs of the projects caused by the limited knowledge of their enforcement.</p> <p>This measure includes implementation of educational and informative activities on eco-design in public and private buildings within the framework of the CE. The measure will also promote the creation and sharing of specific expertise on the enforcement of eco-design through a dedicated pilot project related to the construction of a public building with a high social value, such as a school or a hospital and in collaboration with the Engineering and Architects Association.</p> <p>The measure will also promote incentives for the building that will enforce eco-design criteria.</p>		engineers, architects, technicians, contractors and public administration.							
		A.6.3.2	Design and construction of an eco-design pilot project in a public building.	MCPPSA	JLS/ Academia	EU Funds/ FZOEU/ MCPPSA/ JLS	Design and construction of a pilot-project completed	Number	1	2025-2027
		A.6.3.3	Reduction of planning fees for construction projects that use recycled or reused materials or adopt eco-design criteria focused on future reduction of CDW generation.	MCPPSA	JRS/ JLS/ Academia	EU Funds/ MCPPSA/ JRS/ JLS	Reduction of planning fee	Number	1	2026-2027
M.6.4. Develop guidelines for sharing, conversion and renovation of buildings	The reduction of future CDW generation will be possible through the extension of the lifespan of a building by adopting renovation techniques. Also increasing building use through sharing and conversion is a well-known system for limiting the requirements of new buildings.	A.6.4.1	Development of guidelines for sharing, conversion and renovation of buildings including recommendation for amendments and supplements to spatial plans.	MCPPSA/ Croatian Institute for Spatial Development	JRS/ JLS/ Academia	EU Funds/ MCPPSA/ JRS/ JLS	Development of guidelines completed	Number	1	2023-2024

Measures	Description/Context	Action Index	Action description	Responsible Authority	Major Implementer	Potential funding sources	KPIs			Time frame
							Name	Unit/measure used	Target value	
	<p>This measure includes the development of guidelines for sharing, conversion and renovation of buildings within the framework of the circular economy. The reduction of CDW generation can be achieved by reducing the number of new buildings and construction. The adoption of the renovation process, when feasible, instead of demolishing, represents the most common procedure to increase the lifespan of a building. Also sharing the use of the building and conversion (e.g. the industrial building can be converted into offices or service areas) represent initiatives that should be supported by spatial planning. The renovation of buildings will be supported through dedicated grants for restoring buildings instead of demolition in accordance with guidelines to promote sharing, conversion and multifunctional uses of the public buildings. The awarding criteria will be approved, and procedure will be published on MCPPSA website.</p>	A.6.4.2	<p>Dedicated grants to support the local administration and private citizens on restoring buildings instead of demolition in accordance with guidelines and to promote sharing, conversion, and multifunctional uses of the public buildings.</p>	MCPPSA	JRS/ JLS/ Academia/Building association	EU Funds/ MCPPSA/ JRS/ JLS	Design and renovation of pilot project completed	Number	1	2025-2027

5. PRIORITIZATION OF MEASURES

32. In order to identify the priority pool of actions to be implemented, a Multi Criteria Analysis (MCA) was conducted. Because the enforcement of all the actions in a short timeframe is not possible, the ranking allows the identification of those most relevant of CEAP considering environmental impact, feasibility and stakeholders' interest among other variables. MCA represents one of the most-used ranking procedures because it allows the collection, in a quantitative manner, of the opinion of different experts and stakeholders according to established criterion.

33. The philosophy of the MCA is that monetizing benefits and costs can usually mislead policy makers and distort decisions on social issues. Monetizing costs and benefits can be helpful, but other criteria should be considered as well. Usually, the MCA is performed through participatory processes. For our purposes, the evaluation process was conducted by different experts who have been working on the project. Each one of the participants evaluated the measures, based on five variables (listed below). The values are ranked from 0 (minimum) to 5 (maximum).

The variables adopted to rank the measures are:

- 1) Positive environmental impact
- 2) Technical and economic feasibility
- 3) Alignment with regulations and policies
- 4) Scalability
- 5) Stakeholders' interest

Once the first evaluation process was over, the results were compiled and analyzed. Later, these results were shared again with each one of the evaluators giving them the opportunity to review the results and to decide whether to change the scores or not. During this process, the experts shared some thoughts and ideas that support their final choice.

It is important to mention that the initial evaluation represents only the report's perspective based on the expertise and understanding of the national and local context of Croatian CDW sector.

A description of the methodology adopted to develop the MCA is reported in **Box 3** and in **Annex VI**.

Box 3: Brief Description of MCA Methodology

The philosophy of multi-criteria analysis (MCA) is to incorporate different variables in the analysis of initiatives, thus guiding policymakers in making decisions with a systemic perspective and not basing decisions solely on economic factors. Usually, the MCA is performed through participatory processes.

For our purposes, the evaluation process was conducted by international and local waste management and circular economy experts who have been working on the Action Plan development. Each one of the participants evaluated the measures, based on the five variables.

The MCA procedure was conducted in three phases:

- 1) **First round of evaluations made by each expert:** The results proposed by each participant were compiled and analysed to calculate the final score for every action.
- 2) **Second round of evaluations allowing every expert to explain their proposal in a roundtable:** The results were shared among all evaluators in a virtual roundtable to review the results and decide whether to change the scores or not. During this process, the experts presented their evaluations and ideas that support their final choice.
- 3) **Calculation of the final score and ranking:** At the end of the roundtable the final score for every action was calculated allowing the prioritisation of the proposed measures. Based on these results the actions are ranked.

The results of the prioritization, divided by objectives, are shown in **Annex VII**. The actions ranked from the highest (most relevant) to the lowest (least relevant) score, are shown in **Figure 7**.

34. The analysis of the CDW management systems of the top-performing EU countries confirmed that no single measure could by itself reduce CDW generation and radically improve its management, and the only solution is the adoption of a pool of combined measures. These measures should be associated with precise and achievable targets and strong cooperation among stakeholders. When these measures are implemented simultaneously, they can promote the continuous improvement of the whole CDW value chain and ensure the achievement of EU Targets.

5.1 Results of Prioritization

35. The result of MCA allows the identification of the actions, that based on the Team's know-how, resulted in the most effective leading the CDW value chain to a more circular approach.

36. The strengthening of data collection system and the analysis of reliable data is a crucial aspect to ensure effective enforcement of the measures. The analysis conducted to identify the measures considered as international best practices revealed that every country adopted similar measures but also introduced dedicated adjustments to better meet the local needs and conditions. This fine-tuning of the measures conducted all along the lifespan of the measure implementation is characterized by a strong yet constructive self-assessment of the result obtained by each action. For this reason, a reliable dataset on CDW generation and management represents a prerequisite for the full enforcement of CEAP.

37. The analysis of the actions considered as most effective divided by Objective shows the crucial role of communication among stakeholders. The actions with the highest Impact score in every Objective are those related to the creation of a permanent roundtable among stakeholders (Action 1.1.1), the drafting of guidelines and standard forms to ease the enforcement of the existing legislation (Action 2.3.2, Action 2.4.2) and related training session for the public administrations and private stakeholders (Action 2.1.1, Action 3.1.1, Actions 2.4.3). The request for frank collaboration, as raised in all consultation meetings, confirms that one of the main obstacles on the pathway to a CE is presented by limited sharing of the vision about the CDW management between the central public administration, which acts as a rule-maker, and the industry, which in many instances considers the rules as far from their needs. In relation to Objective 3, "Reduced illegal CDW dumping", the strengthening of inspection powers (Action 3.2.1) and adoption of better technologies control (Action 3.2.3) are considered the most effective.

38. Despite the result in terms of impact score of each action, it is important to underline the synergistic relation among them. The proposed actions can be individually applied, but the best results in terms of enforcement of CE can be obtained thanks to the multiplicative effect generated by the creation of an enabling environment. For example, the actions developed under the measure 6.3, "Implement educational and informative activities on eco-design in public and private buildings", can act as booster for the development of innovative SRM that will be used for sustainable buildings.

39. The transformation of a conservative sector as the CDW value chain from a linear economy to a circular economy is a long process and requires a set of harmonized measures that impact all over the value chain. To obtain the conversion of their economy, the top performing MS have adopted many measures and invested up to 5 years to obtain a full implementation of the legislative framework and to achieve good knowledge and enforcement of the different provisions from the CDW stakeholders.

40. The results of MCA confirm that there is no single measure able to transform the CDW sector, but it is only through a coordinated framework of conditions, measures and actions that it is possible to improve the environmental performance of CDW value chain. The difference in impact score between the top and bottom ranked actions is small and most have similar impact scores. This means that the experts consider most of the actions as valuable in relation to their specific objectives and none of them should be considered less important in achieving the EU targets.

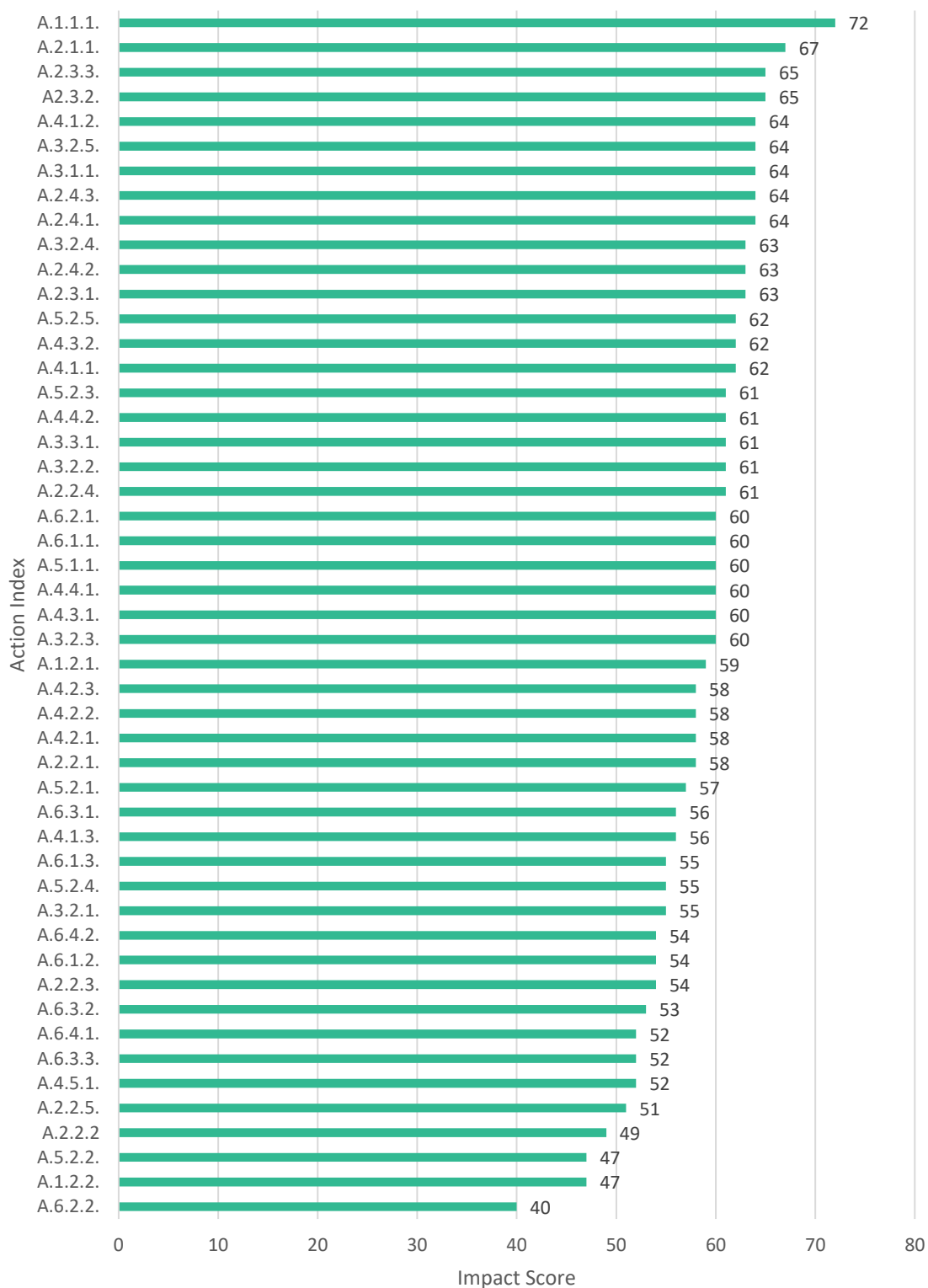


Figure 7: Actions Ranked Based on Their Impact Score

6. ROADMAP AND STAKEHOLDERS' ENGAGEMENT

41. This section details the proposed measures and actions as well as other key aspects for the implementation of the Circular Economy Action Plan (CEAP): description of the roadmap, its implementation by key stakeholders and the roles these actors should play over the next five years to build an enabling environment for the success of the Action Plan on CE in CDW sector in Croatia. At the end of the chapter is a description of the steps taken during the formulation phase of the Action Plan collaboratively with the different key stakeholders identified, in order to coordinate and subsequently consult with them on the suggested measures and make final adjustments and improvements to the CEAP proposal.

6.1 Roadmap

42. The diagram in **Figure 8** shows the proposed roadmap. The complete description of each measure and related actions, including identification of stakeholders involved, is reported in **Chapter 4**. The methodology adopted for the definition of the roadmap is described in **Annex VIII**.

Figure 8: Roadmap Scheme

	CEC	HRK	FZOEU	MoESD	MCPPSA	JLS and JRS	
OBJECTIVE	MEASURE	2023	2024	2025	2026	2027	
Increased cooperation among CDW stakeholders	M.1.1. Enhance dialogue and cooperation among CDW stakeholders	A.1.1.1. Creation of CE platform for CDW management to discuss regulatory provisions, new opportunities and share information.					
	M.1.2. Enhance education and support for research, innovation, and development	A.1.2.1. Organisation of specific annual educational programs including meetings with local administrations and the drafting of a handbook related to innovative recovered materials, reuse, and recycling within the framework of CE and CDW regulatory requirements.					
Improved availability and quality of CDW data	M.2.1. Implement educational and informative activities related to CDW reporting	A.2.1.1. Educational activities, including training, guidelines, and handbook, on the topic of CDW management reporting data within the framework of the CE.					
	M.2.2. Improve CDW management information system applications	A.2.2.1. Enhanced interoperability between EONTO and ROO for data collection regarding CDW quantities and treatment.					
		A.2.2.2 Enhanced the usability of EONTO through the creation of a mobile application.					
		A.2.2.3. Integration of recovered material data generated on-site in the construction permit database for building sites with an expected CDW generation greater than 200 t.					
		A.2.2.4. Integration of digital applications related to CDW on the joint IT platform of waste management in the Republic of Croatia, as part of the national environmental protection and circular economy platform.					
		A.2.2.5. Creation of a Materials Passport and a related database to register materials used in construction projects in order to ease the recognition of hazardous material, future dismantling phase and recovery of resources.					
	M.2.3. Improve availability and quality of CDW management data before and during operating sites					A.2.3.1. Introduction of obligations to prepare CDW Management Report as part of Main Project before issuing Construction Permit for sites with an expected CDW generation greater than 200 t.	
						A.2.3.2. Drafting of standard forms and an on-line tool for compiling and submitting the CDW Management report.	
						A.2.3.3. Approval of a bylaw for the enforcement of a mandatory financial bond for construction projects to cover the cost in case of mismanagement of CDW on the building site.	
	M.2.4. Implement pre-demolition audit for construction sites			A.2.4.1. Amendment to Law on Construction to include pre-demolition audit based on EC guidelines for construction sites with an expected CDW generation greater than 200 t.			
				A.2.4.2. Definition of guidelines on Selective and Removal of Hazardous Components based on the European Guideline.			
						A.2.4.3. Training for the enforcement of guidelines on Selective and Removal of Hazardous Components to construction workers, contractors, and supervising engineers (the guidelines developed in A.2.4.2.).	
Reduced illegal CDW dumping	M.3.1. Increase education of relevant bodies involved in CDW management inspection processes	A.3.1.1. Training programs for CDW management supervision and inspection bodies and parties.					
	M.3.2. Strengthen regulation and controls to reduce illegal dumping of CDW			A.3.2.1. Enforcement of waste management regulation to strengthen the control powers of local authorities and state inspectorate on environmental crimes related to illegal waste management.			
				A.3.2.2. Enforcement of construction law and introduction of mandatory cost breakdown for CDW management in technical project proposals to support companies that propose proper CDW management.			
		A.3.2.3. Investment in technological equipment such as capturing cameras and remote cameras to increase and automatize controls against illegal dumping.					
		A.3.2.4. Improvement of ELOO mobile application for citizens to ease the anonymous reporting of CDW illegal dumping.					
					A.3.2.5. Strengthen of sanctions and fines against illegal dumping.		
M.3.3. Remove CDW from illegal dumpsites	A.3.3.1. Removal of CDW (or mixed waste) from locations contaminated by waste dumped into the environment.						
Increased effectiveness and efficiency	M.4.1. Improve EoW status legislation for CDW	A.4.1.1. Feasibility study for the identification of potential "by-product for non-contaminated excavated soil" and "EoW status for specific CDW streams."					
		A.4.1.2. Definition of a guideline on the enforcement of EoW and relevant Ordinance No. 117/14.					

