

# Circular Economy Approaches in Solid Waste Management

## Report on Inputs to National Waste Management Plan and Implementation Decision Revision



CIRCULAR ECONOMY  
APPROACHES IN  
SOLID WASTE  
MANAGEMENT

## **DISCLAIMER**

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## List of abbreviations

<b>BD</b>	Batteries Directive (2006/66/EC)
<b>CE</b>	Circular Economy
<b>CEF</b>	Connecting Europe Facility
<b>CF</b>	Cohesion Fund
<b>CRII</b>	Corona Response Investment Initiative
<b>CRII+</b>	Corona Response Investment Initiative Plus
<b>EAFRD</b>	European Agricultural Fund for Rural Development
<b>EAGF</b>	European Agricultural Guarantee Fund
<b>EC</b>	European Commission
<b>EEE</b>	Electrical and electronic equipment
<b>EIB</b>	European Investment Bank
<b>ELVD</b>	End of Life Vehicles Directive (2000/53/EC)
<b>EC</b>	European Commission
<b>EEE</b>	Electrical and electronic equipment
<b>EIB</b>	European Investment Bank
<b>ELVD</b>	End of Life Vehicles Directive (2000/53/EC)
<b>e-ONTO</b>	Waste Registre
<b>EPEEF</b>	Environmental Protection and Energy Efficiency Fund
<b>EPR</b>	Extended Producers Responsibility
<b>ERDF</b>	European Regional Development Fund
<b>ESF+</b>	European Social Fund +
<b>ETC</b>	European Territorial Cooperation
<b>EU</b>	European Union
<b>FEAD</b>	Fund for European Aid to the Most Deprived
<b>GDP</b>	Gross Domestic Product
<b>GPP</b>	Green public procurement
<b>L(R)SGU</b>	Local (Regional) Self Government Units (municipalities /cities; counties)
<b>LD</b>	Landfill Directive (1999/31/EC)
<b>LSGU</b>	Local Self Government Units (municipalities and cities)
<b>MCPPSA</b>	Ministry of Physical Planning, Construction and State Assets
<b>MFE</b>	Ministry of Foreign and European Affairs
<b>MFF</b>	Multiannual Financial Framework
<b>MoESD</b>	Ministry of Economy and Sustainable Development
<b>MS</b>	Member States
<b>MSTI</b>	Ministry of the Sea, Transport and Infrastructure
<b>NGEU</b>	Next Generation Recovery EU
<b>NGOs</b>	Non-governmental organizations
<b>NWMP</b>	Waste Management Plan of the Republic of Croatia (2017-2022)
<b>NWMP ID</b>	Decision on the Implementation of Waste Management Plan of the Republic of Croatia (2017-2022)
<b>OG</b>	Official Gazzete
<b>PET</b>	Polyethylene terephthalate
<b>PPE</b>	Personal protective equipment
<b>PPWD</b>	Packaging and packaging waste Directive (94/62/EC)
<b>RC</b>	Republic of Croatia
<b>rescEU</b>	Union Civil Protection Mechanism
<b>RRF</b>	Recovery and Resilience Facility
<b>SUPD</b>	Single-Use Plastic Directive (2019/904/EU)
<b>UN</b>	United Nations
<b>WEEED</b>	Waste Electrical and Electronic Equipment Directive (2012/19/EU)

**WFD** Waste Framework Directive (2008/98/EC)  
**WPP** Waste Prevention Plan



## Executive Summary

1. The Republic of Croatia is currently in the process of alignment of its national waste legislation with European Union legislative requirements derived from the 2015 Circular Economy Action Plan known as „waste package“<sup>1</sup>, along with new Single-Use Plastics Directive<sup>2</sup> (SUPD). Alignment of Croatian with EU waste legislation is implemented by adoption of new waste management act and by-laws. Draft proposal of new waste management act is prepared, and public consultation process was launched on November 13, 2020 for the period of 30 days. The draft act is to be sent to the Croatian Parliament for reading and adoption.
2. In addition, as all other EU member countries, Croatia is currently preparing long-term EU budget for the period 2021-2027 and for that purpose is defining priority areas for investment pipeline activities in the waste sector. The identified key funding waste areas will fall under the scope of new waste management plan for the period 2023-2028, which will be prepared by Ministry of Economy and Sustainable Development (MoESD).
3. The Republic of Croatia has recognised this currently ongoing policy planning processes as opportunity to accelerate the activities of Croatia to meet the EU circular economy targets and to incorporate circular economy approaches into the waste management sector. Respectively, upon MoESD request World Bank is providing support in the form of technical assistance to MoESD through the project *Circular Economy Approaches in Solid Waste Management*. This technical assistance program is financed from the European Union’s Cohesion Fund using the Bank’s Reimbursable Advisory Services (RAS) instrument.
4. In this context, World Bank is supporting MoESD by providing different closely interlinked activities: diagnostic analysis for a circular economy in Croatia, support to formulation of a sectoral Circular Economy Action Plan, support to revision of National Waste Management Plan (2017-2022) and its implementation decision (NWMP ID), strengthening of coordination among various stakeholders and promotion of joint ownership of the new waste management agenda, capacity building, as well as, access to cutting-edge knowledge and expertise to all parties involved.
5. *Report on Inputs to National Waste Management Plan and Implementation Decision* reflects requirements of the MoESD and its immediate needs regarding incorporating circular economy approaches into the current National Waste Management Plan (NWMP) and its implementing decision, as well as into the future (post-2022) national waste management plan. Report is developed in close cooperation and active engagement of MoESD through technical meetings, exchanging information and opinions on topic related practical problems and issues, discussion and agreeing on approach and possible solutions.
6. Aside from MoESD relevant input data and feedback on specific parts of NWMP and NWMP ID is also provided by other stakeholders responsible for implementation of certain NWMP measures: Environmental Protection and Energy Efficiency Fund, Ministry of Agriculture, Ministry of Physical Planning, Construction and State Assets, Croatian Chamber of Economy.
7. Follow-up to that, this Report reflects results of tailor-made technical analyses aimed at assessing and improvement of key waste sector planning documents - NWMP and its implementing decision. Report focuses on key features of waste planning process: defining objectives, measures, and activities (including financial framework for their implementation), and ensuring alignment of overall NWMP with EU requirements, including better “resource circularity”. Analyses and evaluation were not conducted in a way to assess the success of each individual project., e.g. the

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<sup>1</sup> Four directives adopted in May 2018 and should have been transposed into national legislation by 5 July 2020: 1. Directive (EU) 2018/851 amending Waste Framework Directive (WFD), 2. Directive (EU) 2018/850 amending Landfill Directive (LD), 3. Directive (EU) 2018/852 amending Directive on Packaging and Packaging Waste (PPWD), 4. Directive (EU) 2018/849 amending Directive on End of Life Vehicles (ELV), Waste Electrical and Electronic Equipment (WEEE) Directive and Batteries Directive (BATT).

<sup>2</sup> In June 2019, the Single-Use Plastic Directive 2019/904/EU was adopted. This new Directive has to be transposed into national legislation by 3 July 2021.

analysis of the prepared feasibility studies for individual projects was not the subject of this evaluation.

8. Report provides inputs based on the results of exhaustive analysis of current NWMP and NWMP ID which covered:
  - i) Analyses of NWMP and NWMP implementation progress (performance against EU waste targets and NWMP targets, implementation progress of defined measures and activities, progress of envisaged funds expenditure)
  - ii) Evaluation of alignment of measures and activities defined by NWMP and NWMP ID with EU waste legislation and for NWMP targets beside alignment their effectiveness was also assessed
  - iii) Cost re-evaluation for executing NWMP measures and determination of possible funding sources

As a result of conducted analyses recommendations for aligning the content of NWMP with EU requirements, proposals for modification of existing measures, as well as proposal of certain new measures reflecting EU requirements and principles of circular economy is given. Also, the timeline for the implementation of the revised NWMP is proposed.

9. Additionally, priority areas for investment pipeline activities in the waste sector to be supported for the post 2021 period are proposed along with detailly elaborated arguments why there is necessity for investments regarding each proposed waste area.
10. Analysis showed that Croatia generates about 5,5 million tonnes of waste per year, leading to average generation about 1.355 kilograms per capita which is significantly less than the EU average (5.087 kg per capita). Non - hazardous waste is responsible for 97% of the total waste generated, while the remaining 3% is hazardous waste. At the EU-27 level 4,3 % of the total waste generated, in 2018, was classified as hazardous waste. Municipal waste makes share of 33% in total waste generation and in 2019 amounted to 1,81 million tonnes, which in 2019 corresponds to 444 kilograms per capita (EU average in 2019 - 502 kg per capita).

The share of separately collected waste increases and in 2019 was 37%. The same applies to recycling rate, which in period from 2015 to 2019 increased for 12 percentage point and accounted to 30% in 2019. It is still significantly below the 2020 target set up by Directive on Waste 2008/98/EC (WFD), 50%. Landfilling is the most common type of waste treatment with share of 59%. Biodegradable municipal waste ends up far above the EU target for 2020 on landfills (264.661 t). In 2019, 679.080 t of biodegradable municipal waste was landfilled. Construction waste makes 25% of total waste generation. In 2019, recycling rate for construction waste was 67%, only 3 percentage points below EU target 2020 – 70%.

Concerning special waste categories difficulties are identified regarding packaging waste management. For 2019 Croatia achieved 49% recycling and the same recovery rate thus did not met EU Packaging and Packaging Waste Directive 55% to 80% target for recycling and 60% target for packaging waste recovery. For specific packaging materials targets were not met for glass, metal and wood while specific packaging waste targets for paper and board and plastic is met.

11. Currently in Croatia two different sets of waste targets are in force<sup>3</sup>. One set of targets, the same as EU one, is defined by waste legislation (Act on Sustainable Waste Management (OG 94/13, 73/17, 14/19, 98/19) and by-laws and the other group of quantitative targets, not defined at EU level, is defined in NWMP for the period of the NWMP (2017-2022). The analyses showed that it would be more efficient and pragmatic to have only one set of quantitative targets in force. Having one set of quantitative targets, the same as EU ones, will make monitoring more efficient, especially because adequate indicators for measuring progress and success of these targets are developed at EU level. Respectively, the best would be to transpose all quantitative EU “waste package” and the SUPD targets as a part of the new act on waste management while within NWMP to define

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<sup>3</sup> There is a third set of targets defined by Waste Management Strategy of the Republic of Croatia (OG 130/05) from 2005, which is also still formally in force. Yet, they were not considered in this report as they were recognized as outdated.

qualitative targets.

12. To align the NWMP content with requirements of “waste package”, essential prerequisite is to conduct all analytical work envisaged by current NWMP and NWMP ID (different studies and analyses like analyses of recycling capacities needs and capacities needs for hazardous waste management). To a great extent content of the NWMP is aligned with the requirements of Directive on Waste 2008/98/EC and Directive 2018/851/EC amending Directive on Waste, and the greatest challenge is to provide comprehensive data regarding: existing waste collection schemes and major disposal and recovery installations and need for new collection schemes and construction of new waste infrastructure, all supported by assessment of necessary investments. These information are currently not presented at the satisfactory level of details within NWMP.
13. Implementation of NWMP and NWMP ID measures that envisage preparation of different analytical studies should provide data necessary for alignment of NWMP content with EU requirements described above and for defining objectives, measures and investment for the next planning period. Additionally, for proper dimensioning of waste management infrastructure it is important to ensure data on national municipal waste composition on the basis of field conducted sorting analysis considering regional concept. Current estimates of the composition of mixed municipal waste in Croatia are based upon a limited number of analyses of waste composition coupled with data with data from the 2012<sup>4</sup>. Also, these analyses were conducted in a small number of counties and LGUs.
14. Results of implementation progress analyses of the measures and activities defined by NWMP and NWMP ID showed that the best implementation progress has been made on waste prevention. Significant progress has been achieved regarding the construction of recycling yards and procurement of equipment, vehicles and vessels for separate collection. Group of measures for improvement of waste management information system and administrative procedures in waste management can also be assessed as the ones that showed satisfactory progress. Delays are recorded for the implementation of infrastructural measures and activities which are decisive for the transition to a circular economy and the achievement of EU waste targets, like development of re-use and repair network and establishment of re-use centers, construction of sorting plants for dry recyclables, constructing of new recycling facilities and /or capacity increase of existing recycling plants for dry recyclables, facilities for bio-waste treatment, projects preparation and construction of WMC etc. Activities for ensuring additional recycling capacities, deployment of recycling market, introduction of waste policy that will enhance shift from landfilling to re-use and recycling (e.g. introduction of landfill tax) have not started yet.
15. Summarized results of implementation progress of NWMP ID activities are given in the Table 1 below.

**Table 1** – Progress implementation of NWMP measures

No.	Target	Sub-target	Sub-target name	Progress of NWMP ID activities
1.	Improvement of municipal waste management system	Sub-target 1.1	Reduce total quantity of produced municipal waste by 5%	>50%
		Sub-target 1.2.	Separately collect 60% by weight of the produced municipal waste (primarily paper, glass, plastics, metal, bio-waste, etc.);	<50%
		Sub-target 1.3	Separately collect 40% by weight of the produced municipal biowaste	<50%
		Sub-target 1.4	Dispose at landfills less than 25% of produced municipal waste	<50%
2.	Improvement of the system for management with special waste	Sub-target 2.1	Separately collect, by weight, 75% of the produced construction waste	0%
		Sub-target 2.2	Establish system for sludge waste management from waste water treatment plants	50%

<sup>4</sup> From Environmental Polluters Register

No.	Target	Sub-target	Sub-target name	Progress of NWMP ID activities
	<b>categories</b>	Sub-target 2.3	Improve the packaging waste management system	0%
		Sub-target 2.4	Establish waste management system for marine litter	50%
		Sub-target 2.5	Establish waste management system for waste ships, wrecks and sunken things on the seabed	<50%
		Sub-target 2.6	Improve waste management system of other special waste categories	0%
3.	<b>Improvement of hazardous waste management system</b>	Sub-target is not defined by NWMP		0%
4.	<b>Remediate sites contaminated with waste</b>	Sub-target is not defined by NWMP		<50%
5.	<b>Continuously carry out educative-informative activities</b>	Sub-target is not defined by NWMP		>50%
6.	<b>Improve the waste management information system</b>	Sub-target is not defined by NWMP		>50%
7.	<b>Improve supervision of waste management</b>	Sub-target is not defined by NWMP		50%
8.	<b>Improve administrative procedures in waste management</b>	Sub-target is not defined by NWMP		100%

16. Evaluation of measures showed that measures defined by NWMP and NWMP ID are set up in way that concept of circular economy has been introduced and achievement of EU targets has been taken into account, however certain improvements are given to ensure more enhanced and more effective implementation. Some of these recommendations are aimed at: planning of waste management infrastructure capacities based on comprehensive and reliable technical and economic analysis which will provide the most environmentally and economically viable solution, defining more precisely and systematically certain activities and performance indicators (e.g. grouping activities create difficulties regarding progress monitoring like it is the case with activity that covers construction of facilities for biological treatment, procurement of equipment and vehicles for bio-waste).
17. Furthermore, certain measures and activities defined by NWMP and NWMP ID are not regulated by waste management policy and are not under the jurisdiction of MoESD (e.g. waste management system for wrecks and sunken objects on the seabed) and some of them present regular work of MoESD or certain other state authorities (e.g. waste management supervision, amending spatial planning legislation, etc), and as such are covered in detail by the annual work plans of MoESD and/or other competent institutions. Analyses showed that it would be more efficient if such measures and activities are excluded from the scope of the NWMP.
18. Robust assessment of financial progress showed that in the period from 2017 to 2020 total expenditure on the NWMP measures was 1.204.836.185 HRK, which means that financial progress for the analysed period is 32% and for the whole planned period is 24%. By the end of 2020, for additional 995.924.612 HRK procedure of procurement and/or contracting was underway. Financing came predominantly from EU funds (60%). When it comes to progress in the implementation of indicatively planned funds with regard to the source, 58% of funds foreseen by NWMP for EPEEF was spent, followed by Croatian Waters (40%), EU funds (29%) and state budget (20%). Considering that in the meantime, a public procurement procedure was launched, inter alia, for the establishment of 3 WMC and remediation of "hot spot" Sovjak near Rijeka and the fact that for certain NWMP measures contracts have been concluded and their implementation follows (for approximately HRK3 billion) it is to be expected that the amount of spent funds by the end of the

planning period will be higher.

19. As one of the causes of lower progress in spending planned finances is the long period necessary for preparation of project documentation. Additionally, there is a great resistance from the public toward any waste projects, as trust of citizens in the public institutions is very low (“not in my back yard” effect).
20. Furthermore, conducted cost re-evaluation indicates that planned investment costs for executing measures are underestimated. More reliable investment planning is needed, which is indirectly related to better quality planning of the entire waste management system and the implementation of analytical studies.
21. Beside state budget and local (regional) budgets which are limited, for the funding NWMP projects, in the period from 2021 to 2027, the Croatia will have available funds from the cohesion policy (ERDF and CF) and funds from the new instrument Next Generation EU. Additionally, Croatia will need to consider and other sources of financing NWMP projects like: EPEEF, Croatian Waters, loans and private investments.
22. Seven priority areas for investment pipeline activities in the waste sector are identified. Those are: strengthening waste prevention, improvement of preparation for re-use and recycling, establishment of system for marine litter, ensuring economically and environmentally sound management for residual waste, improvement of hazardous waste management system, remediation of waste polluted sites, improvement of waste management information system.
23. Results of arising from conducted analyses indicate that implementation of all existing infrastructure measures, educative and informative projects and activities, waste prevention measures, measures aimed at improvement of waste management information system should continue in the next planning period (2023-2028) while it is important to intensify implementation of projects and activities which present preparatory activities for further improvement of waste management system and infrastructure like: preparation of analytical studies, the preparation of project documentation for remediation of “hot spots” and finalise them by the end of 2022 the latest. Based on results measures should be improved and new measures regarding seven identified areas defined.
24. Following that, measures should be defined based on comprehensive and reliable technical and economic analysis which will provide the most environmentally and economically viable solution. For example, sorting capacity need (capacity and location arrangement of sorting facilities) should be result of detailed technical study which has to consider separate collection objectives and re-use and recycling needs (planned re-use and recycling capacity) at national level. Accordingly, adequate planning should be further applied at the level of each project (e.g. planning of required capacities, investments, and operational costs, utilization of the best available technology which will be economically and environmentally efficient).
25. Communication aspect with citizens is recognized as important area that should be given special attention. Citizens should be timely and clearly informed and acquainted with all aspects of the planned projects (planned capacity and technology, investment and operational costs, how implementation of project will reflect on the price of the utility service, are there possible environmental and public health impacts and what prevention and mitigation measures are anticipated, etc).
26. Additionally, although it does not have to be an integral part of the NWMP, policy instrument that is strongly recommended to be adopted and implemented by the end of this planning period is introduction of landfill fee. Municipal waste management depend on regional and local self-government units and introducing landfill fee could intensify, willingness and cooperation between them, consequently speeding up implementation of measures necessary to move toward recycling society. Also, the revenues can be used for financing investments in waste sector.
27. Furthermore, implementation progress could be accelerated by increased engagement of private

sector especially in activities like separate waste collection, construction of sorting facilities, recycling yards, facilities for biological treatment and treatment of mixed municipal waste. At the same time mobilizing private sector can help reduce pressures on limited public budgetary resources and help deliver innovations in waste management infrastructure and services more hastily than public sector alone.

# 1 Introduction

28. By adoption of two EU Circular Economy Action Plans; “Closing the loop - An EU action plan for the Circular Economy” in 2015, one of the main building blocks of the European Green Deal<sup>5</sup> and „Action plan For a Cleaner and More Competitive Europe“ in 2020, at the European level measures to accelerate transition to a more circular economy were introduced. Circular economy aims to maintain value of resources and products in the economy for as long as possible and the generation of waste minimised.
29. One of the measures introduced by the first Circular Economy Action Plan was revision of existing EU waste legislation. Introduction of this measure was aimed at: strengthening waste prevention, in particular food and marine litter prevention; strengthening extended producer responsibility; boosting the recycling and re-use (especially of municipal and packaging waste); and phasing out waste landfilling. In May 2018 this waste legislation revision, resulted in adoption of 4 new waste Directives, known as the „waste package“. By these Directives six existing waste directives were amended. The deadline for transposing these legislative changes into national legislation was July 5th, 2020. Croatia has not yet harmonized its waste legislation with “waste package” requirements.
30. Furthermore, in May 2018, as part of the European Strategy for Plastics in a Circular Economy, a Directive on the reduction of the impact of certain plastic products on the environment - the Single-Use Plastic Directive 2019/904/EU was adopted. This Directive must be transposed into national legislation by 3 July 2021.
31. Except above mentioned specific measures to prioritize waste prevention, re-use and recycling ahead of landfilling, “waste package” introduced additional requirements that Member States’ waste management plans and waste prevention programs have to include. Thus, Directive 2018/851 amended Article 28 and Article 29 of WFD, which define content of the waste management plan and waste prevention programme. In addition to the Directive 2018/851, Article 11 of the Single-Use Plastic Directive stipulates additional measures which have to be incorporated into the waste prevention programme.
32. In accordance to the provisions of Article 28 and Article 29 of the Waste Framework Directive, Republic of Croatia, in 2017, adopted national Waste Management Plan (NWMP) for the period 2017-2022 which includes its Implementation Decision (NWMP ID). An integral part of Croatian Waste Management Plan is Waste Prevention Plan (WPP). Article 30 of the Waste Framework Directive stipulates obligation of evaluation of national waste management plans and waste prevention programmes at least every six year and revision as appropriate and where relevant.
33. To be fully aligned with above mentioned EU requirements regarding the content and new waste legislation measures, current NWMP with belonging NWMP ID and WPP needs to be revised. Except integration of circular economy principles in Croatian waste management this revision is also important in the context of programming and planning of allocations for the use of EU funds for the next programming period, 2021-2027, as project and activities defined by NWMP represent the basis for allocating EU funds.
34. The waste sector in the Republic of Croatia is facing challenges regarding policy development and its implementation and is lagging behind in meeting the existing EU waste targets necessary for transitioning towards a circular economy. The Croatia failed to bring all existing landfills into compliance with the Directive 1999/31/EC (Landfill Directive) by 31 December 2018 - a deadline defined by the Treaty concerning the accession of the Croatia to the EU from 2011 (Accession

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<sup>5</sup> Europe’s new agenda for sustainable growth

Treaty)<sup>6</sup>. In addition, there is a risk that other existing EU requirements will not be met, such as; reduction of municipal biodegradable waste disposed at landfills, requirements for separation at source and reuse and recycling, by the end of 2020. New ambitious targets set in the “waste package” in 2018 for reuse and recycling and reducing use of landfills from 2025 onward, will put additional pressures on the Croatia already struggling to meet the EU previous targets.

35. Although the main challenge regarding the waste management sector in Croatia is the implementation of defined measures and activities, policy development in a timely manner still represents a great challenge. Preparation of the current NWMP was initiated in 2014, three different versions of the plan have been prepared and have undergone a public consultation process before adopting final version in 2017. Furthermore, as previously mentioned Croatia failed to timely transpose “waste package”.
36. This Report presents the results from evaluating the current NWMP considering the principles of a circular economy that needs to be applied, and recommendation for its revision.

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<sup>6</sup> Treaty between the Kingdom of Belgium, the Republic of Bulgaria, the Czech Republic, the Kingdom of Denmark, the Federal Republic of Germany, the Republic of Estonia, Ireland, the Hellenic Republic, the Kingdom of Spain, the French Republic, the Italian Republic, the Republic of Cyprus, the Republic of Latvia, the Republic of Lithuania, the Grand Duchy of Luxembourg, the Republic of Hungary, the Republic of Malta, the Kingdom of the Netherlands, the Republic of Austria, the Republic of Poland, the Portuguese Republic, Romania, the Republic of Slovenia, the Slovak Republic, the Republic of Finland, the Kingdom of Sweden, the United Kingdom of Great Britain and Northern Ireland (Member States of the European Union) and the Republic of Croatia concerning the accession of the Republic of Croatia to the European Union  
OJ L 112, 24.4.2012, p. 10–110 (BG, ES, CS, DA, DE, ET, EL, EN, FR, IT, LV, LT, HU, MT, NL, PL, PT, RO, SK, SL, FI, SV) OJ L 300, 9.11.2013, p. 11–110 (HR)

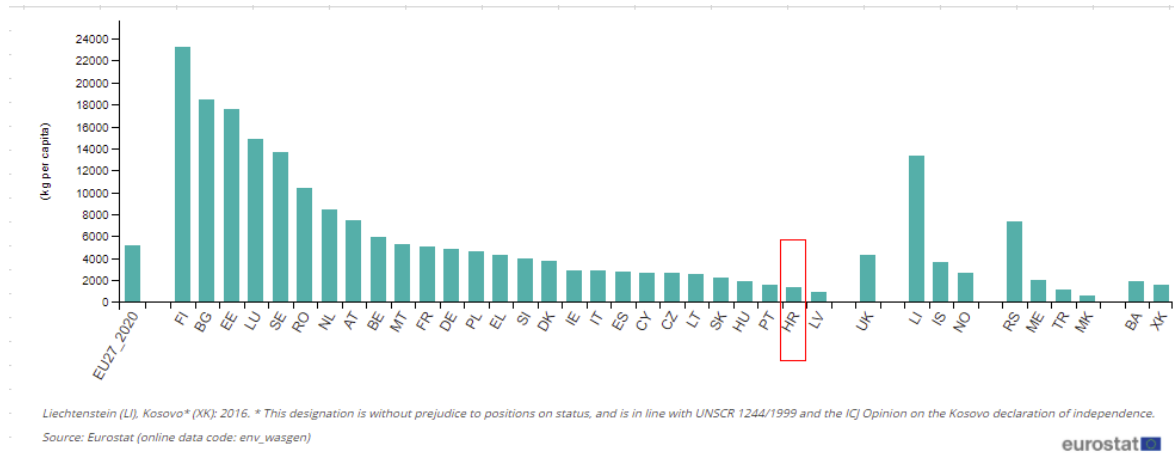


## 2 State of waste management in the Republic of Croatia

### 2.1 Waste generation

37. Croatia generates about 5,5 million tonnes of waste per year, leading to average generation about 1.355 kilograms per capita which is significantly less than the EU average (5.087 kg per capita) (Figure 1).<sup>7</sup>

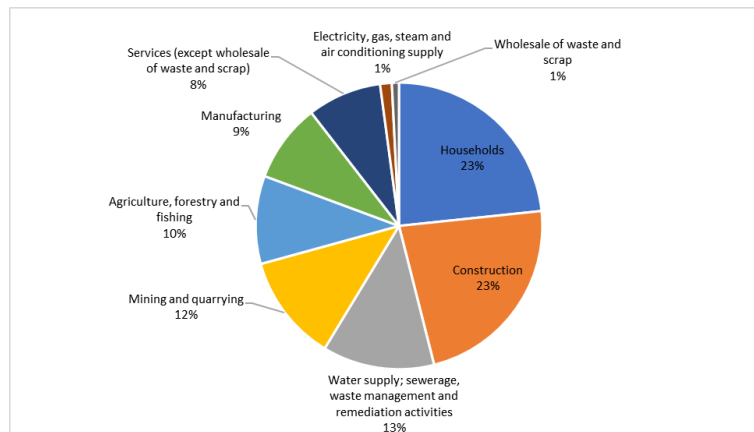
**Figure 1 - Waste generation in kg/capita by countries EU27, 2018**



SOURCE - EUROSTAT database

38. The largest shares of waste are generated by Households (23%) and Construction sector (23%), followed by Water supply; sewerage, waste management and remediation activities (13%) and Mining and quarrying sector (12%). These four sectors together produce almost 71% of all waste (Figure 2).<sup>8</sup>

**Figure 2 - Shares of NACE sectors and households in the waste generation, Croatia, 2018**



SOURCE - Authors, analysis of the EUROSTAT data

39. Non - hazardous waste is responsible for 97% of the total waste generated in 2018, while the

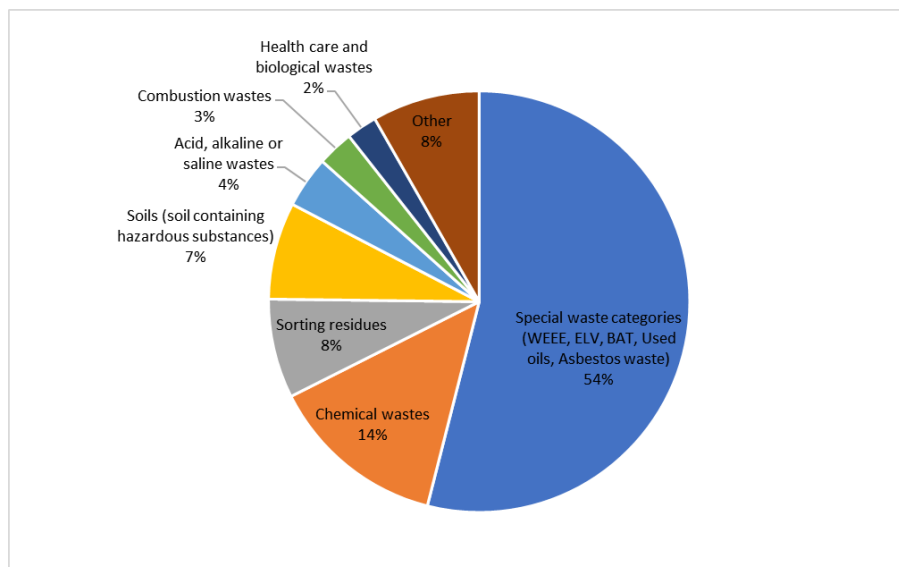
<sup>7</sup> Data on total waste generation (non-hazardous and hazardous waste) are based on the data reported to the Eurostat according to the Waste Statistics Regulation ((EC) No 2150/2002). EU Member States are obliged to deliver data every two years and for that purpose comprehensive data compilation is made. Last available data on total waste generation are for 2018 reporting year. For specific waste fractions for which there are annual reporting obligation to EK, calculation are done on the annual base (e.g. municipal waste, construction waste, special waste categories etc.), and thus for that fractions in the next Chapter last available data, for 2019 reporting year are presented. For calculation of total quantities of waste presented in this chapter and for municipal waste and construction waste (presented in the chapter 2.1.1 and 2.1.2) different methodology approaches are applied.

<sup>8</sup> <https://ec.europa.eu/eurostat/data/database>

remaining 3% is hazardous waste. At the EU-27 level 4,3 % of the total waste generated, for the same year, was classified as hazardous waste.

40. Following non-hazardous waste streams make almost 80% of total non-hazardous waste amounts: municipal waste, construction waste (soils, mineral waste from construction and demolition), metallic waste, mining waste and agricultural waste (animal faeces, urine and manure).
41. In 2018 hazardous waste amounted to 174.350 tonnes. About 54% of hazardous waste make special waste categories like discarded equipment, discarded vehicles, batteries and accumulators wastes, used oils and asbestos waste. Figure 3 gives an information about composition of hazardous waste.

**Figure 3** - Composition of hazardous waste, Croatia, 2018



SOURCE - Authors, analysis of the EUROSTAT data

42. Annual amounts of exported hazardous waste are about 21.000 tonnes while the rest is treated in the country or pre-treated and then exported out of the country for the final treatment.

### 2.1.1 Municipal waste

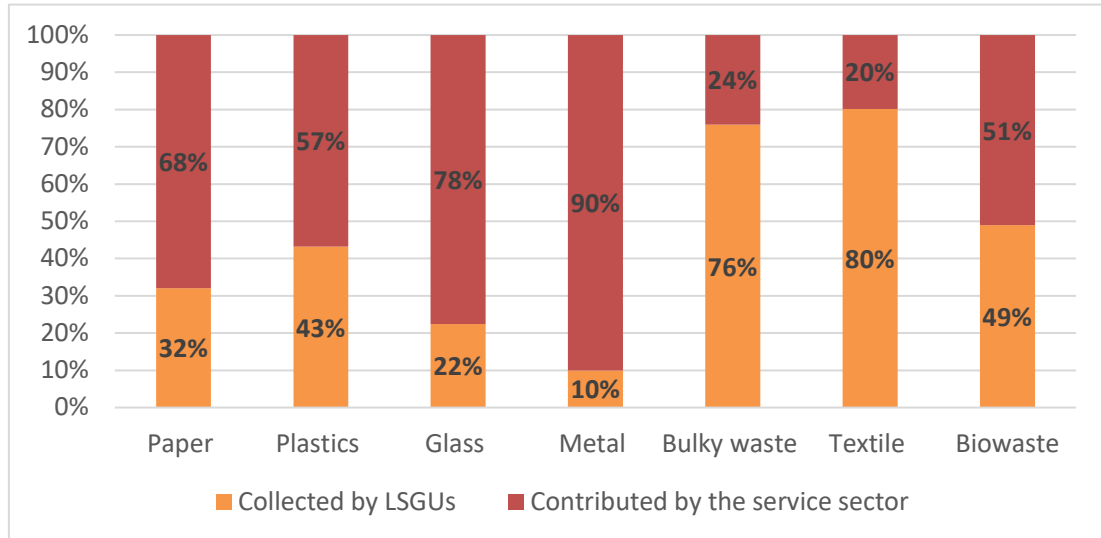
43. Municipal waste<sup>9</sup> makes share of 33% in total waste generation. In the period from 1995 to 2019 municipal waste generation increased considerably, ranging from 978.542 tonnes to 1.811.617 million tonnes, which in 2019 corresponds to 444 kilograms per capita. The largest amounts of municipal waste per capita are recorded in tourist areas (Istria county, Spiti – Dalmatia County, Primorje – Gorski Kotar County etc.) and in most populated cities (City of Zagreb, City of Split etc.) All LGUs are covered by organized collection of municipal waste while population coverage is 99%.<sup>10</sup>
44. In 2019, the share of mixed municipal waste in generated municipal waste was 63% (1.140.848 tonnes). Thus, the share of separately collected municipal waste accounted to 37% (670.769 tonnes), which is increase of 6 percent units compared to the previous year. It is about the largest annual increase from 2012, which partially can be attributed to the accelerated procurement of containers for separate collection of municipal waste in LGUs last few years and the implementation of education and awareness raising activities for citizens.
45. However, only 24% of municipal waste is separately collected as a direct result from LGUs obligation (from households) while the rest is contributed by the service sector. Services sector have great

<sup>9</sup> mixed waste and separately collected waste from households and other sources, where such waste is similar in nature and composition to waste from households

<sup>10</sup> 1% of citizens is located in the area inaccessible to the vehicles

importance for the overall economic activity in Croatia. In service activities, the largest share belongs to tourism, which in 2019 recorded record results.<sup>11</sup> This may be also associated with an increase of separate collection of municipal waste. Figure 4 shows shares of municipal waste fractions collected by LGUs and services sector.

**Figure 4** - Shares of municipal waste fractions collected by LGUs and service sector, 2019



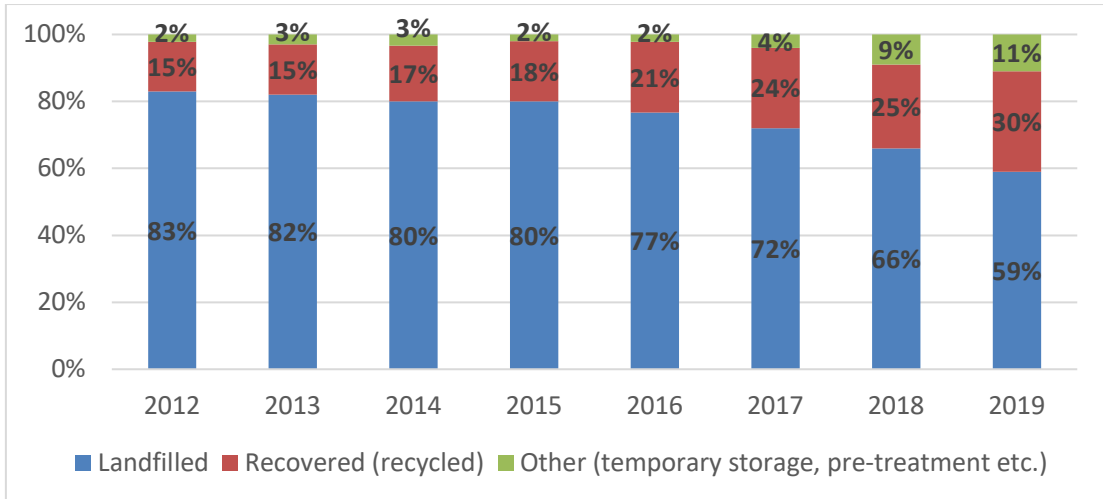
SOURCE - Authors, analysis of the MoESD data<sup>12</sup>

46. Not all quantities of separately collected municipal waste are sent directly to recovery. It is noted that bulky waste (such as furniture), biowaste and other categories of miscellaneous municipal waste significantly increases official rates of separate collection of municipal waste, despite the fact that they end up being landfilled. In 2019, 547.785 tonnes of separately collected waste was submitted to the recovery processes and recovery rate accounted to 30%. Since these were mainly recycling processes, recycling rate was also 30% (Figure 6) while for the EU-27 averaged approximately 48 percent in 2019. Landfilling is the most common type of waste treatment with share of 59% (Figure 5). Amount of biodegradable municipal waste that ends up at landfills significantly exceeds the minimum target value set out by the Landfill directive (Table 3). The remaining 11% of the total generated municipal waste was sent to other recovery/disposal processes, mainly to mechanical-biological waste treatment (MBT plants), while a smaller part refers to the estimated quantities for the non-covered part of the population, quantities that are temporarily stored and quantities forwarded to some other pre-treatment operations (e.g. sorting).

<sup>11</sup> <https://croatia.eu/index.php?view=article&id=32&lang=1>

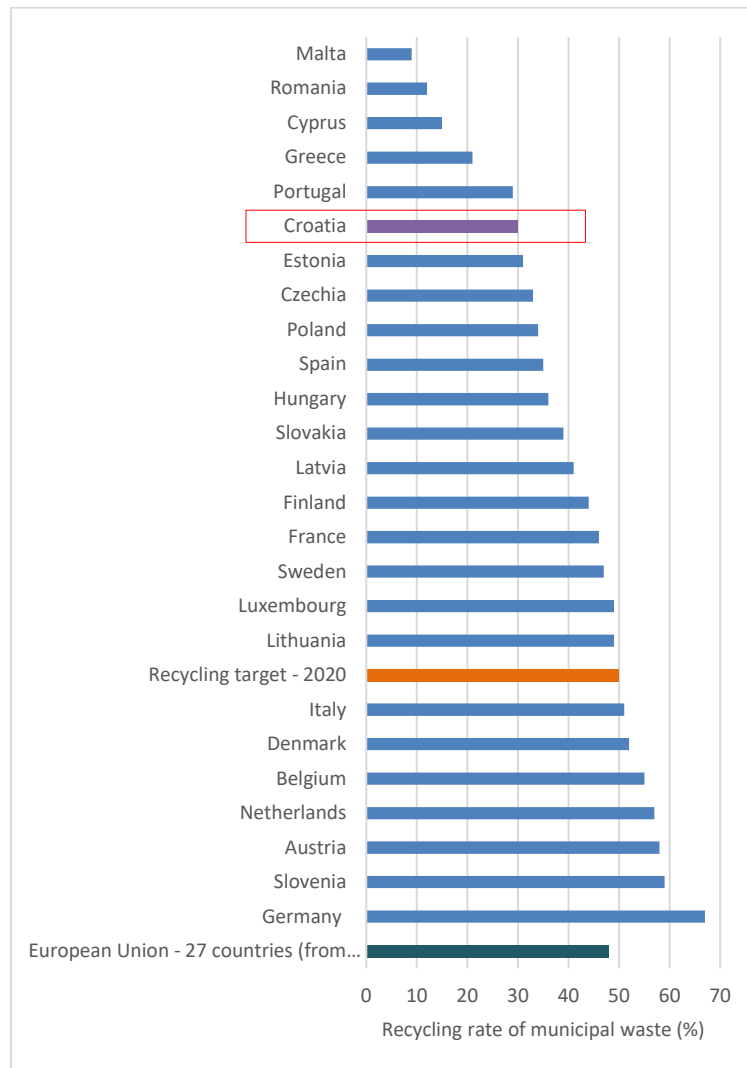
<sup>12</sup> Report on municipal waste 2019, Table 14

**Figure 5 - Municipal waste treatment options Croatia for period 2012-2019**



SOURCE - Report on municipal waste, MoESD

**Figure 6 - Recycling rates of municipal waste among EU-27 countries, 2019**



SOURCE - Authors, analysis of the EUROSTAT data (Data for Bulgaria and Ireland are not available)

47. Regarding ensuring municipal waste collection infrastructure, the biggest improvements are made with the construction of recycling yards, from 47<sup>13</sup> in 2012 to 342<sup>14</sup> in 2019.
48. Slower progress is recorded regarding improvement of waste treatment infrastructure. In the mentioned period 5 additional composting plants are established. From 29 active biogas plants, only 6 of them in 2019 received municipal waste for treatment while the other ones received non-municipal waste types like manure and plant tissues.
49. For the treatment of residual municipal waste, there are active three (3) MBT plants. One of them, with capacity of 95.000 tonnes/year<sup>15</sup>, is operated by private owner. Assessment of available sorting and recycling capacities for dry recyclables still is missing. Table 2 gives an overview of the current basic municipal waste infrastructure in Croatia.

**Table 2** - Municipal waste infrastructure in Croatia

Waste infrastructure	Number	Capacity
Recycling yards <sup>16</sup>	221 stationary	
	121 mobile	
Active landfills <sup>17</sup>	107 (for municipal waste)	10.334.224 t (rest capacity) <sup>18</sup>
Composting plants <sup>19</sup>	13	108.596 t/year
Biogas plants <sup>20</sup>	29	1.264.763 t/year
MBT plants <sup>21</sup>	3	289.000 t/year
Sorting facilities	Data not available	Data not available
Recycling facilities	Data not available	Data not available

SOURCE - Authors, analysis of the MoESD data

### 2.1.2 Construction waste

50. The total amount of construction waste generated in 2019 is estimated at 1,37 million tons, which makes 25% of total waste generation.
51. The largest share in construction waste makes soil, stones and dredging waste (4.5%), followed by mixed construction waste and demolition waste (19.1%). Waste concrete, bricks, tiles and ceramics makes 16.1% of total construction waste, while metals and their alloys represent 13% and other types of waste by less than 7%.
52. The total amount of treated construction waste in 2019 was 1,06 million tons. The remaining unrecorded, about 300.000 tons, could refer to unreported data in the case of export, temporary storage, implementation of a procedure for which no permit has been obtained, e.g. for backfilling, or to waste ended up to illegal dumps.
53. Regarding construction waste management infrastructure, in Croatia there are 24 crushers for construction waste.
54. Hazardous waste in construction waste accounts for 1,9% (26.007 t). Certain quantities refer to construction waste containing asbestos. In 2019, 2.525 tons of asbestos waste was disposed in 6 cassettes built at certain landfills. On the remaining 11 cassettes disposal of asbestos construction waste wasn't recorded.

13 Report on municipal waste 2012

14 <https://mingor.gov.hr/o-ministarstvu-1065/djelokrug/uprava-za-procenu-utjecaja-na-okolis-i-odrzivo-gospodarenje-otpodom-1271/ocevidnici/1283>

15 Waste Permit Registre, <http://regdoz.azo.hr/>

16 Data 2020, MoESD, <https://mingor.gov.hr/o-ministarstvu-1065/djelokrug/uprava-za-procenu-utjecaja-na-okolis-i-odrzivo-gospodarenje-otpodom-1271/ocevidnici/1283>

17 Report on landfills 2019

18 Data 2019, MoESD, Report on landfills 2019

19 <http://envi.azo.hr/?topic=8>

20 <http://envi.azo.hr/?topic=8>

21 Waste Permit Registre, <http://regdoz.azo.hr/>

## 2.2 Performance against the EU targets and NWMP targets

55. This chapter presents the performance of current waste management system against the EU targets and targets stipulated by NWMP.
56. In both cases, EU and NWMP, targets related to the municipal waste are at risk of failure (EU municipal waste recycling target, EU target regarding decrease landfilling of biodegradable municipal waste, NWMP targets on reduction of municipal waste generation, separate collection of municipal waste, separate collection of biowaste and decrease of municipal waste landfilling). Furthermore, specific EU targets related to the packaging and packaging waste are not achieved which is closely linked to the municipal waste targets, since packaging waste makes 37% of municipal waste.<sup>22</sup>
57. Recycling target on minimum recycling efficiencies for nickel-cadmium batteries and accumulators, including recycling of the cadmium content also was not achieved.
58. Detailed overview is given in the Table 3 and Table 4.

**Table 3** –Performance against the EU target

Eu directive	Target date	Target	Reference year	Rate	Indicator	
Waste Framework Directive (2008/98/EC)	December 2020	Prepare for re-use and recycling 50%, by weight, at least paper, metal, plastic and glass from households and possibly from other origins as far as these waste streams are similar to waste from households (calculation method 2 <sup>23</sup> ).	2019	37%	Risk of failure due December 2020	
	December 2020	Prepare for re-use, recycling and material recovery, including backfilling operations using waste to substitute other materials, 70% by weight, of non-hazardous construction and demolition waste, excluding naturally occurring material defined in category 17 05 04 (natural soils and stone).	2019	67%	On track due December 2020	
Packaging and Packaging Waste Directive (94/62/EC)	From 31st December 2008	60% as a minimum by weight of packaging waste will be recovered or incinerated at waste incineration plants with energy recovery.	2019	49%	Not achieved	
		Between 55 % as a minimum and 80 % as a maximum by weight of packaging waste will be recycled.	2019	49%	Not achieved	
		The following yearly minimum recycling targets for materials contained in packaging waste should be attained:				
		(i) 60% by weight for glass.	2019	51%	Not achieved	
		(ii) 60% by weight for paper and board.	2019	74%	Achieved	
		(iii) 50% by weight for metals.	2019	24%	Not achieved	
End of Life Vehicles Directive (2000/53/EC)	01/01/2015	(iv) 22,5% by weight for plastics, counting exclusively material that is recycled back into plastics.	2019	36%	Achieved	
		(v) 15% by weight for wood.	2019	3%	Not achieved	
		Reuse and recovery to a minimum of 95% by average weight of vehicle and year.	2019	99,98%	Achieved	
		Reuse and recycling to a minimum of 85% by average weight of vehicle and year.	2019	99,61%	Achieved	

<sup>22</sup> MoESD, Report on municipal waste 2019

<sup>23</sup> From 4 available calculation methods stipulated by Commission Decision 2011/753/EU, Croatia chose calculation method 2 which applied to paper, plastic, glass and metal waste (the amount of these fractions recycled and the amount of these fractions produced are put in relation)

Eu directive	Target date	Target	Reference year	Rate	Indicator	
Batteries Directive (2006/66/EC)	26/09/2016	Minimum 45% collection rate for batteries & accumulators.	2019	91%	Achieved	
	26/09/2011	Recycling processes shall achieve the following minimum recycling efficiencies:				
		(a) recycling of 65 % by average weight of lead-acid batteries and accumulators, including recycling of the lead content to the highest degree that is technically feasible while avoiding excessive costs.	2019	79%	Achieved	
		(b) recycling of 75 % by average weight of nickel-cadmium batteries and accumulators, including recycling of the cadmium content to the highest degree that is technically feasible while avoiding excessive costs; and	2019	51%	Not achieved	
		(c) recycling of 50 % by average weight of other waste batteries and accumulators.	2019	61%	Achieved	
Landfill Directive (1999/31/EC)	31 December 2020	Biodegradable municipal waste going to landfills must be reduced to 35% of the total quantity (by weight) biodegradable municipal waste produced in 1997 (264.661 t).	2019	679.080 t (61% more than targeted)	Risk of failure due December 2020	
WEEE Directive (2012/19/EC)	From 2019	The minimum collection rate 65 % of the average weight of EEE placed on the market in the three preceding years. <sup>24</sup>	2019	73%	Achieved	
	From 15/8/2018	<b>For Temperature exchange equipment</b> - 85 % shall be recovered - 80 % shall be prepared for re-use and recycled	2019	99,5% 99,5%	Achieved	
	From 15/8/2018	<b>For Screens, monitors, and equipment containing screens having a surface greater than 100 cm</b> - 80 % shall be recovered - 70 % shall be prepared for re-use and recycled	2019	88,8% 88,8%	Achieved	
	From 15/8/2018	<b>For Lamps</b> - 80 % shall be recycled	2019	96,6%	Achieved	
	From 15/8/2018	<b>For Large equipment (any external dimension more than 50 cm)</b> - 85 % shall be recovered - 80 % shall be prepared for re-use and recycled	2019	97,5% 97,4%	Achieved	
	From 15/8/2018	<b>For Small equipment (no external dimension more than 50 cm)</b> - 75 % shall be recovered - 55 % shall be prepared for re-use and recycled	2019	93,3% 93,3%	Achieved	
	From 15/8/2018	<b>For Small IT and telecommunication equipment (no external dimension more than 50 cm)</b> - 75 % shall be recovered - 55 % shall be prepared for re-use and recycled	2019	76,8% 76,8%	Achieved	

<sup>24</sup> From 2019, there are two offered targets on separate collection, i.e.. two calculation methods:

65% - the ratio of collected quantities and average quantities of EE equipment placed on the market in the previous three years

85% - the ratio of collected quantities and quantities of EE waste produced in one year.

RC chose the first (1) calculation method as more favourable.

**Table 4** - Performance against the NWMP targets

NWMP target	Target	Reference Year	Rate	Indicator
NWMP target 1.1	Reduce total quantity of produced municipal waste by 5% (1.571.222 t)	2019	1.811.617 t (15,30% more than targeted)	Risk of failure due December 2022
NWMP target 1.2	Separately collect 60% by weight of the produced municipal waste (primarily paper, glass, plastics, metal, bio-waste, etc.)	2019	37%	Risk of failure due December 2022
NWMP target 1.3	Separately collect 40% by weight of the produced municipal biowaste	2019	19%	Risk of failure due December 2022
NWMP target 2.1	Separately collect 75% by weight of the produced construction waste	2019	67%	On track due December 2022
NWMP target 1.4	Dispose at landfill less than 25% of produced municipal waste	2019	59%	Risk of failure due December 2022



## 3 Methodology

59. As presented in Sub-chapter 2.2 NWMP defines eight waste management targets for the period 2017-2022. Additionally, for two targets (target for improvement of municipal waste and special waste categories management) specific sub-targets are defined (ten sub-targets of which 5 of them are quantitative).
60. For achievement of each target and sub-target NWPM defines measures that have to be implemented, responsible bodies for their implementation, funding requirements and possible source of funds and deadline for implementation. WPP as a part of NWMP defines additional specific group of measures. Measures defined by the WPP aim to exclusively contribute to the achievement of Target 1, Sub-target 1.1. of the NWMP; these measures are specifically designed to contribute to the prevention of following waste categories: biowaste, construction waste, municipal waste, electrical and electronic waste, and paper and cardboard waste.
61. NWMP ID defines project/activities for implementation of each NWMP measure, timeline for their implementation, responsible bodies and stakeholders, source of financing, performance monitoring indicators. NWMP ID also defines projects/activities for realisation of WPP measures, even certain additional waste prevention activities beside those listed in WPP are defined by NWMP ID.
62. Chapters 4 and 5 aim to assess the following aspects of NWMP and NWMP ID:
  - i) Effectiveness of the NWMP targets and their alignment with the EU waste targets
  - ii) Implementation progress of NWMP and NWMP ID
  - iii) Alignment of the measures and activities defined by NWMP and NWMP ID with EU waste legislation
63. i) The basis for assessing the NWMP targets was checking their alignment with the EU waste policy. Furthermore, their effectiveness was discussed primarily regarding the possibility to monitor their achievement and link to EU quantitative targets (see Chapter 4).
64. ii) A quantitative analysis was performed to assess the progress of implementation and achievement of each project/activity defined against performance indicators, both defined by NWMP ID. Analyses also covered assessment of financial progress in relation to funds planned by NWMP. For this purpose, data necessary for the assessment of the implementation progress were collected via questionnaire disseminated to main stakeholders of NWMP activities:
  - Ministry of Economy and Sustainable Development (Institute for Environment and Nature; Directorate for Water Management and Sea Protection; Directorate for Climate Activities; Directorate for EU Programmes and Projects; European and International Affairs; Directorate for Environmental Impact Assessment and Sustainable Waste Management).
  - Environmental Protection and Energy Efficiency Fund (Department for Environmental Protection, Department for EU Funds and Department for Special Waste Streams).
65. In addition, technical meetings on implementation progress were held with MoESD, EPEEF, Ministry of Agriculture, Ministry of Physical Planning, Construction and State Assets, Croatian Chamber of Economy during which implementation progress for each specific project/activity was discussed in more details.
66. Given that NWMP activities are defined for the period until the end of 2022 the assessment gives an overview of the situation as of 2020.

67. Result of NWMP implementation progress were presented in Chapter 5 while assessment of financial progress of planned funds are given in Sub-chapter 6.1.
68. iii) Within the evaluation process EU waste legislation in force (including Single-Use Plastic Directive (2019/904/EU)) was considered as standard / benchmarking tool.
69. Qualitative assessment approach was applied. Coherence check is conducted. It has been checked whether each measure defined by NWMP is relevant for achievement of NWMP targets and sub-targets and whether each activity defined by NWMP ID is linked and relevant for the achieving EU waste directives objectives and requirements.
70. Prior evaluation of usefulness and alignment of NWMP and NWMP ID measures/projects/activities with EU waste legislation, assessment of the implementation progress (also at the level of each measure/project/activity) was conducted (see explanation under point ii). Due to implementation delays, especially delays regarding implementation of infrastructure measures and activities, as a part of this evaluation process it was not possible to precisely and reliably determine impact and contribution of specific measure/activity/project to fulfilment of specific target. Furthermore, certain measures defined by NWMP contribute to more than one specific NWMP and EU target. For example, measures defined for separate collection of biowaste also contribute to the achievement of target for separate collection of municipal waste and target for reduction of landfilling waste.
71. However, coherence check showed that measures/activities/projects defined by NWMP and NWMP ID are of such nature that represent basic foundations to support implementation of EU waste policies and deliver environmental benefits, and are commonly practiced in other EU countries (establishing infrastructure for separate collection and treatment, equipping systems for separate collection of useful fractions, conducting waste prevention public awareness campaigns, introduction of waste fees, etc). Therefore, conducted qualitative analyses present sufficiently reliable method for evaluation of usefulness and effectiveness of NWMP and NWMP ID measures/activities/projects.
72. It is important to emphasize that evaluation was not conducted in a way that evaluates the success of each individual project., e.g. the analysis of the prepared feasibility studies for individual projects was not the subject of this evaluation.
73. Based on results of assessment of implementation progress and evaluation of usefulness and alignment of measures/activities/projects with requirements of EU legislation, proposal for their improvement is presented in Chapter 5.
74. In the table below relation of EU waste targets and waste targets and measures and activities defined by NWMP and NWMP ID for EU targets achievement is given. Relation presented in this table is used in evaluation process.

**Table 5 - Relation of targets and measures for achieving EU targets defined by NWMP and NWMP ID**

EU Directive	EU target	Measure from NWMP <sup>25</sup>	NWMP ID <sup>26</sup> activity/project
<b>NWMP TARGET 1. IMPROVEMENT OF MUNICIPAL WASTE MANAGEMENT SYSTEM</b>			
<b>Sub-target 1.1.- Reduce total quantity of produced municipal waste by 5%</b>			
WFD, Directive (EU) 2018/851 amending WFD  SUPD	<b>By 31 of December 2023 biowaste is separated and recycled at source or is collected separately.</b>  <b>Prevent waste generation.</b>	M 1.1.1 Measures defined by the Waste Prevention Plan <sup>27</sup> M 1.1.2. Establishment of re-use centres M 1.1.3. Home composting	1.1.1. - 1.1.3. 1.2.1. - 1.2.3.; 1.2.4.; 1.3.1.; 1.3.2.; 1.4.1.; 1.4.2.; 1.5.1.; 1.6.1. - 1.6.3.; 1.7.1., 1.7.2.; 1.8.1.; 1.8.2.; 1.9.1. - 1.9.3.; 2.1. -2.5.; 3.1.
<b>Sub-target 1.2. - Separately collect 60% by weight of the produced municipal waste (primarily paper, glass, plastics, metal, bio-waste, etc.)</b>			
WFD, Directive (EU) 2018/851 amending WFD	<b>By 2020 prepare for re-use and recycle - waste materials such as at least paper, metal, plastic and glass from households and possibly from other origins as far as these waste streams are similar to waste from households, to a minimum of overall 50 % by weight</b> - <b>By 2025 - to a minimum of 55 % t</b> - <b>By 2030 - to a minimum of 60 % t</b> - <b>By 2035 - to a minimum of 65 %</b>  <b>By 1 January 2025 set up separate collection for textiles.</b>	M 1.2.1. Procurement of equipment, vehicles and vessels for separate collection of paper, cardboard, metal, plastic, glass and textile M 1.2.2. Constructing a sorting facility for separately collected paper, cardboard, metal, glass, plastic etc. M 1.2.3. Construction of recycling yards M 1.2.4. Introducing quantity-based fees for collection and treatment of mixed and biodegradable municipal waste M 1.2.5. Strengthening the market for waste intended for recycling M 1.2.6 Constructing recycling facilities	4.1. - 4.22.; 5.1.; 5.2.; 6.1. - 6.3.; 7.1.-7.3.; 8.1.; 8.2.
<b>Sub-target 1.3 - Separately collect 40% by weight of the produced municipal biowaste</b>			
WFD, Directive (EU) 2018/851 amending WFD	<b>By 31 of December 2023 biowaste is separated and recycled at source or is collected separately.</b>	M 1.3.1. Development of quality and categorising criteria for compost and digestates M 1.3.2. Procurement of equipment and vehicles for separate collection of bio-waste M 1.3.3. Construction of facilities for biological treatment of separately collected bio-waste	9.1.; 10.1. - 10.3.
<b>Sub-target 1.4 - Dispose at landfill less than 25% of produced municipal waste</b>			
LD and Directive (EU) 2018/850 amending LD Croatia EU accession Treaty from 2011	<b>By 2020 dispose on landfills less than 35% of biodegradable municipal waste produced in 1997.</b>  <b>By 2035 reduce landfill to maximum of 10% of municipal waste</b>	M 1.4.1. Introducing a fee for landfilling M 1.4.2. Monitoring the amount of biodegradable waste in mixed municipal waste M 1.4.3. Intervention measure to decrease landfilling municipal waste generated in the City of Zagreb	11.1. -11.3.; 12.1.; - 12.3.; 13.1.; 13.2.; 14.1. - 14.3.; 15.1., 15.3. - 15.10; 16.1.

<sup>25</sup> Measures defined by NWMP (including measures from WPP) are transferred to the NWPM ID. In the NWMP ID for each NWMP measure the activities and projects, timetable, indicators and responsible bodies for implementation are additionally defined.

<sup>26</sup> Detailed list of activity/project from NWMP ID is given in Annex 4

<sup>27</sup> Measures defined by the Waste Prevention Plan are given in Annex 4

EU Directive	EU target	Measure from NWMP <sup>25</sup>	NWMP ID <sup>26</sup> activity/project
	generated (by weight)	M 1.4.4. Intervention measure to decrease landfilling municipal waste generated in the City of Split M 1.4.5. Constructing waste management centres M 1.4.6. Energy recovery planning	
<b>NWMP TARGET 2. IMPROVEMENT OF THE SYSTEM FOR MANAGEMENT WITH SPECIAL WASTE CATEGORIES</b>			
<b>Sub-target 2.1 - Separately collect 75% by weight of the produced construction waste</b>			
WFD, Directive (EU) 2018/851 amending WFD	<b>By 2020 prepare for re-use, recycling and other material recovery, including backfilling, 70% of non-hazardous construction and demolition waste excluding naturally occurring material defined in category 17 05 04 in the list of waste.</b>	M 2.1.1. Creating an action plan for separate collection and recycling construction and demolition waste M 2.1.2. Constructing and procuring equipment for recycling yards for construction and demolition waste	17.; 18.
<b>Sub-target 2.2 - Establish system for sludge waste management from waste water treatment plants</b>			
WFD, Directive (EU) 2018/851 amending WFD	<b>Separate collection of waste and non-mixing with other waste or other materials with different properties.</b>  <b>Protection of human health and the environment.</b>	M 2.2.1. Preparation of action plan for the use of residual sludge from waste water treatment facilities on suitable surfaces M 2.2.2. Establishing a sludge management system	19., 20.1.
<b>Sub-target 2.3 - Improve the packaging waste management system</b>			
PPWD and Directive 2018/852 (EU) amending PPWD  SUPD:	<b>PPWD:</b> <b>From 2008:</b> - Recycle 55 % - 80 % of packaging waste by weight. - Recover (energy recovery included) 60 % of packaging waste by weight.  - Recycle specific materials in packaging waste, by weight: 60 % of glass and paper and board; 50 % of metals; 22,5 % of plastics (counting exclusively material that is recycled back into plastic); 15 % of wood  <b>No later than December 31, 2025 recycle 65 % of packaging waste by weight.</b> <b>Recycling rates for specific materials in packaging waste are:</b> • 50 % of plastic; • 25 % of wood; • 70 % of ferrous metals; • 50 % of aluminium; • 70 % of glass; • 75 % of paper and cardboard; <b>No later than December 31, 2030 recycle 70 % of packaging waste by weight.</b> <b>Recycling rates for specific materials in packaging waste:</b> • 55 % of plastic; • 30 % of wood; • 80 % of ferrous metals;	M 2.3.1. Improvement and analysis of the existing packaging waste management system	21.1.; 21.2.

EU Directive	EU target	Measure from NWMP <sup>25</sup>	NWMP ID <sup>26</sup> activity/project
	<ul style="list-style-type: none"> <li>• 60 % of aluminium;</li> <li>• 75 % of glass;</li> <li>• 85 % of paper and cardboard.</li> </ul> <p>By 31 December of 2024, EPR schemes have to be established for all packaging waste.</p> <p>From 31 December 2019, the level of annual consumption may not exceed 90 lightweight plastic carrier bags per person, and from 31 December 2025 40 lightweight plastic carrier bags per person or identical targets determined by weight. Very lightweight plastic carrying bags can be excluded from national consumption targets.</p> <p style="text-align: center;"><b>OR/AND</b></p> <p>From 31 December 2018, lightweight plastic carrying bags are not provided free of charge at the point of sale of goods or products, unless equally effective instruments are implemented. Very lightweight plastic carrying bags can be excluded from these measures.</p> <p><u>SUPD:</u> By 2025 ensure the separate collection for recycling, of an amount beverage bottles (up to 3L, including their caps and lids) which are manufactured from polyethylene terephthalate as the major component ("PET bottles") equal to 77 % of such single-use plastic products placed on the market in a given year by weight, and by 2029 equal to 90%. From 2025, ensure that "PET bottles" contain at least 25% recycled plastic, calculated as an average for all PET bottles placed on the market on the territory of Member State; and from 2030 share of recycled plastic of at least 30%</p>		
<b>Sub-target 2.4 - Establish waste management system for marine litter</b>			
<p>WFD, Directive (EU) 2018/851 amending WFD</p> <p>SUPD</p>	<p><b>Prevention of marine litter</b></p> <p><b>Halt the generation of marine litter as a contribution towards the UN Sustainable Development Goal 14 (Conserve and sustainably use the oceans, seas and marine resources for sustainable development)</b></p>	<p>M 2.4.1. Identifying the locations and sources of marine waste and identifying locations of accumulated marine waste on the seabed</p> <p>M 2.4.2. Establishing a system of prevention, collection and disposal of marine waste, as an integral part of the waste management system in the RC.</p> <p>M 2.4.3. Intervention collection and disposal of marine waste.</p> <p>M 2.4.4. Establishing cooperation with neighbouring or other countries regarding marine waste pollution.</p>	22. - 25.
<b>Sub-target 2.5 - Establish waste management system for waste ships, wrecks and sunken things on the seabed</b>			
WFD, Directive (EU) 2018/851	<b>Separate collection of waste and non-mixing with other waste or</b>	M 2.5.1. Establishing a waste ship management system.	26.