OBJECTIVE	MEASURE	2023	2024	2025	2026	2027		
					A.4.1.3. Training sessions on the guideline on the enforcement of EoW (A.4.1.2.).			
	M.4.2. Improve hazardous waste removal and asbestos disposal system		A.4.2.1. Analysis and assessment (report) of the existing and required number and capacity of areas for the disposal of CDW containing asbestos and treatment of hazardous CDW.					
			A.4.2.2. Grants for the development of installation for the recycling of contaminated soils (EWC 170503*) based on BAT.					
		A.4.2.3. Financial support for the collection and disposal of asbestos-containing material from existing buildings.						
	M.4.3. Construct and equip recycling yards for construction and demolition waste "Type A"	A.4.3.1. Construction and equipping of municipal or regional "Type A" recycling yards for CDW on the mainland.						
		A.4.3.2. Construction and equipping of municipal or regional "Type A" recycling yards for CDW on the most populated island.						
	M.4.4. Construct and equip recycling yards for construction and demolition waste "Type B" for processing CDW	A.4.4.1. Construction and equipping of "Type B" recycling yards for processing CDW, equipped with mobile equipment to service municipal and regional requirements.						
A.4.4.2. Construction and equipping of "Type B" recycling yards for processing CDW, as part of waste management centers equipped with mobile equipment to service municipal and regional requirements.								
M.4.5. Build and equip facilities for CDW analysis and quality control				A.4.5.1. Financial funds for the development of authorized quality control infrastructure for CDS SRM.				
Stimulated growth of a green market in construction materials	M.5.1. Improve the existing application to develop a CDW Exchange	A.5.1.1. Improvement, development, and implementation of a web-based tool such as CDW Exchange or marketplace for materials recovery and secondary materials exchange.						
	M.5.2. Create guidelines on Green Public Procurement (GPP)	A.5.2.1. Creation of guidelines for GPP of the office building design, construction and management.						
			A.5.2.2. Implementation of GPP pilot project in accordance with guidelines for office building design, construction and management.					
			A.5.2.3. Creation of guidelines for GPP of road design, construction and maintenance.					
					A.5.2.4. Implementation of GPP pilot project in accordance with guidelines for road design, construction and maintenance.			
					A.5.2.5. Feasibility study for the introduction of a minimum quantity of recycled/reused materials in public constructions and infrastructures in the construction law.			
Reduced generation of CDW	M.6.1. Develop guidelines for the reuse of building components, conversion, and renovation of buildings	A.6.1.1. Drafting of a guideline on identification of reusable component including a positive list of elements such as doors, windows, and other non-structural parts.						
				A.6.1.2. Development of guidelines for sharing, conversion and renovation of buildings including recommendation for amendments and supplements to spatial plans.				
				A.6.1.3. Dedicated grants to support the local administration and private companies on restoring buildings instead of demolition in accordance with guidelines and to promote sharing, conversion, and multifunctional uses of the public buildings.				
	M.6.2. Enhance take-back systems in CDW to increase reused and recycled content	A.6.2.1. Feasibility study for the introduction of "take back system" on specific CDW scraps and unused materials as: 17 01 concrete, bricks, tiles and ceramics; 17 03 bitumen mixtures, coal tar and products containing tar; 17 08 building material based on gypsum.						
				A.6.2.2. Pilot project to enhance "take back system" on select CDW stream based on result of the study set out in A.6.2.1.				
	M.6.3. Implement educational and informative activities on eco-design in public and private buildings	A.6.3.1. Implementation of educational and informative activities on the topic of eco-design in public and private buildings to raise technical knowledge and education for engineers, architects, technicians, contractors and public administration including green building licensing schemes.						
				A.6.3.2. Design and construction of an eco-design pilot project in a public building.				
				A.6.3.3. Reduction of planning fees for construction projects that use recycled or reused materials or adopt eco-design criteria focused on future reduction of CDW generation.				
	M.6.4. Develop guidelines for sharing, conversion and renovation of buildings	A.6.4.1. Development of guidelines for sharing, conversion and renovation of buildings including recommendation for amendments and supplements to spatial plans.						
				A.6.4.2. Dedicated grants to support the local administration and private citizens on restoring buildings instead of demolition in accordance with guidelines and to promote sharing, conversion, and multifunctional uses of the public buildings.				

6.2 Governance of the Circular Economy Action Plan

43. The implementation of the Action Plan requires the involvement of all relevant actors in the construction and demolition chain in Croatia. During the diagnostic and Action Plan formulation phases of the CEAP, these stakeholders were identified, consulted and engaged. In the subsequent phase of the implementation of short- and medium-term actions between 2023 and 2027, these stakeholders play a key role in enabling the direct execution of actions leading to the achievement of the outlined objectives, measures and actions.

44. An operational structure that aims to support the implementation of the CEAP is recommended in this document. This operational structure supports the leading role of the MoESD in guaranteeing a full governance for the transition in the CDW sector to circularity. The role of this operational structure is to drive the implementation of the CEAP. The structure includes stakeholders from the CDW sector, both public and private, comprising different aspects of the sector. The MoESD and the operational structure, during the implementation process, 2023-2027, will also monitor the progress of the CEAP comparing the effects of the actions already in place and, if necessary, adapting the goals to new conditions.

Operational structure to support the implementation of the Circular Economy Action Plan

45. The supportive structure is composed of a Steering Committee (SC), and a Technical Secretariat (TS). It is reinforced by Temporary-Thematic Sub-committees (TTSC).

Steering Committee

The SC oversees the roadmap progress, supporting MoESD during the action's enforcement, promoting cooperation among stakeholders, identifying synergies and funding opportunities. It is comprised of public and private representatives from CDW sector such as government departments, and construction and waste management companies, among others. Nine members comprise the SC, selected by the MoESD and CDW public and private stakeholders, to attend two to three annual meetings during the five years of implementation period of the CEAP.

The SC is a collegial body expected to guide and address the initiatives related to the CEAP enforcement, with members who should be able to present all the requests arising from the entire CDW value chain. The SC would assemble:

- Ministries in charge of circular economy and construction sector that are responsible for taking the leadership in advancing circular economy and resource efficiency to achieve sustainable consumption and production. Members represent the authorities that are responsible for and are in charge of developing the policies related to CE.
- Circular Economy Committee representatives with specific knowledge in CDW management.
- Local authorities that want to develop the circular economy on CDW at the local level.
- Construction companies representatives.
- CDW management sector representatives.
- Professional associations and sectorial clusters such as Croatian Chamber of Economy (HGK), Croatian Employers' Association (HUP), Croatian Business Council for Sustainable Development (HRPSOR), Croatian Association of Civil Engineers (HSGI) and others.
- University and academia representatives.

Each stakeholder would have the opportunity to stand for election every three years to serve as the SC's technical secretariat. This would facilitate the implementation of the actions proposed as the CEAPs roadmap.

Temporary-Thematic Sub-committees

The TTSCs are objective-oriented working groups composed of a small number of people from SC. These groups are responsible for the achievement of an assigned objective into the CEAP and have systematic ad-hoc meetings, at least bi-monthly, defined and agreed to between its members.

Technical Secretariat

The TC is a hired person or group of people responsible for the management of the CEAP implementation. This body is the intermediary between the measures and actions of the CEAP, and the SC.

The scheme for the CEAP management is shown in **Figure 9**.

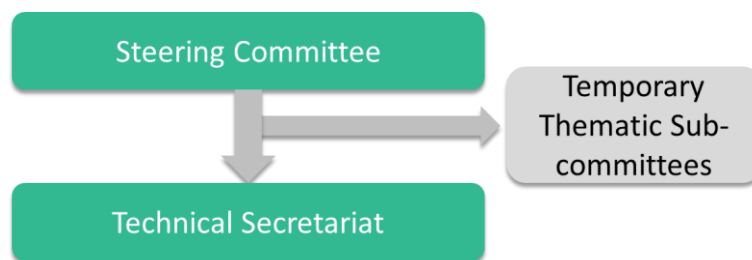


Figure 9: Operational Structure to Support the Implementation of the CEAP

7. CONCLUSIONS

46. Since 2015, Croatia has been progressively moving closer to the goals defined by the European Commission on CDW management through the implementation of a regulatory framework in line with the EU standards. In the context of progressive improvement, the CEAP on CDW has the role of providing a set of operational instruments to overcome gaps that still affect the CDW value chain and achieve the target defined by the WFD and a full embracement of the circular economy.

47. The country has to overcome six key challenges to become a circular economy. These challenges have been identified through the analysis of the data collected during the preliminary study and thanks to the contribution of stakeholders. The identified challenges were presented to the stakeholders, and, thanks to their contributions, it was possible to define specific objectives, aligned and complementary to the NWMP, with which operational measures have been associated. The objectives are to aim to bridge the gaps and address the identified challenges.

48. The first obstacle that has to be removed to allow an effective enforcement of the measures defined by CEAP is the low level of cooperation among government and industry. A mutual trust among stakeholders is a fundamental prerequisite and for this reason CEAP foresees specific actions with the aim to create a communion of purpose between public and private stakeholders. Most stakeholders are aware that the key element is the full and active involvement of all the representatives of CDW value chain in the decision process about CEAP.

49. “You can’t manage what you can’t measure”. The collection of quality data on CDW generation and management is the second prerequisite for the success of CEAP. Improving the integration of existing IT tools for CDW data collection and training of operators on their use are the actions identified to reach a more detailed and accurate picture of how CDW is managed. This information is also needed to enable monitoring of the measures included in CEAP itself.

50. CEAP requires particular attention to defining a set of regulations that will simplify the permitting phase for installations that carry out CDW collection on the territory and the successive recycling into SRM. This will make possible the establishment of a network of plants that can respond to the growing generation of CDW and provide a viable alternative to reduce the still frequent phenomena of CDW dumping. Complementary to the creation of a consolidated supply chain of CDW derived materials, the CEAP foresees measures for the creation of a stable demand for recycled materials. The Green Public Procurement represents the tools to consolidate the market of SRM.

51. CEAP identifies as a short-term target the overcoming of existing challenges and, as a long-term target the full transformation of the CDW value chain with and the minimization the CDW generation. The second target, in order to be achieved, requires the implementation of dedicated measures focused on the creation of strong awareness about the environmental impact caused by inefficient management of CDW since the initial stages of CEAP. This will lead the construction sector to a profound transformation that will include the adoption of new design methods based on the concepts of eco-design and innovative use of existing buildings to reduce the demand for new buildings. The enforcement of dismantling procedure, reuse of building components and restoration instead of demolition, will allow, in the long run, a reduction of CDW generation. For this reason, there are measures established to enable the dissemination of know-how in these areas to both public and private operators.

52. Just as Rome wasn’t built in a day and by one person, the CEAP enforcement needs the commitment from all the stakeholders and a strong government’s will to be fully implemented. The analysis conducted over the evolution of CDW management in other European countries that faced similar challenges in the past, confirmed that only through the creation of a coordinated and shared framework of conditions, measures and actions that work collectively, is it possible to improve performance of CDW management over a period of time and a single measure is not sufficient to improve the environmental performances of CDW value chain.

53. **Croatia today is at a crossroads: the increasing production of CDW caused by the urbanization process and new infrastructures, if properly addressed, can present an opportunity to move the building sector and CDW value chain in the direction defined by the Circular Economy Package.** This CEAP, developed with the contributions of all the stakeholders in the CDW value chain, has the ambition to define the measures to capture this opportunity.

8. REFERENCES

- 50 measures for a 100% circular economy – Roadmap for the Circular economy – Ministry for an Ecological and Solidary Transition - France
- Adapted from Potting, J., et al., 2017. *Circular Economy: Measuring Innovation in the Product Chain*. Available at <http://www.pbl.nl/sites/default/files/cms/publicaties/pbl-2016-circular-economy-measuring-innovation-in-product-chains-2544.pdf>.
- Circular Economy Initiative Deutschland (Ed.): Circular Economy Roadmap for Germany (Update Dezember 2021), *Kadner, S., Kobus, J., Hansen, E., Akinci, S., Elsner, P., Hagelüken, C., Jaeger-Erben, M., Kick, M., Kwade, A., Köhl, C., Müller-Kirschbaum, T., Obeth, D., Schweitzer, K., Stuchtey, M., Vahle, T., Weber, T., Wiedemann, P., Wilts, H., von Wittken, R. acatech/SYSTEMIQ, Munich/London 2021. DOI: https://doi.org/10.48669/ceid_2021
- Circular Economy roadmap of France: 50 measures for a 100% circular economy - https://circulareconomy.europa.eu/platform/sites/default/files/frec_anglais.pdf.
- Council of the European Union. (2008). Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste. <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32008L0098&from=EN> .
- Croatian Government. (2016). The Decision on the Adoption of the Waste Management Plan of the Republic of Croatia for the period 2017-2022. <https://vlada.gov.hr/UserDocsImages//2016/Sjednice/2017/01%20sije%C4%8Dani/15%20sjednica%2014%20VRH//15%20-%202.pdf>.
- Deloitte (2017): Study on Resource Efficient Use of Mixed Wastes, Improving management of construction and demolition waste – Final Report. Prepared for the European Commission, DG ENV.
- Dutch Ministry of Infrastructure & Environment (DMoITE) (2017): EoW for inert aggregates in Member States. ECN project numbers 5.3498, 5.4171.
- EEA greenhouse gases - data viewer — European Environment Agency. (n.d.). Retrieved August 1, 2022, from <https://www.eea.europa.eu/data-and-maps/data/data-viewers/greenhouse-gases-viewer>.
- Environmental Agency Austria [UBA], (2022). Circular Economy Approaches in Solid Waste Management Material Flow Analysis for Circular Economy in Croatia.
- European Environmental Agency (EEA)/European Topic Centre on Waste and Materials in a Green Economy (2020). Construction and Demolition Waste: challenges and opportunities in a circular economy.
- European Union/EU Construction and Demolition Waste Management (2016). EU Construction and Demolition Waste Protocol and Guidelines.
- European Union: Circular Economy Action Plan – 2020. <https://op.europa.eu/en/publication-detail/-/publication/45cc30f6-cd57-11ea-adf7-01aa75ed71a1/language-en>
- Izvešće o gospodarenju građevnim otpadom u 2020. Godini – MoESD 2021 - https://www.haop.hr/sites/default/files/uploads/dokumenti/021_otpad/Izvjescia/OTP_2021_Gradjevni_izvjesce_2020.pdf
- Leading the cycle Finnish road map to a circular economy 2016–2025 – SITRA - <https://www.sitra.fi/app/uploads/2017/02/Selvityksia121.pdf>.
- Lean Business Ireland (2016). Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects.
- Ministry of Environmental Protection and Energy, Management waste in the Republic Croatia in 2018, 2020. Source: <https://www.hgk.hr/documents/pgo-prezentacija-hgk-burza-otpada-2520185aeb13c483058.pdf>.
- Northern Ireland Environmental Agency (2013): Quality Protocol-Aggregates from inert waste. End of Waste criteria for the production of aggregates from inert waste, available at <https://www.gov.uk/government/publications/quality-protocol-production-ofaggregates-from-inert-waste>.

Project co-financed by the European Union from the Cohesion Fund

- Roadmap towards the circular economy in Slovenia - https://circulareconomy.europa.eu/platform/sites/default/files/roadmap_towards_the_circular_economy_in_slovenia.pdf.
- Strategy for Circular Economy – Government of Denmark - https://circulareconomy.europa.eu/platform/sites/default/files/eng_mfvm_cirkulaer_oekonomi_as5_uk_final_web.pdf.
- What is a circular economy? Source: Ellen MacArthur Foundation, <https://ellenmacarthurfoundation.org/topics/circular-economy-introduction/overview>.

OPEN DATA FROM THE EU The EU Open Data Portal (<http://data.europa.eu/euodp/en/data>) provides access to datasets from the EU. Data can be downloaded and reused for free, both for commercial and non-commercial purposes.

ANNEXES

Annex I – Report on priority measure analysis

Annex II - European Best Practices on CDW Management

The following maps show the countries that have adopted specific procedure to support the transformation of the CDW value chain from linear to circular. These procedures are considered as best practices and have been used by the EU commission to define the content of the “EU CDW Protocol and guideline”⁴⁹.

Mandatory Pre-demolition audit



Figure 10: EU Countries that approved pre-demolition audits

Several countries (**Figure 10**) set as mandatory a pre-demolition audit to identify and remove the reusable components, removing hazardous materials such as asbestos roof, gasoline tanks, PCB equipment. The adoption of a preliminary audit minimizes the risk of spreading polluting materials into potentially recyclable CDW or, the production of SRM containing pollutants. At the same time the preliminary audit allows the identification of building elements that can be reused or diverted to specific recycling processes.

⁴⁹ https://single-market-economy.ec.europa.eu/news/eu-construction-and-demolition-waste-protocol-2018-09-18_en

Sorting of CDW



Figure 11: EU Country that approved CDW sorting procedures

The selection at source of different CDW streams play a fundamental role to increase the quality of recovered aggregates and avoid downcycling.

The selection at source of cement for the production of high-performance recycled aggregates represent the most common example. In order to promote the production of high quality SRM and increase the trust of the market for them, several countries (**Figure 11**) introduced the mandatory sorting of CDW, on site or in a dedicated installation.

In many cases the gate fee of the sorting installation depends on the estimated amount of undesired material (e.g. the prior removal of metals).

Mandatory separate collection of specific CDW



Figure 12: EU Country that approved separate collection of CDW procedures

CDW are composed of different materials that present different levels of recyclability. Specific materials such as plastic pipes made of PVC, can be easily recycled and the obtained material has high technical properties. Also asphalt and bitumen, if sorted separately, can be transformed into new construction materials.

Unsorted materials can be recycled but the obtained materials can present technical properties that are not constant. Therefore, its use is limited to application with low technical requirement or downcycled as filler. For these reasons, several countries (**Figure 12**) have introduced mandatory separate collection of specific CDW streams using on site sorting and dedicated container. Other countries don't impose this obligation but developed dedicated guidelines and foresee specific advantages (e.g, lower gate fee) for sorted materials from building sites.

Mandatory GPP

GPP is considered as one of the most effective tools to address the market to a more circular approach. The countries highlighted in **Figure 13** has defined specific obligations in relation to the design criteria or the use of recovered materials in order to participate to the public tenders. EU Commission developed, since 2016, specific guidelines on GPP to support the National Authorities on the enforcement phase. In particular on EU commission website⁵⁰ are available two guidelines related to CDW value chain: (i) *Office Building Design, Construction and Management* (currently under revision), and “*Road Design, Construction and Maintenance.*”



Figure 13: EU Country that approved GPP procedures

⁵⁰ https://ec.europa.eu/environment/gpp/eu_gpp_criteria_en.htm

Annex III - Description of Gaps, Drivers and Barriers

Specific gaps are identified in Croatia's CDW sector that hinder it from becoming a more circular one:

- Insufficient information on CDW streams
- Low recycling and recovery rate of CDW
- Low CDW management capacity and high amount of CDW landfilled or dumped per GDP unit
- High amount of CDW generation and GHG emissions per GDP unit
- Low technical knowledge of CE and low rate of R&D in the field of CDW
- Low market share on CDW SRM

Insufficient information on CDW streams

A solution to the problem of the underdeveloped CDW management system and insufficient infrastructure is to increase the cooperation among stakeholders for the creation of an enabling environment that will allow the creation and growth of new recycling plants.