EU Directive	EU target	Measure from NWMP <sup>25</sup>	NWMP ID <sup>26</sup> activity/project
amending WFD	<b>other materials with different properties.</b> <b>Protection of human health and the environment.</b>		
WFD, Directive (EU) 2018/851 amending WFD  Regulation 1257/2013/EU on ship recycling	<b>Separate collection of waste and non-mixing with other waste or other materials with different properties.</b>  <b>Protection of human health and the environment.</b>	M 2.5.2. Identifying the locations of wrecks and sunken objects on the seabed and creating a cadastre. M 2.5.3. Identifying the composition and quantities of hazardous matter and explosive material in wrecks and sunken objects on the seabed which pose the threat of polluting the marine environment or making the sea resource use an unsafe process. M 2.5.4. Remediation of wrecks and sunken objects on the seabed in ownership of the RC. M 2.5.5. Improve normative standards and procedures for crisis interventions on wrecks and sunken objects on the seabed M 2.5.6. Improve normative standards and procedures for crisis interventions on wrecks and sunken objects on the seabed	27. - 31.
<b>Sub-target 2.6 - Improve waste management system of other special waste categories</b>			
WFD, Directive (EU) 2018/851 amending WFD	<b>Separate collection of waste and non-mixing with other waste or other materials with different properties</b>  <b>Control of hazardous waste.</b>  <b>Ban on the mixing of hazardous waste</b>	M 2.6.1. Improving the medical waste management system M 2.6.2. Conducting an Asbestos waste estimation Study for each county.	32.1.; 33.
LD and Directive (EU) 2018/850 amending LD	<b>Fulfilment of technical characteristics for landfills.</b>	M 2.6.3. Construction of landfill cells for asbestos waste	34.
ELVD and Directive (EU) 2018/849, 2020/362, 2020/363 amending ELVD	<b>By January 2015:</b> <b>- Reuse and recycling to a minimum of 85% by average weight of vehicle and year</b> <b>- Reuse and recovery to a minimum of 95% by average weight of vehicle and year.</b>		35.1.
BD and 2018/849 amending BD	<b>Minimum collection rates:</b> <b>By 26 September 2012 - 25%</b> <b>By 26 September 2016 - 45%</b>  <b>Recycling processes shall achieve the following minimum recycling efficiencies:</b> <b>From September 2011:</b> <b>-Recycling of 65 % by average weight of lead-acid batteries and accumulators, including recycling of the lead content to the highest degree that is technically feasible while avoiding excessive costs;</b> <b>-Recycling of 50 % by average weight of other waste batteries</b>	M 2.6.4. Improving the special categories of waste management system (end-of-life vehicles, waste batteries and accumulators, waste tyres, EE waste, oils)	35.2.

EU Directive	EU target	Measure from NWMP <sup>25</sup>	NWMP ID <sup>26</sup> activity/project
	and accumulators		
WEEE Directive 2012/19/EU amending WEEE Directive 2002/96/EC	<p><b>Minimum annual rates for separate collection of WEEE:</b>  <b>From 2019</b>  <b>65% of the average rate EEE put on the market, calculated on the basis of:</b>  <b>-the total weight of WEEE collected;</b>  <b>-the average weight of EEE put on the market in the three preceding years.</b>  <b>or</b>  <b>85% of WEEE generated on the territory of MS.</b>  <b>MS can choose which one of these two equivalent ways to measure the target they wish to report</b></p> <p><b>From August 2018</b>  <b>Recycling/preparing for reuse/recovery 55%-85% depending on WEEE category</b></p>		35.4.
WFD, Directive (EU) 2018/851 amending WFD	<p><b>Separate collection of waste and non-mixing with other waste or other materials with different properties.</b>  <b>Fulfilment of conditions for separate collection and treatment</b>  <b>Protection of human health and the environment.</b></p>		35.3.; 35.5.; 35.6.
<b>NWMP TARGET 3. - IMPROVE HAZARDOUS WASTE MANAGEMENT SYSTEM</b>			
WFD, Directive (EU) 2018/851 amending WFD	<p><b>Separate collection of waste and non-mixing with other waste or other materials with different properties.</b></p> <p><b>Control of hazardous waste.</b></p> <p><b>Ban on the mixing of hazardous waste.</b></p>	M 3.1. Analysis of existing and necessary capacities for hazardous waste treatment	36.
<b>NWMP TARGET 4. - REMEDIATE SITES CONTAMINATED WITH WASTE</b>			
LD and Directive (EU) 2018/850 amending LD  Croatia EU accession Treaty from 2011	<b>By the end of 2018 all existing landfills in Croatia must comply with the environmental requirements of the Landfill Directive.</b>	M 4.1. Creating a Plan for closing non-hazardous waste landfills M 4.2. Remediation of non-hazardous waste landfills	37.1.; 37.2.; 38.
WFD, Directive (EU) 2018/851 amending WFD	<b>Protection of human health and the environment</b>	M 4.3. Identifying new locations polluted by hazardous waste ("hot spots") M 4.4. Remedying locations polluted by hazardous waste ("hot spots") M 4.5. Remediation of abandoned waste locations.	39.1.; 39.2.; 40.1.- 40.7.; 41.
<b>NWMP TARGET 5. - CONTINUOUSLY CARRY OUT EDUCATIONAL AND INFORMATIVE ACTIVITIES</b>			

EU Directive	EU target	Measure from NWMP <sup>25</sup>	NWMP ID <sup>26</sup> activity/project
WFD, Directive (EU) 2018/851 amending WFD  SUPD	<b>Public awareness campaigns</b>	M 5.1. Creating a Programme of educative-informative M 5.2. Conducting activities from the Programme of educative-informative activities on sustainable waste management M 5.3. Conducting a national campaign on sustainable waste management	42.1.; 42.2.; 43.; 44.1.; 44.2.
<b>NWMP TARGET 6. - IMPROVE THE WASTE MANAGEMENT INFORMATION SYSTEM</b>			
WFD, Directive (EU) 2018/851 amending WFD	<b>Monitoring and verifying compliance with the EPR obligations. Record keeping. Registration.</b>	M 6.1. Creating and/or improving applications that are part of the waste management information system M 6.2. Creating an EPEEF information system for the preparation and implementation of projects	45.1. - 45.6.; 46.
<b>NWMP TARGET 7. - IMPROVE SUPERVISION OF WASTE MANAGEMENT</b>			
WFD, Directive (EU) 2018/851 amending WFD	<b>Inspections</b>	M 7.1. Educating all the participants in waste management supervision M 7.2. Analysis and redefining supervision jurisdiction in waste management	47.1.; 47.2.; 48.1.; 48.2.
<b>NWMP TARGET 8. IMPROVE ADMINISTRATIVE PROCEDURES IN WASTE MANAGEMENT</b>			
WFD, Directive (EU) 2018/851 amending WFD	<b>Issue of permits and exemptions from permit requirements</b>	M 8.1 Improving the system and procedures for issuing waste management permits	49.1.; 49.2.



75. In the Chapter 5 results of NWMP and NWMP ID implementation progress and evaluation of defined measures are summarised and presented in relation to NWMP targets as presented in the table above. In Annex 4 detailed results are given. For each project/activity defined by NWMP ID, progress against defined indicators (quantitative indicators defined by NWMP ID) are given showing percentage of implementation progress up to 2020. Also, for each project/activity in the same Annex it is shown are they aligned with the EU waste legislation and where applicable recommendation for their improvement is given.
76. In Chapter 6 financial aspect of the NWMP is analysed and presented. Based on officially received data financial progress of NWMP planed funds are presented (current status of funds invested/contracted, see Sub-chapter 6.1). Also, funds planed by NWMP were assessed in order to determine are the funds are planed adequately to cover all costs, problems and gaps related to the estimated investments were discussed (see Sub-chapter 6.2). Additionally, in Sub-chapter 6.4 short overview of available sources of funding is given.
77. In Chapter 7, Chapter 8, Chapter 9, and Chapter 10 the segments derived from the conducted analyses are presented. They form the guidelines for quality waste management planning for the next planning period (after 2022) in line with EU waste legislation requirements.
78. Chapter 7 proposes a new timeline for the implementation of NWMP measures. The timeline gives prioritisation of measures whose implementation needs to be intensified and completed by the end of 2022, in order to provide a quality basis for further planning (e.g. development of planned studies), and identifies measures whose implementation should continue in the next planning period.
79. Recommendations on how to align content of waste management plan with the EU requirements is given in Chapter 8 of the Report while the detailed table with the results of analysis of NWMP content compliance with waste legislation including recommendations for its alignment is presented in Annex 8.
80. Chapters 9 and 10 deals with waste management areas which are recognised as relevant for future investments. In Chapter 9 set of new measures, mainly so called “soft measures” are introduced while in Chapter 10 priority areas for investments in waste sector are presented (detail analyses of priority investment area is given in Annex 9).

## 4 Aligning Croatian Waste Management Plan targets with the EU waste legislation requirements

### 4.1 Waste management targets in the Republic of Croatia

81. In the Republic of Croatia two different sets of quantitative waste management targets are currently in force. One set of targets is defined by Act on Sustainable Waste Management (OG 94/2013, 73/2017, 14/2019, 98/2019) and secondary legislations, and the other one is defined by Croatian National Waste Management Plan (2017-2022) (NWMP).
82. Waste management targets and deadlines defined in Waste Framework Directive 2008/98/EC, Packaging and Packaging Waste Directive 94/62/EC, Landfill Directive 1999/31/EC, Batteries Directive 2006/66/EC, End of Life Vehicles Directive 2000/53/EC and Waste Electrical and Electronic Equipment Directive 2012/19/EU, are transposed into the Croatian waste management legislation through Act on Sustainable Waste Management (OG 94/2013, 73/2017, 14/2019, 98/2019) adopted in 2013, and different by-laws (see Table 7).
83. Additional set of targets stipulated by NWMP defines eight waste management targets, which differ from those defined by Act on Sustainable Waste Management and by-laws, and are set up specifically for Croatia for the period of NWMP (2017 - 2022) (see Table 7). For two of those eight targets sub-targets are defined of which some are quantitative (see Table 6).

**Table 6 - NWMP targets which have to be achieved by 2022 compared to 2015**

No.	Target	Sub-target	Sub-target name
1.	<b>Improvement of municipal waste management system</b>	Sub-target 1.1	Reduce total quantity of produced municipal waste by 5%
		Sub-target 1.2.	Separately collect 60% by weight of the produced municipal waste (primarily paper, glass, plastics, metal, bio-waste, etc.);
		Sub-target 1.3	Separately collect 40% by weight of the produced municipal biowaste
		Sub-target 1.4	Dispose at landfills less than 25% of produced municipal waste
2.	<b>Improvement of the system for management with special waste categories</b>	Sub-target 2.1	Separately collect, by weight, 75% of the produced construction waste
		Sub-target 2.2	Establish system for sludge waste management from waste water treatment plants
		Sub-target 2.3	Improve the packaging waste management system
		Sub-target 2.4	Establish waste management system for marine litter
		Sub-target 2.5	Establish waste management system for waste ships, wrecks and sunken things on the seabed
		Sub-target 2.6	Improve waste management system of other special waste categories
3.	<b>Improvement of hazardous waste management system</b>	Sub-target is not defined by NWMP	
4.	<b>Remediate sites contaminated with waste</b>	Sub-target is not defined by NWMP	
5.	<b>Continuously carry out educative-informative activities</b>	Sub-target is not defined by NWMP	
6.	<b>Improve the waste</b>	Sub-target is not defined by NWMP	

No.	Target	Sub-target	Sub-target name
	<b>management information system</b>		
7.	<b>Improve supervision of waste management</b>	Sub-target is not defined by NWMP	
8.	<b>Improve administrative procedures in waste management</b>	Sub-target is not defined by NWMP	

SOURCE - NWMP for Croatia for the period 2017-2022

84. In May 2018 four new directives, known as the “waste package”, amending six existing waste directives were adopted<sup>28</sup>. New targets for waste recycling and limiting the landfill disposal of municipal waste, were set up. Member States had to transpose the “waste package” into national legislation by 5 July 2020 (Table 8).
85. Furthermore, in June 2019, Single-Use Plastic Directive (SUPD)<sup>29</sup> was adopted. Among other, by this Directive quantitative targets for separate collection and design requirements for plastic bottles are defined. This Directive must be transposed into national legislation by 3 July 2021 (Table 8).
86. Croatia plans to transpose “waste package”, and to a certain extend SUPD, through adoption of new waste management act and by-laws. Draft proposal of new waste management act is prepared and is to be sent to the Croatian Parliament for reading and adoption.
87. In the Table 7 comparison of quantitative EU waste management targets and targets defined by Act on Sustainable Waste Management and by-laws and NWMP is given. Targets defined by “waste package” and SUPD that must be transposed into Croatian waste legislation are given in Table 8.
88. Detailed comparison of EU waste targets and Croatian waste targets currently in force are presented in Annex 1.

<sup>28</sup> Four new directives adopted by the European Parliament and the Council of the European Union were published in Official Journal of the European Union on 14 June 2018 and enter into force on the twentieth day following that of its publication in the Official Journal of the European Union: (i) Directive (EU) 2018/851 amending Waste Framework Directive (WFD), (ii) Directive (EU) 2018/850 amending Landfill Directive (LD), (iii) Directive (EU) 2018/852 amending Directive on Packaging and Packaging Waste (PPWD), (iv) Directive (EU) 2018/849 amending Directive on End of Life Vehicles (ELV), Waste Electrical and Electronic Equipment Directive (WEEE) and Batteries Directive (BATT).

<sup>29</sup> Directive (EU) 2019/904 of the European parliament and of the Council of 5 June 2019 on the reduction of the impact of certain plastic products on the environment. This Directive was published in Official Journal of the European Union on 12 June 2019 and enter into force on the twentieth day following that of its publication in the Official Journal of the European Union.

**Table 7 - Comparison of quantitative EU waste targets and waste targets currently in force in the Republic of Croatia<sup>30</sup>**

EU Directive	Target date	EU target	Target currently in force in the Republic of Croatia	
			According to Act on Sustainable Waste Management and by-laws	According to NWMP (to be achieved by the 2022 compared to 2015)
Waste Framework Directive 2008/98/EC	December 2020	Prepare for re-use and recycling 50% of municipal paper, glass, plastics, metal waste	The same as EU target	NWMP Sub-target 1.1 - Reduce total quantity of produced municipal waste by 5%  NWMP Sub-target 1.2 - Separately collect 60% by weight of the produced municipal waste (primarily paper, glass, plastics, metal, bio-waste, etc.)  NWMP Sub-target 1.3 - Separately collect 40% by weight of the produced municipal biowaste
		Preparing for reuse, recycling and other material recovery (incl. beneficial backfilling operations using waste as a substitute) of 70% by weight of construction and demolition non-hazardous waste (excluding natural soils and stone)	The same as EU target	NWMP Sub-target 2.1 – Separately collect 75% by weight of the produced construction waste
Landfill Directive 1999/31/EC <sup>31</sup>	By December 2020	Reduce the biodegradable waste landfilled to 35% of that produced in 1995.	According to Chapter 27: Environment of the Accession Treaty (based on the Landfill Directive 1999/31/EC), the target has been transposed to the Act on Sustainable Waste Management <sup>32</sup>	NWMP Sub-target 1.4 - Dispose at landfill less than 25% of produced municipal waste
Packaging and Packaging Waste Directive 94/62/EC	From <sup>33</sup> 2008.	<ul style="list-style-type: none"> <li>– Recycle 55 % - 80 % of packaging waste by weight.</li> <li>– Recover (energy recovery included) 60 % of packaging waste by weight.</li> <li>– Recycling rates for specific materials in packaging waste are:                             <ul style="list-style-type: none"> <li>• 60 % by weight for glass;</li> <li>• 60 % by weight for paper and board;</li> <li>• 50 % by weight for metals;</li> </ul> </li> </ul>	The same as EU target	Quantitative target not defined

<sup>30</sup> Waste package<sup>30</sup> targets are presented in Table 7

<sup>31</sup> Where over 80% of biodegradable municipal waste was being landfilled in 1995, a four year derogation on these targets can apply. In Table are presented targeted dates for attaining targets with applied derogation.

<sup>32</sup> Croatia negotiated year 1997 as a baseline year for produced biodegradable municipal instead 1995, or the latest year before 1995, as defined by Landfill Directive 1999/31/EC. Years for attaining targets are 2013, 2016 and 2020

<sup>33</sup> Deadline for attaining these yearly targets for the first time was 31 December 2008.

EU Directive	Target date	EU target	Target currently in force in the Republic of Croatia	
			According to Act on Sustainable Waste Management and by-laws	According to NWMP (to be achieved by the 2022 compared to 2015)
		<ul style="list-style-type: none"> <li>22,5 % by weight for plastics, counting exclusively material that is recycled back into plastics;</li> <li>15 % by weight for wood</li> </ul>		
Directive on Waste Electrical and Electronic Equipment 2012/19/EU	From 2019	<p>Minimum annual rates for separate collection of WEEE: 65% of the average rate EEE placed on the market, calculated on the basis of the average weight of EEE placed on the market in the three preceding years in that Member State</p> <p><b>or</b></p> <p>85% of WEEE generated on the territory of Member State.</p> <p><i>MS can choose which one of these two equivalent ways to measure the target they wish to report.<sup>34</sup></i></p>	The same as EU target	Quantitative target not defined
	From 15 August 2018	Recycling/preparing for reuse/recovery 55-85% depending on WEEE category		
End of Life Vehicles Directive 2000/53/EC	From 1 January 2015	<ul style="list-style-type: none"> <li>Reuse and recycling to a minimum of 85% by average weight of vehicle and year.</li> <li>Reuse and recovery to a minimum of 95% by average weight of vehicle and year.</li> </ul>	The same as EU target	Quantitative target not defined
Batteries Directive 2006/66/EC	By 26 September 2016	Minimum 45% collection rate	The same as EU target	Quantitative target not defined
	From 26 September 2011	<ul style="list-style-type: none"> <li>Recycling of 65 % by average weight of lead-acid batteries and accumulators, including recycling of the lead content to the highest degree that is technically feasible while avoiding excessive costs;</li> <li>Recycling of 75 % by average weight of nickel-cadmium batteries and accumulators, including recycling of the cadmium content to the highest degree that is technically feasible while avoiding excessive costs; and</li> <li>Recycling of 50 % by average weight of other waste batteries and accumulators.</li> </ul>		

<sup>34</sup> Croatia is applying 45% minimum annual rate for separate collection

**Table 8 - Targets defined by “waste package” that must be transposed into Croatian legislation**

New EU targets that must be transposed into Croatian legislation			
Target date	EU directive	EU target	Status of Croatian legislation
2025 and 2030	Directive 2018/852 (EU) amending PPWD	<p><b>a) Recycle 65 % of packaging waste by weight, no later than December 31, 2025;</b></p> <p>- Recycling rates for specific materials in packaging waste are:</p> <ul style="list-style-type: none"> <li>• 50 % of plastic;</li> <li>• 25 % of wood;</li> <li>• 70 % of ferrous metals;</li> <li>• 50 % of aluminium;</li> <li>• 70 % of glass;</li> <li>• 75 % of paper and cardboard;</li> </ul> <p><b>b) Recycle 70 % of packaging waste by weight, no later than December 31, 2030;</b></p> <p>– Recycling rates for specific materials in packaging waste:</p> <ul style="list-style-type: none"> <li>• 55 % of plastic;</li> <li>• 30 % of wood;</li> <li>• 80 % of ferrous metals;</li> <li>• 60 % of aluminium;</li> <li>• 75 % of glass;</li> <li>• 85 % of paper and cardboard.</li> </ul>	Should have been transposed into Croatian legislation by 5 July 2020.
2025, 2030 and 2035	Directive 2018/851 (EU) amending WFD Directive	<p><b>a) By 2025</b> prepare for re-use and recycling 55% of municipal waste (paper, glass, plastics, metal at the least),</p> <p><b>b) By 2030</b> prepare for re-use and recycling 60% of municipal waste (paper, glass, plastics, metal at the least)</p> <p><b>c) By 2035</b> prepare for re-use and recycling 65% of municipal waste (paper, glass, plastics, metal at the least)</p>	Should have been transposed into Croatian legislation by 5 July 2020.
2035	Directive 2018/850 (EU) amending LD Directive	Reduce landfill to maximum of 10% of municipal waste	Should have been transposed into Croatian legislation by 5 July 2020.
2025, 2029 and 2030	Single-Use Plastic Directive 2019/904/EU	<p><b>a) By 2025</b> ensure the separate collection for recycling, of an amount beverage bottles (up to 3L, including their caps and lids) which are manufactured from polyethylene terephthalate as the major component (“PET bottles”) equal to <b>77 %</b> of such single- use plastic products placed on the market in a given year by weight, and <b>by 2029 equal to 90 %</b>.<sup>35</sup></p> <p><b>b) From 2025</b>, ensure that “PET bottles” contain at least <b>25 % recycled plastic</b>, calculated as an average for all PET bottles placed on the market on the territory of Member State; and <b>from 2030</b> share of recycled plastic of at least <b>30%</b>.<sup>36</sup></p>	Must be transposed into Croatian legislation by 3 July 2021.
<b>Qualitative targets in terms of deadlines by which the MS need to set up the separate collection schemes and to reduce food waste generation:</b>			

<sup>35</sup> These targets relate to beverage bottles listed in Part F of the Annex of SUPD

<sup>36</sup> Ibidem.

### New EU targets that must be transposed into Croatian legislation

- Bio-waste has to be either separated and recycled at source, or collected separately and not mixed with other types of waste, by 31 December 2023,
  - EPR schemes have to be established for all packaging waste by 31 December of 2024,
  - Separate collection of textile waste has to be set up by January 1, 2025
  - Separate collection for hazardous waste fractions produced by households has to be set up by 1 January 2025,
- Generation of food waste in primary production, in processing and manufacturing, in retail and other distribution of food, in restaurants and food services as well as in households, has to be reduced by 2030.<sup>37</sup> An indicative Union-wide food waste reduction target of 30 % by 2025 and 50 % by 2030 is defined.

89. In June 2019 Food Waste Prevention Plan of the Republic of Croatia for the Period 2019-2022 (OG 61/19) is adopted. This Plan is accompanied by a detailed Program<sup>38</sup> for its implementation. The objective of the Plan is to contribute to achieving objectives of the EU and the UN's Agenda 2030 for sustainable development<sup>39</sup>. Determinants of the Plan are:

- Improving the legislative framework, including education and preparation of guidance to clarify regulations and facilitate the food donation process
- Facilitation of communication among stakeholders of the food donation system
- Preparation of the Feasibility Study of the Food Bank in the Republic of Croatia and, depending on the results of the Study, networking of target groups in order to initiate further activities
- Encouraging better use of EU funds in the field of food waste prevention and food donation
- Coordinated actions towards food producers, distributors, traders, catering sector and institutional kitchens through the development of sector guides, conclusion of voluntary agreements on food waste reduction, food donation and motivation through the awarding of special recognitions for the most prominent examples of good practice in food waste prevention
- Establishment of a digital platform for sharing one's own experiences, media campaigns, written brochures through which stakeholder education will be conducted, i.e. directly and indirectly acting towards the end consumer in the form of raising awareness of food waste and understanding food expiration date labels
- Education of preschool and school age children and professional training of educational staff.

90. Qualitative targets defined in NWMP and Food Waste Prevention Plan and Programme are defined in such a way to support improvement of waste management system and fulfilment of EU waste management legislation requirements.

91. It would be reasonable to reconsider exclusion of following qualitative (sub)targets from the NWMP: Sub-target 2.5 - *Establish waste management system for waste ships, wrecks and sunken things on the seabed*, Target 7 - *Improve supervision of waste management* and Target 8 - *Improve administrative procedures in waste management*.

92. Sub-target 2.5. and measures for their achievement are to the fullest extent under the jurisdiction of Ministry of the Sea, Transport and Infrastructure (wrecks and sunken objects on the seabed) and

<sup>37</sup> As a contribution to the UN Sustainable Development Goal to reduce by 50 % the per capita global food waste at the retail and consumer levels and to reduce food losses along production and supply chains

<sup>38</sup> Food Waste Prevention Plan and Program for the implementation of the Food Waste Prevention Plan of the Republic of Croatia for the Period 2019-2022 is available at: <https://poljoprivreda.gov.hr/istaknute-teme/hrana-111/sprjecavanje-nastanka-otpada-od-hrane/sprjecavanje-nastanka-otpada-od-hrane-1263/1263>. The responsible body for implementation of the Plan and Program is the Ministry of Agriculture.

<sup>39</sup> Specifically to objective 12.3. Responsible production and consumption with the specific objective of reducing food waste per capita, by half at the level of retail and consumers and reducing food losses along the entire production and supply chain.

are not regulated by the waste management policy. It would be more efficient to integrate management of wrecks and sunken objects on the seabed in strategic and/or planning documents under authority of Ministry of the Sea. Waste ships are special waste category under authority of MoESD and thus measures can be defined for its management under the Sub-target 2.6 - *Improve waste management system of other special waste categories*. Furthermore, supervision of waste management is under authority of State Inspectorate<sup>40</sup> and present its regular work while administrative procedures in waste management are regular work of MoESD. Therefore, it would be reasonable to exclude *Target 7 - Improve supervision of waste management* and *Target 8 - Improve administrative procedures in waste management* from the scope of the NWMP. Detailed information on measures evaluation is presented in Chapter 5.

93. In the following sub-chapters analysis of quantitative sub-targets defined in NWMP is presented.

#### 4.1.1 Sub-target for waste prevention (NWMP Sub-target 1.1)

94. In NWMP, quantitative waste prevention sub-target for reduction of municipal waste generation until 2022 by 5% of the amounts generated in 2015 is defined. According to NWMP the implementation of waste prevention measures defined by NWMP should ensure a reduction of the total amount of municipal waste produced in 2022 to a maximum of 1.571.222 t.

95. At the EU level, a mandatory quantitative waste prevention target is not defined. Directive 2018/851/EU, amending Directive 2008/98/EC on Waste defines an indicative target for food waste reduction of 50% by 2030 (see Table 8). Except this indicative target Directive 2018/851/EU only specifies a minimum set of prevention measures that have to be included in the MS prevention programmes<sup>41</sup>. By the end of 2024<sup>42</sup> EC will examine the feasibility of setting waste reduction targets, and if appropriate, prepare legislative proposal.

96. The analysis of the measures defined in the NWMP shows that most of the measures are of educational and informative nature (see Sub-chapter 5.1.1.2 and Sub-chapter 5.1.9). Given that Croatia adopted waste prevention planning document for the first time<sup>43</sup>, by which integrated approach to this topic should be established, education and sensitization is a necessary initial step for the successful implementation of waste prevention. However, for achievement of rather ambitious NWMP waste prevention target implementation of stronger measures are necessary (e.g. introduction of regulatory and economic instruments, decreasing the quantity of materials used in products and increasing the efficiency with which they are used; designing and consuming products that generate less waste).

97. Given that Directive (EU) 2018/851 defines an indicative target for food waste reduction of 50% by 2030, and introduces mandatory determination of food waste on an annual basis from the reporting year 2020 onwards, introducing a quantitative food waste target in relation to 2020 can be considered. However, the unstable economic situation caused by COVID-19 pandemic, started at the beginning of the 2020, it is to be expected that the amount of food waste in 2020, and possible in the few following years, will be significantly less than in economically stable years, as the largest producers of food waste are service sector (restaurants, hotels, etc.) and households are currently most affected by this economic situation. Stipulating quantitative food waste reduction target could result in setting unrealistically low baseline quantitative values which will be impossible to reach in future years. The same uncertainty rises in the case of defining quantitative targets for any other waste category (e.g. municipal waste, construction waste, etc.). Methodology for defining quantitative target should take this uncertainty into account and for that good economic forecast

40 From April 1, 2019, most inspection services, as well as environmental inspection, were separated from the competent ministries and merged into a single State Inspectorate

41 See Annex IV of the Directive 2008/98/EC (consolidated version): <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02008L0098-20180705>

42 According to Directive 2018/851/EU, amending Directive 2008/98/EC

43 Waste Prevention Plan as a part of NWMP



should be ensured.

98. Additionally, EC will consider the feasibility of establishing a food waste reduction target by 2030 at Union level (by 31 December 2023), following the first submission of Member States data for 2020. This may result in a different target from the indicative one.
99. Therefore, considering the existing and planned EU legislation, as well as the development of monitoring tools (waste prevention indicators), for the next planning period it would be opportune to define qualitative waste prevention targets instead quantitative ones. Otherwise, quantitative targets should be based on sound research, have to be clearly defined and supported with effective mechanism for measurement (have performance measurement systems in place).

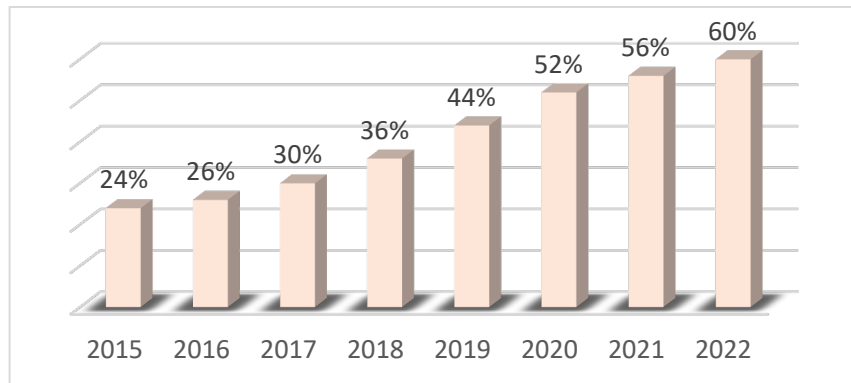
#### **4.1.2 Sub-targets for separate collection of municipal waste and bio-waste (NWMP Sub-targets 1.2 and 1.3)**

100. The NWMP sub-target 1.2 defines obligation to separately collect 60% of the mass of municipal waste generated by 2022 in comparison to 2015: “primarily paper, glass, plastic, metal, bio-waste etc.”, while EU legislation defines obligation of preparation for re-use and recycling 50%, by weight for municipal paper, metal, plastic and glass by 2020, 55% by 2025, 60% by 2030 and 65% by 2035. NWMP dynamics of increase of separately collected municipal waste by 2022 (Figure 7 and Figure 9) takes into account achievement of the waste prevention sub-target (reducing the generation of municipal waste) and sub-target for separate collection of bio-waste.
101. The NWMP quantitative sub-target 1.2 is defined for source separation of municipal waste, and reference year is 2015, while EU target is defined for preparation for re-use and recycling of municipal waste fractions rather than just collected, and it is an annual target. When taking into account the fact that during the preparation for re-use and recycling of separately collected waste at source, impurities are extracted in a significant proportion, it is questionable whether this NWMP target is in line with the WFD target. This especially relates to the bulky waste, which after sorting in significant quantities, still ends up in a landfill.
102. Furthermore, it is not clearly defined what municipal waste fractions (apart from paper, plastic, glass, metal, bio-waste and bulky waste<sup>44</sup>) are included in NWMP sub-target for separate collection of municipal waste.
103. Having two sets of targets in force, one for separate collection of municipal waste defined by NWMP and the other, in line with EU legislation, defined by Act on Sustainable Waste Management for preparation for re-use and recycling, makes monitoring more demanding.
104. Quantitative sub-target 1.3 for bio-waste defined in NWMP is more ambitious compared to EU requirements (Figure 8). According to the NWMP, by the end of 2022, 40% of bio-waste from municipal waste, of the amounts generated in 2015, should be separately collected while at the EU level quantitative target for separate collection of bio-waste is not defined. According to Directive (EU) 2018/851 amending Waste Framework Directive, by the end of 2023 bio-waste has to be either separated and recycled at source or collected separately and not mixed with other types of waste.

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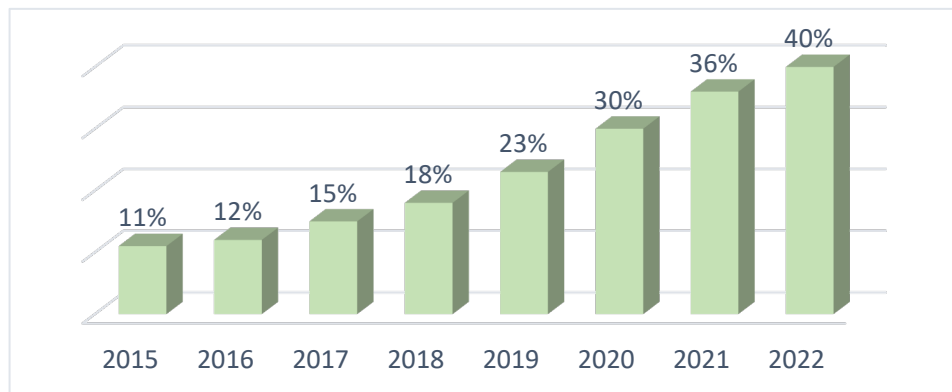
In Table 11 Waste Management Targets that need to be achieved by 2022 compared to 2015 of the NWMP it is stated that Target 1.2. includes primarily paper, glass, plastic, metal, bio-waste, etc.. Figure 25 of the NWMP The dynamics of achieving NWPM target 1.2 - collect separately 60% of municipal waste fractions (primarily paper/cardboard, glass, plastic, metal, bio-waste, bulky waste) shows that target also includes bulky waste.

**Figure 7** - The dynamics of achieving NWPM sub- target 1.2 - collect separately 60% of municipal waste fractions (primarily paper/cardboard, glass, plastic, metal, bio-waste, bulky waste)



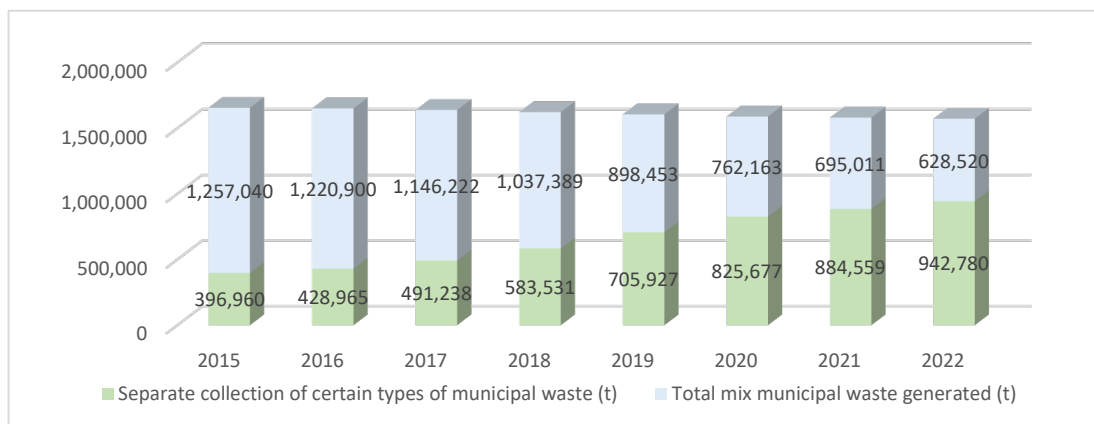
SOURCE - NWMP for Croatia in the period 2017-2022

**Figure 8** - Growth projection for separately collected quantities of bio-waste, for Republic of Croatia, 2017-2022 (NWPM sub-target 1.3)



SOURCE - NWMP for Croatia in the period 2017-2022

**Figure 9** - The dynamics of increase of separately collected municipal waste by 2022 (NWPM targets 1.1, 1.2, 1.3)



SOURCE - NWMP for Croatia in the period 2017-2022

105. Amended WFD and the Commission Implementing Decision (EU) 2019/1004 of 7 June 2019<sup>45</sup>, define strict and clear calculation rules of the attainment of re-use and recycling targets for municipal waste for 2025, 2030 and 2035. Calculation of target for preparation for re-use should only include the products or the components of products that, following checking, cleaning or repairing operations, can be re-used without further sorting or pre-processing (parts of those products/components of products that have been removed during repairing operations may be included in the amount of municipal waste prepared for re-use).
106. Calculation of the recycling targets should be based on the weight of municipal waste which enters recycling (at the point where municipal waste enters the recycling operation). Under strict conditions, it is allowed to establish the weight of municipal waste recycled on the basis of measuring the output of any sorting operation. Losses of materials which occur before the waste enters the recycling operation, for instance due to sorting or other preliminary operations, should not be included in the waste amounts reported as recycled.
107. Similar is regarding bio-waste. From 1 January 2027 this fraction of municipal waste will be allowed to count as recycled (actually undergo aerobic or anaerobic treatment) only if it is: i) separately collected at source; ii) collected together with waste with similar biodegradability and compostability properties; iii) separated and recycled at source.
108. Given all aforementioned it would be more efficient to have only one set of targets, identical to EU ones, and not specific quantitative targets for separate collection.

#### **4.1.3 Sub-target for reduction of municipal waste disposal on landfills (NWMP Sub- target 1.4)**

109. According to Chapter 27: Environment of the Accession Treaty (based on the Landfill Directive 1999/31/EC), Croatia had to ensure a gradual decrease in the amount of biodegradable municipal waste going to landfills as per following dynamics: i) by end of 2013, the share of biodegradable municipal waste deposited on landfills should have been reduced to 75 % of the total amount of biodegradable municipal waste produced in 1997; ii) by the end of 2016 to 50 % of the total amount and iii) by the end of 2020, to 35 % of the total amount produced in 1997.
110. At the EU level the same targets are defined only difference is that Croatia negotiated year 1997 as a baseline year for produced biodegradable municipal instead 1995, or the latest year before 1995, as defined by Landfill Directive 1999/31/EC.
111. These targets have been incorporated into the Act on Sustainable Waste Management.
112. The same as for separate collection of municipal waste, NWMP defines additional quantitative sub-target.
113. Sub-target 1.4 defined in NWMP requires that less of 25% of municipal waste generated by weight is landfilled by 2022 compared to 2015.
114. According to amended Landfill Directive, by 2035 landfilling of municipal waste must be reduced to maximum of 10% of the total amount of municipal waste generated (see Table 8).
115. Recommendation is to have one target for reduction of disposal of municipal waste on landfills, identical to EU target.

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<sup>45</sup> EC Implementing Decision laying down rules for the calculation, verification and reporting of data on waste in accordance with Directive 2008/98/EC of the European Parliament and of the Council and repealing Commission Implementing Decision C(2012) 2384

#### **4.1.4 Sub-target for separate collection of construction waste (NWMP Sub-target 2.1.)**

116. The NWMP defines obligation to separately collect 75% of the mass of the construction waste generated by 2022 in comparison to 2015 (Table 6).
117. EU legislation (WFD) defines obligation to prepare for re-use recycling/material recovery, including backfilling operations using waste to substitute other materials, 70% by weight, of non-hazardous construction and demolition waste, excluding naturally occurring material defined in category 17 05 04 by 2020.
118. Again, like for municipal waste, sub-target defined in NWMP (see Sub-chapter 4.1.1) aims to strengthen separate collection of construction waste, while EU target (which is transposed in Act on Sustainable Waste Management) defines obligation for the re-use and recycling.
119. Recommendation is to have one quantitative target on construction waste, and that target is identical to EU target.

## 5 Implementation status of Waste Management Plan of the Republic Croatia for the period 2017-2022 and National Waste Management Plan Implementing Decision and evaluation of defined measures

### 5.1 Evaluation of the measures and activities defined by Waste Management Plan and Implementing Decision and recommendations on modifications reflecting legislation update

120. Evaluation of measures showed that measures defined by NWMP are set up in way that concept of circular economy has been introduced and achievement of EU targets has been taken into account. However, some recommendations for improvement can be given, primarily regarding activities and projects defined by NWMP ID. An overview of the implementation progress and evaluation results for each NWMP ID activity is given in the following sub-chapters while summarized results with recommendations for their improvements are given in the Table 9. Methodology applied is presented in Chapter 3.

#### 5.1.1 Measures for achievement of NWMP Target 1 - Improvement of municipal waste management

121. For the achievement of NWMP Target 1 Improvement of municipal waste management in NWMP 18 measures are defined (including 1 measure which covers WPP in whole), which can be classified as:

- i. *measures for improvement of separate waste collection system and waste treatment infrastructure;*
- ii. *waste prevention measures;*
- iii. *measures for waste policy improvement and development of recycling market.*

122. Measures for improvement of infrastructure for separate waste collection and its treatment can be considered as one of the technically and/or financially most demanding NWMP measures. Their implementation requires supporting dialogue among state, regional and local government and private sector, investment capacity, as well as supportive policy frameworks in place.

123. To ensure the implementation of 18 measures defined by NWMP, 86 activities/projects are defined within NWMP ID (see Table 5 and Annex 4).

124. Measures are linked and aimed at fulfilment of four NWMP sub- targets:

*Sub-target 1.1. - Reduce total quantity of produced municipal waste by 5%;*

*Sub-target 1.2. - Separately collect 60% by weight of the produced municipal waste (primarily paper, glass, plastics, metal, bio-waste, etc.);*

*Sub-target 1.3. - Separately collect 40% by weight of the produced municipal biowaste;*

*Sub-target 1.4. - Dispose at landfills less than 25% of produced municipal waste.*

### 5.1.1.1 Measures for improvement of separate waste collection system and waste treatment infrastructure

125. Measures for improvement of separate collection of waste and waste treatment infrastructure include: procurement of equipment, vehicles and vessels for separate collection (primarily municipal paper, cardboard, glass, plastic, metal, biowaste), construction of recycling yards and construction of sorting facilities, construction of waste management centres (WMCs), recycling facilities for dry recyclables, facilities for biological treatment of separately collected bio-waste, intervention measures to decrease landfilling of municipal waste generated in the City of Zagreb and City of Split (construction of sorting facilities and facilities for biological treatment of biowaste, procurement of equipment and vehicles for separately collected biowaste of the City of Split and the City of Zagreb).
126. NWMP measures to improve separate collection of waste and waste treatment infrastructure should ensure the efficient waste management system consisted of adequate system for separate waste collection and treatment of separately collected waste as well as residual mixed municipal waste.
127. Envisaged NWMP measures for separate collection of waste ensure separate collection of fractions suitable for re-use and recycling, but also help to raise awareness on the waste generated amounts and to develop a sense of responsibility for the waste. An indispensable link between separate waste collection and ensuring its maximal utilization are sorting plants. As sorting of separately collected waste increases the value of fractions and its placement on the market, sorting plants represent driving factor for separate collection.
128. Since biowaste represents a significant share of municipal waste, envisaged development of biowaste treatment capacities should contribute to the number of positive environmental effects and sustainability; energy re-use, mitigation of greenhouse gas emission, re-use of nutrients (production of compost and anaerobic digestate and their use for soil improvement).
129. Primary national option for treatment of mixed municipal waste remaining after separation of recyclable waste fractions are WMCs. Also, the NWMP within the WMC envisages the possibility of construction of biowaste treatment plants, sorting plants, recycling yards, bulky waste treatment plants, reuse centers and asbestos disposal cells.
130. For development of efficient and cost-effective waste management infrastructure it is of crucial importance to dimension waste management system on reliable and realistic planning taking into account; produced waste quantities, existing waste treatment capacities as well needed capacities, market demand, etc. While planning system EU waste targets should be taken into account and waste hierarchy principles should be considered and applied. The same should be applied at the project level for each project.

#### 5.1.1.1.1 *Implementation status of measures for improvement of separate waste collection system and waste treatment infrastructure*

131. Within measures for improvement of separate collection of waste and waste treatment infrastructure the best progress is identified regarding the construction of recycling yards with implementation status of 77% (out of 150 planned recycling yards, 116 of them was constructed from the start of the planning period until end of 2020). Also, activities of procurement of equipment, vehicles and vessels for separate collection (municipal paper/cardboard, glass, plastic, metal, biowaste) are carried out in significant share. EPEEF is conducting a project of purchasing 1.230.695 waste bins for 407 out of 556 LSGUs. Furthermore, the project of procurement of equipment on the islands is being implemented in parallel, as well as project of procurement of vehicles for separate collection of waste. So far, 55 projects for the purchase of vehicles vehicles

for separately collected waste are approved.

132. All other infrastructure measures have low implementation status and are predominantly at risk of failing under this planning period.
133. Regarding construction of sorting facilities, the implementation status is only 7%, with realized 51.946 t of sorting capacity in eight counties from planned 715.000 t for 20 counties. Out of planned 200.00 t/year capacity for construction facilities for biological treatment of separately collected bio-waste, until the end of 2020, 19% is realized (37.102 t/year).
134. Activities planned for strengthening recycling by ensuring sufficient recycling infrastructure are significantly delayed. The most important NWMP ID activity that represents backbone for development of recycling infrastructure, determination of lack of recycling capacities on a national level, is not implemented. Realization of this activity should provide planning information for construction of new recycling facilities and /or capacity increase of existing recycling plants. Therefore, due to lack of planning basis also ensuring of additional recycling capacities did not started. Intervention measures to decrease landfilling of municipal waste generated in the City of Zagreb and City of Split which include the construction of sorting facilities and facilities for biological treatment of biowaste, procurement of equipment and vehicles for separately collected biowaste of the City of Split and the City of Zagreb, are also not implemented.
135. There are delays in projects preparation and construction of WMC. For two WMCs construction works are underway (Bikarac and Biljane Donje). For WMCs Babina Gora, Lečevica and Piškornica public procurement is in process. Also, envisaged revision of cost-effectiveness for the construction of WMC Lučino razdolje is implemented and public procurement procedure is ongoing. WMC Šagulje, WMC Orlovnjak and WMC Zagreb are in the process of project documentation preparation for application of project for EU funding.

#### 5.1.1.2 Waste prevention measures

136. Waste prevention measures for achievement of NWMP Target 1 include: development of re-use network and establishing of re-use centres, procurement and distribution of home composters, preparation of different educational and informative materials and conduction of education and promoting activities on re-use and home composting.
137. Also, separate set of measures is defined by WPP. Evaluation results for WPP activities/projects are given in the Chapter 5.1.9.
138. NWMP measure related to development of re-use network and establishment of re-use centres is obligatory according to the amended WFD. It contributes to waste prevention and the promotion of preparing for re-use activities, by connection of collection schemes and re-use and repair network and thus enabling more waste to be reused.

Introduction of home composting is measure which contributes to the waste prevention, increasing municipal waste recycling<sup>46</sup> and decreasing biodegradable municipal waste disposal. By home composting the environmental impacts of waste transport and handling are avoided, households use compost as a product closing the recycling loop. Separation of own waste stream also raises the awareness of householders regarding waste generation and helps develop a sense of responsibility for their waste.

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<sup>46</sup> According to the Commission Implementing Decision (EU) 2019/1004, which defines rules for the calculation, verification and reporting of data on waste in accordance with WFD, MS have option to include the amounts of home-composted biowaste in the calculation of recycling target on municipal waste.

### 5.1.1.2.1 Implementation status of waste prevention measures

139. In the field of waste prevention, the biggest progress is achieved regarding the implementation of so called “soft prevention measures” aimed at awareness raising. Their status of realization is 100% (activities that include e.g. preparation of different materials and conducting educational and informative activities on re-use and home composting).
140. The activities of procurement and distribution of home composters are conducted intensively, and it can be concluded that they are also implemented to a satisfactory extent. In the period 2017-2019, 277 LSGUs distributed 151.509 home composters while within the EPEEF public procurement process for communal equipment for the islands, in 2020, 10 out of 35 local self-government units applied for home composters (total of 3.278 home composters).
141. The weakest results were achieved in relation to measures of development of re-use network and establishing of re-use centres. Activities on development of re-use network are not yet begun. Out of planned 20 re-use centres only one is established. The realization of envisaged re-use projects is high and accounts to 86% (this includes different project on re-use like public awareness raising and education on re-use through campaigns, workshops, etc).
142. For separate set of measures defined by WPP, implementation status is given in the Chapter 5.1.9.

### 5.1.1.3 Measures for waste policy improvement and development of recycling market

143. NWMP and NWMP ID define obligation for preparation of different regulations like: regulation on municipal waste management, regulation on determining the status of landfills and the amount of disposed waste, instructions for monitoring the amount of biodegradable waste in mixed municipal waste, introduction of a fee for landfilling, quantity-based fees for collection and treatment of mixed and biodegradable municipal waste, etc.
144. In addition to infrastructure measures, certain policy tools defined by NWMP ID help ensure minimisation of landfilling and enhancement and acceleration of demand for recycled materials. Some of them are already defined by existing waste legislation and they are applied, some of them are still not applied while some of them are not defined yet (e.g. quantity-based fees for collection and treatment of mixed and biodegradable municipal waste is defined and applied<sup>47</sup>, introduction of landfill fee in not implemented<sup>48</sup>).
145. For development of efficient and cost-effective waste infrastructure it is of crucial importance to dimension waste management system on reliable and realistic planning taking into account; produced waste quantities, existing waste treatment capacities as well needed capacities, marked demand, etc. Within NWMP and its NWMP ID preparation of different studies are foreseen (e.g. determination of lack of recycling capacities on a national level, preparation of study of the need for energy recovery). These studies should serve as a base for further development and upgrading of waste treatment capacities.
146. Measures aimed at mobilising recycling industry to increase its capacity and add value to the waste are of great importance for ensuring achievement of defined EU targets and accelerating the transition to a circular economy by shifting from “disposal” to “recycling” society while applying the proximity principle. Therefore, except determination of recycling capacity needs and accordingly

<sup>47</sup> Quantity-based fees for collection and treatment of mixed and biodegradable municipal waste are stipulated by Articles 30 i 33 of Act on sustainable waste management (OG 94/13, 73/17, 14/19 i 98/19). The utility company is obliged to calculate the price of the service user in proportion to the amount of delivered waste in the accounting period using the criterion for calculation of the waste amount based on the mass or the volume of the waste and the number of emptying of the container in the accounting period. Calculation method is in more detailed defined by Regulation on municipal waste management (OG 50/17, 84/19 i 14/20 - Decision of the Constitutional Court of the Republic of Croatia). This fee is implemented.

<sup>48</sup> Introduction of landfill fee is obligation required by Article 27 of Act on sustainable waste management (OG 94/13, 73/17, 14/19 i 98/19). It must be paid by persons in charge of the landfill (companies founded by LGU) in the case that the permissible annual amounts, defined by the MoESD at an annual level, are exceeded. This fee supposed to be paid to the EPEEF for the purpose of recycling yards construction. This fee is still not implemented.



construction of new recycling facilities and /or capacity increasement of existing recycling plants with aim of strengthening the recycling market, measure for ensuring the suitability of waste fractions for recycling, including high-level recycling, is defined<sup>49</sup> as well as establishment of publicly available database of waste supply and demand so called "waste market".

#### **5.1.1.3.1 Implementation status of measures for waste policy improvement and development of recycling market**

147. Implementation status for the measures for waste policy improvement and development of recycling can be considered as good, however certain problems were noted after the realization of one of these activities and certain relevant activities (preparation of study of the recycling need capacities and introducing a fee for landfilling) are not conducted.
148. Regulation on municipal waste<sup>50</sup>. is prepared and adopted in 2017. There were three amendments of which two were related to the Decisions of Constitutional Court by which some provisions have been repealed. It is about provisions which define the structure of price for public waste collection service and the methodology of determining the price. Furthermore, the provision that stipulates the calculation and payment of fee for the reduction of the quantity of mixed municipal waste have been repealed, too, but with start September 15, 2021. Provisions regarding the price are repealed in January 2020.
149. Measure introducing tariff for charging collection and treatment of mixed and biodegradable municipal waste by quantity is implemented by adoption of aforementioned Regulation. Instructions for Monitoring the amount of biodegradable waste in mixed municipal waste are prepared and published on the web pages of the MoESD. Monitoring the amount of biodegradable waste in mixed municipal waste is conducting only 11% of LSGUs.
150. Still, quality and categorising criteria for compost and digestate are not developed. Also, preparation and adoption of Regulation on determining the status of landfills and the amount of disposed waste is missing.
151. Activities aimed at creating the technological demands for certain types of waste and establishing the system of supply and demand of waste ("waste market") are implemented.
152. Study of the need for energy recovery is prepared which is important for further development of waste management infrastructure.

#### **5.1.2 Measures for achievement of NWMP Target 2 - Improvement of the system for the management of special waste categories**

153. For the achievement of NWMP *Target 2 Improvement of the system for special waste categories management*, NWMP defines 19 measures. To ensure the implementation of these measures 25 activities/projects are defined within NWMP ID (see Table 5 and Annex 4).
154. Measures are linked to the six NWMP sub- targets:
- Sub-target 2.1. Separately collect, by weight, 75% of the produced construction waste;*
  - Sub-target 2.2. Establish system for sludge waste management from waste water treatment plants;*
  - Sub-target 2.3. Improve the packaging waste management system*
  - Sub-target 2.4. Establish waste management system for marine litter;*
  - Sub-target 2.5. Establish waste management system for waste ships, wrecks and sunken things on*

<sup>49</sup> Measure defining an obligation of preparation and publishing of recycling technological requirements

<sup>50</sup> OG 50/17, 84/19, 14/20 and 31/21 - Decision of the Constitutional Court

*the seabed;*

*Sub-target 2.6. Improve waste management system of other special waste categories.*

155. Measures for improvement of the system for the management of special waste categories include: creating an action plan for separate collection and recycling construction and demolition waste, action plan for waste sludge from waste water treatment facilities and establishing a sludge management system, constructing and procuring equipment for recycling yards for construction and demolition waste, establishing a system of prevention, collection and disposal of marine waste, establishing a waste ship management system, construction of landfill cells for asbestos waste etc.
156. In NWMP special emphasis, by defining more complex measures like construction activities, identification of waste locations, remediation activities etc., is given to the: construction and demolition waste (including asbestos waste), sludge management, marine waste and wasted ships, wrecks and sunken objects on the seabed. For other special waste categories (packaging waste, medical waste, end-of-life vehicles, waste batteries and accumulators, waste tyres, EE waste, waste oils,) soft measures like preparation of analysis of current waste management systems and amendment of legislation based on the recommendations obtained by those analysis are defined.
157. NWMP measure related to the establishment of infrastructure for separate collection of construction and demolition waste will mitigate negative impacts of this waste category which. This is problematic waste stream given that a large quantities are still uncontrolled discarded in the environment. Prior the implementation of this measure (construction and equipping recycling yards) the action plan, which should set up the foundations for a long-term solution for construction waste management, and accordingly achieving the recovery targets, should be prepared as it is planned by NWMP.
158. Furthermore, based on studies which should estimate amounts of asbestos waste that is expected to be generated in each county (preparation of 21 study) it is planned to upgrade infrastructure for disposal of asbestos waste by constructing asbestos landfill cells. These measures contribute to the WFD requirements of ensuring that waste management is carried out without endangering human health.
159. Sewage sludge management measures are necessary for the solving long-standing problem regarding the lack of capacities for sewage sludge treatment and its accumulation on the locations of wastewater treatment plants. According to NWMP prior establishment of the sewage sludge treatment capacities, the preparation of an action plan for the use of residual sludge from waste water treatment plants should provide useful results on acceptable methods for sludge treatment.
160. Extended producer responsibility scheme (EPR) is a policy tool aiming at strengthening the prevention and the re-use, recycling and other recovery of waste and is implemented in the EU in the WFD, as well as in specific regulations like the Packaging and Packaging Waste Directive (PPWD) and SUPD. At EU level all MS have to introduce measures to ensure that producers of packaging bear financial responsibility or financial and organisational responsibility for the management of the waste stage of a product's life cycle.<sup>51</sup> A detailed assessment of current Croatian packaging and packaging waste management system and defining most suitable model and mechanisms for the EPR scheme (including identification of persons obliged to pay the fees for packaging and packaging waste management), as it is recognised in NWMP, is necessary for strengthening the prevention, re-use, recycling and other types of waste recovery and meeting requirements defined by EU waste legislation.

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<sup>51</sup> According to Article 7 of PPWD Member States have to ensure that, by 31 December of 2024, extended producer responsibility schemes are established for all packaging in accordance with Articles 8 and 8a of Directive 2008/98/EC.

161. Establishing a system of prevention, collection and disposal of marine waste, as an integral part of the waste management system in the Croatia, is planned by NWMP measures. Marine litter is a good indicator of a resource inefficient economy where usable materials end up on the seabed instead of being returned back into our economy. Measure regarding the collection and disposal of marine waste isn't the most desirable option but it is only appropriate option when the problem occurs. Following that, other marine waste measures cover identification of the locations and sources of marine waste and identification of locations of accumulated marine waste on the seabed, intervention collection and disposal of marine waste, and establishment of cooperation with neighbouring or other countries regarding marine waste pollution.

#### 5.1.2.1 Implementation status of measures for improvement of the system for the management of special waste categories

162. Regarding the implementation progress of measures for improvement of special waste categories management, in general, low performance is identified.

163. Only four of nineteen envisaged activities are implemented. Those are soft measures related to the preparation of action plan for the use of residual sludge from waste water treatment facilities on suitable surfaces, establishment of cooperation with neighbouring or other countries regarding marine waste pollution and establishment of a waste ship management system (through adoption of relevant legislation). In addition to those measures, intervention collection and disposal of marine waste is implemented.

164. Calls for project proposals for construction and equipping of the recycling and sorting facilities for construction waste are announced at the beginning of the 2020 and so far, 27 projects are approved.

165. All other measures, like construction of landfill cells for asbestos waste, establishment of system for marine litter management, identification and remediation of wrecks and sunken object on the seabed, preparation of analysis of the existing waste management systems for special waste categories, creating action plan for separate collection and recycling construction and demolition waste etc, stayed unexecuted.

166. Regarding the waste sludge management, facilities for sludge treatment are constructed as a part of projects implemented in water sector (construction of waste water treatment plants (WWTP)). The progress of activity related to construction of waste sludge treatment facilities and equipment in relation to the indicator defined by NWMP ID in 2019 is following: 68.192 t of produced waste sludge is treated while indicator for 2019 is 85.000 t. Since the beginning of the planning period EU funds are ensured for construction of larger number of WWTP (projects of WWTP are at the different stages of realisation: under trial period, under construction, procurement process is ongoing, preparation of project documentation, etc.). Accordingly, it is expected that by the end of this programming period (end of 2023) capacities for waste water treatment, and thus capacities for waste sludge management to some extent will be increased.

#### 5.1.3 Measure for achievement of NWMP Target 3 – Improvement of hazardous waste management system

167. For the achievement of NWMP *Target 3 – Improvement of hazardous waste management system*, implementation of one measure is defined in NWMP and one activity in NWMP ID: preparation of feasibility study with analysis of existing and needed capacities for hazardous waste treatment (see Table 5 and Annex 4).

168. Implementation of this measure is of great importance for efficient planning of hazardous waste management. WFD requires that production, collection and transportation of hazardous waste, as

well as its storage and treatment, should be carried out in conditions providing protection for the environment and human health. This is not possible to provide without appropriate infrastructure for hazardous waste management.

#### 5.1.3.1 Implementation status of measure for improvement of hazardous waste management system

169. Procurement procedure for the preparation of feasibility study with analysis of existing and needed capacities for hazardous waste treatment is underway.

#### 5.1.4 Measures for achievement of NWMP Target 4 – Remediate sites contaminated with waste

170. For the achievement of *Target 4 – Remediate sites contaminated with waste*, 5 measures are defined in NWMP. To ensure the implementation of these measures 13 activities/projects are defined within NWMP ID (see Table 5 and Annex 4).

171. Measures for remediation of sites contaminated with waste include: creating a Plan for closing non-hazardous waste landfills, remediation of non-hazardous waste landfills, identifying new locations polluted by hazardous waste ("hot spots"), remedying locations polluted by hazardous waste ("hot spots") and remediation of illegal dump sites.

172. According to the conditions that Croatia accepted by signing EU Accession Treaty, from 1st of January 2019 all non-compliant landfills must be closed. To comply with mentioned NWMP defines measure for preparation and publishing of plan for closing non-hazardous waste landfills. By this plan dynamic of closure of non-complied landfills should be defined but also plan for further disposal of waste on landfills which comply with EU requirements should be set up.

173. With purpose of protection of human health and the environment remediation of non-hazardous waste landfills and illegal dump sites are planned. These measures mostly contribute to the WFD requirements of carrying out the waste management, without endangering human health, without harming the environment and, in particular without risk to water, air, soil, plants or animals; without causing a nuisance through noise or odours.

174. "Hot spots" are hazardous waste polluted sites that present large endanger for human health and environment. Remediation of six existing "hot spots" is planned, as well as identification and remediation of new ones. Remediation of newly identified "hot spots" is in plan after the adoption of *Decision on remediation of new identify locations pollutes by hazardous waste*.

##### 5.1.4.1 Implementation status of measures aimed at remediation of sites contaminated with waste

175. Measures for remediation of sites contaminated with waste are implemented partly yet there are significant delays regarding remediation of "hot spots".

176. Envisaged Plan for closing non-hazardous waste landfill is created and published. On the base of that Plan, Decision on the order and dynamics of landfill closure (OG 3/19, 17/19) was adopted. Implementation status for activity of remediation of non-hazardous waste landfill is 14%.

177. Identification of new locations polluted by hazardous waste ("hot spots") and consequently the adoption of Decision on remediation of new identify locations pollutes by hazardous waste and remediation of those new locations, aren't implemented. Regarding existing 6 locations of "hot spots", neither of them have been remediated. For the remediation of "hot spot" Sovjak pit near Rijeka, EU co-financing is approved.

178. When it comes about remedying illegal dump-sites, legislative framework on the national level is

established, as well as system for monitoring.

### **5.1.5 Measures for achievement of NWMP Target 5 - Continuously carry out educational and informative activities**

179. For the achievement of NWMP *Target 5 - Continuously carry out educational and informative activities*, NWMP defines 3 measures. To ensure the implementation of these measures 5 activities/projects are defined within NWMP ID (see Table 5 and Annex 4).
180. Measures for continuous educational and informative activities include: creating a Programme of educative-informative activities on sustainable waste management and conducting activities from the Programme, conducting a national campaign on sustainable waste management.
181. Conduction of educative-informative activities and campaigns at all levels (local, regional and national) is very important considering their contribution to reducing the waste generation and saving resources.