The target groups, in order to increase communication between stakeholders in CDW management process, should be: industry practitioners; construction sector (renovation companies and demolition contractors), construction product manufacturers, waste treatment, transport, and logistics as well as recycling companies; public authorities at local and regional levels; quality certification bodies for buildings and infrastructure; and clients of CDW recycled materials.

Table 4) below presents a short description of barriers and drivers related to communication between stakeholders.

Table 4: Barriers and drivers related to Stakeholder Communication

TYPE	BARRIER
Policy and Regulatory	Unrecorded CDW / illegal dumpsites due to lack of regulation framework
Institutional	Lack of effective communication and understanding between individuals, private and public stakeholders
Infrastructural	Lack of capacity for treatment of CDW resulting in a significant share of undisposed and unrecorded CDW
TYPE	DRIVERS
Social	Awareness raising to inform about the importance of having consistent data, and education and training to introduce the CDW in the system for stakeholders
Infrastructural	Increased infrastructure for treatment by planning new locations for the CDW recycling yards in spatial plans

Low recycling and recovery rate of CDW

Further progress is expected in recycling, especially for mineral CDW, since several new permits are being issued for shredding waste in crushers. The processing of construction waste produces increasingly more recycled aggregates and other materials used in road construction and backfilling. It is also important to increase the recovery of old asphalt.

According to WMP 2017-2022, measure M 2.1.2.: Construction and equipping of construction waste treatment plants (2023-2029) will help in the development of new recycling yards for CDW and to buy equipment. These measures include building and equipping new plants and increasing the capacity of existing ones (may include a mobile construction waste recycling plant) and improving the technology of existing construction waste treatment plants.

Table 5 below presents a short description of barriers and drivers related to the low recycling and recovery rate.

Table 5: Barriers and drivers related to low recycling and recovery rate.

TYPE	BARRIER
Policy and Regulatory	Complex and unclear end of waste (EoW) standard
Institutional	Insufficient number of permits issued for shredding waste in crushers and CDW recycling facilities
Infrastructural	Insufficient logistic arrangements and lack of recycling facilities
Economic	Lack of financial measures and activities for prevention of CDW
Technological	Lack of technology for CDW separation and collection at source

TYPE	DRIVERS
Policy and Regulatory	New regulations and protocols aligned with EU: GPP, selective demolition and eco-design standard
Institutional	Progress in recycling, especially for mineral construction waste, and increased number of new work permits for shredding waste in crushers and recycling facilities
Infrastructural	Construction and equipping of CDW treatment plants will help in development of new CDW recycling yards and to buy equipment
Economic	Promoting sustainable construction; exchange of knowledge in green and sustainable construction (part of the NWMP)

Low CDW management capacity and high amount of CDW landfilled or dumped per GDP unit

The combined effect of a low level of controls, lack of authorized collecting points for CDW and limited environmental awareness is the reason behind the high number of illegal dumping sites. In 2020, there was an estimated total of about 2,200 tons of disposed waste. In reality, the quantities of discarded waste and the number of illegal dumpsites are much higher.

In order to reduce disposal of asbestos-containing waste, new measures for better management need to be considered, which would provide better protection against illegal dumping. The NWMP defines measures to be completed by the end of this planning period (2017-2022) in M 2.3.2.: Preparation of a study to estimate the amount of asbestos-containing waste by counties. Measures to be continued in the next planning period (2023-2029) will include M 2.3.4.: Improving the asbestos-containing construction waste disposal system.

Enforcement of landfill restrictions is primarily the responsibility of local and regional governments. Local government needs to manage complaints about illegal dumping actively, including thorough investigations and follow-up of reporting. Proportional sanctions for illegal activities need to be imposed.

If there is a shortage of permanent recycling facilities, temporary recycling installations and on-site recycling can help as well. Some materials of higher value (plastics, ceramics, glass, gypsum, wood and metal) could be transported further away. Advantages of mobile recycling plants can include reduced transportation costs, and direct on-site access to the recycled materials.

Table 6 presents a short description of barriers and drivers related to the increase of treatment capacity.

Table 6: Barriers and drivers related to Increasing of treatment capacity

TYPE	BARRIER
Policy and Regulatory	Lack of a standardized system to separate hazardous waste and waste contaminated with hazardous substances
Economic	Reduction in the collection and disposal of this waste related to the lack of co-financing of the collection system
Institutional	There are limited enforcement of landfill restrictions
Infrastructural	Insufficient allocation of the space for recycling Lack of infrastructure planning for the treatment of CDW based on the zoning
Economic	Lack of public co-financing of the measures and activities for prevention of CDW

TYPE	DRIVERS
Policy and Regulatory	Legislation related to ecosystem's health and safety: the removal of asbestos which is the most frequent hazardous substance in CDW
Institutional	Allocation of temporary recycling installations and on-site recycling
Social	Environmental awareness about the landfilling impacts, and sustainable tourism that leads to a proper management of CDW
Economic	Encouraging the reuse of materials from CDW; introduction of an incentive fee for the reuse of demolition materials – part of the NWMP
Technological	Local authorities to form a view on the use of mobile recycling plants (or mobile crushers)

High amount of CDW generation and GHG emissions per GDP unit

Authorities at all levels can provide incentives for promoting the use of CDW recycled materials. GPP criteria have been published for use in office buildings and in road construction. These guidelines take a lifecycle approach that addresses not only the use of recycled materials but also the ability to design buildings for disassembly – enabling high rates of reuse and recycling at the end of life.

The evolution to more sustainable tourism will include the renovation and construction of sustainable buildings. This pathway will also include the inclusion of eco-design criteria and the proper management of CDW.

The GPP plan should be considered as the main instrument to enhance the market of CDW-derived materials. The adoption of specific minimum environmental criteria for road and building construction, taking into account the current limited production of derived materials represents an opportunity to meet market demand within the existing legal framework.

Table 7 presents a short description of barriers and drivers related to the high amount of CDW generation and GHG emission per GDP unit.

Table 7: Barriers and drivers related to CDW generation

TYPE	BARRIER
Policy and Regulatory	The national rules, plans and standards do not integrate CDW generation and GHG emissions intensity criteria
Economic	There are no economic incentives to use recycled materials and so-called green materials
Technological	The appropriate and green technology is missing in the CDW sector; the companies have not adopted/renewed the technology to reduce resource intensity

TYPE	DRIVERS
Policy and Regulatory	Croatia developed in 2015 a National Plan for the enforcement of GPP criteria without mandatory criteria for public buildings and infrastructures; this plan is currently under review
Social	Active citizens and sustainable consumption patterns that enforce and boost the implementation of environmentally friendly practices The role of sustainable tourism that leads to a proper management of CDW The evolution to more sustainable tourism will include the renovation and construction of sustainable buildings; this pathway will also include the inclusion of eco-design criteria and the proper management of CDW
Economic	Croatia has identified the construction sector as a priority sector for green public procurement and it focuses on public expenditure

Low technical knowledge of CE and low rate of R&D in the field of CDW

Improved waste identification, separation, and collection at the source are at the start of the CDW management process. Improved waste identification requires clear and unambiguous definitions; it also requires good quality pre-demolition audits and waste management plans to be prepared and executed.

It is necessary to improve familiarity and knowledge of the public servants regarding resource streams and circularity analyses, and implementation of circular models. The local and national governments

should come forward and play their part in enlightening the organizations regarding the ecological, economic, and social benefits of the CE approach.

Business cooperation is needed in the areas of recycling and circular production, and connection of these sectors with the public sector. Investments in the reuse and recycling infrastructure and R&D are necessary to ensure the transition to CE in waste management and the achievement of EU waste management objectives. The transition from waste management as the main option for waste treatment to reuse and recycling requires an efficient waste collection system, new technologies and sufficient waste recycling capacity.

To increase confidence in the quality of CDW recycled materials, the CDW obtained should be efficiently dealt with and handled such that its quality is not impaired. Selective demolition should be practiced for hazardous materials. The handling should be efficient so that mixing would not occur. On-site sorting should be carried out in such a way as to avoid the mixing of waste. Classification of waste should be according to its nature and potential economic benefits. Efficient quality control systems should be enforced with the proper check and balance on methods of material recovery, waste acceptance criterion, material properties, and the pros and cons of material utilization in construction activities.

In order to promote circular value chains there must be a supporting institutional and legal framework that endorses them. At the national level, stakeholders and decision-makers still need to develop a clear vision for waste management based on the principles of CE. An important step will be to establish a CEC and to establish a CE platform.

Table 8 below presents a short description of barriers and drivers related to the low technical knowledge of CE and low rate of R&D in the CDW sector.

Table 8: Barriers and drivers related to low technical knowledge of CE and low rate of R&D.

TYPE	BARRIER
Policy and Regulatory	Inexistence of circular initiatives that hinder the adoption of new circular approaches in all sectors
Institutional	Lack of communication and coordination between private sector and the administration to implement unified plans for the implementation of CE in the CDW sector There is no in-place construction waste separation system at the site of generation Insufficient institutional awareness and legal framework to promote the adoption of CE practices
Technological	Insufficient investments in the R&D and new technology in the waste management sector Lack of confidence in the quality of CDW recycled materials
Economic	Lack of financial measures and activities for prevention of CDW

TYPE	DRIVERS
Institutional	Conducted events dedicated to the exchange of knowledge on green and sustainable construction Improved waste identification, separation, and collection at the source to reduce fees at the landfill Establishment of a Circular Economy Committee and a circular economy platform
Technological	Investment increase in the transition from waste management as the main option for waste treatment to R&D and new technologies to ensure the transition to a CE The waste obtained from CDW activities should be efficiently dealt with and handled such that its quality is not impaired; selective demolition should be practiced for hazardous materials; the handling should be efficient so that mixing would not occur. Efficient quality control systems should be enforced

Technological	Investment increase in the transition from waste management as the main option for waste treatment to R&D and new technologies to ensure the transition to a CE The waste obtained from CDW activities should be efficiently dealt with and handled such that its quality is not impaired; selective demolition should be practiced for hazardous materials; the handling should be efficient so that mixing would not occur. Efficient quality control systems should be enforced
----------------------	---

Low market share on CDW SRM

One of the reasons the market is underdeveloped for recycling waste coming from different sectors, and the lack of fiscal incentives promoting circular production and recycling, is that they often make recycling and recovery of materials more expensive than using raw materials.

The backbone of the NWMP consists of recycling yards and recycling centers where waste can be prepared for recycling. The capacities and facilities of the waste management centers will promote innovative waste management practices and assume the achievement of reduced waste quantities. Waste management facilities are waste collection facilities including waste storage facilities, reloading/transfer stations and recycling yards, waste treatment facilities including landfills, waste management centers, and construction waste recycling facilities.

Hazardous waste needs to be removed correctly and systematically prior to demolition in order to minimize the risk of spreading of contaminated materials to non-contaminated areas. The waste management plan needs to foresee which actions are to be taken if unexpected hazardous waste materials are found.

New products need to be created by using recycled material and construction materials derived from CDW.

Table 9 below presents a short description of barriers and drivers related to low market share of SRM.

Table 9: Barriers and drivers related to low market share of SRM.

TYPE	BARRIER
Policy and Regulatory	Standards, guidelines and enforcement laws that oblige the SRM production are missing
Infrastructural	Insufficient logistic arrangements and lack of recycling facilities and limited recycling facilities with capacity and quality to treat different wastes
Social	Lack of confidence in the quality of CDW recycled materials
Economic	High cost of waste management and the introduction of a circular value chain across the CDW sector have been detected as a barrier since recycled materials still cannot compete with natural raw materials
Technological	A crucial part of the source separation is the elimination of hazardous waste, as well as the separation of materials that hamper recycling

TYPE	DRIVERS
Policy and Regulatory	Legislation in line with the EU to ensure material quality: enforcement of EU Regulation n. 305/011 for CE labelling of recycled aggregates as well as other labelling to clarify the technical comparability to natural aggregates
Infrastructural	Circular models require increased logistic activities along the sector value chain; the backbone of the WMP consists of recycling yards and recycling centres where waste can be prepared for recycling
Economic	Fiscal incentives promoting circular production and recycling Product development; creation of new products using recycled materials; construction materials derived from CDW; ECO-SANDWICH

Annex IV – Comments to first draft of CEAP measures

The following **Table 10** summarizes the comments to the first draft of CEAP measure shown to stakeholders during the Consultation meeting held on July 22, 11th.

Table 10: Annex IV – A Comments from the Ministry of Agriculture.

Author	Measure	Comment	Accepted/ Not Accepted
Ministry of agriculture	General comment	A general comment on the draft action plan is that the proposed goals, sub-measures and activities do not follow a logical or time matrix and it is suggested to redefine them. Overlapping activities are elaborated through six separate objectives/measures. Creating a matrix based on the bottom-up principle, listing all activities (given that it is an action plan), will enable a clearer overview of the problem and significantly facilitate the implementation of the plan, as well as a clear division of responsibilities and the time sequence of the implementation of activities.	Partially accepted. The scheme of CEAP has been redesigned considering these points
		Also, a number of objectives/measures can be summarized into a smaller number of objectives. Thus, for example, the activities in measures 1 and 2 can be combined into one - 'Promoting the development and adoption of an incentive legislative framework for effective management of construction waste'. This goal would include sub-measures/activities such as creating a comprehensive solution for mapping, i.e. collecting waste information, creating a platform (IT) that will improve cooperation between stakeholders in the sector and ultimately facilitate the creation of a legislative framework with all interested stakeholders	
	M.1.1	Every legislative proposal (strategy, law, regulation) in the Republic of Croatia goes through a public consultation procedure.	Accepted. Text reformulated
	M.1.3	The structure of the state administration in the Republic of Croatia imposes the legislative competences of individual sectors; one body is in charge of drafting the law, while the others participate in part of their competences. In the process of drafting legal regulations, commissions are established that enable an intersectoral approach to the drafting of regulations.	General comment no need to accept it
	M.2.1 A.2.1.3	Provide a link with other platforms that deal with waste (e.g. - BIOHUB M.poljoprivrede), i.e. extend the IT solution to other types of waste, not just construction.	Not accepted, out of the scope

Author	Measure	Comment	Accepted/ Not Accepted
	M.2.2	Within this objective, M2.2 should be implemented before measure M2.1. - first, it is necessary to map the data and flows of waste generation that will serve to define the parameters of a comprehensive IT solution, then revise the existing software, and finally create and implement a new interface	The map of CDW stream is developed by MoESD and included in annual report on CDW generation and management.
	M.2.4	Activities A.2.4.1. and A.2.5.1. are key points that will directly affect the reduction and better management of construction waste; they are related to significant changes in the legislative framework and therefore should be adequately elaborated and put in the focus of this action plan.	Accepted. Proposal redefined and detailed.
	M.3	Measure 4 precedes measure 3, they can be combined into one measure - 'Encouraging efficient and circular waste management'	Not accepted.
	M.3.2 A.3.2.4	These IT tools should be developed in measure 2.	Not accepted. The tools have different target and meaning. The development of IT tools should coordinate in order to harmonize and share the information avoiding excessive request of data
	M.3.3	This activity is a measure	Not clear
	M.3.4	Redefine, it is unclear what is intended by this action.	Accepted
	M.5	Measures 5 and 6 are aimed at further development and innovation in the sphere of construction waste and could also be combined into a measure to encourage waste reduction through the development of research and innovation in eco-design and construction	Not accepted
	M.5	These actions are also part of the development of the IT platform	Not accepted. The tools have different target and meaning. The development of IT tools should coordinate in order to harmonize and share the information avoiding excessive request of data

Table 11: Annex IV – B Comments from the Croatian Business Council for Sustainable development – HR BCSD

Author	Measure	Comment	Accepted/ Not Accepted
Croatian Business Council for Sustainable development – HR BCSD	M.1.1	Within the Ministry, there are already two bodies within which it is possible to realize the above. It is not necessary to create a new platform, but to use existing and available tools for improving the system.	Accepted CEC has been included as coordinator of M.1.1
	M1.1	In addition to HG, there are other business organizations that need to be included in the implementation of this activity. Especially in light of the change in the Law on HGK and the fact that small companies are no longer mandatory members of HGK. It is especially necessary to include chambers of engineers and architects, HUP, Council for Green Building, etc.	Accepted
	M1.2	It is not clear from where this fund would be filled, i.e. from where the funds would be provided. At the EU level, there are various funds intended specifically for research activities and in the field of C&D waste management. It is necessary to focus on these means.	Not Accepted. CEAP is not in charge only for the proposal of funds.
	A1.3.1	The Ministry of Economy and Sustainable Development already has two bodies that can meet the needs stated in this measure. Let's use existing bodies.	Accepted. CEC has been involved and included in M.1.1.
	A1.4.1	There are already clearly defined responsibilities of public bodies in positive legal regulations. The challenge is related to the implementation itself. Especially if you do not catch the perpetrator of undesirable actions in the act. It is necessary to completely turn the system around and redirect the powers to LGUs, and not wait for court proceedings to be initiated. Connect illegal dumping with economic activity and financially punish any illegal behavior immediately on the spot.	Accepted. Proposal of increase the power of local inspectors
	A1.4.1	The above is not a measure, but an indicator. The measure would be: Actively work to reduce illegal landfills. The indicator of this measure would be that by 2030 illegal landfills have been reduced by 50%.	
	A2.1.1	HGK has nothing to do with the IT solution. It is managed exclusively by the Ministry.	Not accepted. HGK will be in charge of developing the IT tools.
	A.2.1.2	Include other chambers as well. HGK is not the only business organization	Accepted
	A2.1.3	The aforementioned action would represent a direct administrative obstacle especially for SMEs, but also for large companies. It is not clear how this would be implemented. It is necessary to define the action more clearly.	
	M2.3	It is necessary to clarify the measure	Accepted. Better description provided
	M2.4	The above implies a change in the legislative framework. In view of the challenge related to the adoption of regulations, I propose to change the wording.	Not accepted
	M2.5	Personally, it seems to me that the above is already an obligation, but I believe that colleagues from the ministries will comment on the same.	General comment. The CEAP foresee new installations.