#### **5.1.5.1 Implementation status of measures of continuously carrying out educational and informative activities**

182. Implementation status for measures related to continuously carrying out educational and informative activities is very high. Programme of educative-informative activities on sustainable waste management is created and published. Progress of conducting activities from that Programme is 53%. National campaign on sustainable waste management is prepared and conducted.

### **5.1.6 Measures for achievement of NWMP Target 6 - Improve the waste management information system**

183. For the achievement of NWMP *Target 6 - Improve the waste management information system*, NWMP defines 2 measures. To ensure the implementation of these measures 7 activities/projects are defined within NWMP ID (see Table 5 and Annex 4).
184. Measures for improvement the waste management information system include: creating and/or improving applications that are part of the waste management information system (Waste Register (e-ONTO), Waste Management Permits Register, Central digital application for transboundary movement of waste, Application for abandoned waste locations; Special Waste Categories Register and EPEEF information system for the preparation and implementation of projects and integration of existing digital applications on a joint IT waste management platform).
185. Reliable data are necessary for efficient planning and monitoring of the waste management system and hence indirectly for the achievement of EU targets. NWMP measures related to the establishment of new databases and improvement of existing databases will allow better control of waste shipments, including transboundary movement of waste. Monitoring and reporting waste data will be easier and double reporting requirements avoided, hence, administrative burden on the economy will be reduced. Furthermore, access to information on authorized waste management companies and modernize and speed up the exchange of information between competent authorities during the process of issuing waste management permits and authorizations will be facilitated. When it comes to establishment of application on the illegal dump sites, except protection of human health and the environment, this register should raise citizens' awareness regarding importance of waste management as well as contribute to raising citizen's trust in local government when it comes waste management issues. Establishment of Special Waste Categories Register is necessary for the implementation and monitoring of implementation of extended producer responsibility obligations.

#### 5.1.6.1 Implementation status of measures aimed at improvement the waste management information system

186. Measures aimed at improvement the waste management information system are partly implemented. Out of 7 envisaged applications 4 of them are established. These are: Waste Register (e-ONTO), Waste management activities register (currently it is in test mode), Application for abandoned waste locations.
187. Central digital application for transboundary movement of waste and Register for management of special categories of waste are in the phase of initiating the development of procurement project documentation. Creating an EPEEF information system for the preparation and implementation of projects isn't implemented yet.

#### 5.1.7 Measures for achievement of NWMP Target 7 - Improve supervision of waste management

188. For the achievement of NWMP *Target 7 - Improve supervision of waste management*, NWMP defines 2 measures. To ensure the implementation of these measures 4 activities/projects are defined within NWMP ID (see Table 5 and Annex 4).
189. Measures for improvement of supervision of waste management include: education of all the participants in waste management supervision, analysis and redefining supervision jurisdiction in waste management.
190. Measures on waste management supervision should improve legislation implementation. They include education of communal wardens and environmental inspectors and analysis and redefinition of competencies for the implementation of waste traffic control within the Republic of Croatia and cross-border waste traffic control. According to the WFD establishments or undertakings which carry out waste treatment operations, establishments or undertakings which collect or transport waste on a professional basis, brokers and dealers, and establishments or undertakings which produce hazardous waste have to be subject to appropriate periodic inspections by the competent authorities (by which the origin, nature, quantity and destination of the waste collected and transported have to be covered).

#### 5.1.7.1 Implementation status of measures aimed at improvement the supervision of waste management

191. Measures aimed at improvement the supervision of waste management are implemented partially. Preparation of Analysis and redefining supervision jurisdiction in waste management and amendment of legislation based on the recommendations obtained by Analysis and redefining supervision jurisdiction in waste management are implemented, while activities aimed at preparation of Plan for Educating all the participants in waste management supervision and conducting that education aren't implemented.

#### 5.1.8 Measures for achievement of NWMP Target 8 - Improve administrative procedures in waste management

192. For the achievement of NWMP *Target 8 - Improve administrative procedures in waste management* in one measure is defined in NWMP. To ensure the implementation of this measure 2 activities/projects are defined by NWMP ID (see Table 5 and Annex 4).
193. Measure for improvement of administrative procedures in waste management includes improvement of the system and procedures for issuing waste management permits.
194. This measure contributes to improvement of the licensing system with the purpose of relieving the

economy. It covers the preparation of analysis of current system for issuing waste management permits and the amendment of legislation for issuing waste management permits based on that analysis. According to the WFD MS shall require any establishment or undertaking intending to carry out waste treatment to obtain a permit from the competent authority, with some exceptions<sup>52</sup>. Improvements of the licensing procedure contributes to attracting new investors in waste management field and thus accelerate the establishment of waste management system.

#### **5.1.8.1.1 Implementation status of measures aimed at improvement the administrative procedures in waste management**

195. The implementation status for the measures aimed at improvement the administrative procedures in waste management is 100%. Analysis of current system for issuing waste management permits is prepared and amendment of legislation based on the recommendations obtained by that Analysis is done.

#### **5.1.9 Measures defined by Waste Prevention Plan**

196. Measures defined by WPP are aimed to entirely contribute to achievement of the NWMP Target 1 *Improvement of municipal waste management system*, Sub-target 1.1. *Reduce total quantity of produced municipal waste by 5%*. There are 24 activities/projects defined by NWMP ID. Some of them are overlapping with measures from NWMP and some of them (General measures for waste prevention) are not defined in NWMP (WPP).

197. WPP measures are specifically designed to contribute to specific targets on prevention of following waste categories: biowaste, construction waste, municipal waste, WEEE and paper and cardboard waste. They include: general measures for waste prevention, organisation of informative-educative campaign on food waste prevention, improvement of the information system and data on food waste, establishment of a food donation system, promotion of home composting, encouragement of re-use of demolition material, promotion of sustainable construction, organisation of a communication campaign for citizens, encouragement of waste plastic bags prevention, encouragement of "green" and sustainable public procurement and encouragement of exchange and reuse of used products.

198. Inclusion of waste prevention measures in local waste management plans, as well as establishment of information system for prevention of waste generation and exchange of good practice (web portal) in general contribute to the waste prevention by promoting waste prevention. Furthermore, local waste management plans are valuable tool for the organization and decision-making process for waste management at local level. This is especially important regarding municipal waste management because municipalities are responsible for managing municipal waste.

199. Eco labels promotion presents measure which contributes to the promotion of international policy of sustainable production and consumption. It aims to reduce the negative impact of production and consumption on the environment, health, climate and natural resources and to encourage socially responsible business and sustainable lifestyles.

200. Activities related to the implementation of informative-educative campaign on food waste prevention, promoting homecomposting, improvement of the information system and data on food waste and promotion of food donation system directly contribute to the biowaste prevention. Conduction of educative-informative campaigns on food waste prevention activities and homecomposting, strongly influences the behaviour of targeted stakeholders and motivate

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<sup>52</sup> MS may exempt from the permit requirement establishments or undertakings for the following operations:

(a) disposal of their own non-hazardous waste at the place of production; or  
(b) recovery of waste.

behavioural change toward food waste prevention. Food donation is the best option for food surpluses if the limiting the generation of surplus food cannot be achieved, but only where safe for human consumption. When it comes about data on food waste, in order to define achievable targets on reducing food waste and to prescribe appropriate measures for achievement these targets, reliable statistics are needed.

201. Implementation of measures aimed to encouraging re-use of demolition material and promotion of sustainable construction should result in construction waste reduction. Preparation and publishing guidelines for green and sustainable construction are an effective way to emphasize waste reduction methods because they go beyond awareness raising and provide businesses with practical tools and techniques to achieve construction waste prevention, such as: reuse and recovery, design for sustainability, adaptability and possibility of disassembly, exchange of materials, use of less toxic materials, separation of toxic materials. Exchange of knowledge about the green and sustainable construction should encourage re-use of demolition material. Furthermore, the introduction of fee for re-use of demolition material makes useful economic instrument for encouraging exchange and reuse, while recycles that fulfil specific quality standards makes base for development of the market for recycles and inclusion of construction and demolition waste in "waste market" (database of waste supply and demand).
202. Measures for the contribution to the municipal waste prevention are aimed to the organising communication campaigns for citizens and encouraging waste plastic bags prevention. Conducting national campaigns on sustainable waste management and activities from the Programme of educative-informative activities on sustainable waste management as well as exchange of knowledge about the prevention of waste and organization of Waste Prevention Week present effective instruments for waste prevention. Education of citizens is necessary for improvements in the field of municipal waste reduction, since they are the biggest producers of that waste type. Additionally, established web portal is recognized as useful tool for exchange of knowledge. Introduction of fee on all plastic bags will help in achieving a sustained reduction in the consumption of lightweight plastic carrier bags.
203. Considering measures for encouraging of green and sustainable public procurement, they are aimed to the achievement of municipal waste prevention, EE waste prevention, paper and cardboard waste prevention, construction waste prevention. They include Analysis of the results of the implementation of the National Action Plan for Green Public Procurement for the period from 2015 to 2017 and Preparation and Implementation of the National Action Plan for Green Public Procurement for the period from 2018. to 2020. Green public procurement is a process by which public bodies are encouraged to the purchase of "green" products and services, i.e. those that have a lower impact on the environment during their lifetime than those products that they would otherwise procure. Since public administration bodies are significant consumers and spend significant financial resources, by using their purchasing power to select goods and services with a lower environmental impact, they can make an important contribution to sustainable consumption and production and contribute to reducing resource consumption. Although the National Action Plan is primarily intended for public procurement payers, it may also encourage the private sector to introduce the practice of green public procurement in their business.

#### 5.1.9.1 Implementation status of measures defined by Waste Prevention Plan

204. Implementation status of measures defined by Waste Prevention Plan is very high. Out of 24 activities only 6 of them are not implemented. Those are: organization of Waste Prevention Week, activities regarding preparation and publishing Guidelines for green and sustainable construction, exchange of knowledge about green and sustainable construction, introduction of fee for re-use of demolition material and preparation of the National Action Plan for Green Public Procurement for



the period from 2018. to 2020.

205. Inclusion of waste prevention measures in local waste management plans is underway with implementation progress of 87%. Web Portal on waste prevention is established and exchange of knowledge about the waste prevention is carrying out. Informative-educative activities on waste prevention including food waste and promotion of food waste donation are continuously implemented.
206. Project proposal for improvement of the system of collection and analysis of food waste data is finished and improvement of food waste data is in progress. Also, activities aimed at adoption and enforcement of legislation on plastic bag are implemented. Regarding construction waste, this fraction is included in “waste market” as it is envisaged by the NWMP ID.

**Table 9 - Summarized implementation progress results and results of evaluation of NWMP measures with recommendations for their improvements**

No.	Target	Sub - target	Sub - target name	Measures in line with EU requirements	Measure implementation status	Recommendations for improvements	
1.	Improvement of municipal waste management system	<b>WPP measures</b>					
		Sub-target 1.1	Reduce total quantity of produced municipal waste by 5%	√	Implementation status of measures defined by Waste Prevention Plan is very high.	<ul style="list-style-type: none"> <li>- Implementation of educative-informative activities are continuously carried out, but there is no legal obligation for delivering data in MoESD Information system. It would be useful to incorporate it as reporting obligation into the waste legislation and thus ensure monitoring of implementation progress. This recommendation should not be part of NWMP revision but should be reconsidered when preparing new waste legislation.</li> <li>- Regarding preparation of project proposal for improvement of the system of collection and analysis of food waste data, collection and analysis of food waste data is envisaged under this planning period (end of 2022) which also covers first reporting year (2020) for food waste report to EC. As same set of data and its assessment is necessary to be ensured every four year, this measure should also be part of the next planning period.</li> </ul>	
		<b>NWMP measures</b>					
		Sub-target 1.1	Reduce total quantity of produced municipal waste by 5%	√	<ul style="list-style-type: none"> <li>- All infrastructure measures, except construction of recycling yards have low implementation status and are predominantly at risk of failing under this planning period.</li> </ul>	<b>Measures for improvement of separate waste collection system and waste treatment infrastructure</b> <ul style="list-style-type: none"> <li>- <b>Measures for improvement of separate waste collection system and waste treatment infrastructure</b> <ul style="list-style-type: none"> <li>- At the level of each infrastructure project, proper planning of required capacities, investments, and operational costs should be conducted. This is especially important for the projects of construction of WMC. These projects have to be based on the feasibility studies that provide reliable analysis of needed capacities and technologies for mixed municipal waste treatment, comprehensive cost benefit analysis and environmental impact assessment. While planning infrastructure for residual waste, it is necessary to take into consideration: remaining amounts of waste after targeted separate collection, re-use and recycling, the capacity and technology of existing and nationally planned WMC and sorting plants. Planning should not be focused on capital investment cost and adsorption of EU funds, leading to underestimated operational cost (examples from two constructed WMC (Kaštijun and Mariščina). It is important to develop infrastructure that utilize the best available technology and to be economically and environmentally efficient. The development of WMCs must involve close and transparent collaboration between national, regional and local institutions, as well as interested public. Communication aspect with citizens should be enhanced. Citizens should be timely and clearly informed and acquainted with all aspects of the planned projects (planned capacity and technology, investment and operational costs, how implementation of project will reflect on the price of the utility service, are there possible environmental and public health impacts and what prevention and mitigation measures are anticipated, etc). Furthermore, it would be reasonable that while planning WMC, recycling is also reconsidered as a part of WMC infrastructure.</li> <li>- Improvement is possible related to NWMP ID activities defined for establishing of sorting</li> </ul> </li> </ul>	
		Sub-target 1.2.	Separately collect 60% by weight of the produced municipal waste (primarily paper, glass, plastics, metal, bio-waste, etc.);	√			
Sub-target 1.3	Separately collect 40% by weight of the produced municipal biowaste	√					
Sub-target 1.4	Dispose at landfills less than 25% of produced municipal waste	√					

No.	Target	Sub - target	Sub - target name	Measures in line with EU requirements	Measure implementation status	Recommendations for improvements
						<p>capacity for dry recyclables. NWMP ID defines, for each county (20 counties) and City of Zagreb, sorting capacity (t/year) that must be established by the end of current planning period. Sorting capacity should be result of detailed technical study which has to consider separate collection objectives and re-use and recycling needs (planned re-use and recycling capacity) at national level. This analysis can be conducted as a part of NWMP ID activity 8.1. (Determination of lack of recycling capacities on a national level). Afterwards, more precise capacity need, including best available technology, cost-benefit analyses, and environmental impact assessment, for each individual sorting plant should be further developed for the level of each individual project.</p> <ul style="list-style-type: none"> <li>- To help accelerating the scale-up of the circular economy, it would be reasonable to reconsider possibility to include other stakeholders as responsible bodies for implementation of infrastructural measures like construction of recycling yards, sorting facilities, facilities for biological treatment and WMC (e.g. private investments, waste utility companies, etc.). Currently NWMP and NWMP ID define LSGUs as responsible bodies for most of measures for separate collection. Also, LSGUs are main eligible applicants for funds from EU Cohesion Fund (2014-2020).</li> </ul> <p><b>Waste prevention measures</b></p> <ul style="list-style-type: none"> <li>- In the field of waste prevention, the biggest progress is achieved regarding the implementation of so called “soft prevention measures” aimed at awareness raising. Their status of realization is 100% (activities that include e.g. preparation of different materials and conducting educational and informative activities on re-use and home composting).</li> </ul> <p>The weakest results were achieved in relation to measures of development of re-use network and establishing of re-use centres.</p> <p><b>Waste prevention measures</b></p> <ul style="list-style-type: none"> <li>- Certain improvement can be done at organisational level. Development and coordination of re-use and repair network covered by this measure, due its complexity requires different policy instruments that will enable access to waste held by collection schemes or treatment facilities, economic instruments, public procurement criteria, etc. Therefore, it would be reasonable that implementation of measure for development and coordination of re-use and repair network is under competency of MoESD while individual projects and activities like establishment of re-use centres, implementation of re-use projects can be assigned to the civil sector or LSGUs or private investors, etc. Following that, it would be good that the preparation and publishing of guidelines for re-use is defined as responsibility of the MoESD.</li> </ul> <p>Also, as it is case with waste collection and treatment infrastructure plan for optimal number and type of re-use and re-pair facilities should be developed (capacity need should be conducted).</p> <p>Additionally, it is recommended to incorporate the reporting obligation on the implementation of re-use projects into the legislation to ensure better monitoring.</p>

No.	Target	Sub - target	Sub - target name	Measures in line with EU requirements	Measure implementation status	Recommendations for improvements
					<p><b>Measures for waste policy improvement and development of recycling market</b></p> <ul style="list-style-type: none"> <li>Implementation status for the measures for waste policy improvement and development of recycling can be considered as good, however certain relevant activities are not conducted (preparation of study of the recycling need capacities, introducing a fee for landfilling etc.).</li> </ul>	<p><b>Measures for waste policy improvement and development of recycling market</b></p> <ul style="list-style-type: none"> <li>Regarding measures related to policy preparation, although they contribute to meeting EU waste policy requirements, it is recommended, as this present regular MoESD work, not to be defined as specific measures within NWMP. Certain financial instruments (e.g. "smart taxes") could be defined within a plan, but to single-out preparation of specific regulations or ordinances seem redundant.</li> </ul>
2.	Improvement of the system for management with special waste categories	Sub-target 2.1	Separately collect, by weight, 75% of the produced construction waste	√	Implementation status of the measures for the achievement of this target is low.	<ul style="list-style-type: none"> <li>Sub-target 2.5. and measures for its achievement are to the fullest extent under the jurisdiction of Ministry of the Sea, Transport and Infrastructure and it would be reasonable to integrate management of wrecks and sunken objects on the seabed in strategic and/or planning documents under authority of Ministry of the Sea, Transport and Infrastructure.</li> <li>Certain improvement can be done regarding measure that envisage preparation of asbestos waste estimation studies. It would be more efficient to prepare one comprehensive study rather than separate study for each county (21 study). This approach supports application of common methodology and standardized assessment procedures. In line with that, it would be efficient that responsibility for this measure is shifted from L(R)SGUs to MoESD.</li> </ul>
Sub-target 2.2		Establish system for sludge waste management from waste water treatment plants	√	Only soft measures related to the preparation of action plan for the use of residual sludge from waste water treatment facilities on suitable surfaces, establishment of cooperation with neighbouring or other countries regarding marine waste pollution and establishment of a waste ship management system (through adoption of relevant legislation) are implemented.		
Sub-target 2.3		Improve the packaging waste management system	√	In addition to those measures, intervention collection and disposal of marine waste is implemented.		
Sub-target 2.4		Establish waste management system for marine litter	√			
Sub-target 2.5		Establish waste management system for waste ships, wrecks and sunken things on the seabed	√			
Sub-target 2.6		Improve waste	√			

No.	Target	Sub - target	Sub - target name	Measures in line with EU requirements	Measure implementation status	Recommendations for improvements
			management system of other special waste categories			
3.	Improvement of hazardous waste management system	Sub-target is not defined by NWMP		√	Procurement procedure for the implementation of the measure under this target is underway.	- No recommendation for improvements.
4.	Remediate sites contaminated with waste	Sub-target is not defined by NWMP		√	Measures for the achievement of this target are implemented partly. Significant delays regarding remediation of "hot spots" are recorded.	- In relation to measure on Adoption of Decision on remediation of new identify locations polluted by hazardous waste, although this measure contributes to meeting EU waste policy requirements, it is recommended, as this present regular MoESD work, not to be defined as specific measure within NWMP.
5.	Continuously carry out educative-informative activities	Sub-target is not defined by NWMP		√	Implementation status of the measures for the achievement of this target is very high.	- In relation to measure on Creating a Programme of educative-informative activities on sustainable waste management, since within this Program, the implementation of educational and informative activities is planned to support the implementation of Specific Objective 6i1 - Reduced amount of waste disposed of in landfills from Operational Program "Competitiveness and Cohesion 2014-2020", it is necessary to create and publish new Programme that will cover in next planning period (period of the new NWMP 2023-2028).
6.	Improve the waste management information system	Sub-target is not defined by NWMP		√	Measures for the achievement of this target are partly implemented.	- No recommendation for improvements.
7.	Improve supervision of waste management	Sub-target is not defined by NWMP		√	Measures for the achievement of this target are implemented partially.	- Supervision of waste management is under authority of State Inspectorate and defined measures represent its regular work. It would be reasonable to reconsider to exclude NWMP Target 7, and thus measures for achievement of this target, from the scope of the NWMP.
8.	Improve administrative procedures in waste management	Sub-target is not defined by NWMP		√	Measures for the achievement of this target are implemented.	- Since policy preparation is regular work of MoESD, it would be worth reconsidering to exclude this target and measure for achieving target from the scope of the NWMP.

## 6 Cost estimation for executing the planned measures and funding sources

### 6.1 Financial progress

207. Estimated total funds for the execution of NWMP by end of 2022 amount to 5.077.300.000 HRK. For the period 2017 – 2020 this value amounts to 3.725.200.000 HRK. Robust assessment of financial progress showed that in the period from 2017 to 2020 total expenditure on the implementation of NWMP measures was 1.204.836.185 HRK (Table 10). According to this, for the analysed period realisation of NWMPs envisaged funds was 32% while for the whole NWMP period was 24%. By the end of 2020, for additional 995.924.612 HRK procedure of procurement and/or contracting was underway.
208. Financing came predominantly from EU funds (60%). When it comes to progress in the implementation of indicatively planned funds with regard to the source, 58% of funds foreseen by NWMP for EPEEF was spent, followed by Croatian Waters (40%), EU funds (29%) and state budget (20%), (Table 11).
209. It should be noted that the above results are based on MoESD and EPEEF official data and therefore financing provided by L(R)SGUs is possibly underestimated as the information on funds spent for the measure of home composters procurement and measure on remediation of illegal dump sites are not covered. Also, part of investment in waste sludge management, which is part of investments in WWTP under water sector, was not covered by analyses.
210. Additionally, results are based on data with cut-off date December 2020. In the meantime, a public procurement procedure was launched, inter alia, for the establishment of 3 WMC (Lećevica, Lučino razdolje, Piškornica) and remediation of “hot spot” Sovjak near Rijeka, for which total costs are estimated at HRK2 billion. Considering this and fact that for certain NWMP measures contracts have been concluded and their implementation follows it is to be expected that the amount of spent funds by the end of the planning period will be higher.
211. All aforementioned indicates a risk of spending EU funds allocated for this programming period. Expenditure of funds for the first four years of planning period indicates implementation problems. Additionally, implementation of projects complex in nature like construction of WMC by the end of 2023, when the eligibility of expenditure of EU fund for this programming period ends, seems challenging.

**Table 10.** Overview of NWMP financial progress for the period 2017-2020

Measure number	Measure	NWMP estimation of funds 2017-2022 (HRK)	Spent 2017 – 2020 (HRK)	Contracted / contract under preparation / procurement in progress (HRK)
M 1.1.1	Measures defined by the Waste Prevention Plan	10.000.000	370.300	1.375.000
M 1.1.2	Establishment of re-use centres	75.000.000	1.414.222	998.841
M 1.1.3; M 1.2.1.; M 1.3.2; M 1.4.3; M 1.4.4.	- Home composting ; - Procurement of equipment, vehicles and vessels for separate collection of paper, cardboard, metal, plastic, glass and textile;	655.000.000	175.580.268	401.907.555

Measure number	Measure	NWMP estimation of funds 2017-2022 (HRK)	Spent 2017 – 2020 (HRK)	Contracted/ contract under preparation / procurement in progress (HRK)
	<ul style="list-style-type: none"> <li>- Procurement of equipment and vehicles for separate collection of bio-waste</li> <li>- Intervention measure to decrease landfilling municipal waste generated in the City of Zagreb</li> <li>- Intervention measure to decrease landfilling municipal waste generated in the City of Split</li> </ul>			
M 1.2.2	Constructing a sorting facility for separately collected paper, cardboard, metal, glass, plastic etc.	350.000.000	0	62.468.465
M 1.2.3	Construction of recycling yards	450.000.000	448.772.041	70.443.699
M 1.3.3	Construction of facilities for biological treatment of separately collected bio-waste	150.000.000	0	30.763.374
M 1.4.2.	Monitoring the amount of biodegradable waste in mixed municipal waste <sup>53</sup>	0	199.313	0
M 1.4.5	Constructing waste management centres	1.600.000.000	165.420.651	0
M 2.1.2	Constructing and procuring equipment for recycling yards for construction and demolition waste	80.000.000	0	196.262.325
M 2.2.1.	Preparation of action plan for the use of residual sludge from waste water treatment facilities on suitable surfaces	5.000.000	3.500.000	0
M 2.4.	Establish waste management system for marine litter	2.500.000	2.690.656	0
M 3.1; M 4.3.	Analysis of existing and necessary capacities for hazardous waste treatment; Identifying new locations polluted by hazardous waste ("hot spots")	3.000.000	0	3.000.000
M 4.2	Remediation of non-hazardous waste landfills	975.000.000	201.131.977	218.725.354
M 4.4	Remediating locations polluted by hazardous waste ("hot spots")	450.000.000	130.345.542	0
M 5.2	Conducting activities from the Programme of educative-informative activities on sustainable waste management	10.000.000	62.468.465	0
M 5.3	Conducting a national campaign on sustainable waste management	5.000.000	7.300.000	0
M 6.1	Creating and/or improving applications that are part of the waste management information system	10.000.000	5.642.750	0
M 6.2	Creating an EPEEF information system for the preparation and implementation of projects	5.000.000	0	9.980.000
	Other measures	241.800.000	0	0
	<b>Total (HRK)</b>	<b>5.077.300.000</b>	<b>1.204.836.185</b>	<b>995.924.612</b>

SOURCE EPEEF and MoESD

**Table 11** - Overview of NWMP financial progress for the period 2017-2020 by funding source

Source	NWMP estimation of funds 2017-2022 (HRK)	NWMP estimation of funds 2017 – 2020 (HRK)	Spent 2017 – 2020 (HRK)	Contracted/ contract under/ preparation/ procurement in progress (HRK)
State budget	25.301.250	23.201.250	4.618.311	1.375.000
EU	3.420.259.135	2.457.984.135	720.278.258	770.611.759

<sup>53</sup> For measure M 1.4.2. Monitoring the amount of biodegradable waste in mixed municipal waste, in NWMP estimation of costs didn't presented

Source	NWMP estimation of funds 2017-2022 (HRK)	NWMP estimation of funds 2017 – 2020 (HRK)	Spent 2017 – 2020 (HRK)	Contracted/ contract under/ preparation/ procurement in progress (HRK)
L(R)SGUs*	1.032.479.500	751.109.500	100.318.741	128.307.849
EPEEF	490.760.115	412.155.115	239.710.883	20.786.665
CW	15.500.000	8.750.000	3.500.000	0
CS and PI	93.000.000	72.000.000	639.766	410.762
WMCs Bikarac, Biljane Donje and Babina Gora **	-	-	135.770.226	-
Measure of constructing and procuring equipment for recycling yards for construction and demolition waste***	-	-	-	74.432.578
<b>Total:</b>	<b>5.077.300.000</b>	<b>3.725.200.000</b>	<b>1.204.836.185</b>	<b>995.924.612</b>

\* Value is possibly underestimated as the funds related to the measure on procurement of composters by L(R)SGUs and measure on remediation of illegal dump sites are not covered by analyses

\*\* Information on reallocation of spent funds by sources for measures of construction were not presented in the official data

\*\*\* Information on source of fund for co-financing the national part were not presented in the official data (possible sources: (L(R)SGUs or private investments)

SOURCE EPEEF and MoESD

212. As one of the causes of lower progress in spending planned finances is the long period necessary for preparation of project documentation. This is mainly due to: long-term resolution of property legal relations; lengthy process of establishing the necessary infrastructure on the sites (such as electricity, water, telecommunication, access roads etc.); complex and lengthy public procurement process to contract all the services needed for project implementation. Additionally, there is a great resistance from the public toward any waste projects, as trust of citizens in the public institutions is very low (“not in my back yard” effect).



## 6.2 Cost estimation for executing the planned measures

### 6.2.1 Establishment of Re-use centres

#### 6.2.1.1 Problems related to the estimated investments and financing measures

213. NWMP ID envisage the establishment of 20 re-use centers by 2020. The NWMP ID defines only the planned number of re-use centers, not the type and capacity. There is no reliable data on the number of re-use centers currently active in the Croatia.. In order to identify whether the investments in item “M 1.1.2. Establishment of Re-use centres” are estimated correctly, an assumption for the total number of centers, type of re-use centers and their capacity should be made. The total **number** of the centers should be enough so that it is convenient for the households to bring their waste to the centers. With regard to the **total capacity of re-use centers**, it should be noted that it is crucial that as much waste quantity as possible is assessed for suitability for re-use. The following two approaches for designing the network of re-use centers have different impact on the total capacity of the centers:

1. Establishment of a network of re-use centers accepting waste for reuse only – this approach means that end-user are supposed to bring to these centers only waste they deem suitable for reuse/ repair. This lowers the quantity of waste brought to the centers and being assessed for reusability by professional staff of the reuse centers.
2. Combining the functionality of re-use centers and recycling yards – under this approach the households are supposed to bring to the recycling yards all wastes they deem suitable for reuse/ repair, all recyclable and hazardous waste for which there is no separate collection systems and all wastes that cannot fit in the containers (bulky waste) as well as construction waste. If appropriate waste acceptance criteria and procedures are established by the recycling yard operators to allow assessment of all quantity accepted at the yard, the waste quantity assessed for reusability/ reparability would be much higher.

214. Moreover, the total investment would be much lower when combining re-use centers and recycling yards as the common facilities (access road, weighbridge, power supply, lighting, etc.) will require one time investment.

215. Taking into account the above described arguments it is assumed that the total investment amount under item “M 1.1.2. Establishment of Re-use centres” is estimated in a most rational way – all recycling yards have a dedicated site for storage re-usable waste, shop for small repairs, shop for selling or giving for free of repaired goods, etc.

#### 6.2.1.2 Methodology for cost re-estimation

216. The methodology for costs re-estimation is presented in Annex 5. It contains a practical example for determining the typical investment costs for construction of a recycling yard with a capacity of 1000 tons / year, serving 25,000 inhabitants, including the necessary facilities for reuse center and for storage construction waste and demolition waste from households. It is accepted that if 25 000 inhabitants are serviced by 1 recycling yard the system will be convenient enough for the households. This parameter was used to determine the required number of recycling yards (including reuse and C&D waste temporary storage) in the country. The investment costs for recycling yards (including reuse and C&D waste temporary storage) in the country are determined as the total number of yards multiplied by the value of the investment costs of the exemplary recycling yard described in Annex 5.

**Table 12** - Necessary investment costs in recycling yards (including reuse and C&D waste temporary storage)

Investments needed for recycling yard (including re-use and C&D storage) serving 25.000 inhabitants, EUR	393.000
Total number of population of Croatia (2019)	4.058.165
Number of inhabitants served by a recycling yard	25.000
Total number of recycling yards needed	162
Total investment needs in recycling yards, EUR	63.666.853
Total investment needs in recycling yards, HRK	481.958.080

217. The construction of reuse centers at each recycling yard can be considered as a system in which the network of facilities has minimal investment costs but at the same time is convenient enough for the population. Further, the system can be further improved by building stand-alone reuse centers. Annex 5 also presents a model for calculating the investment costs of a stand-alone reuse center.

### 6.2.1.3 Re-evaluation of cost for measures

218. The total investment needs in recycling yards calculated in accordance with the methodology presented in Annex 5 amounts to 63.666.853 EUR or 481.958.080 HRK. Almost the same amount is envisaged under item "M 1.2.3 Constructing recycling yards" – 500.000.000 HRK. Therefore, the investments planned for construction of recycling yards are enough to cover the costs for combining recycling yards, reuse centers and temporary storage of household C&D waste. In addition, under item "M 1.1.2. Establishment of Re-use centres" 100.000.000,00 HRK are planned that can be used for construction of stand-alone reuse centers. In accordance with the methodology in Annex 5 a stand-alone reuse center costs around 2.500.000 HRK, which means that additional 40 stand-alone reuse center could be constructed within the budget of NWMP.