Author	Measure	Comment	Accepted/ Not Accepted
		The problem is not in the audit before demolition, but in the lack of infrastructure to manage this waste after demolition. When you have certain C&D waste and you have nowhere to put it, then what?	
	A3.1.1	It is not clear what is meant by this. The procedure is not complicated; the system is simply missing. If there are no consequences for negative actions (illegal disposal) and there is no place where waste can be legally disposed of, actions defined in this way do not make sense.	
	A3.1.2	I also suggest publicly available information on construction waste disposal sites with highlighted disposal prices.	Not accepted
	A3.1.2	Personally, I am not aware that such an association exists. I welcome its establishment and ask that its representatives be named.	Accepted
	A3.2.2	It is not clear which Association this is. Please clarify.	accepted
	A3.2.3	I believe that a separate regulation is not needed, but rather an addition to the existing one, which will clearly define the way of dealing with, for example, waste asphalt.	Action removed
	M3.2	This process has more to do with defined standards related to construction products than with permits. Permits are issued for the treatment of certain waste, and as far as I know, permits are not issued for the installation of a secondary unit in a new product. The amount of secondary aggregate in the product is defined by the quality standard for that particular product and that standard should be adhered to.	Measure replaced
	A3.2.4	I am repeating a comment related to an association that, as far as I know, does not exist.	
	A3.3.1	Reduction of delay is possible if a market is created for the new product. If there is no market, companies will simply have to pay fines. Therefore, it is necessary to reformulate this measure.	Measure replaced
	A4.1	Does this mean waste or unused product? It is not clear what exactly is meant by 'waste recovery system'. It is necessary to describe the system. If we mean extended producer responsibility and returns within this system, then we are talking about product returns, not waste returns.	
	A5.1.1	The above is part of the client's request, not the company's choice. This is where the role of architects and construction experts comes to the fore, who should specify the minimum proportion of secondary aggregate used during design. The contractor has no influence on this.	General comment
	A5.1.3	HGK and the academic community cannot be the executors of this measure. This is the exclusive competence of state institutions.	Measure replaced

Author	Measure	Comment	Accepted/ Not Accepted
	5.2.1	This tool was developed by HGK and is already available to companies. You should start using it. The unnecessary formation of additional platforms is an inefficient use of resources.	Accepted

Table 12: Annex IV – C Comments from the Service for harmonization with EU strategies and international obligations

Author	Measure	Comment	Accepted/ Not Accepted
Service for harmonization with EU strategies and international obligations	General comment	In addition to this proposal of measures of the Action Plan for a circular economy in the construction waste management sector in Croatia, an introductory part should have been made with a description of the situation in the sector, a presentation of the goals, needs and measures that arise from them and through which the set goals will be realized. It is somewhat difficult to monitor and comment on the proposed measures without data on the situation in the sector.	Accepted.
		Thresholds (percentages, etc.) in all measures are very high. Their justification and feasibility should be considered.	
		Larger number of agreements/partnerships annually between	
	M1.1	A greater number of agreements/partnerships per year between stakeholders in the value chain in % should be an indicator, and the measure should be, for example, the creation of an information system or a platform for communication and cooperation between sectors.	Measure replaced
	A1.1.1	Within the framework of the CIRKULAR.HR platform, a "sub-site" for construction waste should be designed and created, which will facilitate cooperation and data exchange between the public sector (state administration, regional and local self-government, scientific and research institutions), the private sector, non-governmental organizations, associations and other stakeholders in the field of construction, construction industry, construction waste management, transport, logistics, etc. within the framework of which stakeholders will be mobilized and their engagement in waste reduction and construction waste management will be supported.	Accepted.
Instead of "association/cluster/round table", the intersectoral working group from A.1.3.1 should be put.			
A1.2.1	10 research and innovation projects and training that will be carried out by stakeholders of the value chain in construction should be an indicator, and as a measure, co-financing from the state budget of partnerships on projects in the Framework Program for Research and Innovation Horizon Europe - Innovative Europe and other programs could be foreseen and EU funds and support from the state budget for the use of innovative solutions in construction waste management.	Accepted	

Author	Measure	Comment	Accepted/ Not Accepted
	A1.3.1	The measure should be defined as a reduction in the number of regulations governing the field of construction waste management. The smaller number of regulations in % should be an indicator.	Not accepted
	M1.4	Fewer illegal landfills by 2030 in %. should be an indicator. 50% less illegal landfills compared to which year?	With the first year of implementation
	M1.4	A.1.4.2. To prescribe offenses and determine penalties that are proportional to the offense. A.1.4.3. Regulate by law that revenue from fines is paid into the state budget for building capacity for construction waste management.	Clarified measure in the new text
	M2.1	M.2.1. should be connected to the platform from A.1.1.1. and mark HR entities on the map and connect those who offer and those who demand construction waste (create a kind of waste exchange) in order to reuse it or produce a new product from it. Within the framework of the platform, examples of good practice should be presented, and the platform should be connected with similar platforms or exchanges in the EU.	Accepted. The IT tools should be coordinated
	M2.3	A Communication Strategy should be created and through various forms of informing the public (public forums, public presentations, conferences, workshops, media campaigns, etc.) raise awareness about recycling and reuse of construction waste.	Accepted.
	M2.4	The link between the measure, the description and the related actions is not clear. Is the creation of a construction waste management plan and the submission of a report for obtaining a use permit an obligation for everyone who builds or only for construction sites with an expected construction waste production of more than 200 t?	Not defined in CEAP. It will be decided by MoESD
	M2.4	Limit the capacity of legal landfills with construction waste? The meaning of this measure is not clear, and it interferes with the business policy of a company. Or is the goal to reduce the number of illegal construction waste dumps by 50% in the next 10 years? If the landfill capacity is limited, why is there an obligation only for construction sites with an expected construction waste production of more than 200 t?	No limit for landfill defined by CEAP
	M2.4	Do LGUs JLS have the capacity for these additional jobs?	Not accepted
	M2.5	Is there an item for this purpose in the JLS budget?	Not accepted
	A3.1.1	Adjust the time frame to the deadline (every year by 10%) from the description/context. What are the expected results until 2030? 70% or more?	Accepted.
	A3.1.1	How will limiting the capacity of construction waste disposal sites affect the increase in the rate of construction waste collection?	No limit for landfill foreseen by the CEAP
	A3.1.2	Increasing the rate of construction waste collection should be the goal, and the measure should be, for example, investment in disposal and recycling infrastructure.	Not accepted

Author	Measure	Comment	Accepted/ Not Accepted
	A3.2.1	The way the measures are written is not very logical, on the one hand, the existing capacities of recycling facilities are not sufficient to cover current and future needs, and on the other hand, the capacities of construction waste disposal facilities are limited.	No limit for landfill foreseen by the CEAP
	A3.2.1	Increasing the production of construction materials from waste should be one of the strategic goals. The measure should be something like financing the construction of regional stationary and mobile facilities from the budget of the Republic of Croatia and LGUs. Is an increase of 10% per year realistic? And is it realistic to expect that only the related actions A.3.2.1., A.3.2.2., A.3.2.3. and A.3.2.4. increase the production of building materials from waste?	Not financing but creation of an enabling environment for private initiative
	A3.4.1	Why only 10 islands in 10 years? By what criteria will the 10 islands be determined?	Not included in the final CEAP
	A5.1.2	Harmonize the time frame with the percentage from M.5.1.	Accepted
	A5.1.3	What is the role of the academic community in the implementation of the measure?	Accepted. Academy has to support on the definition of technical elements.
	A5.1.2	Connect with measure M1.1., related action A.1.1.1. in the "waste exchange" within the CIRKULAR.HR platform.	Accepted.
	A6.1.1	The guidelines should be prepared by the MCPPSA as the authority responsible for the Construction Act.	Accepted.
	A6.2.1	Adjust the time frame to the deadline (by 10% each year) from measure M.6.2.	Accepted.
	A6.4.2	Adjust the time frame to the deadline (by 10% each year) from measure M.6.4.	Accepted.
	A.6.5.1	Does uncontaminated soil have to be recycled in a waste management facility or could it be used on some other surface without recycling in the facility?	Not described in CEAP. Uncontaminated soil is not a waste for WFD

Author	Measure	Comment	Accepted/ Not Accepted
Holcim		A.1.1.1. In 2023, create a platform/association/cluster/round table for the exchange of information on building materials and new possibilities (introduce quarterly meetings).	Not accepted
		A.1.1.2. In 2023, the annual report on construction waste management issued by MoESD should be turned into a quarterly report, so that such a report is the basis for the work of the platform/association/cluster.	
		A.1.1.3. In 2023, choose one public procurement project on which such an agreement will be tested.	
		A.1.2.1. Creation of a fund for the initial co-financing of 10 projects that will implement the circular management of construction waste. The fund will be used to support studies related to construction waste management through grants and scholarships.	Not accepted
	A1.2.1	Innovations must be observed only at the local level, because in countries with a high percentage of construction waste recycling, they already have designed products.	Not accepted
		The academic community cannot be a responsible body when it says that a fund should be created, MoESD is responsible for that.	Not accepted
	M1.3	this measure is the basis of the further use of construction waste and must be carried out in 2023. E.g. This year, the Technical Committee for the Circular Economy was established at the Croatian Standards Institute	accepted
	M1.4	The application of regulations is primarily the responsibility of local and/or regional authorities. Local government should actively address complaints of illegal waste disposal through thorough investigations, monitoring and remediation. It is necessary to introduce proportional sanctions for illegal activities. Sanctions must be set at high levels to act as a deterrent, especially when it comes to hazardous waste. periodic inspection from construction site to site initiation of investigation to find the perpetrator of illegal dumping. Defining sanctions should be done after creating a legal and reliable alternative for construction waste management.	Accepted increased power of inspection
	A2.5.1	A.2.5.1. In 2023, Adopt the standard models of pre- and post-demolition reports that would be developed by MoESD and which are mandatory for construction sites with an expected generation of construction waste greater than 200 t. In 2024 include training for local authorities and stakeholders and implementation of the measure.	Accepted
	A3.2.3	A.3.2.3. Establish criteria for defining which Adoption of special regulations for certain streams of construction waste such as asphalt or plasterboard should be adopted (including courses for local government and construction waste processors).	Accepted
A3.2.4	A.3.2.4. Adoption of IT tools and guidelines in order to facilitate the process of issuing permits for material created from waste. - it is not clear what is meant here.	Accepted: better explanation provided	
A3.3.1	A.3.3.1 Permanent disincentive of disposal by charging a disincentive fee for disposal.	Not Accepted. The increase of fee can be foreseen when the	

Author	Measure	Comment	Accepted/ Not Accepted
			network of recovery plant will be able to treat the CDW.
	M4.1	on what basis are plasterboards and packaging waste separated?	Non accepted. International experiences with these materials
	M4.2	time frame 2025 and here it says 10 years. Need to coordinate	accepted
	M4.3	connected with the above measure, put 2025, or immediately, given that selective separation is prescribed by project documentation. Implementation in practice should be ensured.	accepted
	A.5.2.1	A.5.2.1 Design, development and implementation of web tools for real-time exchange of materials.	accepted
	A6.5.1	in most cases the material cannot be recycled because it is soil mixed with stones. It is necessary to find a solution for the use of this material. In addition to its use in horticultural works, it is necessary to encourage the use of this material for the rehabilitation of abandoned quarries. Considering that we also have a lot of illegal abandoned quarries, it is necessary to foresee the possibility that LGUs can give permission to Investors to transport excavated earth (KB 17 05 04) to such locations within their territory	accepted
	A6.5.2	this as a special measure because it refers to everything and not only to the material from the excavation	Not Accepted. EWC 170504 represent the largest part of CDW.

Table 13: Annex IV – D Comments uploaded on the collaborative platform “Padlet”. The comments are anonymous.

Author	Measure	Comment	Accepted/ Not Accepted
Padlet	Improve the collection and quality of data on construction waste	Since it is not specified, I suggest that the data on GO be collected according to the type of material for easier navigation and grouping of offers according to potential users. Also, since HGK already has an installed Waste Exchange, it can be adapted for data exchange and for construction waste. Also, related to measure M 4.1. it is possible to introduce several streams, such as plastic pipes, EPS insulation, PVC joinery, etc.	Accepted. The IT tools should be developed considering integration and information sharing among different databases.
	Increase efficiency in construction waste management, including its recovery	in the Plan for the use of financial resources obtained from the sale of emission units through auctions in the Republic of Croatia from 2021 to 2025, there is an area Research and development where certain funds are planned and which can be used for innovations, and about which the FZOEU should be contacted	Replaced measure with new explanation
	Ensure effective and encouraging laws and regulations for construction waste management	It is necessary to ensure the implementation of the existing legal regulations through the inspection services and municipal security forces of local self-government units in the segment of monitoring and preventing illegal dumping of construction waste into nature. Possible control is currently only carried out for "small" offenders, while significant investors/contractors of large projects are rarely monitored.	Accepted
Padlet		During construction, the supervising engineer must be presented with each monthly situation a PL-O form and an invoice from which it is evident that the resulting waste/excavation surplus has been disposed of in a legal manner at an authorized company. Subject items of works can only be recognized afterwards. At the technical inspection of each building, it is necessary to demand that all documentation provided by law for waste management be presented and prove specifically where all waste and excess excavation is disposed of. This must be a condition for issuing a use permit!	The proposed action includes a field survey. The details will be developed by the Responsible Authority.
Padlet	Stimulate the growth of the green building materials market	Encouraging and prescribing the mandatory quantity of construction waste as a secondary raw material should be coordinated with the available quantities of quality secondary raw material from construction waste primarily from the Croatian market.	Accepted.

Table 14: Annex IV – E Comments from the Directorate for climate activities

Author	Measure	Comment	Accepted/ Not Accepted
Directorate for climate activities	General comment by mail.	<p>Increase of 10% per year in the number of agreements/partnerships between stakeholders in the value chain. I suggest supplementing that measure by changing the wording and that the name of the measure is, for example, the establishment of an agreement/partnership between stakeholders in the value chain, the initial value is 0, and the target value is 10, and so the narrative is changed throughout the entire document. In the following, I selected some examples and commented on them in order to get a broader picture in which direction to amend the document in question, some of the comments are also listed in the attachment, however, to understand the context, it is enough to read the comments in the text of the email.</p>	
		<p>I cannot agree with measure M.1.3. increase the number of intersectoral laws/regulations developed by various state administrations by 50%. I believe that a greater amount of regulations will not create order, but rather education, raising the level of knowledge and awareness, which is achieved by the circular economy, so that society and the local community will be motivated and come up with instruments to move away from the linear economy. The order will do more by sanctioning those who do not implement the existing regulations.</p>	
		<p>The narrative of the Action Plan and the name of the measure is in the "spirit" of the wish list, and we need an operational document where we know who does what, at what time, with what money, and that's why the document is called the Action Plan.</p>	
		<p>Measure M.2.1. Defining a comprehensive information technology (IT) solution for the standardization of data and information management for the use, reuse and recycling of materials, as well as construction waste management is a measure that can be called the Establishment of a Circular Economy Platform, and under the description of the measure it can be stated: It is necessary develop a systematic approach in all value chains related to the Croatian economy, and refer to the measures listed in the Action Plan for a circular economy, on the basis of which the EC integrates the principles of the circular economy in the production and consumption of plastics, water management, food systems and management of special waste streams . The so-called intersectoral working group The circular economy committee will determine the stakeholders of the circular economy (focus on industry and suppliers of raw materials, energy sources and packaging) and according to them, create a national action plan for the transition to a circular economy through the adjustment of the legislative framework. The inclusion of representatives of the Republic of Croatia in the Stakeholder Platform for the European Circular Economy enables direct access to innovations and best practices, as well as cooperation in them.</p>	
		<p>In measure M.3.1. Increase construction waste collection rates by 10% writes: Creating a legal and reliable alternative will remove the moral excuse for illegal dumping, I think the narrative should be adapted to MoESD, the service provider. The narrative is also inappropriate in measure M.3.2. Increase</p>	

Author	Measure	Comment	Accepted/ Not Accepted
		the production of construction materials from waste by 10% per year where it says The process of issuing permits is considered one of the main obstacles for the development of new plants. MoESD can draft special laws that define minimum mandatory technical standards and, for projects that comply with these standards, adopt a simplified permitting procedure. Instead of creating, I suggest using: establishment, establishment or construction	
	M.1.1	establishment of agreements/partnerships between stakeholders in the value chain also an increase of 10% is to be set as the goal of the measure with the obligation to indicate the initial value	
	A1.2.1	FZOEU has funds for financing professional and scientific research, which can be planned as early as September 2022, but you need to know the name of the project and the necessary funds. Also, the research proponent will need to create a project assignment so that the tender can be published by FZOEU https://MoESD.gov.hr/UserDocImages/klimatske_aktivnosti/emisijske_jedinice/odl_dop_pl_drazbi_2_1_25.pdf	Not Accepted. CEAP will not define the funds.
	M.1.2	specify the specific name of the proposal for research and innovation projects	Not accepted. CEAP will not identify the projects. This part will be developed by the Responsible Authority

Table 15: Annex IV – F Comments from Strabag

Author	Measure	Comment	Accepted/ Not Accepted
Strabag	General mail	<p>I will focus on road construction, but same applies to buildings. These are operational proposals, rather than definitions of the present status, which we are all aware of anyway.</p> <p>I would propose simple steps/responsibilities for both construction (excess excavation and reuse of natural materials) and reconstruction projects (recycling of materials) at the START of each project, not at the END:</p> <p>CONSTRUCTION</p> <p>During the DESIGN phase, the investor must insist (it could also be defined by laws!) that the method of handling „waste“ is explained IN DETAIL in the main project. This way it is pre-defined and there can be no doubts during the tendering phase.</p> <p>At the same time, the Ministry has to impose a „payment per ton“ for the above mentioned waste as a sort of a „deposit“ from the INVESTOR, who can transfer it to the construction company (through the bill of quantities). Without this step NO construction permits are issued.</p> <p>In the tendering phase, ONLY the companies which can fulfil the above points can apply. If anyone has a better proposal than suggested by the design (for example, new methods of reuse), he can be awarded extra points.</p>	Partially accepted. Some measure includes the definition of financial guarantee for CDW management.
		<p>RECONSTRUCTION</p> <p>All existing infrastructure was built by fulfilling detailed designs/norms. This means that all the materials used have been CHECKED AND VERIFIED during construction. This means that there is NO NEED to test them again for End of Waste procedures, milled asphalt for example.</p> <p>Every INVESTOR needs to specify in the main design which materials can be reused/recycled for what purpose. This is the job of the DESIGNER and this way exact amounts of waste/materials could be tracked easily.</p> <p>Point 2 & 3 above need to be repeated again.</p> <p>The “deposit“ would include everyone in the process chain and not only burden companies with payment of „insurance per ton of deposited waste“, because companies try to evade this step by not classifying materials as waste. Another way would be classifying some known and verified materials as</p>	Partially accepted. Some measure includes the definition of specific EOW procedures and simplification of permitting process.