219. A conclusion can be drawn that the investments envisaged in the NWMP are enough for construction of adequate network of reuse centers if the spending is optimized by combining reuse centers and recycling yards.

## 6.2.2 Introduction of home composting

### 6.2.2.1 Problems related to the estimated investments and financing measures

220. The total number of home composters need depends on the willingness for participation in home composting. Currently, there is no nationwide survey of public attitudes about the readiness of households to compost bio-waste. More reliable information would be obtained if LSGU organize their own surveys on local level.

### 6.2.2.2 Methodology for cost re-estimation

221. As a basis for assessment of number of home composters needed, it should be known the number of rural households willing to take part in home composting schemes.

222. The statistical data shows that the total number of housing units - dwellings for permanent habitation in Republic of Croatia is 1.923.522<sup>54</sup>. There is no breakdown how many of these dwellings are in rural areas or how many are 1-2 storey buildings with yards. It can be assumed that the percentage of dwellings in rural areas equals the percentage of rural population in Croatia. In

54

[https://www.dzs.hr/PXWeb/Table.aspx?layout=tableViewLayout1&px\\_tableid=T1\\_eng.px&px\\_path=Popis%20stanovni%C5%A1tva%202011\\_\\_Priv%20rezultati&px\\_language=en&px\\_db=Popis%20stanovni%C5%A1tva%202011&rxid=fcf4f5a8-bbbc-47d6-bc3b-399758913c8b](https://www.dzs.hr/PXWeb/Table.aspx?layout=tableViewLayout1&px_tableid=T1_eng.px&px_path=Popis%20stanovni%C5%A1tva%202011__Priv%20rezultati&px_language=en&px_db=Popis%20stanovni%C5%A1tva%202011&rxid=fcf4f5a8-bbbc-47d6-bc3b-399758913c8b)

accordance with World Bank data<sup>55</sup>, the rural population as % of total population in Croatia in 2019 was 42,76%.

223. For assessment of the willingness for participation information from another East European country was used. In Bulgaria, in the surveys for estimating the willingness for participation in home composting schemes, 40-45% of households in residential areas 1-2 storey buildings with backyards declare interest, but afterwards only 25-30% request home composters. So, (as a first stage) it could be assumed that the number of home composters needed in Croatia is 30% of total number of rural households.
224. For estimation of the price of home a composter, the results of an open competitive tender performed in Bulgaria were used. The complete tender procedure could found on the Tenders Electronic Daily, which is the online version of the 'Supplement to the Official Journal' of the EU, dedicated to European public procurement<sup>56</sup>. The price offered by the winner was 43 EUR per composter and it includes: purchase and distribution free of charge to households of home composters, activators and aerators, as well as stickers with the logo of the municipality and instructions for use. The distribution service includes provision of temporary storage for composters and transportation of composters to the households.
225. Therefore, to estimate the investments needed the number of households in rural areas willing to participate (30% of all rural households) should be multiplied by 43 EUR.

### 6.2.2.3 Re-evaluation of cost for measures

226. The results of application of the above described methodology are presented in the following table.

**Table 13** – Necessary investment costs in homecomposting

Total number of dwellings for permanent habitation	1.923.522
Rural population (% of total population) in Croatia in 2019	42,76%
Total number of dwellings for permanent habitation in rural areas	822.498
Household willingness to participate in home composting	30%
Total number of households participating in home composting	246.749
Price for supply and distribution of home composters and consumables, EUR/composter	43
Investments in home composting, EUR	10.610.224
Investments in home composting, HRK	80.319.397

227. The total investment needs for home composting in accordance with the methodology described above amounts to 10.610.224 EUR or 80.319.397 HRK. Similar amount is envisaged under item “M 1.1.3 Introduction of home composting” – 100.000.000 HRK. Apart from investment costs for home composters there are other costs that have to be taken into account:

228. The difference between the planned budget and the evaluated investment could be used for
- Preparatory information and awareness raising campaign to explain the benefits of home composting – 200.000 EUR would be needed for a well organised campaign with targeting groups;
  - Survey of public attitudes about the readiness of households to compost bio-waste – 50.000

<sup>55</sup> <https://data.worldbank.org/indicator/SP.RUR.TOTL.ZS?locations=HR>

<sup>56</sup> <https://ted.europa.eu/udl?uri=TED:NOTICE:358235-2018:TEXT:EN:HTML&tabId=5&tabLang=en>

EUR for nationwide survey; however more reliable information would be obtained if municipalities organize their own surveys on local level.

- Development of training instructions for home composting – 10.000 EUR

229. Even after taking these costs into account, there remains a difference between the planned budget and the estimated investment. The difference may be due to a higher percentage of households to be covered or to a difference in prices between Croatia and Bulgaria. In any case, the planned funds are sufficient to build a functional system for home composting.

### 6.2.3 Separate collection of paper, cardboard, metal, plastic, glass and textile

#### 6.2.3.1 Problems related to the estimated investments and financing measures

230. Different systems for separate collection of recyclable waste are applicable and the choice of the most appropriate system depends very much on local conditions. In general, door-to-door systems are more convenient for households, their efficiency is higher, but they are more expensive compared to “bring systems”. Door-to-door systems are applied in densely populated areas where large amounts of waste are generated and therefore the cost per tonne of waste collected is lower. The choice of system is further complicated depending on whether the different recyclable materials are collected in separate containers or in a common container, with subsequent sorting.

231. The factors that determine the choice of separate collection system in a given region are the density of construction, number of households in a building, the average amount of waste generated by one household per year (waste generation rate), the percentage of recyclable waste in MSW, the level of household income, transport distances, etc. All these local features cannot be taken into account when compiling a model for determining investment costs at the national level. The exact investment costs can only be determined by conducting feasibility studies in each municipality, including a comparison of different alternatives for separate collection and their assessment by financial, technical and environmental criteria.

#### 6.2.3.2 Methodology for cost re-estimation

232. In order to be as close as possible to reality, the cost re-estimation methodology must take into account, as far as possible, the factors on which the choice of a separate collection system depends. To this end, it is assumed that the future national system for separate collection of recyclable waste in Croatia will be based on two main methods of separate collection:

- 1) door-to-door collection, which will be applied in areas with a large amount of waste generated, high population density or a large influx of tourists, the so-called coastal areas. For these areas, where high-rise construction predominates, it is assumed that a residential building is inhabited by an average of 10 residents and that a container for separate collection of dry recyclable waste (1,1 m<sup>3</sup>) will be placed in front of each building (every front door).
- 2) bring system, which will be applied in the so-called “continental” areas where the amount of waste generated per person is significantly less. In this system, the number of required containers is determined not by the number of residential buildings, but by the volume of containers (which should be large), the frequency of transportation, the density of waste so as to optimize investment and operating costs.

233. Based on these assumptions, for determining the investment costs, a model for separate collection in a “typical” or average area has been compiled, corresponding to an average municipality with a total population of 75.000 inhabitants, of which 50.000 live in urban areas (corresponding to the

conditions in “costal” areas) and the remaining 25.000 are scattered in smaller settlements (corresponding to the conditions in “continental” areas). For the urban part it is accepted that a "door to door" system will be applied, and for the rural part - a "bring system".

234. As a final result, the model calculates the investment costs per tonne of separately collected recyclable waste on average for coastal areas and on average for continental areas. Subsequently, these results are used to determine the necessary investment costs in each of the coastal and continental regions.

235. The model for calculating the investment costs for separate collection of dry recyclable waste is presented in Annex 6.

### 6.2.3.3 Re-evaluation of cost for measures

236. The necessary investment costs in each of the coastal and continental regions are calculated by multiplying the quantity of dry recyclables (that is possible to be collected through the respective collection method in the region) by average investment costs per ton calculated through the model presented in Annex 6. The results are presented in the following table.

**Table 14** - Necessary investment costs in separate collection of paper, cardboard, metal, plastic, glass and textile by counties

		MSW	MSW	Percentage of dry recyclable waste	Dry recyclable waste generated	Percentage collected	Dry recyclable waste collected	Investment costs per ton collected	Investment costs
County of	2019	kg/inhabitant/year	t/year	%	t/year	%	t/year	(EUR/t)	(EUR)
<i>Republic of Croatia</i>	4.065.253			51.90%			609.400		
<i>Zagreb County</i>	309.169	263	81.311		42.201	60%	25.320	183	4.646.005
<i>Krapina-Zagorje County</i>	124.517	141	17.557		9.112	60%	5.467	183	1.003.173
<i>Sisak-Moslavina County</i>	145.904	298	43.479		22.566	60%	13.539	183	2.484.342
<i>Karlovac County</i>	115.484	358	41.343		21.457	60%	12.874	183	2.362.288
<i>Varaždin County</i>	166.112	194	32.226		16.725	60%	10.035	183	1.841.326
<i>Koprivnica-Križevci County</i>	106.367	223	23.720		12.311	60%	7.386	183	1.355.314
<i>Bjelovar-Bilogora County</i>	106.258	255	27.096		14.063	60%	8.438	183	1.548.210
<i>Primorje-Gorski kotar County</i>	282.730	572	161.722		83.933	80%	67.147	168	11.248.888
<i>Lika-Senj County</i>	44.625	491	21.911		11.372	80%	9.097	168	1.524.058
<i>Virovitica-Podravina County</i>	73.641	295	21.724		11.275	60%	6.765	183	1.241.280
<i>Požega-Slavonia County</i>	66.256	205	13.582		7.049	60%	4.230	183	776.081
<i>Slavonski Brod-Posavina County</i>	137.487	259	35.609		18.481	60%	11.089	183	2.034.649
<i>Zadar County</i>	168.213	640	107.656		55.874	80%	44.699	168	7.488.265
<i>Osijek-Baranja County</i>	272.673	262	71.440		37.078	60%	22.247	183	4.081.985
<i>Šibenik-Knin County</i>	99.210	504	50.002		25.951	80%	20.761	168	3.477.985
<i>Vukovar-Sirmium County</i>	150.985	298	44.994		23.352	60%	14.011	183	2.570.858
<i>Split-Dalmatia County</i>	447.747	542	242.679		125.950	80%	100.760	168	16.880.046
<i>Istria County</i>	209.573	667	139.785		72.549	80%	58.039	168	9.723.057
<i>Dubrovnik-Neretva County</i>	121.816	587	71.506		37.112	80%	29.689	168	4.973.752
<i>Međimurje County</i>	109.232	238	25.997		13.493	60%	8.096	183	1.485.439
<i>City of Zagreb</i>	807.254	387	312.407		162.139	80%	129.712	168	21.730.155
Total investment costs in EUR									104.477.154
Total investment costs in HRK									790.892.057

237. As can be seen, the calculated investments (790.892.057 HRK) significantly exceed those set in the NWMP item M 1.2.1 (450.000.000 HRK). This may be due to the fact that the NWMP includes investments for the completion and upgrade of the existing separate collection system, while the model calculates in total all the investments needed to build a national separate collection system from scratch.

238. Another explanation could be that the measures envisaged in the NWMP rely more on recycling yards, collection of big generators and DRS for achievement of the targets for municipal waste recycling. However, taking into account that these ways of collection have already reached their limits and with the upcoming increase of municipal waste recycling targets a conclusion can be drawn that the investments in separate collection of dry recyclables should be increased significantly beyond the investments set in the NWMP.

## 6.2.4 Construction of sorting facilities for separately collected paper, cardboard, metal, glass, plastic etc.

### 6.2.4.1 Problems related to the estimated investments and financing measures

239. No study has so far been carried out on the number and capacity of the facilities required for sorting separately collected waste. Moreover, no studies have been performed to select the most appropriate sorting technology. Sorting technologies can range from pure manual sorting to a high degree of mechanization and automation, through the use of complex sorting equipment such as NIR, ballistic separators, air classifiers and others.

240. To assess the planned investments, it is necessary to make assumptions about the parameters of the national network of sorting facilities and the degree of complexity of the equipment used.

### 6.2.4.2 Methodology for cost re-estimation

241. Typical investment costs for construction of a sorting facility with a capacity of 30.000 t/year for separately collected dry recyclables are presented in Annex 6. The technology includes manual sorting, magnetic separation of ferrous metals, drum screening, shredding, eddy current separation of non-ferrous metals.

242. Knowing the quantities of separately collected dry recyclable waste (see chapter 6.2.3) it can be calculated the number of sorting facilities with capacity of 30.000 t/year. The total investments in sorting facilities could be roughly estimated by multiplying the investment costs for the facility presented in Annex 6 and the number of needed facilities with this capacity.

### 6.2.4.3 Re-evaluation of cost for measures

243. The results of re-evaluation of the investments in sorting facilities are presented in the table below:

**Table 15** - Necessary investment costs in sorting facilities

Dry recyclable waste collected in the country, t/year	609.400
Number of sorting plants with capacity of 30.000 t/year needed	20
Investment costs for sorting facilities, EUR	126.007.475
Investment costs for sorting facilities, HRK	953.876.584

244. The calculated investments (953.876.584 HRK) significantly exceed those set in the NWMP item M 1.2.2 (400.000.000 HRK). The model evaluates the total investments for the construction of all necessary facilities for sorting the whole quantity of separately collected dry recyclables. On the other hand it is not clear how the figure shown in item M 1.2.2 was determined and whether it

contains full investment costs. Although, it can be concluded that if a transition would be undertaken from collection through recycling yards to separate collection at source a significant investments would be needed exceeding the investments planned in the WMP item M 1.2.2.

## 6.2.5 Construction of recycling yards

### 6.2.5.1 Problems related to the estimated investments and financing measures

245. In order to identify whether the investments in item “M 1.2.3. Constructing recycling yards” are estimated correctly, an assumption for the total number of yards and their capacity should be made. The total number of the yards should be enough so that it is convenient for the households to bring their waste to the recycling yards.

### 6.2.5.2 Methodology for cost re-estimation

246. The methodology for cost re-estimation is presented in chapter 6.2.1.

### 6.2.5.3 Re-evaluation of cost for measures

247. The re-evaluation is presented in chapter 6.2.1. The results show that the total investment needs in recycling yards calculated in accordance with the methodology presented in Annex 5 (481.958.080 HRK) almost equals the amount set under item “M 1.2.3 Constructing recycling yards” – 500.000.000 HRK. Therefore, the investments envisaged in the WMP are enough for construction of adequate network of recycling yards.

## 6.2.6 Construction of recycling facilities

### 6.2.6.1 Problems related to the estimated investments and financing measures

248. Practice shows that waste is recycled mainly by companies that produce finished products. In this regard, investments in recycling facilities should be made if the operator concerned is established on the market for products that are produced from waste. Therefore, in case a decision is made to invest public funds in recycling plants, it is needed not only to provide the funds for the investment for a recycling facility, but then in order for the investment to be viable, it is necessary to invest also in manufacturing of products made from recyclable waste and to find a market for these products. As the market of such products is driven by market forces it is advisable that recycling investments are done by private companies, specialized in selling products made from recycled waste.

249. State investments could be needed however for supporting the innovations in new recycling technologies, sourcing of raw materials from hard to recycle waste (e.g. crisp packs), biorefineries, etc.

### 6.2.6.2 Methodology for cost re-estimation

250. Because it is not described how the investment amount in item M 1.2.6 has been determined it is assumed that there are two possibilities:

- It shows the amount that the private waste recycling companies will invest in recycling facilities – in this case it is not possible to verify amount in item M 1.2.6 as the private investments depend on decisions whether there are market opportunities for investment or not and it is a subjective decision that private operators make based on assessment of the risks of repayment their investment
- It shows the amount the Government intends to spend for innovation in waste recycling – in this case in order to determine whether the planned investment is enough it should be compared with the percentage of the spending for research and development from the total



budget of other sectors

### 6.2.6.3 Re-evaluation of cost for measures

251. Re-evaluation of the private investments is not possible due to the reasons described above. In case the funds are intended to support innovation probably this is the maximum amount that the Government deems affordable to spend for innovation in waste recycling. The best way to ensure that the allocated funds are spent with maximum effectiveness is to organize and open call for presenting innovation projects and select the best projects that fit in the budget for innovation in waste recycling.

### 6.2.7 Separate collection of bio-waste

#### 6.2.7.1 Problems related to the estimated investments and financing measures

252. Investments in bio-waste collection could vary in a wide range depending on the chosen method for collection. Different systems for separate collection of bio-waste are used and the choice of the most appropriate system depends very much on local conditions. In general, door-to-door systems are more convenient for households, their efficiency is higher, but they are more expensive compared to "bring systems". Door-to-door systems are applied in densely populated areas where large amounts of waste are generated and therefore the cost per tonne of waste collected is lower. The choice of system is further complicated depending on whether food waste and green waste are collected in separate containers or in a common container and respectively treated together or in different treatment facilities.

253. The factors that determine the choice of bio-waste separate collection system in a given region are the density of construction, number of households in a building, the average amount of waste generated by one household per year (waste generation rate), the percentage of bio-waste in MSW, the level of household income, transport distances, etc. All these local features cannot be taken into account when compiling a model for determining investment costs at the national level. The exact investment costs can only be determined by conducting feasibility studies in each municipality, including a comparison of different alternatives for separate collection and their assessment by financial, technical and environmental criteria.

#### 6.2.7.2 Methodology for cost re-estimation

254. It is assumed that the future national system for separate collection of bio-waste in Croatia will be based on two main methods of separate collection:

- 1) door-to-door collection, which will be applied in areas with a large amount of waste generated, high population density or a large influx of tourists, the so-called coastal areas. For these areas, where high-rise construction predominates, it is assumed that a residential building is inhabited by an average of 10 residents and that a container for separate collection of bio-waste (0,12 m<sup>3</sup>) will be placed in front of each building (every front door).
- 2) bring system, which will be applied in the so-called "continental" areas where the amount of waste generated per person is significantly less. In this system, the number of required containers is determined not by the number of residential buildings, but by the volume of containers (which should be large), the frequency of transportation, the density of waste so as to optimize investment and operating costs.

255. Based on these assumptions, for determining the investment costs, a model for separate collection in a "typical" or average area has been compiled, corresponding to an average municipality with a total population of 75.000 inhabitants, of which 50.000 live in urban areas (corresponding to the

conditions in “costal” areas) and the remaining 25.000 are scattered in smaller settlements (corresponding to the conditions in “continental” areas). For the urban part it is accepted that a "door to door" system will be applied, and for the rural part - "bring system".

256. As a final result, the model calculates the investment costs per tonne of separately collected bio-waste on average for coastal areas and on average for continental areas. Subsequently, these results are used to determine the necessary investment costs in each of the coastal and continental regions.

257. The model for calculating the investment costs for separate collection of bio waste is presented in Annex 6.

### 6.2.7.3 Re-evaluation of cost for measures

258. The necessary investment costs in each of the coastal and continental regions are calculated by multiplying the quantity of bio-waste (that is possible to be collected through the respective collection method in the region) by average investment costs per ton calculated through the model presented in Annex 6. The results are presented in the following table.

**Table 16 - Necessary investment costs in separate collection of bio-waste**

	2019	MSW kg/ inhabitant/ year	MSW t/year	Percentage of bio- waste	Bio- waste generated t/year	Percentage collected	Bio- waste collected t/year	Investment costs per ton collected (EUR/t)	Investment costs (EUR)
<i>Republic of Croatia</i>	4.065.253			37.10%					
<i>Zagreb County</i>	309.169	263	81.311		30.167	60%	18.100	135	2.443.789
<i>Krapina-Zagorje County</i>	124.517	141	17.557		6.514	60%	3.908	135	527.667
<i>Sisak-Moslavina County</i>	145.904	298	43.479		16.131	60%	9.679	135	1.306.759
<i>Karlovac County</i>	115.484	358	41.343		15.338	60%	9.203	135	1.242.558
<i>Varaždin County</i>	166.112	194	32.226		11.956	60%	7.173	135	968.534
<i>Koprivnica-Križevci County</i>	106.367	223	23.720		8.800	60%	5.280	135	712.892
<i>Bjelovar-Bilogora County</i>	106.258	255	27.096		10.053	60%	6.032	135	814.355
<i>Primorje-Gorski kotar County</i>	282.730	572	161.722		59.999	80%	47.999	67	3.225.483
<i>Lika-Senj County</i>	44.625	491	21.911		8.129	80%	6.503	67	437.005
<i>Virovitica-Podravina County</i>	73.641	295	21.724		8.060	60%	4.836	135	652.910
<i>Požega-Slavonia County</i>	66.256	205	13.582		5.039	60%	3.023	135	408.217
<i>Slavonski Brod-Posavina County</i>	137.487	259	35.609		13.211	60%	7.927	135	1.070.221
<i>Zadar County</i>	168.213	640	107.656		39.940	80%	31.952	67	2.147.169
<i>Osijek-Baranja County</i>	272.673	262	71.440		26.504	60%	15.903	135	2.147.115
<i>Šibenik-Knin County</i>	99.210	504	50.002		18.551	80%	14.841	67	997.270
<i>Vukovar-Sirmium County</i>	150.985	298	44.994		16.693	60%	10.016	135	1.352.266
<i>Split-Dalmatia County</i>	447.747	542	242.679		90.034	80%	72.027	67	4.840.149
<i>Istria County</i>	209.573	667	139.785		51.860	80%	41.488	67	2.787.969
<i>Dubrovnik-Neretva County</i>	121.816	587	71.506		26.529	80%	21.223	67	1.426.163
<i>Međimurje County</i>	109.232	238	25.997		9.645	60%	5.787	135	781.338
<i>City of Zagreb</i>	807.254	387	312.407		115.903	80%	92.722	67	6.230.860
Total investment costs in EUR									36.520.689
Total investment costs in HRK									276.461.614

259. As can be seen, the calculated investments (276.461.614 HRK) significantly exceed those set in the WMP item M 1.3.2 (100.000.000 HRK). This may be due to the fact that the WMP includes investments for the completion and upgrade of the existing separate collection system, while the model calculates in total all the investments needed to build a national separate collection system from scratch.

260. Taking into account the upcoming increase of municipal waste recycling targets a conclusion can be drawn that the investments in separate collection of bio- waste should be increased significantly beyond the investments set in the NWMP.

### **6.2.8 Construction of facilities for biological treatment of separately collected bio-waste**

#### **6.2.8.1 Problems related to the estimated investments and financing measures**

261. No study has so far been carried out to determine the number and capacity of the facilities for treatment of separately collected bio-waste and to select the most appropriate treatment technology. Bio-waste treatment technologies can range from simple open windrow composting to complex technologies ensuring better control of the parameters of the composting process (temperature, moisture, airflow, etc.) such as in-vessel rotary drum composters and box/tunnel composting systems as well as anaerobic digestion technologies.

262. To assess the planned investments, it is necessary to make assumptions about the parameters of the national network of bio-waste treatment facilities and the degree of complexity of the equipment used.

#### **6.2.8.2 Methodology for cost re-estimation**

263. For development of the methodology the following assumptions were made:

1. The MSW generation rates given in the NWMP are used for calculation of the bio-waste quantity in each county
2. Percentage (weight) of biowaste (food + green + wood waste) in the MSW (37,1%) is used for calculation of biowaste quantities generated in each county
3. Collectability of biowaste – 80% collection effectiveness for door-to-door system and 60% collection effectiveness for the “Bring system” were used for calculation of biowaste quantities collected and delivered for treatment
4. Small installations (<20.000 t/a) will apply Open Windrow composting; Large installations – Closed composting in Boxes/ Tunnels
5. Each county will have only one biowaste treatment facility.

264. In Annex 6 a model for calculation of capital expenditures based on input waste quantities and different technologies is given. It includes the necessary construction works, machinery and equipment for composting facilities with different treatment capacities (10 000, 20 000, 50 000, 80 000 and 100 000 t/a respectively).

265. Finally, the investment costs for the different treatment capacities calculated in Annex 6 are used for estimation of the investment costs needed in each county depending on the bio-waste quantity that is expected to be collected in the county.

#### **6.2.8.3 Re-evaluation of cost for measures**

266. The results of re-evaluation of the investments in facilities for biological treatment of separately collected bio-waste are presented in the table below:

**Table 17** - Necessary investment costs in construction of facilities for biological treatment of separately collected bio-waste

	2019.	MSW kg/ inhabitant / year	MSW t/year	Percentage of biowaste 37,10%	Biowaste generated t/year	Percentage collected	Biowaste collected t/year	Treatment capacity t/year	Technology	Investment costs EUR
<i>Republic of Croatia</i>	4.065.253									
<i>Zagreb County</i>	309.169	263	81.311		30.167	60%	18.100	20.000	Open Windrow	1.800.000
<i>Krapina-Zagorje County</i>	124.517	141	17.557		6.514	60%	3.908	10.000	Open Windrow	1.700.000
<i>Sisak-Moslavina County</i>	145.904	298	43.479		16.131	60%	9.679	10.000	Open Windrow	1.700.000
<i>Karlovac County</i>	115.484	358	41.343		15.338	60%	9.203	10.000	Open Windrow	1.700.000
<i>Varaždin County</i>	166.112	194	32.226		11.956	60%	7.173	10.000	Open Windrow	1.700.000
<i>Koprivnica-Križevci County</i>	106.367	223	23.720		8.800	60%	5.280	10.000	Open Windrow	1.700.000
<i>Bjelovar-Bilogora County</i>	106.258	255	27.096		10.053	60%	6.032	10.000	Open Windrow	1.700.000
<i>Primorje-Gorski kotar County</i>	282.730	572	161.722		59.999	80%	47.999	50.000	Boxes/ Tunnels	8.000.000
<i>Lika-Senj County</i>	44.625	491	21.911		8.129	80%	6.503	10.000	Open Windrow	1.700.000
<i>Virovitica-Podravina County</i>	73.641	295	21.724		8.060	60%	4.836	10.000	Open Windrow	1.700.000
<i>Požega-Slavonia County</i>	66.256	205	13.582		5.039	60%	3.023	10.000	Open Windrow	1.700.000
<i>Slavonski Brod-Posavina County</i>	137.487	259	35.609		13.211	60%	7.927	10.000	Open Windrow	1.700.000
<i>Zadar County</i>	168.213	640	107.656		39.940	80%	31.952	40.000	Boxes/ Tunnels	8.000.000
<i>Osijek-Baranja County</i>	272.673	262	71.440		26.504	60%	15.903	20.000	Open Windrow	1.800.000
<i>Šibenik-Knin County</i>	99.210	504	50.002		18.551	80%	14.841	20.000	Open Windrow	1.800.000
<i>Vukovar-Sirmium County</i>	150.985	298	44.994		16.693	60%	10.016	20.000	Open Windrow	1.800.000
<i>Split-Dalmatia County</i>	447.747	542	242.679		90.034	80%	72.027	80.000	Boxes/ Tunnels	11.000.000
<i>Istria County</i>	209.573	667	139.785		51.860	80%	41.488	50.000	Boxes/ Tunnels	8.000.000
<i>Dubrovnik-Neretva County</i>	121.816	587	71.506		26.529	80%	21.223	30.000	Boxes/ Tunnels	8.000.000
<i>Međimurje County</i>	109.232	238	25.997		9.645	60%	5.787	10.000	Open Windrow	1.700.000
<i>City of Zagreb</i>	807.254	387	312.407		115.903	80%	92.722	100.000	Boxes/ Tunnels	13.000.000
Total investment costs in EUR										<b>81.900.000</b>
Total investment costs in HRK										<b>619.983.000</b>

267. The calculated investments (619.983.000 HRK) significantly exceed those set in the NWMP item M 1.3.3 (150.000.000 HRK). The model evaluates the total investments for the construction of all necessary facilities for sorting the whole quantity of separately collected bio-waste. On the other hand, it is not clear how the figure shown in item M 1.3.3 was determined and whether it contains full investment costs. Although, it can be concluded that if a functional nationwide system for separate collection of bio-waste is to be developed a significant investments in bio-waste treatment facilities would be needed exceeding the investments planned in the NWMP item M 1.3.3.

## 6.2.9 Construction of Waste Management Centres

268. NWMP and NWMP ID foresaw the construction of 11 waste management centres for treatment of mixed municipal waste and other waste. All foreseen WMCs facilities are already built or in the process of construction or planning and preparation for construction. The project values of 9 waste management centers is already known.

**Table 18** - Necessary investment costs in construction Waste Management Centres

Waste Management Center	Total project value (HRK)	Total project value (EUR)	Capacity for mix municipal waste treatment (t)
BIKARAC	180.005.565.00	24.000.742.00	37.000.00
BILJANE DONJE	682.044.680.00	90.939.290.67	75.000.00
LUČNO RAZDOLJE	494.923.542.00	65.989.805.60	38.595.00
LEČEVICA	611.419.690.00	81.522.625.33	109.973.00
PIŠKORNICA	448.230.229.00	59.764.030.53	70.602.00
BABINA GORA	270.490.490.00	36.065.398.67	29.290.00
ŠAGULJE	488.712.000.00	65.161.600.00	45.000.00
ORLOVNJAK	450.000.000.00	60.000.000.00	42.000.00
ZAGREB	1.125.000.000.00	150.000.000.00	180.000.00
	<b>4.750.826.196.00</b>	<b>633.443.492.80</b>	

269. The total value of the 9 projects (4.750.826.196 HRK) exceeds significantly the funding envisaged under item M 1.4.5 “Constructing waste management centres” (1.600.000.000).

270. No re-evaluation of cost is necessary as the investment costs of the remaining 2 waste management centers will be determined through feasibility studies.

## 6.2.10 Remediation of non-hazardous waste landfills

### 6.2.10.1 Problems related to the estimated investments and financing measures

271. To determine the costs for closure and reclamation of all old landfills and dumpsites, it is necessary to know their number and occupied area.

### 6.2.10.2 Methodology for cost re-estimation

272. The investments in remediation of old landfills includes the following activities:

1. Compacting of waste in order to decrease the area for land remediation;
2. Construction of drainage canals in order to prevent surface/slope water entering the body of the landfill (on the perimeter of the area if necessary)

3. Technical remediation including:
  - a. Surface sealing with insulation screen and remediation layer of 1 meter soil (the lower 50 cm of which is clay material);
  - b. Construction of gas system – for removing generated gas, including construction of vertical wells at every 100 m. and flare;
4. Biological recultivation of the landfill – planting with local species;
5. For landfills above 15.000 <sup>3</sup> control and monitoring of the following parameters will be required:
  6. Level and content of underground water;
  7. Emitted gases from the landfill body;
  8. Subsiding of the landfill surface
  9. Maintenance and after care

273. The cost for covering these parameters will be approximately 30 Euro per square meter.

#### 6.2.10.3 Re-evaluation of cost for measures

274. Due to the lack of data on the total area of the dumpsites, the verification of the investments provided for in measure "M 4.2 Remedy non-hazardous waste landfills" cannot be performed.

275. The above mentioned costs of EUR 30 per square meter can be used to calculate an indicative value for the closure of landfills for which the contaminated area is known.

### 6.3 Financial gap for execution of NWMP measures

276. Cost estimation from the Chapter 6.2 covered measures which make 80% of the total costs envisaged for the implementation of all NWMP measures. In the Table 19 estimated financial gap for the implementation of these measures is presented and it is estimated at HRK 4.949.316.928.

277. Estimation was based on practical examples for determining the typical investment costs and thus findings presented in table below should be interpreted only as a rough estimate whose purpose is to indicate are the NWMP cost are underestimated, and should not be used as real costs (funds necessary for NWMP implementation).