Author	Measure	Comment	Accepted/ Not Accepted
		by-products (not as waste), but this would probably take longer, even though some EU countries have done this.	
		I know this sounds very simple (or maybe not), but I believe it would help significantly the tracking of C&D waste. Also, there is definitely no need for two waste registers (called ROO and eONTO), both controlled by the same Ministry, because this is just administrative doubling. Whichever register will be chosen in the future, numbers could be easily compared to the amounts from the above described steps and we would finally have exact figures on all types of waste created during the process.	Accepted. A general review of IT tools is included in CEAP measures.

Table 16: Annex IV – G Comments from MCPPSA to CEAP proposal – first draft

Objective	Comment	Accepted/ Not Accepted
General comments related to the title of the document	1. We suggest that the name of the document be changed, given that it is an expert basis/guidelines for the preparation of a future strategic planning act.	Accepted. The CEAP should be considered as a proposal. The GoC can use the document as base to develop its own CEAP. Title of the document change to „Proposed CE Action Plan“
1	MCPPSA cannot be listed as the main executor of the measure ("Major Implementer") for any of the mentioned measures/activities, since state administration bodies cannot be applicants in public procurement procedures, nor are they allowed to do so by law. MCPPSA is a state administration body whose competence is determined by laws and is the responsible body in terms of making regulations and their implementation, all in accordance with the Law on the Organization and Scope of State Administration Bodies (Official Gazette 85/2020).	Accepted. In the last version of the CEAP MCPPSA is not qualified as Responsible authority in measure or action related to Obj. 1. The both terms “responsible authority” and “major implementer” has been adopted in agreement with MoESD and is equivalent to the “Activity holder” - <i>Nositelj</i> and “Activity Coholder” - <i>Sunositelj</i> as defined in the NWMP.
2	<p>Amendments to the Law on Construction (Official Gazette 153/13, 20/17, 39/19 and 125/19) in the sense of the obligation to introduce a mandatory elaboration of the Construction Waste Management Plan as an integral part of the main project, and for the purpose of obtaining a building permit, are not necessary, since that Art. 69, which defines the components of the main project, apart from the mandatory studies, leaves the possibility of creating other necessary studies, and the possibility of creating a study of the Construction Waste Management Plan is permitted by the Law.</p> <p>We also note that according to the current regulation, in accordance with Art. 30 of the Ordinance on mandatory content and equipment of building projects (Official Gazette 118/19 and 65/20) in the main project it is necessary to process Special technical conditions of</p>	Partially accepted The legislation currently in force doesn't have a clear reference to a mandatory CDW management report for building sites. The Team's proposal is to introduce a mandatory CDW management report for building sites with an expected production higher than 200 t of CDW in order to push the building companies to have a clear knowledge of the duties and cost related to CDW management since the design phase of the building. We introduce the reference to art. 69 and Ordinance on mandatory content and equipment of building projects (Official Gazette 118/19 and 65/20) in the measure's description column.

Objective	Comment	Accepted/ Not Accepted
	construction and waste management, and the possibility of stating the amount and type of waste is left.	
	The Law on Construction does not prescribe fees for the issuance of a building permit, so amendments to the aforementioned Law are not possible in this part. The Law on Administrative Fees (Official Gazette 115/16 and 114/22) and related Regulations regulating the amount of fees and tariff fees are under the jurisdiction of another ministry.	<p>Not Accepted</p> <p>In relation to A.2.3.3 The objective of the action is not the introduction of a tax or fee, but of a financial guarantee or bank surety for the site management company (only for sites with a planned CDW production of more than 200 t). The bank surety can be requested and used by the administration that issued the construction permit to cover the costs of remediation in the event of proven mismanagement of the CDW, caused by the activity or activity of a subcontractor of the company that obtained the construction permit.</p> <p>The proposed responsible authority was selected by the team on the basis of an analysis of the technical knowledge and administrative skills required to ensure proper implementation of the action. According to this criterion, the MCPPSA is the first choice. If the MCPPSA cannot be qualified as the responsible authority, the MOESD can be considered the second choice. Either body may identify one or more internal resources to develop the action or delegate an external expert.</p>

Table 17: Annex IV – H Comments from MoESD to CEAP proposal – first draft

Chapter	Page	Comments MOESD	Accepted/ Not Accepted
3	Pag. 14:	Given that the term is used in several places in the AP (in different contexts), we believe it is necessary to define it unambiguously	Accepted: text rephrased

Chapter	Page	Comments MOESD	Accepted/ Not Accepted
	Pag. 15: - [2]	Vague term "CDW value chain"	Accepted: added definition of CDW value chain
	Pag. 16: - [3]	The claim does not hold, and it is necessary to reformulate the sentence because a centralized system would probably not be economically justified	Accepted: text rephrased
	Pag. 16: - [4]	It is not clear which regulations are missing	Accepted: text rephrased with more emphasis on enforcement
	Pag. 16: - [5]	Although the absence of the obligation to use "green public procurement" does not contribute to the increase of the market for recovered products from construction waste, it cannot be argued that the absence of such an obligation is a limiting factor in the development of the market for recovered materials.	Partially Accepted: Stakeholders underlined that the existing market for SRM derived from CDW is very limited. The GPP is an international best practice universally used to push the market to greener solution especially where the raw material is cheaper alternative and when the SRM has a low market acceptance. The text has been rephrased.
	Pag. 17: - [6]	What method is used to determine the "reliability" of existing data?	Accepted. Text rephrased. Detailed explanation in Annex 1
	Pag. 17: - [7]	It is unclear what kind of control was meant.	Accepted. Text rephrased.
		"quality" of what?	Accepted. It was related to the quality of data collected.

Chapter	Page	Comments MOESD	Accepted/ Not Accepted
		We suggest reconsidering the expression, because if it was determined in the previous sentence that "the data is unreliable", using this expression means that this plan is "incorrect" and that it is not possible to implement "proper enforcement" of the measures from this plan.	Accepted. Text rephrased. The good quality of CDW data is crucial for monitoring the enforcement of CEAP.
		The obligation prescribed by law (handover to an authorized person) is not "alternative". The phrase "absence of a reliable alternative" is not correct because permits have been issued for the recovery of construction waste, therefore the obligation can be fulfilled. In addition, the issue of the cost of fulfilling the obligation (handover to an authorized person) has not been identified as a problem.	Partially accepted. Text rephrased using "limited" instead of "absence". Costs of CDW management has been discussed with private operator that underlined that transport costs is one of the factor that cause illegal dumping.
		The sentence does not make sense, because "the purpose of increasing cooperation ... is to enable new networking ... in order to implement CE".	Accepted
		It is a misdemeanor, and maybe even a criminal offense, and not a "diffuse phenomenon". The paragraph needs to be reworded.	Not accepted. All the stakeholders contacted identified illegal dumping as one of the main challenges
		It is necessary to familiarize yourself with the legislative framework of the Republic of Croatia, citizens can hand over CDW in recycling yards, and small companies can, with payment. After all, it is a question of the business of the person who performs the collection, because it is a market activity (excluding the possibility for citizens)	Not Accepted. The stakeholders underlined that the absence of a wider network of recycling yards represent a problem because citizens and companies must face high cost of transport.

Chapter	Page	Comments MOESD	Accepted/ Not Accepted
		It is necessary to reformulate the sentence, because the market exists, which has been proven in the registration procedures in the Register of Waste Elimination.	Not accepted. Based on MoESD data CDW SRM production is very limited (less than 100.000 t/y in 2020)
	Pag. 19: - [15]	A baseless claim that has nothing to do with this AP.	Partially accepted. Text rephrased.
	Pag. 19: - [16]	Taking into account that most of the legislative framework for waste management is pre-determined by EU ACQUIS, the discussion is carried out at the EU level, not at the level of the Republic of Croatia, and since this is a plan for the Republic of Croatia, the sentence is meaningless.	Partially accepted. Stakeholders highlighted that the problem is the implementation at national level of EU directive and the absence of follow up after the approval of new legislation. (Regulatory impact assessment (RIA))
	Pag. 20 - [17]	We are of the opinion that companies cooperate to the extent they need, and the issue of lack of cooperation cannot be a matter for the state AP without being precisely clear about what is being done, why it is being done and what will be achieved.	Not Accepted. The creation of a CE needs a strong and frank cooperation between government and industry as stated in any report on the enforcement of CE. Industry and companies highlighted that cooperation is limited and, in relation to technical aspects, the contribution of industry could be higher.
	Pag. 20:- [18]	It is unclear on what basis this is claimed, namely when it comes to construction products, they are regulated to a large extent by binding standards that address the above, so it is necessary to clarify what it is about.	Not accepted. As documented in many reports on SRM (e.g. IMPEL "Making the circular economy work") the lack of trust on SRM is a common problem despite the strict regulation at set EU level.

Chapter	Page	Comments MOESD	Accepted/ Not Accepted
4	Pag. 20: - [19]	It was previously stated that the implementing regulations were not implemented, here it is stated that "some" changes to the regulations are necessary - they are generally general and it is not clear what is meant, which is not acceptable for such a planning document	Partially accepted. Text rephrased. The details on amendments required is reported in Chapter 4
	Pag. 20: - [20]	It is necessary to clarify what "better answer" is.	Accepted. Text rephrased.
	Pag. 20: - [21]	In view of the claims and their possible consequences, it is necessary to specify which "key stakeholders" are in this section	Accepted. Text rephrased.
		Perhaps it should be planned to create an application for builders in which they would enter all the materials they have installed in the building with the exact location so that it can be connected with the land deed and then we have information about all the buildings. I think the Netherlands has something like that.	Accepted. Action A.2.2.5 added based on this suggestion.
	Pag. 21: - [23]	I would emphasize the mandatory education of the construction sector-craftsmen and companies, firefighters, communal wardens, communal companies	Accepted. Text rephrased.
	Pag. 21: - [24]	Unclear, maybe another term would be better because if the measure is read separately it is not clear what kind of application it is	Accepted. Text rephrased.
	Pag. 21: - [25]	Does this mean that all construction sites with more than 200 t will have to make a study - this seems to me to be a big burden on the construction sector and everyone else in the	Accepted. Text rephrased.

Chapter	Page	Comments MOESD	Accepted/ Not Accepted
	Pag. 21: - [TJ26]	The proposed measure does not represent an action in terms of solving the causes of the creation of these illegal landfills, and the same should be proposed, i.e. determine the main weaknesses of this problem and eliminate them with a systematic approach. They would beg for a proposal for a system that would be incorporated into the national legislation, which would reduce such locations to a minimum	Accepted. The measure has been reviewed adding specific actions (see Objective 3)
	Pag. 21: - [27]	Are they perhaps recycling yards for construction waste?	Accepted. Terminology aligned with Croatian
	Pag. 21: - [TJ28]	It is necessary to define "Collection Centres" in terms of the Law or the Framework Directive on waste; Directive	Accepted. Terminology aligned with Croatian
	Pag. 21: - [29]	Are you referring to recycling yards?	Accepted. Terminology aligned with Croatian
	Pag. 23: - [31]	It would include the measure of creating an online application that would serve builders. In the application, the waste that will be generated on the construction site, the amount of waste expected during the demolition and where it is intended to be used would be entered.	Accepted. The technical detail of the application can be discussed during the implementation phase.
		In fact, it could be preparations for a demolition project.	
		This application could be used by the municipal warden/inspector who could, for example, check the condition of the location	

Chapter	Page	Comments MOESD	Accepted/ Not Accepted
		The above cannot be considered as a measure, i.e. concrete actions that should be taken and which are in accordance with the current regulations should be specified	Accepted. Text rephased
	Pag. 23: - [34]	Who is this guarantee for? As part of the waste permit, there is already insurance. Does this mean that the builder must also have insurance?	Accepted. Text rephased. The financial bond or bank surety can be used by the local administration if
		Rehabilitation of the locations of discarded construction waste is not a measure, a measure should be proposed to prevent the creation of these locations	Accepted. Measures added in the final version
	Pag. 24: - [36]	The procedure for dealing with illegally dumped construction waste is prescribed	Accepted. Text rephased
	Pag. 24: - [37]	The amount does not seem realistic to me	Accepted. Text rephased
	Pag. 24: - [38]	Croatia is implementing the procedures for canceling the waste status for construction waste as well as permits for the recovery of construction waste, concrete measures should be specified in which way it could be improved	Accepted. Text rephrase. Focus on EOW status for specific CDW stream as gypsum plasterboard, asphalt

Chapter	Page	Comments MOESD	Accepted/ Not Accepted
		Defining a guideline, what does it mean?	Partially accepted. guideline is a public document approved and adopted by PA for their evaluation. It can be used by private companies to ease the process. Italian Environmental Agency, as example, published a dedicated guideline on the document requested to obtain an EoW permit. (https://www.snpambiente.it/2020/02/18/pubblicare-le-linee-guida-per-lapplicazione-della-disciplina-end-of-waste/).
		The licensing process has already been optimized	Accepted. Action removed.
		It seems to me that we already have this in some format.	Accepted. instead of developing we can use the term "improve"
		The issue is resolved within the prescribed demolition project, and these "instructions" cannot replace the prescribed obligation.	Accepted. instead of developing we can use the term "improve"
		Considering the inquiries from KOM, it might be necessary to create a simple application in which the owners of building structures with asbestos (e.g. roofs) would enter the surface of the roofer with asbestos, the exact location of the building code no. in order to connect with the owner and	Accepted. The creation of an app can be output of the A.4,2,1

Chapter	Page	Comments MOESD	Accepted/ Not Accepted
		define the state of asbestos on the roof according to a simple flowchart of questions.	
		Recycling yards are recycling yards according to the definition from ZOGO (where waste is collected but not processed) or are they recycling yards for construction waste (according to ZOGO) - are they persons with a permit or are recycling yards for construction waste Collection Centres? Not clear terminology	Accepted. Text rephased
		It is necessary to take into account the definition of the recycling yard from the law, as well as the locations where the recycling yards are located and the acceptability of that location for processing construction waste	Accepted. Text rephased
		As part of this, and considering that all sectors need to be directed towards a circular economy, laboratories that will be able to do analyzes (accredited) should be developed so that EoW could come to life.	Accepted. Action added in Measure 4,5
		Funding for laboratories and employees should be foreseen in this regard.	Accepted. Action added in Measure 4,5
	Pag. 25: - [47]	In what sense is the analysis?	Accepted, term replaced with Feasibility study

Chapter	Page	Comments MOESD	Accepted/ Not Accepted
	Pag. 25: - [49]	It is necessary to take into account the specificities in the Republic of Croatia, for example, most cement and brick factories have a permit for waste management and take waste for recovery, so it is not clear what would be achieved with the proposed measure.	Not accepted. the aim of this actions is the reduction of waste production. The adoption of a take back system allow to reintroduce the unused material/scraps in the economic circle avoiding the generation of waste.
	Pag. 25: - [50]	This is primarily the decision of the investor/owner, and it is not clear who would use what was proposed and when	Not accepted. the aim of this actions is the extend the use of existing building instead the creation of new one. A guideline is necessary to support the building owners on how they can change the use of a building to extend its lifespan providing examples.
	. 25: - [51]	Same comment as the previous one	Not accepted. the aim of this actions is the extend the use of existing building instead the creation of new one. A guideline is necessary to support the building owners on how they can change the use of a building to extend its lifespan providing examples.
	Pag. 26: - [TJ53]	It should be reformulated in the direction of a circular economy, for example, a platform for a circular economy (entire life cycle) in the construction sector and the production of construction products, and the topics should primarily start from product design and preventing the generation of waste, naturally including waste	Accepted. Text rephased
	Pag. 26: - [TJ54]	Add MCPPSA	Accepted. Text rephased MCPPSA added a Major Stakeholder
	Pag. 26: - [TJ55]	Specify from which program	Not accepted. Funding is not in the scope of CEAP. ...same text that MCPPSA

Chapter	Page	Comments MOESD	Accepted/ Not Accepted
	Pag. 26: - [TJ56]	Add: as a technically and legally possible solution intended exclusively for specific situations for which there are no solutions	Partially accepted. Additional explanations added in Description/Context column in relation to the aim of R&D program.
	Pag. 26: - [57]	Considering that waste processing devices that are written off as waste in the EU are imported into the Republic of Croatia, a measure should be designed to prevent such importation of machines that are not at the appropriate technological level	Accepted. Text rephased. The financial bond or bank surety can be used by the local administration if
	Pag. 26: - [TJ58]	Developing tor without a specific problem and a legal solution makes no sense, because often in practice we come across innovative solutions that cannot be implemented in practice	Accepted. Text rephased
	Pag. 27: - [59]	A more specific description of the measure.	Accepted. Text rephased
	Pag. 27: - [TJ60]	Determine who the training is intended for, for example, representatives of companies that have registered a construction site in the last two months or similar.	Accepted. Text rephased
		Unclear, because the info system has been around for years, there is also eONTO, which reports in much more detail than ROO, which was not taken into account in this AP at all	Accepted. Text rephased

Chapter	Page	Comments MOESD	Accepted/ Not Accepted
	Pag. 27: - [62]	We assume that the proposed reporting would require the introduction of additional administrative obligations for companies, which is contrary to the significant efforts of the Ministry and the Government to reduce the aforementioned, and a measure that would include additional reporting is unacceptable, and a solution should be sought within the framework of the existing reports or their possible refinements	Partially accepted. The proposed actions do not introduce additional administrative obligations but the harmonization of the existing one through the creation of a "one stop shop" IT tool
	Pag. 27: - [63]	It is not clear what kind of standardization is involved, the data for eONTo and ROO are standardized	Not accepted. The standardization of data collections should be extended to the information collected for the permit of the building site, through the one-stop-shop IT tool
	pag.28	Who does it apply to and who does it - it would not be good to impose an obligation to pay companies and people who would do an assessment on every construction site.	Accepted. Text rephased
		here, the demolition project is mentioned as something new that should be implemented in our legislation, which is not a good suggestion because such a thing has already been implemented in the legislation, article 76 of the Act.	Partially accepted. Text rephrased.