**Table 19.** – Financial gap for execution of NWMP measures

Number of NWMP measure	Name of the NWMP measure	NWMP estimation of funds for the executing the planned measures (HRK)	Results of the re-evaluation of cost estimation for executing the planned measures (HRK)	Financial gap for executing the NWMP measures (HRK)
M 1.1.2	Establishment of re-use centres	75.000.000	Re-evaluation of cost considered construction of reuse centers at the locations of recycling yards and therefore it is included in the re-evaluation of cost for measure M 1.2.6. Construction	No financial gap

Number of NWMP measure	Name of the NWMP measure	NWMP estimation of funds for the executing the planned measures (HRK)	Results of the re-evaluation of cost estimation for executing the planned measures (HRK)	Financial gap for executing the NWMP measures (HRK)
			of recycling yards	
M 1.1.3	Home composting	80.000.000	80.319.397	319.397
M 1.2.1.	Procurement of equipment, vehicles and vessels for separate collection of paper, cardboard, metal, plastic, glass and textile;	300.000.000	790.892.057	490.892.057
M 1.2.2	Constructing a sorting facility for separately collected paper, cardboard, metal, glass, plastic etc.	350.000.000	953.876.584	603.876.584
M 1.2.3	Construction of recycling yards	450.000.000	481.958.080	31.958.080
M 1.3.2.	Procurement of equipment and vehicles for separate collection of bio-waste	75.000.000	276.461.614	201.461.614
M 1.3.3	Construction of facilities for biological treatment of separately collected bio-waste	150.000.000	619.983.000	469.983.000
M 1.4.5	Constructing waste management centres	1.600.000.000	4.750.826.196	3.150.826.196
M 4.2	Remediation of non-hazardous waste landfills	975.000.000	Cost estimation was made for square meter	n/a
<b>Total:</b>		<b>4.055.000.000</b>	<b>7.954.316.928</b>	<b>4.949.316.928</b>
<b>Share in NWMP financial funds for the execution of all measures</b>		<b>80%</b>		
<b>TOTAL NWMP financial funds for the execution of all measures</b>		<b>5.077.300.000</b>		



## 6.4 Financing

### 6.4.1 Possible sources of funding

278. Financing of projects envisaged by NWMP is possible from several sources. These are public sources such as the state budget, the budgets of L(R)SGUs, EU funds, the EPEEF and Croatian Waters. In addition to public sources, bank loans and private investments can also be considered as potential financial sources.

279. A comprehensive financial package of € 1.824,3 billion<sup>57</sup> has been prepared for EU MS for the period 2021-2027. This package includes € 1.074,3 billion for the EU Multiannual Financial Framework (MFF) for the period 2021-2027<sup>58</sup> and € 750 billion for the new Next Generation Recovery EU (NGEU) instrument. Package will support recovery from the COVID-19 pandemic and long-term EU priorities in 7 different spending areas (Table 20). Almost 40 EU funds/programmes will be funded.

**Table 20** - Multiannual Financial Framework 2021-2027 total allocations per spending areas (headings)

Br.	Spending areas	MFF (€ billion)	NGEU (€ billion)	Total (€ billion)
1.	Single market, innovation and digital	132,8	10,6	143,4
2.	Cohesion, resilience and values	377,8	721,9	1.099,7
3.	Natural resources and environment	356,4	17,5	373,9
4.	Migration and border management	22,7	-	22,7
5.	Security and defence	13,2	-	13,2
6.	Neighbourhood and the world	98,4	-	98,4
7.	European public administration	73,1	-	73,1
	Total:	1.074,3	750	1.824,3

\* All amounts in € billion, in 2018 prices

SOURCE - European Commission<sup>59</sup>

280. This financial package will contribute to the transformation of the EU by supporting the European Green Agenda and the digital transformation and strengthening resilience. Expenditure under the MFF and the NGEU instrument should be in line with the EU 2050 climate neutrality target<sup>60</sup>, the 2030 EU climate target<sup>61</sup> and the Paris Agreement. Climate-related projects should account for 30% of total expenditure<sup>62</sup>.

281. If EU policies are considered, as in the previous MFF, most funding will be spent on Cohesion Policy (€ 330,2 billion) and the Common Agricultural Policy (€ 336,4 billion). The Republic of Croatia has been allocated € 8,04 billion at the disposal of the Republic of Croatia within the MFF 2021-2027 for the financing of Cohesion Policy<sup>63</sup>, and € 4,23 billion to finance the Common Agricultural Policy<sup>64</sup> (Table 21). Detailed description of EU Funds/Programmes for financing Cohesion Policy and

57 In constant 2018 prices

58 On 17 December 2020, the European Council adopted a Regulation establishing the EU MFF for the period 2021-2027.

59 [https://ec.europa.eu/info/strategy/recovery-plan-europe\\_en#main-elements-of-the-agreement](https://ec.europa.eu/info/strategy/recovery-plan-europe_en#main-elements-of-the-agreement)

60 The European Green Deal

61 The European Green Deal

62 Interinstitutional Agreement between the European Parliament, the Council of the European Union and the European Commission on budgetary discipline, on cooperation in budgetary matters and on sound financial management, as well as on new own resources, including a roadmap towards the introduction of new own resources Interinstitutional Agreement of 16 December 2020 between the European Parliament, the Council of the European Union and the European Commission on budgetary discipline, on cooperation in budgetary matters and on sound financial management, as well as on new own resources, including a roadmap towards the introduction of new own resources

63 <https://op.europa.eu/en/publication-detail/-/publication/d3e77637-a963-11eb-9585-01aa75ed71a1/language-en> (The EU's 2021-2027 long-term budget & NextGenerationEU, Facts and figures)

64 <https://op.europa.eu/en/publication-detail/-/publication/d3e77637-a963-11eb-9585-01aa75ed71a1/language-en> (The EU's 2021-2027 long-term budget & NextGenerationEU, Facts and figures)

Common Agricultural Policy is given in the Annex 7.

**Table 21** - Allocation of funds for financing Cohesion policy and Common Agricultural Policy intended for the Republic of Croatia, by EU Programmes (MFF)

EU Funds / Programmes	Amount
<b>Cohesion policy</b>	<b>€ 8,04 billion</b>
European Social Fund + (ESF+)	€ 1,758 billion
European Regional Development Fund (ERDF)	€ 4,749 billion
European Territorial Cooperation (ETC) - Interreg	€ 163 million
Cohesion Fund (CF)	€ 1,372 million
- From which Connecting Europe Facility (CEF)	€ 323 million
<b>Common agricultural policy</b>	<b>€ 4,23 billion</b>
European Agricultural Fund for Rural Development (EAFRD)	€ 1,911 billion
European Agricultural Guarantee Fund (EAGF)	€ 2,315 billion

\* All amounts in € billion, in current prices

SOURCE - European Commission<sup>65</sup>

282. The basic precondition for the use of available funds from EU Funds / Programmes are the programme documents: Partnership Agreement and Operational Programmes. The Republic of Croatia is currently in the process of drafting Partnership Agreement 2021-2027 and the following Operational Programmes<sup>66</sup>:

- Operational Programme Competitiveness and Cohesion 2021-2027, the EU part will be financed from the ERDF and the CF
- Operational Programme Effective Human Resources 2021-2027, the EU part will be financed from the ESF +
- Integrated Territorial Programme 2021-2027, the EU part will be financed from the ERDF, the CF and the Just Transition Fund

283. **The framework for financing projects in the field of environmental protection, and thus the projects envisaged by NWMP**, will be the Operational Programme Competitiveness and Cohesion 2021-2027. Funds from the MFF will be available from the ERDF and the CF.

284. In addition to above mentioned funds, funds from the Next Generation EU will also be available for financing NWMP projects. Next Generation EU is an extraordinary temporary recovery instrument that should help MS to deal with the consequences of the COVID-19 crisis. The implementation of the Next Generation EU recovery instrument will require the approval of a decision on EU own resources in all MS in accordance with their constitutional provisions.<sup>67</sup> The majority of this instrument (more than 80%) will be used to support public investment and key structural reforms in the MS, concentrated where the crisis and resilience needs are most affected. It will be channelled through seven Funds / Programmes in the form of loans (€ 360 billion) and grants (€ 390 billion). (Table 22).

<sup>65</sup> [https://ec.europa.eu/info/sites/info/files/about\\_the\\_european\\_commission/eu\\_budget/1\\_table\\_breakdown\\_of\\_cohesion\\_policy\\_current\\_prices.pdf](https://ec.europa.eu/info/sites/info/files/about_the_european_commission/eu_budget/1_table_breakdown_of_cohesion_policy_current_prices.pdf)

<sup>66</sup> <https://vlada.gov.hr/sjednice/18-sjednica-vlade-republike-hrvatske-30756/30756>

<sup>67</sup> Decisions on own resources are adopted unanimously by the Council after consulting the European Parliament. Moreover, Council decisions on own resources only enter into force once they have been approved by the Member States "in accordance with their respective constitutional requirements", which generally implies the approval of national parliaments.

**Table 22 - EU Funds/ Programmes through which the EU Next Generation instrument will be directed**

EU Fund / Programme	Field	Amount on EU level <sup>68</sup>	Funds available for the Republic of Croatia
Recovery and Resilience Facility	Clean technologies; energy efficiency; smart transportation; connectivity; digital services; research and innovation; education, skills and jobs; health	€ 672,5 billion (loans – € 360 billion, grants - € 312,5 billion)	Grants: € 4,322 billion (2021 – 2022) € 1,628 billion (2023) <sup>69</sup>
REACT-EU	Continuation and extension of crisis response and recovery measures implemented under the Corona Response Investment Initiative (CRII) and the Corona Response Investment Initiative Plus (CRII +).	€ 47,5 billion (grants)	€ 541 million (for 2021) For other years, the distribution of funds by country is still not available. <sup>70</sup>
Just Transition Fund	Productive investments in small and medium-sized enterprises, the establishment of new enterprises, research and innovation, the restoration of the environment, clean energy, additional training and retraining workers, job search assistance and active involvement programmes for job seekers, the transformation of existing plants with high carbon emissions when these investments bring to significant emission reductions and job protection.	€ 10 billion (grants)	€ 97 million <sup>71</sup>
European Agricultural Fund for Rural Development (EAFRD)	The members define themselves within the Union priorities for rural development.	€ 7,5 billion (grants)	€ 187,4 million (for 2021 and 2022) <sup>72</sup>
InvestEU Fund	Sustainable infrastructure; research, innovation and digitization; small and medium enterprises; and social investment and skills.	€ 5,6 billion (grants)	No country allocation is available for Next Generation EU
Horizon Europe	Strengthening the science and technology sector to address major global challenges in key areas such as health, population aging, security, pollution and climate change.	€ 5 billion (grants)	No country allocation is available for Next Generation EU
Union Civil Protection Mechanism (rescEU)	Protecting citizens from disasters and managing emerging risks.	€ 1,9 billion (grants)	No country allocation is available for Next Generation EU
<b>Total:</b>		<b>€ 750 billion</b>	

All amounts in € billion, in 2018 prices

285. Most of the funds from the Next Generation EU will be directed through the Recovery and Resilience Facility, worth € 672,5 billion. This mechanism will support public investment and reforms in MS through grants and loans, helping them to face the economic and social

<sup>68</sup> <https://www.consilium.europa.eu/hr/policies/the-eu-budget/long-term-eu-budget-2021-2027/>

<sup>69</sup> [https://ec.europa.eu/info/sites/info/files/about\\_the\\_european\\_commission/eu\\_budget/recovery\\_and\\_resilience\\_facility\\_.pdf](https://ec.europa.eu/info/sites/info/files/about_the_european_commission/eu_budget/recovery_and_resilience_facility_.pdf)

<sup>70</sup> [https://ec.europa.eu/info/sites/info/files/about\\_the\\_european\\_commission/eu\\_budget/react-eu\\_allocations\\_2021\\_2.pdf](https://ec.europa.eu/info/sites/info/files/about_the_european_commission/eu_budget/react-eu_allocations_2021_2.pdf)

<sup>71</sup> [https://ec.europa.eu/info/sites/info/files/about\\_the\\_european\\_commission/eu\\_budget/just\\_transition\\_fund\\_allocations\\_05.11\\_v2\\_0.pdf](https://ec.europa.eu/info/sites/info/files/about_the_european_commission/eu_budget/just_transition_fund_allocations_05.11_v2_0.pdf)

<sup>72</sup> <https://op.europa.eu/en/publication-detail/-/publication/d3e77637-a963-11eb-9585-01aa75ed71a1/language-en#>

consequences of the COVID-19 pandemic and the challenges posed by the green and digital transition.

286. In order to receive support from the Recovery and Resilience Facility mechanism, Member States must draw up national recovery and resilience plans setting out their reform and investment programmes until 2026. On 29 April 2021, Croatian Government adopted Proposal of National Recovery and Resilience Plan which is sent to the European Commission for final approval. Within this proposal Government defined HRK 1,25 billion (€ 166 million) needed investments for construction of additional infrastructure for separately collection, sorting and recovery of recyclable waste and for remediation of closed landfills and sites contaminated with hazardous waste (Reform measure C1.3 R2).<sup>73</sup>
287. National recovery and resilience plans must be aligned with EU priorities: boosting growth, job creation, and economic and social resilience. At least 37% of the funds allocated from each plan must be dedicated to supporting the green transition, and at least 20% to supporting the digital transformation. The support will be closely linked to the recommendations of the European Semester<sup>74</sup>, which will set out the central challenges that each MS must respond to in order to strengthen competitiveness and social and economic cohesion. Some of the areas for reform and investment projects that can be included in recovery and resilience plans are: clean technologies, energy efficiency, smart transportation, connectivity, digital services, research and innovation, education, skills and jobs, health.
288. Available grants from the Recovery and Resilience Facility mechanism are allocated individually for each EU MS according to defined criteria. In the period 2021-2022. 70% of the planned grant will be awarded taking into account the following criteria: unemployment 2015-2019, inverse GDP per capita and population share. In 2023, the allocation of remaining funds will take into account: the drop in real GDP during 2020, the overall drop in real GDP 2020-2021, inverse GDP per capita and the population share.
289. For the rest EU Funds/ Programmes through which the EU Next Generation instrument will be channelled (REACT-EU, Just Transition Fund, EAFRD, InvestEU, Horizon Europe and rescEU), more detailed description is given in the Annex 7.
290. Another significant public source of funding is EPEEF, the central national body for collecting and investing extra-budgetary funds in programmes and projects for environmental and nature protection, energy efficiency and the use of renewable energy sources. The EPEEF primarily finances programmes, projects and similar activities determined in accordance with the National Environmental Protection Strategy and the National Environmental Action Plan, the Energy Development Strategy and the Programme for the Implementation of the Energy Development Strategy and national energy programmes. The EPEEF allocates funds to legal entities and individuals through: interest-free loans, subsidies, assistance, and donations.

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<sup>73</sup> <https://planoporavka.gov.hr/UserDocsImages/dokumenti/55%20-%201%20NPOO.pdf?vel=12358896>

<sup>74</sup> The European Semester is a multi-annual discussion / exchange between the EC and the MS in order to achieve the objectives of the EU in accordance with the Europe 2020 strategy and in accordance with the Pact on Stability and Growth. It represents the annual cycle of economic and fiscal policy coordination within the EU. Because of the focus on the period the first six months of the year is called a "semester". During the European Semester, MS align their budgetary and economic policies with the objectives and rules agreed at EU level. It was introduced in 2011 as part of the Europe 2020 strategy at the suggestion of the EC, which allows for the scrutiny of MS' budgets and reform proposals before they are adopted by national parliaments. The main goal of the European Semester is to ensure national budgetary disciplines and an efficient economy.

**Table 23** - Financial plan of the EPEEF for 2021 and projections for 2022 and 2023

	2021	2022	2023
Total (HRK billion)	1,97	1,66	1,63
Waste management (HRK billion)	1,35	1,17	1,28

SOURCE - Ministry of Finance<sup>75</sup>

291. Other potential public sources of funding are the state budget, the budgets of L(R)SGUs, funds of public service providers and funds of water service providers owned by LSGUs, which have very limited possibilities for financing projects in the field of waste management. For example, entire MoESD budget for 2021 envisages HRK 7,3 billion.<sup>76</sup> Given the mentioned limitations of the state budget and the budget and capacity faced by local (regional) authorities, as well as great needs for investments in the field of waste management, funding from private sources should certainly be envisaged. The current regulatory framework does not support to a sufficient extend the involvement of the private sector in waste management, and investment planning does not take into account existing private infrastructure. Additionally, it is possible to use loans from banks such as the World Bank, the European Bank for Reconstruction and Development, the European Investment Bank, etc., which provide loans at more favourable interest rates than commercial banks.

<sup>75</sup> <https://mfin.gov.hr/UserDocImages/dokumenti/proracun/2021/2.%20FZOEU%202021.-2023.xlsx>; <https://mfin.gov.hr/proracun-86/drzavni-proracun-2021-godina/311676>

<sup>76</sup> <https://mfin.gov.hr/UserDocImages/dokumenti/proracun/2021/2.%20Prilog%202022%20Dr%20CS%20BEavni%20prora%20C4%8Dun%20po%20korisnicima%20%20ekonomskoj%20klasifikacij> i.xls (for 2022. – 9,2 mlrd HRK, for 2023. 8,4 mlrd HRK)

## 7 Timetable for implementation of the revised Waste Management Plan of the Republic of Croatia

292. As elaborated in previous Chapters measures defined by NWMP are designed in such manner to contribute to achievement of EU legislation requirements and targets, yet their implementation is not conducted in accordance with the schedule given in NWMP and NWMP ID. Following that, implementation of almost all measures, defined by current NWMP, including projects and activities defined by NWMP ID, should continue in the next planning period (period 2023-2028).
293. However, it is important to intensify implementation of projects and activities which present preparatory activities for further development of waste management system and infrastructure like: preparation of studies for waste re-use and recycling, improvement of special waste categories, study on hazardous waste treatment capacity needs, study on expected quantities of asbestos waste, action plan for separate collection and treatment of construction and demolition waste, medical waste, etc. These measures should be implemented by the end of 2022 the latest.
294. Furthermore, by the end of this planning period it is necessary to create adequate policy framework by adopting new waste act and related by-laws in line with EU “waste package” and SUPD. One of important policy mechanisms that can push up waste treatment in the waste hierarchy, towards waste prevention and recycling, is introduction of landfill fee. Therefore, activities needed for introduction of this economic instrument should be intensified (e.g. preparation of a detailed analysis that would define the manner of introduction, type, and the amount of the fee, competences, assessment of the effects of the fee, taking into account all relevant factors like affordability, etc.).
295. In the Table 24 new implementation deadline for NWMP measures is given. It is important to emphasise that proposed timeline covers only the measures defined by existing NWMP and not new (additional) measures that supposed to be defined for the next planning period (additional measures to enhance circular economy practices within waste management).

**Table 24 - Proposal of timeline for implementation of NWMP measures**

NWMP measure	Proposed deadline
<b>Measures that are implemented and should not continue in the next planning period</b>	
M 1.2.4. Introducing quantity-based fees for collection and treatment of mixed and biodegradable municipal waste	-
M 1.4.6. Energy recovery planning	-
M 2.2.1. Preparation of action plan for the use of residual sludge from waste water treatment facilities on suitable surfaces	-
M 2.5.1. Establishing a waste ship management system	-
M 4.1. Creating a Plan for closing non-hazardous waste landfills	-
M 7.2. Analysis and redefining supervision jurisdiction in waste management	-
M 8.1 Improving the system and procedures for issuing waste management permits	-
<b>Measures to be excluded from the scope of NWMP</b>	
M 1.3.1. Development of quality and categorising criteria for compost and digestates	-
M 7.1. Educating all the participants in waste management supervision	-
M 2.5.2. Identifying the locations of wrecks and sunken objects on the seabed and creating a cadastre.	-
M 2.5.4. Remediation of wrecks and sunken objects on the seabed in ownership of the RC.	-
M 2.5.5 Intervention remediation of wrecks and sunken objects on the seabed and their contents	-

NWMP measure	Proposed deadline
M 2.5.3. Identifying the composition and quantities of hazardous matter and explosive material in wrecks and sunken objects on the seabed which pose the threat of polluting the marine environment or making the sea resource use an unsafe process.	-
<b>Measures that should be finished by the end of this planning period (2017-2022)</b>	
M 3.1. Analysis of existing and necessary capacities for hazardous waste treatment	2021
M 4.3. Identifying new locations polluted by hazardous waste ("hot spots")	2021
M 1.4.1. Introducing a fee for landfilling	2022
M 2.1.1. Creating an action plan for separate collection and recycling construction and demolition waste	2022
M 2.3.1. Improvement and analysis of the existing packaging waste management system	2022
M 2.6.1. Improving the medical waste management system	2022
M 2.6.2. Conducting an asbestos waste estimation study for each county	2022
M 2.6.4. Improving the special categories of waste management system (end-of-life vehicles, waste batteries and accumulators, waste tyres, EE waste, oils)	2022
M 6.2. Creating an EPEEF information system for the preparation and implementation of projects	2022
<b>Measures that should be continued in the next planning period (2023-2028)</b>	
M 1.2.1. Procurement of equipment, vehicles and vessels for separate collection of paper, cardboard, metal, plastic, glass and textile	2023
M 1.4.3. Intervention measure to decrease landfilling municipal waste generated in the City of Zagreb	2023
M 1.4.4. Intervention measure to decrease landfilling municipal waste generated in the City of Split	2023
M 5.1. Creating a Programme of educative-informative activities on sustainable waste management	2023
M 1.2.2. Constructing a sorting facility for separately collected paper, cardboard, metal, glass, plastic etc	2025
M 1.2.3. Construction of recycling yards	2025
M 1.3.2. Procurement of equipment and vehicles for separate collection of bio-waste	2025
M 2.6.3. Construction of landfill cells for asbestos waste	2025
M 6.1. Creating and/or improving applications that are part of the waste management information system	2025
M 1.4.5. Constructing waste management centres	2026
M 2.1.2. Constructing and procuring equipment for recycling yards for construction and demolition waste	2026
M 1.1.1 Measures defined by the Waste Prevention Plan	2028
M 1.1.2. Establishment of re-use centres	2028
M 1.1.3. Home composting	2028
M 1.2.5. Strengthening the market for waste intended for recycling	2028
M 1.2.6. Constructing recycling facilities	2028
M 1.3.3. Construction of facilities for biological treatment of separately collected bio-waste	2028
M 1.4.2. Monitoring the amount of biodegradable waste in mixed municipal waste	2028
M 2.2.2. Establishing a sludge management system	2028
M 2.4.1. Identifying the locations and sources of marine waste and identifying locations of accumulated marine waste on the seabed	2028
M 2.4.2. Establishing a system of prevention, collection and disposal of marine waste, as an integral part of the waste management system in the RC.	2028
M 2.4.3. Intervention collection and disposal of marine waste.	2028
M 2.4.4. Establishing cooperation with neighbouring or other countries regarding marine waste pollution.	2028
M 4.2. Remediation of non-hazardous waste landfills	2028
M 4.4. Remedying locations polluted by hazardous waste ("hot spots")	2028
M 4.5. Remediation of abandoned waste locations.	2028
M 5.2. Conducting activities from the Programme of educative-informative activities on sustainable waste management	2028
M 5.3. Conducting a national campaign on sustainable waste management	2028

**Figure 10-** Proposal of timeline for implementation of NWMP measure

NWMP Measure	Next planning period							
	2021	2022	2023	2024	2025	2026	2027	2028
M 3.1. Analysis of existing and necessary capacities for hazardous waste treatment	▶							
M 4.3. Identifying new locations polluted by hazardous waste ("hot spots")	▶							
M 1.3.1. Development of quality and categorising criteria for compost and digestates	▶							
M 1.4.1. Introducing a fee for landfilling								
M 2.3.1. Improvement and analysis of the existing packaging waste management system								
M 2.6.1. Improving the medical waste management system								
M 2.6.2. Conducting an asbestos waste estimation study								
M 2.6.4. Improving the special categories of waste management system (end-of-life vehicles, waste batteries and accumulators, waste tyres, EE waste, oils)								
M 6.2. Creating an EPEEF information system for the preparation and implementation of projects								
M 7.1. Educating all the participants in waste management supervision								
M 1.2.1. Procurement of equipment, vehicles and vessels for separate collection of paper, cardboard, metal, plastic, glass and textile	▶							
M 1.4.3. Intervention measure to decrease landfilling municipal waste generated in the City of Zagreb								
M 1.4.4. Intervention measure to decrease landfilling municipal waste generated in the City of Split								
M 5.1. Creating a Programme of educative-informative activities on sustainable waste management								
M 1.2.2. Constructing a sorting facility for separately collected paper, cardboard, metal, glass, plastic etc	▶							
M 1.2.3. Construction of recycling yards								
M 1.3.2. Procurement of equipment and vehicles for separate collection of bio-waste								
M 2.6.3. Construction of landfill cells for asbestos waste								
M 6.1. Creating and/or improving applications that are part of the waste management information system								
M 1.4.5. Constructing waste management centres	▶							
M 2.1.2. Constructing and procuring equipment for recycling yards for construction and demolition waste								
M 1.1.1 Measures defined by the Waste Prevention Plan	▶							
M 1.1.2. Establishment of re-use centres								
M 1.1.3. Home composting								
M 1.2.5. Strengthening the market for waste intended for recycling								
M 1.2.6. Constructing recycling facilities								
M 1.3.3. Construction of facilities for biological treatment of separately collected bio-waste								
M 1.4.2. Monitoring the amount of biodegradable waste in mixed municipal waste								
M 2.2.2. Establishing a sludge management system								
M 2.4.1. Identifying the locations and sources of marine waste and identifying locations of accumulated marine waste on the seabed system in the RC								
M 2.4.2. Establishing a system of prevention, collection and disposal of marine waste, as an integral part of the waste management system in Croatia.								
M 2.4.3. Intervention collection and disposal of marine waste.								
M 2.4.4. Establishing cooperation with neighbouring or other countries regarding marine waste pollution.								
M 4.2. Remediation of non-hazardous waste landfills								
M 4.4. Remedying locations polluted by hazardous waste ("hot spots")								
M 4.5. Remediation of abandoned waste locations.								
M 5.2. Conducting activities from the Programme of educative-informative activities on sustainable waste management								
M 5.3. Conducting a national campaign on sustainable waste management								



## 8 Aligning content of Waste Management Plan with EU requirements

296. Directive 2018/851 amended articles Article 28 and Article 29 of WFD. These articles define content of the waste management plan and waste prevention programme that MS are obliged to prepare (see Annex 8). In addition to the Directive 2018/851, Article 11 of SUPD stipulates additional measures which have to be incorporated into the waste prevention programme.
297. Article 28 of WFD defines requirements regarding the content of the waste management plan. The mandatory elements of waste management plan are defined by paragraph 3 of Article 28 WFD while elements which may be contained as a part of waste management plan (which are not mandatory) are listed in the paragraph 4 of Article 28.
298. Waste prevention programme is defined by Article 29 WFD. WPPs can be prepared as integrated part of waste management plan or other environmental policy programmes or as separate programme and has to set out at least the waste prevention measures laid down in paragraph 1 of Article 9 WFD (13 of them, see Annex 3). Since WFD gives special focus on food waste, specific food waste prevention programmes also must be adopted. According to the SUPD each MS have to ensure that the measures taken to transpose and implement this Directive form an integral part of and are consistent with its programmes of measures established among others<sup>77</sup> in accordance with Articles 28 and 29 of Directive 2008/98/EC.
299. NWMP in force does not fully meet new requirements defined by paragraphs 3(b), 3 (c) 3(cb) and paragraph 5 of the WFD Article 28. According to these requirements existing major disposal and recovery installations, including any special arrangements for waste oils, hazardous waste, waste containing significant amounts of critical raw materials, have to be presented. In the current NWMP this part is not presented sufficiently, especially when it comes to data on existing sorting and recycling capacities. Good source of data and information regarding this could be ensured by implementation of NWMP measure aimed at determination of lack of recycling capacities, yet there are delays in implementation of this measure.
300. Also, WFD requires that WMPs include adequate assessment of need and the investments, and other financial means, necessary for closure of existing waste installation as well construction of new waste installation infrastructure (paragraph (c) of Article 28). Regarding assessment of new infrastructural needs, this information is not included in the NWMP, but it is in the NWMP ID, yet partly (e.g. no data on recycling capacity needs). Also, and in some cases data on capacity needs in NWMP ID is not clearly presented. Capacity needs for separate collection of dry recyclables (procurement of equipment, vehicles and vessels) and capacity needs for construction of sorting facilities are expressed together and thus, it is not clear whether the equipment is part of the envisaged capacity needs or not. For example, for NWMP measure 1.2.2<sup>78</sup> and 1.2.1<sup>79</sup> a unique capacity is expressed for each county. The same stands for capacity needs regarding biowaste treatment (for the measures 1.3.2<sup>80</sup> and 1.3.3<sup>81</sup>)<sup>82</sup>.

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77 Beside into the waste prevention programmes, measures taken to transpose and implement SUPD should form an integral part of and are consistent with its programmes of measures established in accordance with Article 13 of Directive 2008/56/EC for those Member States, that have marine waters, the programmes of measures established in accordance with Article 11 of Directive 2000/60/EC, and the waste reception and handling plans established under Directive (EU) 2019/883.