Chapter	Page	Comments MOESD	Accepted/ Not Accepted
		The measure is unacceptable because it imposes a new obligation without it being clear what is gained by its implementation, especially in relation to the already existing reporting obligations - if there is a deficiency, it is necessary to make an analysis from which the deficiency is visible, and perhaps consider how the existing reporting obligation could be achieved with a minor change purpose.	Not Accepted. The adoption of a CDW management report during the permitting phase is considered a best practice by EU. Its allow the evaluation by the permitting authorities since the preliminary stage of the expected CDW generation and how the building company intend to manage them. It also allows the adoption of specific obligations in case the CDW management plan is considered as inadequate.
		I support this measure and think it is good (perhaps think more about the threshold values), but I am of the opinion that the circular economy should start from the production of construction products and the construction of buildings (that every building has a kind of passport), and only then reports on construction waste	
	Pag. 29: - [76]	Specify specific activities aimed at preventing repeated dumping or illegal dumping.	Accepted. Measures added in the final version
		This cannot be considered a measure for the reason that the Law clearly stipulates the obligations of all participants	Not Accepted. The aim of the Action is related to training and explain the existing obligation to participants.
		As I stated previously, this plan should propose a management system to avoid these situations	Accepted. Actions added focused on this topic.

Chapter	Page	Comments MOESD	Accepted/ Not Accepted
	Pag. 29: - [76]	It is unclear what the role of the county is, it would be better if associations of cities and municipalities were included instead of counties	Accepted.
		The issue has been fully regulated by law for a long time, and if it is necessary to change the regulation, an analysis with arguments should be included in the appendix. In addition, financing the removal of illegally dumped waste means that society bears the cost of the individual whose obligation it was, therefore measures should include strengthening identification and achieving success in punishing offenders, as well as significantly strengthening the market for recovery	Partially Accepted. Text rephrased to clarify that the fund can be used when the CDW waste is unknown.
	Pag. 30: - [TJ77]	Reconsider the measure, the ROO is reported once a year and after the waste has been created, and the building permit is issued much earlier, so the measure set in this way does not make sense	Not accepted. The use of an IT tool allows the creation of separate databases, but with a high level of interoperability. The permit date and related information and the ROO report can be linked using a unique code assigned during the permit application phase
	Pag. 30: - [78]	It is necessary to state what it is about, because the procedure has been optimized for several years, and it can be thought that the currently valid legal framework in the Republic of Croatia has not been taken into account.	Accepted. Action replaced
	. 30: - [79]	Considering that it is a building, the materials used again in the building should be certified and this should be taken into account. Considering past experiences, there should be control. It is necessary to	Accepted. Action replaced

Chapter	Page	Comments MOESD	Accepted/ Not Accepted
		define what exactly the procedure would be simplified for.	
	Pag. 30: - [80]	By-products are not waste, and it is not clear what kind of by-products they are (taking the definitions and interpretations of by-products from the WFD and the Law)	Accepted. Action replaced
	Pag. 30: - [TJ81]	The Ministry cannot be responsible for increasing the amount, it solely depends on the person who is registered in the Register; these instruments are voluntary	Accepted. Action replaced
		I am of the opinion that the increase in quantity can be solved either by measures to include recycled content in certain products or by some other incentives, which is within the competence of MCPPSA	Accepted. Action replaced
	Pag. 30: - [TJ82]	Please propose these criteria, and that they be in accordance with the Law and the Directive	Accepted. Action replaced.
		How to ensure that the work of removing construction waste containing asbestos is carried out by professional and trained persons who will hand it over to authorized persons to take possession of the waste, given the fact that such work is mainly carried out by natural persons who cannot hand over more than 200 kg of hazardous waste - construction material containing asbestos, in RD, so the management of this type of waste is problematic.	Partially accepted. Text rephrased. To minimize the risks during the removal of small amount of asbestos material by citizens the mandatory use of protection equipment should be implemented as part of the action A.4.2.3

Chapter	Page	Comments MOESD	Accepted/ Not Accepted
	Pag. 30: - [85]	The asbestos disposal system in the Republic of Croatia has existed since 2007, and with the accession of the Republic of Croatia to the EU, disposal options have been significantly expanded. Additional disposal of asbestos is not a public service but a market activity, so the proposed measure should be reconsidered.	Not accepted. The high costs of discharge of asbestos material is a barrier especially for private citizens. The aim of the action is supporting the costs of dismantling reducing the risk of illegal dumping of a carcinogenic material. Action can be addressed by the Responsible Authority to be focused on specific cases where there is a failure of market (e.g. abandoned industrial buildings, public buildings)
	Pag. 30: - [86]	Nothing new is proposed here that is not already prescribed by the current legislation, if it is proposed to improve the existing system, then a specific measure should be proposed that would be applicable and in accordance with the law	Accepted. Text rephased
	. 31: - [88]	The issue was resolved a few years ago in the FZEOU based on the Ordinance.	Not accepted. The analysis is focused on the current needs before the adoption of supporting scheme for the removal of asbestos in order to evaluate if the existing landfill cell are enough for the expected waste flow.
	Pag. 31: - [TJ89]	As I mentioned previously, it is necessary to harmonize the term with the Law/Directive	Accepted. Text rephased
		The terminology is not clear, what are collection centers, are they recycling yards for construction waste? also the recycling yards mentioned here, are they recycling yards in accordance with ZOGO, because they do not process waste....	Accepted. Text rephased

Chapter	Page	Comments MOESD	Accepted/ Not Accepted
	Pag. 31: - [92]	It is a market activity, therefore regulations on incentives should be taken into account before proposing such a measure	Accepted. The Responsible Authority in charge of the action will consider the regulation on incentives.
	Pag. 32: - [93]	This is a good idea, but it needs to be thought about in view of the public call for construction waste processing devices, this might affect the achievement of the objectives of the entities that have been allocated EU funds, because there would be a reduction in the amount of waste, on the other hand, the regional character would enable better control for the abolition of waste status	Accepted.
	Pag. 32: - [94]	The purpose of WMC is prescribed by the Law, and additional "contents" such as the recovery of construction waste is an issue that can be resolved at the level of an individual project.	Accepted. Action rephrased.
		In addition, the WMC system is relatively centralized and includes transfer stations, and transportation is a significant cost in the system, and basing the construction waste recovery system on WMCs would cause even higher costs for the products created by the recovery of that waste.	
	Pag. 32: - [TJ95]	Further clarify what is meant and connect with the provisions of the Act	Accepted. Action rephrased.

Chapter	Page	Comments MOESD	Accepted/ Not Accepted
	Pag. 33: - [97]	This would be good for reuse, but I don't know how good it would be when it becomes waste because it is no longer a building material. What would be the role of the green market for waste, especially since according to the law, the waste must be further submitted for processing/recycling when it is collected.	Accepted. Action rephrased. The marketplace will be focused on EoW and reusable materials not classified as waste.
	Pag. 33: - [98]	Either the measure is not well described or the amount is wrong, almost half a million € for finishing the existing application, mostly with already existing documents, seems inappropriate to me	Accepted. Action rephrased.
	Pag. 35: - [TJ107]	Since these products must meet the requirements for a construction product, these instructions must be made by the manufacturer and under the jurisdiction of MCPPSA	Not Accepted. MCPPSA is qualified as major implementer to support the MoESD on technical aspects related to buildings construction and GPP enforcement. The proposed responsible authority was selected by the team on the basis of an analysis of the technical knowledge and administrative skills required to ensure proper implementation of the action. According to this criterion, the MCPPSA is the first choice. If the MCPPSA cannot be qualified as the responsible authority, the MOESD can be considered the second choice. Either body may identify one or more internal resources to develop the action or delegate an external expert.
	Pag. 35: - [108]	This is prescribed by construction regulations and cannot be modified by instructions If it is necessary to change the regulations, then it is necessary to write it down and support it with analysis/arguments in the appendix	Not accepted. The aim of the action is the creation of a guideline for the enforcement of existing legislation. No amendment to the legislation in force is foreseen by the action.

Chapter	Page	Comments MOESD	Accepted/ Not Accepted
		It is necessary to become familiar with the legislative framework of the Republic of Croatia, the proposed "preliminary study" would be about something that has been regulated by law and regulations for several years.	Accepted. Text rephased
		The analysis planned here should be in the Appendix of this AP	Accepted. Added as Annex 1
	Pag. 35: - [110]	terms unclear	Accepted. Text rephased
		Since these products must meet the requirements for a construction product, these instructions must be made by the manufacturer and under the jurisdiction of MCPPSA	Accepted. Text rephased
		Incomprehensible measure, what is done and obtained for the proposed means	Accepted. Text rephased
	Pag. 35: - [111]	Unclear why implementation of this via reuse centers is not being considered - CPUs are not covered by this AP at all and are what should be developed	Accepted. Reusable centres could a part of the digital marketplace and included as part of the recycling yards.
		It is proposed to spend almost €3.5 million, but it is not clear what the Republic of Croatia will receive for these funds	Not accepted. Funds and financing are out of the scope of CEAP. The proposed costs of every actions have been estimated based on similar initiative promoted in EU member states and Croatia. The estimated costs provide an indication to GoC about the resources needed to implement the CEAP.

Chapter	Page	Comments MOESD	Accepted/ Not Accepted
		Buildings are not designed by "public consciousness"	Accepted. Text rephased
	Pag. 36: - [113]	An inappropriate measure, and if the exact concept is not known, how can funds in this amount be paid in the first place	Not Accepted. The aim of the action is to support the creation of buildings projected adopting eco-design criteria that use SRM as building materials, ease the future dismantling and minimize the use of hazardous substances.
	Pag. 36: - [114]	The question is how applicable this is in Croatia due to the poor maintenance of old buildings and whether it is economically profitable to restore such buildings because most of them were not built to withstand stronger earthquakes, which is characteristic of this area	Accepted. Text rephased.
	Pag. 36: - [115]	Questionable purpose of the measure, the question is regulated by construction regulations and cannot be regulated by instructions instead. If something needs to be changed in the regulations, it should have been determined and the analysis attached to the appendix of this AP	Not accepted. The aim of the action is the creation of a guideline for the enforcement of existing legislation. No amendment to the legislation in force is foreseen by the action.
	Pag. 36: - [116]	Inappropriate measure - financing the adaptation of someone's real estate without a clear purpose	Accepted. Text rephased.
5	Pag. 37: - [117]	Measures that already exist in our legislation are being proposed, and I see no reason to propose something that already exists in a plan like this. For example, measures should be proposed that do not exist in the legislation, but would also be useful. The proposed	Accepted. Text rephased.

Chapter	Page	Comments MOESD	Accepted/ Not Accepted
		measures, first of all, should be based on the profession, in accordance with the Law and the EU protocol, and not in opposition to them. For example, the proposal is a measure that determines greater use of recycled materials. For example in civil engineering, the lower structure of roads, has the capacity, in my opinion, to accept all non-hazardous construction waste from the Republic of Croatia, of course, with full compliance with all the legislation of the Republic of Croatia relating to waste management (in this particular case, which refers to the abolition of waste status) and construction (in this particular case, the regulation related to construction products).	
	eneral comment	In general, the proposal insufficiently respects the obligations and limitations of the EU and Croatian legislation, it is not clear exactly what problem is solved by the implementation of the proposed measure, the actual circumstances in the Croatian Republic are insufficiently taken into account. Also, it is not clear from the proposal what the Republic of Croatia gets for the funds spent. In addition, considering the number of proposed measures that include education, it follows that the main difficulty is a lack of knowledge, so I propose to consolidate in one point	Accepted. Text rephrased.
	pg. 39	A2,3,1, I think the financial guarantee for producers of waste above 200 t is a good measure	
6	pg. 50	I think this is inappropriate, this is not the UN but the Republic of Croatia.	Not accepted. Steering committee is a proposal to ensure the proper enforcement of CEAP. GoC can adopt different schemes

Chapter	Page	Comments MOESD	Accepted/ Not Accepted
7	pg. 52	The statements in this chapter do not derive from the previously mentioned chapters	Partially accepted. The conclusions was a preliminary text, that has been adapted based on the final version of the document
	pg. 52	It was previously stated that there is weak cooperation between companies and not between the government and companies - an inconsistency that needs to be refined	Partially accepted. The conclusions was a preliminary text, that has been adapted based on the final version of the document
	pg. 52	Now where does this "goal" (communion of purpose) come from and what exactly is it, this is an AP and not a poetic composition, if an expression is used that is not generally known (and we believe that this is not) it needs to be specified in order to convey unambiguous information	Partially accepted. The conclusions was a preliminary text, that has been adapted based on the final version of the document
	pg. 52	It is not clear what this sentence has to do with the rest of the AP	Partially accepted. The conclusions was a preliminary text, that has been adapted based on the final version of the document
	pg. 52	It is necessary to familiarize yourself with the existing publicly published information on permits for waste management, which show in detail how construction waste is managed for each individual case	Partially accepted. The conclusions was a preliminary text, that has been adapted based on the final version of the document

Chapter	Page	Comments MOESD	Accepted/ Not Accepted
	pg. 52	Nowhere is it stated what exactly is "too complex" in the existing regulations and needs simplification, and taking into account the EU requirements for legislation, how big is the proctor within which something can be simplified, as well as what exactly will be gained by it. An analysis of the existing process of obtaining a birth certificate, i.e. registration in the register, which clearly identifies deficiencies, should be in the appendix of this AP	Partially accepted. The conclusions was a preliminary text, that has been adapted based on the final version of the document
	pg. 52	You need to familiarize yourself with the Croatian legislation, this is not correct	Partially accepted. The conclusions was a preliminary text, that has been adapted based on the final version of the document
	pg. 52	It is necessary to clarify what kind of "consolidation of the market" is involved, which is carried out through green public procurement.	Partially accepted. The conclusions was a preliminary text, that has been adapted based on the final version of the document

Annex V – Estimation of CEAP Costs

Related actions	Estimation of costs	Estimated costs EUR (without VAT)	Estimated costs EUR (25% VAT included)
OBJECTIVE 1: Increased cooperation among CDW stakeholders		5.250.000	6.562.500
M.1.1. Enhance dialogue and cooperation among CDW stakeholders		250.000	312.500
A.1.1.1. Creation of CE platform for CDW management to discuss regulatory provisions, new opportunities and share information.	The project includes: 4 round tables per year, max 20 members of "working group"; estimated cost 12.500 EUR per meeting; 500 EUR/person + 125 EUR/expenses based on team's best know-how	250.000	312.500
M.1.2. Enhance education and support for research, innovation, and development		5.000.000	6.250.000
A.1.2.1. Organization of specific annual educational programs including meetings with local administrations and the drafting of a handbook related to innovative recovered materials, reuse, and recycling within the framework of CE and CDW regulatory requirements.	<i>Source: "SCIENTIFIC RESEARCH AND DEVELOPMENT PROJECTS, Faculty of Civil Engineering in Zagreb"; Sample program 1: "Development of professional competences for green construction", 2 year duration, cost 1.160.156 kn (155.000 EUR); The project includes:</i> Minimum 1 educational program per year; Estimated cost: development of education program + presentation/training at x locations; 100.000 EUR per year, implementation 5 years period;	500.000	625.000
A.1.2.2. Development of R&D program for CE in CDW sector through the creation of nation or EU funds.	<i>Source: "SCIENTIFIC RESEARCH AND DEVELOPMENT PROJECTS 2018 - 2020, Faculty of Civil Engineering in Zagreb"; As a sample there are many different project with costs from 200.000 to 2.000.000 EUR; Sample program 1: "Development of innovative building composites using bioash", 4 years duration, cost 4.791.401 kn (640.000 EUR); Sample program 2: "KLIK PANEL – Composite light panel with an integrated load-bearing structure", 3 years duration, cost 8.456.961 kn (1.130.000 EUR); The project includes:</i> Preparation and implementation of three (3) research and development projects on CDW management; Estimated cost: max. 1.500.000 EUR per project, to complete 3 projects within 5 years period;	4.500.000	5.625.000
OBJECTIVE 2: Improved availability and quality of CDW data		3.890.000	4.862.500
M.2.1. Implement educational and informative activities related to CDW reporting		750.000	937.500
A.2.1.1. Educational activities, including training, guidelines, and handbook, on the topic of CDW management reporting data within the framework of the CE.	<i>Source: NWMP 2017-2022, "M 5.3 Implementation of a national campaign on sustainable waste management", estimated cost 5.000.000 kn (670.000 EUR), 5 year period; The project includes:</i> Specific educational programs in regards to CDW data collection and reporting completed; Minimum 1 specific educational program per year (21 county);	750.000	937.500
M.2.2. Improve CDW management information system applications		2.300.000	2.875.000
A.2.2.1. Enhanced interoperability between EONTO and ROO for data collection regarding CDW quantities and treatment.	<i>Source: NWMP, "M 6.1 Creation and/or improvement of applications that are part of the waste management information system", estimated cost 10.000.000 kn (1.340.000 EUR), 5 year period; The project includes:</i> Functional electronic Register of environmental pollution (ROO) system; For 2 year period 1 functional IT application;	500.000	625.000
A.2.2.2. Enhanced the usability of EONTO through the creation of a mobile application.	<i>Source: NWMP, "M 6.1 Creation and/or improvement of applications that are part of the waste management information system", estimated cost 10.000.000 kn (1.340.000 EUR), 5 year period; The project includes:</i> Functional IT Tools to record data linked to the construction permit database; For 3 year period 1 functional IT application;	200.000	250.000
A.2.2.3. Integration of recovered material data generated on-site in the construction permit database for building sites with an expected CDW generation greater than 200 t.	<i>Source: NWMP, "M 6.1 Creation and/or improvement of applications that are part of the waste management information system", estimated cost 10.000.000 kn (1.340.000 EUR), 5 year period; The project includes:</i> Functional IT platform of circular economy and	400.000	500.000

Related actions	Estimation of costs	Estimated costs EUR (without VAT)	Estimated costs EUR (25% VAT included)
	environmental protection; For 5 year period 1 functional IT application;		
A.2.2.4. Integration of digital applications related to CDW on the joint IT platform of waste management in the Republic of Croatia, as part of the national environmental protection and circular economy platform.	Source: NWMP, "M 6.1 Creation and/or improvement of applications that are part of the waste management information system", estimated cost 10.000.000 kn (1.340.000 EUR), 5 year period; The project includes: Integration of existing platform and IT tools; For 2 year period 1 functional application;	700.000	875.000
A.2.2.5. Creation of a Materials Passport and a related database to register materials used in construction projects in order to ease the recognition of hazardous material, future dismantling phase and recovery of resources.	Source: NWMP, "M 6.1 Creation and/or improvement of applications that are part of the waste management information system", estimated cost 10.000.000 kn (1.340.000 EUR), 5 year period; The project includes: Functional database and created Material Passport; For 2 year period 1 functional application;	500.000	625.000
M.2.3. Improve availability and quality of CDW management data before and during operating sites		450.000	562.500
A.2.3.1. Introduction of obligations to prepare CDW Management Report as part of Main Project before issuing Construction Permit for sites with an expected CDW generation greater than 200 t.	The project includes: Harmonization of legislation to introduce preparation of CDW Management Study as part of Main Project; for 3 year period 1 completed harmonization of legislation; The cost has been estimated considering the annual cost for an expert part time(30.000 €/y), 4 meetings and related arrangement costs (20.000 €/y)	150.000	187.500
A2.3.2. Drafting of standard forms and an on-line tool for compiling and submitting the CDW Management report.	The project includes: To create standard forms and on-line tool for compiling and submitting reports; for 3 year period 1 completed CDW Management Study – Standard form and online tool; The cost has been estimated considering the annual cost for an expert part time(30.000 €/y), 4 meetings and related arrangement costs (20.000 €/y)	150.000	187.500
A.2.3.3. Approval of a bylaw for the enforcement of a mandatory financial bond for construction projects to cover the cost in case of mismanagement of CDW on the building site.	The project includes: Approval of the bylaw for the enforcement of mandatory financial bond for construction projects; to complete Financial Surety for CDW producers; for 3 year period 1 completed Financial Surety for CDW producers. The cost has been estimated considering the annual cost for an expert part time(30.000 €/y), 4 meetings and related arrangement costs (20.000 €/y)	150.000	187.500
M.2.4. Implement pre-demolition audit for construction sites		390.000	487.500
A.2.4.1. Amendment to Law on Construction to include pre-demolition audit based on EC guidelines for construction sites with an expected CDW generation greater than 200 t.	The project includes: Harmonization of legislation to introduce preparation of a pre-demolition audit to carry out before renovation or demolition project; to create standard forms and on-line tool for compiling and submitting reports; for 2 year period 1 completed harmonization of legislation. The cost has been estimated considering the annual cost for an expert part time(30.000 €/y), 4 meetings and related arrangement costs (20.000 €/y).	150.000	187.500
A.2.4.2. Definition of guidelines on Selective and Removal of Hazardous Components based on the European Guideline.	The project includes: Completion of guidelines on selective demolition and hazardous components removal; for 1 year period 1 completed guidelines. The cost has been estimated considering the annual cost for an expert part time(30.000 €/y), 4 meetings and related arrangement costs (20.000 €/y).	100.000	125.000
A.2.4.3. Training for the enforcement of guidelines on Selective and Removal of Hazardous Components (the guidelines developed in A.2.4.2.).	Source: NWMP 2017-2022, "M 5.3 Implementation of a national campaign on sustainable waste management", estimated cost 5.000.000 kn (670.000 EUR), 5 year period; The project includes: Training on enforcement of Selective Demolition Guideline; Minimum 1 specific training program per county, total 21 county/locations	140.000	175.000
OBJECTIVE 3: Reduced illegal CDW dumping		14.450.000	18.062.500
M.3.1. Increase education of relevant bodies involved in CDW management inspection processes		450.000	562.500
A.3.1.1. Training programs for CDW management supervision and inspection bodies and parties.	Source: NWMP 2017-2022, "M 5.1 Creation of a Program of educational and informative activities on sustainable waste management", estimated cost 800.000 kn (105.000 EUR), 5 year period; (In 2020 there were 629 unprocessed	450.000	562.500

Related actions	Estimation of costs	Estimated costs EUR (without VAT)	Estimated costs EUR (25% VAT included)
	applications from the public, it was resolved only 19. Source: Overview of data from the system Records of locations of discarded waste, 03/2021); The project includes: Implementation of education and training; Target: 3 educations and training per county (21 county) in 5 years period; Estimated cost: preparatio of education program + training and presentation at 21 location; 150.000 EUR per year, implementation 3 years period;		
M.3.2. Strengthen regulation and controls to reduce illegal dumping of CDW		1.500.000	1.875.000
A.3.2.1. Enforcement of waste management regulation to strengthen the control powers of local authorities and state inspectorate on environmental crimes related to illegal waste management.	The project includes the analysis and drafting of additional controls powers against environmental crimes ; for 2 year period 1 completed analysis and reports. The cost has been estimated considering the annual cost for an a technical expert part time (25.000 €/y) and a legal expert part time (25.000 €/y)..	100.000	125.000
A.3.2.2. Enforcement of construction law and introduction of mandatory cost breakdown for CDW management in technical project proposals to support companies that propose proper CDW management.	The project includes the analysis and drafting of amendment for the introduction of cost breakdown analysis; for 2 year period 1 completed analysis and reports. The cost has been estimated considering the annual cost for an a technical expert part time (25.000 €/y) and a legal expert part time (25.000 €/y)..	100.000	125.000
A.3.2.3. Investment in technological equipment such as capturing cameras and remote cameras to increase and automatize controls against illegal dumping.	<i>Source: NWMP, "M 6.1 Creation and/or improvement of applications that are part of the waste management information system", estimated cost 10.000.000 kn (1.340.000 EUR), 5 year period; The project includes:</i> Provision of technical equipment; For 5 year period; Estimated equipment: 2 drone with remote camera including training (200.000 €), cameras and related IT tools, dedicated training courses; Cost estimated on the basis of team's best know-how.	1.000.000	1.250.000
A.3.2.4. Improve of ELOO mobile application for citizens to ease the anonymous reporting of CDW illegal dumping.	<i>Source: NWMP, "M 6.1 Creation and/or improvement of applications that are part of the waste management information system", estimated cost 10.000.000 kn (1.340.000 EUR), 5 year period; The project includes:</i> Creation of ELOO Mobile Application; For 2 year period 1 functional IT application;	200.000	250.000
A.3.2.5. Strengthen of sanctions and fines against illegal dumping.	The project includes the analysis and drafting of new sanction system against illegal dumping; for 2 year period 1 completed analysis and reports. The cost has been estimated considering the annual cost for an a technical expert part time (25.000 €/y) and a legal expert part time (25.000 €/y)..	100.000	125.000
M.3.3. Remove CDW from illegal dumpsites		12.500.000	15.625.000
A.3.3.1. Removal of CDW (or mixed waste) from locations contaminated by waste dumped into the environment.	Source: NWMP 2017-2022, "M 4.5 Remediation of locations polluted by waste dumped into the environment", estimated cost 10.000.000 kn (1.400.000 EUR), 5 year period; Municipal wardens estimated that a total of about 2,200 t of waste was discarded at the confirmed locations of discarded waste (250 active locations) and that almost all reports refer to bulky, construction and mixed municipal waste. They also estimated that approx. 54,000 m2 of the territory of Croatia is occupied by the locations of discarded waste. An estimation of the potential dumping of CDW on county basis is reported in Delivery 1. Using the estimated average per capita generation (1.1 ton/y per capita), the potential gap rises up to 3.14 Mt in 2020 of the estimates per capita of the amount of uncollected/untreated CDW; The project includes: 50 locations per year or 250 locations with CDW (including mixed waste) in 5 years period; Estimated cost 50.000 EUR/per location x 250 = 12.500.000 EUR in 5 years period; This is just a budget for 5 years period, it will require separate assessment of each site, the cost can go from 20.000 to 200.000 EUR per location;	12.500.000	15.625.000

Related actions	Estimation of costs	Estimated costs EUR (without VAT)	Estimated costs EUR (25% VAT included)
OBJECTIVE 4: Increased effectiveness and efficiency in the CDW management including its recovery		86.750.000	108.437.500
M.4.1. Improve EoW status legislation for CDW		450.000	562.500
A.4.1.1. Feasibility study for the identification of potential "by-product for non-contaminated excavated soil" and "EoW status for specific CDW streams."	Source: NWMP 2017-2022, "M 2.3.1 Improvement and analysis of the existing waste packaging management system", estimated cost 2.000.000 kn (270.000 EUR), 5 year period; The amount of recycled aggregate that was obtained after processing construction waste and receive end-of waste status in 2020 was 54,797 t; Certain by-products (at least 28,684 t) were used in road construction, backfilling or cement production; The project includes: Feasibility study for the identification of potential "by-product for non-contaminated excavated soil" and "end-of waste status for specific CDW streams" including preparation of report by 2 experts full time (100.000 €/y); For 2 year period 1 completed assessment and report;	200.000	250.000
A.4.1.2. Definition of a guideline on the enforcement of EoW and relevant Ordinance No. 117/14.	The project includes: Definition of guidelines on the enforcement of EoW and relevant Ordinance No. 117/14. for 1 year period 1 completed guidelines. including preparation of reports by 2 experts full time (100.000 €/y);	100.000	125.000
A.4.1.3. Training sessions on the guideline on the enforcement of EoW (A.4.1.2.).	Source: NWMP 2017-2022, "M 5.3 Implementation of a national campaign on sustainable waste management", estimated cost 5.000.000 kn (670.000 EUR), 5 year period; The project includes: Training on the implementation of the Guideline on EoW (A.4.1.2); Minimum 1 specific training program per county, total 21 county/locations	150.000	187.500
M.4.2. Improve hazardous waste removal and asbestos disposal system		16.300.000	20.375.000
A.4.2.1. Analysis and assessment (report) of the existing and required number and capacity of areas for the disposal of CDW containing asbestos and treatment of hazardous CDW.	The project includes: Definition reports on the existing and required capacity of areas for the disposal of asbestos contaminated materials. For 2 year period 1 completed analysis including preparation of reports by 2 experts full time (100.000 €/y) and on field activities (50.000 €/y).	300.000	375.000
A.4.2.2. Grants for the development of installation for the recycling of contaminated soils (EWC 170503*) based on BAT.	Source: Based on Main Design for Construction Permit and Bill of Quantity for construction and equipping CDW recycling facilities for Waste Management Center Bikarac. Required development area between 6.000 to 10.000 m2, including employee facilities, weighbridge, mobile plant with impact crusher, screener, combined construction machine for material manipulation and miscellaneous tools. <u>The project includes;</u> Target 4 locations in 5 years period; Estimated cost 2.000.000 EUR each x 4 locations;	8.000.000	10.000.000
A.4.2.3. Financial support for the collection and disposal of asbestos-containing material from existing buildings.	Source: NWMP 2017-2022, "M 4.5 Remediation of locations polluted by waste dumped into the environment", estimated cost 10.000.000 kn (1.400.000 EUR), 5 year period; The quantities of construction waste containing asbestos that were disposed of in cassettes in 2020 amounted to 3,496.8 t; <u>The project includes;</u> removal of 2.000 t per year or 10,000 t in 5 years period; Estimated cost 800 EUR/per ton x 10,000 t = 8.000.000 EUR in 5 years period; <i>This is just a budget for 5 years period, it will require separate assessment of quantities, the cost can go from 4 to 16 million EUR (4,000 t/y) in 5 years period, the financial support to the private owners may vary from 30% to 70% of total cost, instead to have 100% grant</i>	8.000.000	10.000.000
M.4.3. Construct and equip recycling yards for construction and demolition waste "Type A"		23.000.000	28.750.000
A.4.3.1. Construction and equipping of municipal or regional "Type A" recycling yards for CDW on the mainland.	Source: Based on Main Design for Construction Permit and Bill of Quantity for construction and equipping CDW recycling yard for Municipality of Novigrad and Municipality of Sukošan. Development area between 4.000 to 5.000 m2, including employee facilities, weighbridge, combined construction machine with loading shovel for material	15.000.000	18.750.000

Related actions	Estimation of costs	Estimated costs EUR (without VAT)	Estimated costs EUR (25% VAT included)
	<i>manipulation and miscellaneous tools; In 2017 estimated cost was 400.000 EUR each; <u>The project includes:</u> Construction and equipping Recycling Yards for CDW Type A or basic Recycling Yards for temporary storage on the mainland; Target 30 locations (required between 60 and 80) in 5 years period; Estimated cost 500.000 EUR each x 30 locations;</i>		
A.4.3.2. Construction and equipping of municipal or regional "Type A" recycling yards for CDW on the most populated island.	<i>Source: The Republic of Croatia has 78 islands, 524 islets and 642 cliffs. According to the 2011 census, there are 132,756 inhabitants in 18 cities, 41 municipalities and 345 settlements on <u>50 inhabited islands</u>, including Pelješac peninsula. A recycling yard must be provided for at least the 20 largest islands in terms of population and construction activities: Cres, Krk, Mali Lošinj, Rab, Pag, Dugi otok, Ugljan, Pašman, Vir, Iž, Silba, Murter, Brač, Hvar, Šolta, Vis, Mljet, Korčula, Lastovo and/or the Pelješac peninsula. Development area between 3.000 to 4.000 m2, including employee facilities, weighbridge, combined construction machine with loading shovel for material manipulation and miscellaneous tools; In 2017 estimated cost was 300.000 to 400.000 EUR each; <u>The project includes:</u> Construction and equipping Recycling Yard for CDW Type A or basic Recycling Yards for temporary storage on the islands; Target 20 locations (required up to 50 medium and small size) in 5 years period; Estimated cost 400.000 EUR each x 20 locations;</i>	8.000.000	10.000.000
M.4.4. Construct and equip recycling yards for construction and demolition waste "Type B" for processing CDW		46.000.000	57.500.000
A.4.4.1. Construction and equipping of "Type B" recycling yards for processing CDW, equipped with mobile equipment to service municipal and regional requirements.	<i>Source: Based on Main Design for Construction Permit and Bill of Quantity for construction and equipping CDW recycling facilities for Waste Management Center Bikarac. Required development area between 6.000 to 10.000 m2, including employee facilities, weighbridge, mobile plant with impact crusher, screener, combined construction machine for material manipulation and miscellaneous tools. <u>The project includes:</u> Construction and equipping of Recycling Yards for CDW Type B for processing CDW; Target 10 locations (required up to 21 locations) in 5 years period; Estimated cost 2.000.000 EUR each x 10 locations;</i>	20.000.000	25.000.000
A.4.4.2. Construction and equipping of "Type B" recycling yards for processing CDW, as part of waste management centres equipped with mobile equipment to service municipal and regional requirements.	<i>Source: Based on Main Design for Construction Permit and Bill of Quantity for construction and equipping CDW recycling facilities for Waste Management Center Bikarac. Required development area between 8.000 to 14.000 m2, including employee facilities, weighbridge, mobile plant with impact crusher, screener, combined construction machine for material manipulation, dump-truck, trailer for transporting mobile equipment and miscellaneous tools. <u>The project includes</u> Recycling Yard for CDW Type B as part of Waste Management Centres for processing CDW; Target 10 locations (total 11 WMC in Croatia, 1 RD under construction) in 5 years period; Estimated cost 2.600.000 EUR each x 10 locations;</i>	26.000.000	32.500.000
M.4.5. Build and equip facilities for CDW analysis and quality control		1.000.000	1.250.000
A.4.5.1. Financial funds for the development of authorised quality control infrastructure for CDS SRM.	Cost estimated based on direct interviews conducted by the team.	1.000.000	1.250.000
OBJECTIVE 5: Stimulated growth of a green market in construction materials		3.750.000	4.687.500
M.5.1. Improve the existing application to develop a CDW Exchange		300.000	375.000
A.5.1.1. Improvement, development, and implementation of a web-based tool such as CDW Exchange or marketplace for	<i>Source: "SCIENTIFIC RESEARCH AND DEVELOPMENT PROJECTS, Faculty of Civil Engineering in Zagreb"; Program: "Research and development of the E-exchange of energy renovation in the building industry and industry", 1 year</i>	300.000	375.000

Related actions	Estimation of costs	Estimated costs EUR (without VAT)	Estimated costs EUR (25% VAT included)
materials recovery and secondary materials exchange.	<i>duration, cost 1.350.476 kn (180.000 EUR); The project includes:</i> Creation and/or improvement of applications to develop a digital marketplace; Estimated cost: 300.000 EUR, implementation 3 years period;		
M.5.2. Create guidelines on Green Public Procurement (GPP)		3.450.000	4.312.500
A.5.2.1. Creation of guidelines for GPP of the office building design, construction and management.	<i>Source: NWMP 2017-2022, "M 2.1.1 Development of an action plan for separate collection and recycling of construction waste", estimated cost 1.000.000 kn (130.000 EUR), 5 year period; The project includes:</i> Creation of guidelines for GPP of the office building construction; Estimated cost 150.000 EUR/ 1 year period;	150.000	187.500
A.5.2.2. Implementation of GPP pilot project in accordance with guidelines for office building design, construction and management.	<i>The project includes:</i> To implement GPP pilot project in accordance with Guidelines for office building; for 2 years period 1 pilot project for office building completed; estimated cost: building area 1.000 m2 x 2.000 EUR/m2; Cost estimated based on best know-how of the Team	2.000.000	2.500.000
A.5.2.3. Creation of guidelines for GPP of road design, construction and maintenance.	<i>Source: NWMP 2017-2022, "M 2.1.1 Development of an action plan for separate collection and recycling of construction waste", estimated cost 1.000.000 kn (130.000 EUR), 5 year period; The project includes:</i> Creation of guidelines for GPP for road construction completed; Estimated cost 150.000 EUR/ 1 year period; preparation of report by 2 experts full time (100.000 €/y) and related on-field activities (50.000 €/y); For 1 year period 1 completed assessment and report;	150.000	187.500
A.5.2.4. Implementation of GPP pilot project in accordance with guidelines for road design, construction and maintenance.	<i>The project includes:</i> To implement GPP pilot project in accordance with Guidelines for road constructions; for 2 years period 1 pilot project for office building completed; estimated cost: building area 1.000 m2 x 2.000 EUR/m2; Cost estimated based on best know-how of the Team	1.000.000	1.250.000
A.5.2.5. Feasibility study for the introduction of a minimum quantity of recycled/reused materials in public constructions and infrastructures in the construction law.	The project includes: Feasibility Study to introduce amendment to the Construction Regulation; Completed assessment and report 1 year period; preparation of report by 2 experts full time (100.000 €/y) and related on-field activities (50.000 €/y); For 1 year period 1 completed assessment and report;	150.000	187.500
OBJECTIVE 6: Reduced generation of CDW		6.500.000	8.125.000
M.6.1. Develop guidelines for the reuse of building components, conversion, and renovation of buildings		2.250.000	2.812.500
A.6.1.1. Drafting of a guideline on identification of reusable component including a positive list of elements such as doors, windows, and other non-structural parts.	<i>Source: "SCIENTIFIC RESEARCH AND DEVELOPMENT PROJECTS, Faculty of Civil Engineering in Zagreb"; Program: "Development of professional competences for green construction", 2 year duration, cost 1.160.156 kn (155.000 EUR); The project includes:</i> Preparation of guidelines on identification of reusable component; Implementation 2 years period; preparation of guideline by 1 experts full time (60.000 €/y) and related on-field activities (15.000 €/y); For 1 year period 1 completed assessment and report;	150.000	187.500
A.6.1.2. Development of guidelines for sharing, conversion and renovation of buildings including recommendation for amendments and supplements to spatial plans.	<i>Source: "SCIENTIFIC RESEARCH AND DEVELOPMENT PROJECTS, Faculty of Civil Engineering in Zagreb"; Program: "Development of professional competences for green construction", 2 year duration, cost 1.160.156 kn (155.000 EUR); The project includes:</i> Preparation of guidelines on identification of reusable component; Implementation 2 years period; preparation of guideline by 1 experts full time (50.000 €/y); For 2 year period 1 completed assessment and report;	100.000	125.000
A.6.1.3. Dedicated grants to support the local administration and private companies on restoring buildings instead of demolition in accordance with guidelines and to promote sharing, conversion, and	<i>The project includes:</i> Design (preliminary and main design, supervision) and renovation instead of demolition (it will include as per design some or all elements: landscape, architectural, structural, mechanical, electrical, plumbing, fire protection, interior and FFE) of a pilot project; for 3 year	2.000.000	2.500.000

Related actions	Estimation of costs	Estimated costs EUR (without VAT)	Estimated costs EUR (25% VAT included)
multifunctional uses of the public buildings.	period 1 pilot project completed; estimated cost: building area 1.000 m2 x 1.500 EUR/m2.		
M.6.2. Enhance take-back systems in CDW to increase reused and recycled content		700.000	875.000
A.6.2.1. Feasibility study for the introduction of "take back system" on specific CDW scraps and unused materials as: 17 01 concrete, bricks, tiles and ceramics; 17 03 bitumen mixtures, coal tar and products containing tar; 17 08 building material based on gypsum.	Source: NWMP 2017-2022, "M 2.3.1 Improvement and analysis of the existing waste packaging management system", estimated cost 2.000.000 kn (270.000 EUR), 5 year period; <u>The project includes:</u> Feasibility Study of the "take back systems" obligation on CDW and unused materials including following groups: 17 01 concrete, bricks, tiles and ceramics / 17 03 bitumen mixtures, coal tar and products containing tar / 17 08 building material based on gypsum; Implementation period 2 years period;	200.000	250.000
A.6.2.2. Pilot project to enhance "take back system" on select CDW stream based on result of the study set out in A.6.2.1.	Source: NWMP 2017-2022, "M 5.2.2 Preparation and implementation of a pilot project to prevent the generation of waste from cigarette filters"; <u>The project includes:</u> Pilot project to enhance the "take back system" on select CDW stream; Estimated cost: 250.000 per group x 3 groups, implementation 3 years period;	500.000	625.000
M.6.3. Implement educational and informative activities on eco-design in public and private buildings		1.900.000	2.375.000
A.6.3.1. Implementation of educational and informative activities on the topic of eco-design in public and private buildings to raise technical knowledge and education for engineers, architects, technicians, contractors and public administration.	Source: NWMP 2017-2022, "M 5.3 Implementation of a national campaign on sustainable waste management", estimated cost 5.000.000 kn (670.000 EUR), 5 year period; <u>The project includes:</u> Specific educational and informative activities regarding eco-design; Minimum 1 specific educational program per year; Estimated cost: development of education program + presentation at x locations, 50.000 EUR per year, for 5 years period target 5 activities;	250.000	312.500
A.6.3.2. Design and construction of an eco-design pilot project in a public building.	<u>The project includes:</u> Design (preliminary and main design, supervision) and construction (landscape, architectural, structural, mechanical, electrical, plumbing, fire protection, interior and FFE) of a pilot project using <u>eco-design</u> ; for 3 year period 1 pilot project completed; estimated cost: building area 750 m2 x 2.000 EUR/m2	1.500.000	1.875.000
A.6.3.3. Reduction of planning fees for construction projects that use recycled or reused materials or adopt eco-design criteria focused on future reduction of CDW generation.	Cost estimated based on the team's best know-how.	150.000	187.500
M.6.4. Develop guidelines for sharing, conversion and renovation of buildings		1.650.000	2.062.500
A.6.4.1. Development of guidelines for sharing, conversion and renovation of buildings including recommendation for amendments and supplements to spatial plans.	Source: "SCIENTIFIC RESEARCH AND DEVELOPMENT PROJECTS, Faculty of Civil Engineering in Zagreb"; Program: "Development of professional competences for green construction", 2-year duration, cost 1.160.156 kn (155.000 EUR); <u>The project includes:</u> Development of guidelines for sharing, conversion and renovation completed; Estimated cost 150.000 EUR/ 2 years period;	150.000	187.500
A.6.4.2. Dedicated grants to support the local administration and private companies on restoring buildings instead of demolition in accordance with guidelines and to promote sharing, conversion, and multifunctional uses of the public buildings.	<u>The project includes:</u> Design (preliminary and main design, supervision) and renovation instead of demolition (it will include as per design some or all elements: landscape, architectural, structural, mechanical, electrical, plumbing, fire protection, interior and FFE) of a pilot project; for 3 year period 1 pilot project completed; estimated cost: building area 1.000 m2 x 1.500 EUR/m2. <i>The cost is just estimated budget and will depend on the scope of work!</i>	1.500.000	1.875.000
TOTAL		120.590.000	150.737.500

Annex VI- Methodological framework of MCA

The philosophy of multi-criteria analysis (MCA) is to incorporate different variables in the analysis of initiatives, thus guiding policymakers in making decisions with a systemic perspective and not basing decisions solely on economic factors. Usually, the multicriteria analysis is performed through participatory processes.

In this case, the evaluation process was conducted by international and local waste management and circular economy experts who have been working on the Action plan development. Each one of the participants evaluated the measures, based on the five variables.

The MCA procedure has been conducted in three phases:

- 1) **A first round of evaluations made by each expert:** Once the results proposed by each participant were compiled and analysed to calculate the final score for every action.
- 2) **A second round of evaluation where every expert explained his proposal in a round table.** In this phase the results were shared among all evaluators in a virtual roundtable allowing them to review the results and decide whether to change the scores or not. During this process, the experts exposed their evaluations and ideas that support their final choice.
- 3) **Calculation of the final score:** at the end of the round table the final score for every action has been calculated allowing the prioritization of the proposed measures.

The following table (Table 9) below describes the different points that are possible to be assigned to a specific criterion and the aspects that have been evaluated by the experts.

The criterion adopted to conduct the MCA has been defined by the expert team considering the following aspects:

Positive environmental impact: the experts evaluated the direct effects of the measure to promote the recycling of CDW, the reduction of CDW generation and minimize the backfilling and landfilling.

Technical and economic feasibility: this point considers the level of technical complexity (as number of stakeholders involved, needs of specific equipment) to implement the action and its economic cost. A high level of complexity is classified as a barrier for the action enforcement.

Alignment with regulations and policies: this point considers if the proposed action can fall within the field of application of a law already in place. the presence of a reference in the existing legislation would allow a quicker and more effective implementation of the action.

Scalability: the experts considered the possibility to adapt the action to different or to a bigger scale than just the local context. This point has been added in consideration of the regional disparities that characterize the country.

Stakeholders' interest: this criterion takes into account the feedback received from the stakeholders during the Consultation meeting. A high interest of stakeholder is classified as a confirmation of their will to collaborate and that the action responds to a specific need.

Annex VII – Results of the MCA

Table 18: Number of Points for Each Action Scored by the Report

Objectives	Measures	Actions Index	Positive environmental impact	Technical and economic feasibility	Alignment with regulations and policies	Scalability	Stakeholders' interest	Total	%
OBJECTIVE 1: Increased cooperation among CDW stakeholders	M.1.1.	A.1.1.1.	13	14	15	15	15	72	95%
	M.1.2.	A.1.2.1.	9	12	12	14	12	59	78%
		A.1.2.2.	7	9	10	11	10	47	62%
OBJECTIVE 2: Improved availability and quality of CDW data	M.2.1.	A.2.1.1.	14	14	13	13	13	67	88%
	M.2.2.	A.2.2.1.	11	12	13	10	12	58	76%
		A.2.2.2.	11	10	9	9	10	49	64%
		A.2.2.3.	10	12	11	10	11	54	71%
		A.2.2.4.	12	13	10	12	14	61	80%
		A.2.2.5.	13	9	9	8	12	51	67%
	M.2.3.	A.2.3.1.	15	14	10	11	13	63	83%
		A2.3.2.	8	15	15	12	15	65	86%
		A.2.3.3.	15	12	12	14	12	65	86%
	M.2.4.	A.2.4.1.	15	15	11	11	12	64	84%
		A.2.4.2.	12	15	12	9	15	63	83%
		A.2.4.3.	14	14	11	13	12	64	84%
	OBJECTIVE 3: Reduced illegal CDW dumping	M.3.1.	A.3.1.1.	13	13	13	14	11	64
M.3.2.		A.3.2.1.	15	7	11	11	11	55	72%
		A.3.2.2.	12	12	11	14	12	61	80%
		A.3.2.3.	9	15	10	12	14	60	79%
		A.3.2.4.	14	13	12	12	12	63	83%
		A.3.2.5.	15	12	12	12	13	64	84%
M.3.3.	A.3.3.1.	15	10	12	12	12	61	80%	

Objectives	Measures	Actions Index	Positive environmental impact	Technical and economic feasibility	Alignment with regulations and policies	Scalability	Stakeholders' interest	Total	%
OBJECTIVE 4: Increased effectiveness and efficiency in the CDW management including its recovery	M.4.1.	A.4.1.1.1	13	13	11	11	14	62	82%
		A.4.1.2.	13	13	13	14	11	64	84%
		A.4.1.3.	9	10	11	12	14	56	74%
	M.4.2.	A.4.2.1.	11	12	12	13	10	58	76%
		A.4.2.2.	11	13	13	12	9	58	76%
		A.4.2.3.	11	12	12	13	10	58	76%
	M.4.3.	A.4.3.1.	15	9	12	9	15	60	79%
		A.4.3.2.	15	10	12	10	15	62	82%
	M.4.4.	A.4.4.1.	14	9	11	11	15	60	79%
		A.4.4.2.	13	10	11	12	15	61	80%
M.4.5.	A.4.5.1.	8	8	10	12	14	52	68%	
OBJECTIVE 5: Stimulated growth of a green market in construction materials	M.5.1.	A.5.1.1.	9	14	13	15	9	60	79%
	M.5.2.	A.5.2.1.	10	12	11	13	11	57	75%
		A.5.2.2.	8	7	10	12	10	47	62%
		A.5.2.3.	13	13	12	11	12	61	80%
		A.5.2.4.	11	10	11	11	12	55	72%
		A.5.2.5.	15	10	11	12	14	62	82%
OBJECTIVE 6: Reduced generation of CDW	M.6.1.	A.6.1.1.	14	12	11	10	13	60	79%
		A.6.1.2.	13	13	10	8	10	54	71%
		A.6.1.3.	9	12	10	12	12	55	72%
	M.6.2.	A.6.2.1.	14	10	10	11	15	60	79%
		A.6.2.2.	8	7	8	9	8	40	53%
	M.6.3.	A.6.3.1.	12	14	9	11	10	56	74%
		A.6.3.2.	10	11	11	11	10	53	70%
		A.6.3.3.	12	10	8	8	14	52	68%
	M.6.4.	A.6.4.1.	9	12	11	11	9	52	68%

Objectives	Measures	Actions Index	Positive environmental impact	Technical and economic feasibility	Alignment with regulations and policies	Scalability	Stakeholders' interest	Total	%
		A.6.4.2.	8	11	9	12	14	54	71%

Table 19: Defined criteria to assess the measures

	Defined criteria to assess the measures				
Value	1	2	3	4	5
Positive environmental impact	The action has no direct environmental impact.	The action has an indirect and direct environmental impact.	The action has a direct environmental impact.	The action has a good indirect environmental impact.	There could have a very good indirect environmental impact.
Technical and economic feasibility	The action presents several critical points related to its technical and economic feasibility	The action presents a few critical aspects related to its technical and economic feasibility	The actions are technically and economically feasible	The action is technically acceptable very expensive and economically feasible in the long term	The action is technically acceptable and economically feasible in the short term
Alignment with regulations and policies	Alignment with actual regulations and policies needs strong adaptation of existing policies	Alignment with actual regulations and policies is possible with many adjustments to existing policies	Alignment with actual regulations and policies is possible with limited adjustments to existing policies	Alignment with actual regulations and policies is possible with minor adjustments to existing policies	Alignment with actual regulations and policies is possible immediately without adjustment of existing policies
Scalability	No scalability.	Poor scalability.	Acceptable scalability.	Good scalability.	Very good scalability.
Stakeholders' interest	Stakeholders presented a limited interest in the activity.	Stakeholders presented an interest in the activity.	Stakeholders presented a good interest in the activity.	Stakeholders presented a high interest in the activity.	Stakeholders consider the activity as pivotal for CEAP.

The experts involved in this study independently scored the measures according to the given criteria, after which the measures were arranged according to the scoring value.

It is important to note that this initial evaluation only represents the Report's ' findings based on the authors' expertise and understanding of the national and local contexts of Croatia.

In this case, the MCA was composed of the five variables (described above). Each variable is weighted homogenously; however, these weightings will be discussed and agreed to by MoESD after first draft submission. The values are ranked from 1 (minimum) to 5 (maximum) according to the criteria of the assessment rubric.

The weights of the different variables are shown below:

- a) Environmental impact - 20%
- b) Technical and economic feasibility - 20%
- c) Alignment with regulations and policies - 20%
- d) Scalability - 20%
- e) Stakeholders' interest - 20%

$$TTA_i = \left(\sum_{i=1}^n EE_i \right) * W$$

Where, TTA is the evaluated measures, i is the category that is being evaluated, EE the evaluation of each expert and W is the weight assigned to that category.

Annex VIII Roadmap design considerations

The roadmap has been developed considering these factors:

- The actions related to the creation of a shared vision and a strong collaboration among stakeholders should have the same duration of CEAP to provide enough time to obtain a mutual trust that allow a fruitful cooperation also after the conclusion of CEAP.
- The actions related to training and knowledge sharing should cover all the CEAP lifespan in order to guarantee a continuous improvement and the progressive resolution of the different issues that can arise by the day-by-day application of the measures. In addition, the training sessions are considered as an event to increase the collaboration among stakeholders.
- The actions related to the definition of guidelines should be followed by specific training courses about their enforcement. For this reason, their timeframe should be at least two years, the first dedicated to the development and drafting, the second to training and sharing.
- The actions related to the construction of infrastructures as collection sites and new recycling sites require additional time for design, permitting and construction phases, therefore they will cover the whole duration of CEAP.
- The actions focused on the enforcement of eco-design and reduction of CDW generation will be implemented in the second half of CEAP. In this way it will be possible to carry out preliminary actions, as removal of illegal dumping site and training courses on the technical properties of CDW SRM, that will increase the environmental awareness and the trust on recycling process.
- The actions focused on the strength of CDW SRM market should be activated during the initial phase of CEAP to allow the active participation of existing CDW management plant and support their development obtaining a national best practice that can be used as example.