78 M 1.2.1. Procurement of equipment, vehicles and vessels for separate collection of paper, cardboard, metal, plastic, glass and textile;

79 M 1.2.2. Constructing a sorting facility for separately collected paper, cardboard, metal, glass, plastic etc.; M 1.3.2. Procurement of equipment and vehicles for separate collection of bio-waste

80 M 1.3.2. Procurement of equipment and vehicles for separate collection of bio-waste

81 M 1.3.3. Construction of facilities for biological treatment of separately collected bio-waste;

82 Unclear presentation of the planned capacities also applies to the following NWMP measures: M 1.4.3. Intervention measure to decrease landfilling municipal waste generated in the City of Zagreb (activity/project – 13.1. Improvement of separate collection of dry recyclables system in City of Zagreb (Constructing a sorting facility for separately collected dry recyclables

301. Estimation of financial means for investments in the infrastructural measures are given in the NWMP but not for the level of local/regional authorities as it is required by WFD. Furthermore, although according to paragraph 3 (cb) assessment of waste collection schemes in NWMP are presented data and information for certain collection schemes are not sufficiently detailed and comprehensive (e.g. medical waste, construction waste).
302. Other requirements defined by amended Article 28 of the WFD (paragraphs 1, 2, 3 (a), (d), (e), (f), (g), and 4)) are fulfilled when it comes to the NWMP content. Yet, for the next planning period revision of used data are necessary. NWMP should be updated using last available data.
303. To a large extent measures defined in WPP meet the requirements defined by amended Article 29 of WFD. Prevention measures from paragraphs 1 (b), (c), (e), (k), and (i) of Article 9 WFD, are not sufficiently included in current WPP. They are mainly related to encouraging reusable product design and encouraging re-use and repair in general, product design that will reduce use of critical raw materials. Additionally, according to paragraph 2 of Article 29, WPPs (where relevant) have to evaluate usefulness of the examples of measures indicated in Annex IV WFD what currently is missing in the WPP. Measures indicated in Annex IV WFD are given in Annex 3 of this Report.
304. Detailed results of analysis of compliance of the NWMP content (including WPP) with the requirements defined by EU legislation is given in Annex 8 while summarized results are given in the Table 25 below

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and procurement of equipment for separate collection of dry recyclables); M 1.4.4. Intervention measure to decrease landfilling municipal waste generated in the City of Split (activity/project – 14.1. Improvement of separate collection of dry recyclables system in City of Split (Constructing a sorting facility for separately collected dry recyclables and procurement of equipment for separate collection of dry recyclables)

**Table 25 - Summarized results of analysis of compliance of the NWMP content (including WPP) with the requirements defined by EU legislation**

Number of NWMP Chapter / Recommendation for improvement	Compliant with WFD /SUPD requirement
<b>General information</b> - Should be also part of the revised NWMP.	n/a
<b>1 Waste management status in the republic of Croatia</b> <ul style="list-style-type: none"> <li>• It is necessary to revise this chapter according to the latest available information</li> <li>• More detailed overview of waste amounts is necessary regarding data on waste from manufacturing sector and data on municipal waste</li> <li>• Analysis of ships and marine waste management should be included, as well as information on waste prevention measures and measures for reuse that have been taken</li> <li>• It is necessary to amend with missing data regarding recycling facilities and sorting plants and provide data on existing energy recovery capacity</li> </ul>	<b>Partially</b>
<b>2 Main goals of waste management</b> <ul style="list-style-type: none"> <li>• It is necessary to revise this chapter according to the latest available information</li> <li>• See Chapter 4 on revision of waste targets and reconsider exclusion of some (sub)targets (Chapter 5)</li> <li>• Performance indicators for defined measures, as is the case with WPP, would be efficient tool</li> </ul>	<b>Partially</b>
<b>3. Waste flow development estimation, needs and methods of establishment of new systems and facility networks and devices for waste management</b> <ul style="list-style-type: none"> <li>• It is necessary to revise this chapter according to the latest available information</li> <li>• It is necessary to align chapter with waste package provisions related to waste prevention (article 9 WFD)</li> <li>• Revisions of envisaged dynamics of meeting specific targets should be done in line with revisions of NWMP targets and revision of estimations of municipal waste generation</li> <li>• As a part of need assessment, information on the needed capacities for new waste management centers have to be provided, as well as for all other capacities (e.g. new collection schemes, additional waste infrastructure etc.)</li> </ul>	<b>Partially</b>
<b>4 Criteria for determining planned locations and the necessary capacities of new facilities and plants</b> <b>5 General technical requirements for facilities and plants</b> <b>6 Organisational aspects of waste management and division or responsibility between private and public subjects working in waste management</b> <ul style="list-style-type: none"> <li>• It is necessary to revise this chapter according to the latest available information</li> </ul>	<b>Yes</b>
<b>7 Measures for plan execution</b> <ul style="list-style-type: none"> <li>• Regarding defining responsible bodies for the implementation of specific measure, it would be more efficient to define one responsible body instead several of them</li> <li>• Detailed results of evaluation of WPP measures are presented in the Chapter 5.1.8.1.1 of this Report and the proposal of some new measures in the Chapter 9 of this Report.</li> </ul>	<b>Partially</b>
<b>8. Projects of importance for the execution of the waste management plan</b> - No recommendation	n/a
<b>9. Waste prevention plan</b> <ul style="list-style-type: none"> <li>• It is necessary to revise this chapter according to the latest available information</li> <li>• Alignment with paragraphs 1 (b), (c), (e), (k), and (i) of Article 9 WFD and paragraph 2 of Article 29 of WFD should be done</li> <li>• Requirements defined by Articles 4 and Articles 10 of SUPD should be considered during revision of WPP measures.</li> <li>• Detailed results of evaluation of current WPP measures are presented in the Chapter 5.1.8.1.1 of this Report and the proposal of some new measures is presented in the Chapter 9 of this Report.</li> </ul>	<b>Partially</b>
<b>10 Financial assets for the execution of plan measures</b> <ul style="list-style-type: none"> <li>• An assessment of the investments, and other financial means required to meet those needs, is necessary to be carried out also for local/regional authority level.</li> </ul>	<b>Partially</b>
<b>11 Estimating usefulness and appropriateness of economic instruments in waste management with unburdened function of the inner market</b> <ul style="list-style-type: none"> <li>• It is necessary to revise this chapter according to the latest available information</li> </ul>	<b>Partially</b>

## 9 Proposal of new measures for revised Waste Management Plan of the Republic of Croatia

### 9.1 Measures related to SUPD and Circular Economy Action Plan

305. The adoption of the SUPD presents an important step forward in the reduction of single-use plastics and in the transition towards a circular economy (including reuse systems and reusable materials). The Single-Use Plastic Directive (Directive (EU) 2019/904) must be transposed into national legislation by 3 July 2021.
306. Most of the plastic in oceans originates from land-based sources. On European beaches, plastics make up 80-85 % of marine litter, which is considered a major threat to marine and coastal biodiversity<sup>83</sup>. As SUPD introduces serious of measure regarding single-use plastic products, as well as a fishing gear, this Directive address the issue of marine litter from plastics.
307. As per the SUPD Member states are required to undertake: market restrictions (bans) for certain single-use products<sup>84</sup>, measures to reduce consumption of certain SUP products for which there is no alternative<sup>85</sup>, separate collection, recycling and design changes for plastic bottles (see defined quantitative targets in Table 8), compulsory marking for certain SUP products<sup>86</sup> and introducing EPR<sup>87</sup>. To ensure efficient implementation of this SUPD complex requirements, research, raising awareness, education, communication and dialogue among all relevant stakeholders, as well as application of economic instruments is necessary.
308. Revised NWMP should include measures that support implementation of Circular Economy Action Plan<sup>88</sup> (in particular to address plastic pollution) and the SUPD requirements, like measures aimed at development guidelines on implementing Single-Use Plastic Directive, organisation of public national/regional/local educational and awareness raising campaigns and educational programmes, conduction of promotion and prevention pilot projects.
309. Due to COVID-19 pandemic the waste composition will be significantly influenced by disposable plastic-based personal protective equipment (PPE) and single-use plastics. Measures to encourage proper management of this type of waste should also envisaged.
310. Effective implementation of measures that would improve functioning of such a complex value chain requires strong cooperation by all its key players, from plastics producers to recyclers, retailers and consumers. New NWMP measures should aim citizens, businesses, NGOs, public authorities (LGUs, counties, municipal companies, etc), and their implementation should start in this planning period and continue during the next one.
311. Since this is a multidisciplinary topic, building cross-sectoral cooperation is of great importance, starting from policy making level and further by harmonising different, government bodies, scientific institutions, NGOs, etc. For that reason, it is recommended to set up interministerial

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83 [https://www.europarl.europa.eu/thinktank/en/document.html?reference=EPRS\\_BRI\(2018\)625115](https://www.europarl.europa.eu/thinktank/en/document.html?reference=EPRS_BRI(2018)625115)

84 Cutlery (forks, knives, spoons, chopsticks), plates, straws, cotton bud sticks, beverage stirrers, sticks to be attached to and to support balloons, food containers made of expanded polystyrene, products made from oxo-degradable plastic.

85 Drinking cups including covers and lids, and containers of prepared food for immediate consumption

86 Sanitary items, wet wipes, tobacco products with filters, drinking cups.

87 Food and beverage containers, bottles, cups, packets and wrappers, light-weight carrier bags, tobacco products with filters, fishing gear. For wet wipes and balloons, these obligations will apply with the exception of the collection costs.

88 COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS A new Circular Economy Action Plan For a cleaner and more competitive Europe, COM/2020/98 final

working group which will facilitate efficient implementation of measures and work together in further improvement and creating new CE solutions.

312. As Circular Economy Action Plan and the SUPD aim to raise demand for sustainable products green public procurement (GPP), NWMP should define measures to support and enhance GPP.
313. Furthermore, to facilitate re-use, recycling and GPP it would be good to reconsider launching project of re-use and recycling linked to reconstruction of buildings damaged by earthquake that on March 22, 2020, struck City of Zagreb and earthquake that on December 29, 2020 struck Petrinja. Initial reports show that some 25,000<sup>89</sup> buildings were damaged in City of Zagreb, Krapina-zagorje and Zagreb county (assessment of damage by Petrinja earthquake is still ongoing). Although most of the material streams from demolition and renovation works are not suitable for reuse or high-grade recycling great potential for re-use has office furniture and glass panels<sup>90</sup> and part of construction waste can be recycled.
314. Regarding strengthening waste prevention and re-use, except informative and educational instruments, it would be also worth reconsidering the use of voluntary programmes and agreements. Preparation of this kind of projects should define who are the actors, leaders and what is motivation for implementing these projects. It should be identified what are the barriers and what are the drivers to participate in such a programmes, and how to capitalize drivers to get stakeholders on board. Process of creating and launching of volunteer programs and platforms is complex and it requires engagement and close cooperation of different stakeholders.
315. Croatia is touristic destination and since food waste is already defined as a targeted waste category by WPP, and Circular Economy Action Plan recognise food value chain as responsible for significant resource and environmental pressures, and WFD defines an indicative target for food waste reduction, it would be worth considering for the next planning period to launch waste prevention and re-use pilot projects targeting tourism sector.

## 9.2 Measures for improvement of waste management monitoring

316. For successful dimensioning of municipal waste management system, as pre-condition step it is necessary to conduct analysis of municipal waste composition. In addition, reliable data on municipal waste composition makes important tool for monitoring waste management system establishment progress and its effectiveness.
317. It is recommended to introduce new measure which will ensure reliable data on municipal waste composition on national level determined on the basis of conducted field sorting analysis because current data on national composition of municipal waste is unreliable and based on the limited number of waste composition analyses (county and/or LGUs level) coupled with data from the 2012 database Environmental Polluters Register.
318. Implementation progress of NWMP measures have to be efficiently monitored and if necessary, preventive and corrective actions should be timely applied. Considering that implementation of NWMP measures is the responsibility of different stakeholders (e.g. local and regional self-government units, civil sector, business sector, etc.) it would be reasonable to develop uniform system for monitoring and assessing progress implementation of NWMP measures.

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<sup>89</sup> <https://mjpu.gov.hr/o-ministarstvu-15/djelokrug/graditeljstvo-98/obnova-zgrada-ostecenih-potresom-na-podrucju-grada-zagreba-i-okolice/10668>

<sup>90</sup> The reuse of an office chair leads to the avoidance of, on average, 8 kg of plastic waste and 6 kg of metal. An adjustable office desk contains on average 2 kg of plastic and 20 kg of metal. In windows, the plastic content is around 5 %. The waste prevention potential of the renovation of a 2 000 m<sup>2</sup> office with 170 staff is 40 kt (combined with avoiding 69 tonnes of CO<sub>2</sub> emissions (Source: <https://www.eea.europa.eu/publications/preventing-plastic-waste-in-europe>)

319. In the table below proposal of new measures for revised NWMP are given.

**Table 26** - Proposal of new NWMP measures

Activity/Measure	Targeted waste / product type	Responsible for the implementation / Relevant stakeholder <sup>91</sup>	Implementation period	Description
Developing guidelines on implementing Single-Use Plastic Directive for: i) business sector ii) local/regional governments units.	Single use plastic products, plastic waste, marine litter	Responsible for the implementation - MoESD,  Relevant stakeholder: Ministry of the Sea, Transport and Infrastructure (MSTI), Environmental Protection and Energy Efficiency Fund (EPEEF)	By the end of this planning period (end of 2022)	Guidelines should support implementation of the new SUP requirements by: explaining why prevention of single-use plastic waste generation is important, what SUPD and new Croatian waste management act defines and what impacts it may have on current practices, what are the challenges and how to implement new legislative provisions. It should be published at least on the web site of MoESD and EPEEF and should be presented by organising public presentations (workshops, conferences, etc.)
Organising public national/regional/local educational and awareness raising campaigns and educational programmes for children for the reduction of single use plastic and separately those aimed primarily on marine litter;	Single use plastic products, plastic waste, marine litter	Responsible for the implementation – MoESD for national campaigns and local and regional governments units for local and county level  Relevant stakeholder: MSTI, EPEEF	Start in this planning period and continue in the next one	Educational and awareness raising campaigns and educational programmes should be conducted in mass media means, kindergartens, schools, etc. and with the goal to inspire and engage younger generation in bringing a positive behavioural change regarding reduction of single use plastic, plastic waste and marine litter.
Developing and implementing pilot projects for promotion of public drinking water	Single use plastic products, plastic waste, marine litter	Responsible for the implementation – MoESD for national level and local and regional governments units for local and county level  Relevant stakeholder: EPEEF, Croatian Waters	Start in this planning period and continue in the next one	These projects should aim to prevent the use of plastic bottles by developing capacity for free tap drinking water (e.g. by installing a network of accessible water fountains).
Developing and implementing pilot projects for prevention of cigarettes buds	Single use plastic products, plastic waste, marine litter	Responsible for the implementation – MoESD for national level and local and regional governments units for local and county level  Relevant stakeholder: EPEEF	Start in this planning period and continue in the next one	This measure should create environment that enable disposal of cigarettes buds and should explain reasons way it is important to reduce cigarette litter (e.g. ensuring/upgrading button bin infrastructure, placing signs on butt bins and stickers on the ground to create pathways to the location of butt bins, etc).

<sup>91</sup> Under „Relevant stakeholder“ only those recognized as the most significant in terms of a potential source of co-financing or when the topic is under the jurisdiction of several ministries, etc. were singled out.

Activity/Measure	Targeted waste / product type	Responsible for the implementation / Relevant stakeholder <sup>91</sup>	Implementation period	Description
Organising educational and informative campaign on how to properly manage COVID-19 waste	Medical waste, single use plastic waste, marine litter, household and similar waste	Responsible for the implementation – MoESD  Relevant stakeholder: Ministry of Health, EPEEF	By the end of this planning period (end of 2022)	This measure should include preparation of guidance's, information leaflets, actions in mass media means, etc. It should influence the behaviour of targeted stakeholders and motivate behavioural change with the aim of proper waste management.
Organising national workshops and informative and public awareness raising campaigns on GPP	n/a	Responsible for the implementation – MoESD  Relevant stakeholder: EPEEF	Start in this planning period and continue in the next one	These workshops should be co-creation workshops that gather at the same table public authorities and business sector. Workshops should provide exchange of information and knowledge on: importance and benefits of GPP, national and EU GPP rules, good GPP practices, barriers and corrective actions regarding GPP.  National informative and public awareness raising campaigns on GPP for citizens should stimulate demand for more sustainable goods and services and thus stimulate GPP implementation.
Developing and implementing projects and setting up voluntary programmes and agreements: - For refill scheme, - For waste prevention and re-use projects targeting tourism sector.	Single use plastic products, plastic waste, marine litter, food waste (including water and energy efficiency were applicable)	Responsible for the implementation – MoESD  Relevant stakeholder: MSTI, EPEEF, Ministry of Agriculture, Croatian Waters	Preparation of projects and initiating voluntary programmes and agreements to start in this planning period and continue in the next one.  Implementation in the next planning period	This measure applies to public voluntary programme for creating network of places like shops, restaurants, etc., where people can refill their water bottle, coffee cup, lunchbox, etc. This way citizens are encouraged to eliminate single-use items in favour of multi-use reusable alternatives.  Furthermore, since tourism sector in Croatia represents a great source of single-use plastic packaging and packaging waste in general, in this area waste prevention and re-use projects should be conducted. The best CE approach would be to combine waste prevention objectives with other resource efficiency objectives like energy and water efficiency.
Developing and implementing project of re-use and recycling	Construction waste, bulky waste	Responsible for the implementation – MoESD	Start in this planning period and continue in the	This measure should include projects focused on the great re-use and recycling potential from



Activity/Measure	Targeted waste / product type	Responsible for the implementation / Relevant stakeholder <sup>91</sup>	Implementation period	Description
linked to reconstruction of buildings damaged by Zagreb City earthquake from March 22, 2020 and earthquake in Petrinja from December 29 2020 (including application of GPP for equipping reconstructed buildings)	(furniture)	Relevant stakeholder: Ministry of Physical Planning, Construction and State Assets (MCPPSA), Reconstruction Fund, EPEEF	next one	waste office furniture and glass panels and some part of construction waste which originates from damaged public buildings (kindergartens, primary and secondary schools, faculty buildings (of universities), research institutes, health facilities, etc.) and business premises damaged by earthquake during their reconstruction. These projects should apply GPP while equipping reconstructed buildings.
Determination of national municipal waste composition on the basis of field conducted sorting analysis considering regional concept.	Municipal waste	Responsible for the implementation – MoESD Relevant stakeholder: EPEEF	Periodically	This measure includes periodic conduction of sorting analysis of municipal waste by applying regional concept with the aim of determination national municipal waste composition.
Developing uniform system for monitoring and assessing implementation of WMP measures.	n/a	Responsible for the implementation – MoESD Relevant stakeholder: EPEEF	By the end of this planning period (end of 2022)	This measure includes development of uniform system for monitoring and assessing progress implementation of NWMP measures which will cover different stakeholders like local and regional self-government units, civil sector, business sector, etc.

## 10 Priority areas for investment pipeline activities in the waste sector transition to circular economy

320. In this Chapter summarised results of proposal on the areas for investment pipeline activities in the waste sector are presented. Detailed information is given in Annex 9.

321. Seven priority areas for investment pipeline activities in the waste sector are identified as follows:

### 10.1 STRENGTHENING WASTE PREVENTION

322. The first pillar of the most preferred approach to waste management is not to create it in a first place, followed by ensuring the re-use and high recycling rate as a major goal of sustainability efforts. For fostering behavioural change to achieve sustainable resource and waste management, besides an appropriate regulatory framework, awareness and sensitization activities are of high importance. It is essential that the public is properly informed and educated to understand what transition from linear to circular economy approach is, how this will be conducted in Croatia, what are the financial requirements for incorporating circular economy principals.

323. For successful implementation of waste prevention measures, a combination of regulatory, economic, technical and communication mechanisms is required. Under this priority area investment pipeline activities should include targeted actions to radically alter patterns of consumption and production for example by applying educational and information tools and incentives like, investments in public awareness raising, motivating consumers to change their consumption patterns towards sustainable consumptions and a return to traditional consumption patterns to include reduce reuse, repair.

324. A comprehensive communication strategy represents a good tool for planning investments under this priority area. Important is that this strategy includes communication activities with public not only regarding the waste prevention but of all aspects of “circular waste management”. To understand importance of sustainability and waste prevention, how they can gain from it and how their role is crucial for its success, it is important that public is adequately informed and educated regards waste separation, planned sorting and recycling technologies but also projects and costs of treatment of residual waste within waste management centers

### 10.2 IMPROVEMENT OF PREPARATION FOR RE-USE AND RECYCLING

325. This investment area generally includes investments in following activities:

- infrastructure for separate collection (biowaste, plastic, paper, metal, construction and demolition waste, textile, etc.);
- re-use and recycling infrastructure
- projects/programs for innovations in production;

326. Further, investments in separate collection system and re-use and recycling infrastructure is necessary to ensure transition to circular economy in waste management and ensuring achievement of EU waste management targets. To shift from waste disposal as a main waste treatment option and to push waste management toward re-use and recycling require efficient waste collection system and sufficient waste recycling capacities. This requires continuing with

investments regarding the development of re-use network, system for separate collection and treatment of waste (e.g. investment in construction of re-use centers, recycling yards, equipment for waste collection like vehicles and waste bins, sorting capacities for dry recyclables, facilities for biological waste treatment and facilities for recycling of dry recyclables).

327. To have efficient re-use and recycling but also resource efficient management investments in production efficiency innovations are necessary. Investments plans in different programs and projects that will stimulate innovation in the waste sector by highlighting future trends and opportunities for growth in the circular economy through design and technological development and increased resource efficiency should be developed (e.g. different types of eco-innovations related to conception and design of product, process, organizational, marketing, social, etc.).

328. For planning investment for this area, it is of crucial importance to ensure proper planning of the waste management system. Waste separation model which takes into account environmental but also economic viability, national re-use and recycling needs and consequently capacities should be determinate prior investments planning.

### **10.3 ESTABLISHMENT OF MANAGEMENT SYSTEM FOR MARINE LITTER**

329. Marine litter is gaining growing attention at EU level and marine litter management is incorporated in a range of strategic documents and directives (e.g. European Green Deal, Directive on Single Use Plastic Products, etc).

330. Current NWMP defines measures regarding marine litter management yet comprehensive action plan by which more precise definition and prioritisation of action needed is provided. It would be reasonable to prepare national Action Plan on marine litter. This type of Action Plan should clarify issue of competent authorities', defined exact measures, needed investments and deadlines. Prior preparation of Action plan assessment on marine litter sources, quantities etc. (analytical work) should be conducted as a background for defining measures/activities within Action plan.

### **10.4 ENSURING ECONOMICALLY AND ENVIRONMENTALLY SOUND MANAGEMENT OF RESIDUAL WASTE**

331. Treatment of residual waste is planned within WMC. Two out of 11 planned WMC are constructed while for the other project preparation process is ongoing (projects are at different stage of project preparation, for certain feasibility studies are under preparation, while for certain public procurement process is currently conducting). In general projects are at a high level of completeness when it comes to project preparation process.

332. The current EU waste management legislation does not necessitate change in the concept for treatment of residual waste in Croatia. In accordance with the Landfill Directive by 2035 the amount of municipal waste landfilled have to be reduced to 10 % or less of the total amount of municipal waste generated (by weight). Yet, to be sure that planning and dimensioning of system for residual waste is environmentally and economically efficient it is recommended to prepare Material Flow Analysis on the state level. This analyses should take into account new waste package goals and existing situation to determinate expected residual waste up to 2035. Accordingly, investment pipeline should be prepared including residual waste treatment plants and/or landfill cells to overcome needs.

### **10.5 IMPROVEMENT OF HAZARDOUS WASTE MANAGEMENT SYSTEM**

333. Although share of hazardous waste accounts 3% of the total waste generated in Croatia its proper

management is of great importance from environmental aspect and from human health aspect. EU legislation calls for ensuring separate collection for hazardous waste fractions produced by households.

334. Currently in Croatia hazardous waste is mainly pre-treated and exported from country or after stabilisation disposed at landfills and when it comes for collection system difficulties are identified (e.g. collection packaging containing remains of hazardous substances is not well established).

335. Based on the results of implementation of NWMP measure which envisage preparation of feasibility study with analysis of existing and needed capacities for hazardous waste treatment, further activities and investment should be defined in more details.

## **10.6 REMEDIATION OF WASTE POLLUTED SITES**

336. This generally includes investments in following measures:

- Remediation of existing non-compliant landfills;
- Remediation of dump sites (wild landfills);
- Remediation of hot spots.

337. Implementation of these activities are of great importance for protection of human health and the environment but also present conditions that Croatia accepted by signing EU Accession Treaty (closure of all landfills that are not in compliance with EU requirements).

## **10.7 IMPROVEMENT OF WASTE MANAGEMENT INFORMATION SYSTEM**

338. EU Member States must record and report on their waste management activities in order to comply with various binding targets relating to aspects of waste management. This requires reliable, relevant and consistent data to be provided to the European Commission. Furthermore, ensuring accurate and comprehensive waste data is important for strategic planning and setting goals, for decision making, and monitoring of the performance in waste management and achievement of the targets.

339. Waste Management Information System in Croatia is currently scattered, consisting of various information databases that are often not linked with each other. This represents an administrative burden for both the competent authorities and the taxpayers who are obliged to report in Waste Management Information System (e.g. causes double reporting of the same sets of data in different databases). Changes in EU waste legislation bring new, additional requirements and challenges regarding monitoring and reporting and in general EU society is moving towards digitalisation. Therefore, investment in digital transformation of waste management information system and integration of existing digital applications on a joint IT waste management platform is important waste sector investment area.

## 11 Conclusions and recommendations

340. Croatia is lagging behind with the transposition of European waste legislation. Four EU waste directives, known as the “waste package”, amending six existing waste directives, MS supposed to transpose into national legislation by 5 July 2020. Croatia did not align its waste legislation accordingly. Additionally, Single-Use Plastic Directive must be transposed into national legislation by 3 July 2021. These EU waste directives Croatia plans to transpose through adoption of new Waste Management Act (WMA) and by-laws. Draft proposal of new WMA is prepared, and public consultation process was launched on November 13, 2020 for the period of 30 days. The draft act is to be sent to the Croatian Parliament for reading and adoption.
341. In addition to delays regarding alignment of its legislation with EU, Croatia is lagging behind in meeting the existing EU waste targets necessary for transitioning towards circular economy. Croatia failed to bring all existing landfills into compliance with the Landfill Directive by 31 December 2018 - a deadline defined by Accession Treaty of the Republic of Croatia to the EU from 2011. In addition, there is a risk that other existing EU requirements will not be met. The amount of biodegradable municipal waste disposed in landfills in 2019 amounted to 679.080 t, thus, the objectives related to the reduction of the disposal of biodegradable municipal waste for 2013 and 2016 have not been reached, and most probably won't be met for 2020<sup>92</sup>. Total recycling rate of municipal waste was 30% in 2019, the recycling rate for the four fractions – metal, glass, plastics and paper from municipal waste was 37% (recycled quantity in relation to the quantity of these fractions produced), while EU target for 2020 is 50%. Landfilling is still the most common type of waste treatment with share of 59% in 2019. Satisfactory results are registered for construction waste (recycling rate 67%).
342. Currently in Croatia two different sets of waste targets are in force. One set of waste targets, the same as EU one, is defined by waste legislation (Act on Sustainable Waste Management and by-laws) and the other one (group of quantitative targets not defined at EU level) is defined specifically for Croatia in Croatian NWMP for the period of the NWMP (2017-2022). Additionally, targets from “waste package” and SUPD are yet to be transposed.
343. NWMP targets are interlinked with EU ones. They are defined with the aim to drive waste up the waste hierarchy by enhancing separate collection and as for EU 2020 waste targets, there is a risk of failure.
344. Results of implementation progress analyses of the measures and activities defined by NWMP and NWMP ID, for the period 2017-2020, suggest that one of the causes related to the risk of failure to achieve the objectives are delays in implementation of the certain measures defined by the NWMP and NWMP ID.
345. The best implementation progress has been made on waste prevention related measures, primarily the so - called "soft measures" like conducting awareness raising campaigns and distribution of home-composters. Also, significant progress has been achieved regarding the construction of recycling yards with implementation status of 77% (out of 150 planned recycling yards, 116 of them was constructed in the period 2017-2020). Activities of procurement of equipment, vehicles and vessels for separate collection (municipal paper/cardboard, glass, plastic, metal, biowaste) are carried out in significant share and share of separately collected waste is increasing (from 28% in 2017 to 37% in 2019). Group of measures for improvement of waste management information

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<sup>92</sup> Croatia was to ensure a gradual decrease in the amount of biodegradable municipal waste going to landfills as per following dynamics: a) by end of 2013, the share of biodegradable municipal waste deposited on landfills should have been reduced to 75 % of the total amount of biodegradable municipal waste produced in 1997 (equivalent to 567.131 t); b) by the end of 2016 to 50 % of the total amount (equivalent to 378.088 t) and c) by the end of 2020, to 35 % (equivalent to 264.661 t) of the total amount produced in 1997.

system and administrative procedures in waste management can also be assessed as the ones that showed satisfactory progress.

346. However, there are delays in implementation of measures and activities which are decisive for the transition to a circular economy and the achievement of EU waste targets: deployment of waste treatment infrastructure and recycling market, introduction of waste policy that will enhance shift from landfilling to re-use and recycling (e.g. introduction of landfill tax). Delays in implementation of NWMP ID activity for determination of lack of recycling capacities on a national level, reflected on constructing of new recycling facilities and /or capacity increase of existing recycling plants for dry recyclables. Activities for ensuring additional recycling capacities have not started yet. Also, construction of sorting plants for dry recyclables and facilities for bio-waste treatment is slower than anticipated. Insufficient progress is detected regarding the development of re-use and repair network and establishment of re-use centers. Also, there are delays in projects preparation and construction of WMC. For two WMCs construction works are underway (Bikarac and Biljane Donje) and the other seven are in the different stage of project preparation (for WMCs Babina Gora, Lečevica, Piškornica and Lučino razdolje public procurement is ongoing; the WMC Šagulje, WMC Orlovnjak and WMC Zagreb are in the process of project documentation preparation).

347. **Recommendations:**

348. To accelerate progress in the waste sector and ensure circularity, without further ado, it is necessary to **fully align the existing legislative waste framework with the European one**. Preparation and adoption of regulations should take place in parallel with the process of alignment NWMP content with the amendments arising from the Directive 2018/851 (which corresponds to the start of the planning activities for the next planning period (2023-2028)).

349. Aligning content of NWMP requires **inclusion of new information on existing major disposal and recovery installations**<sup>93</sup>, and, **construction of new waste management infrastructure**, including assessment of needs and investments. Also, **assessment of existing waste collection schemes**, and **determination of the need for new collection schemes** should be presented in NWMP. These requirements are already partially covered by existing NWMP; nevertheless NWMP should be updated and in certain parts extended. The same also stands and for some other parts of NWMP (e.g. analysis of the state in the waste management, defining appropriate qualitative or quantitative indicators and targets etc.), as they are based on the data for 2015.

350. In order to do this it is particularly important to **conduct all analytical work envisaged by current NWMP and NWMP ID** (analyses of systems for special waste categories, analyses of asbestos in use, action plan for separate collection and recycling construction and demolition waste, analyses of recycling capacities needs and capacities needs for hazardous waste management). The results of these analyzes should provide data necessary for defining objectives, measures and investment for the next planning period. Implementation of activities covering analytical work should be intensified and finished by the end of this planning period (end 2022). Additionally, reconsider conducting determination of national municipal waste composition on the basis of field conducted sorting analysis considering regional concept as this is of great importance for proper dimensioning of waste management infrastructure.

351. Assessment of NWMP **waste management targets showed that improvement could be made**. Although, intention of additional NWMP targets was to push transition of waste management in Croatia more toward CE, having two different sets of targets in force, as shown by the analysis of data on the state of waste management, did not ensure the achievement of the same. Especially,

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<sup>93</sup> Including any special arrangements for waste oils, hazardous waste, waste containing significant amounts of critical raw materials

having inconsistency and ambiguities related to certain targets defined by NWMP (e.g. waste prevention sub-target).

352. Targets on their own are not sufficient to change behavior and improve waste management and resource efficiency. **Clear and firm strategic objectives have to be put in place.** For example, policy makers by applying different policy instruments have to send clear message that long-term vision for Croatia is to move towards more circular economy society. For example, by applying „smart-taxes“ in order to make landfilling more expensive than recycling, by ensuring effective coordination mechanism between different stakeholders (different state bodies, local and regional governments, industry groups, NGOs). A clear and strong government commitment has to in a way give a credibility to targets – targets setting has to be followed by the actions. Furthermore, efficient monitoring system has to be put in place to track targets achievement and measures performance and to, if necessary, in time introduce corrective actions for removing obstacles for their achievement.
353. When transposing the “waste package” and the SUPD, transposition of all **quantitative targets through the new act on waste management** is recommended, while within NWMP **defining qualitative targets would be more suitable.** Having one set of quantitative targets, comparable to EU ones, will make monitoring more efficient, especially because adequate indicators for measuring progress and success of these targets are developed at EU level. Also, setting the achievable targets, not overambitious ones, can motivate stakeholders to implement. Targets should be supported by mechanism for their achievement (appropriate measures) and a monitoring mechanism to track performance.
354. It would be reasonable to **reconsider exclusion from NWMP scope of qualitative (sub)targets aiming at; establishment of waste management system for waste ships, wrecks and sunken objects on the seabed, improvement of system for waste management supervision and administrative procedures** (NWMP sub-targets: 2.5, 7 and 8). Waste management system for wrecks and sunken objects on the seabed is to the fullest extent under the jurisdiction of Ministry of the Sea, Transport and Infrastructure (MSTI) and is not regulated by the waste management policy. Therefore, integrating their management in strategic and/or planning documents under authority of MSTI seems as a better planning approach. Waste ships are special waste category under authority of MoESD and thus within NWMP measures related to waste ship management can be defined as a part of waste target for improvement of waste management system of special waste categories. Regarding the targets 7 and 8, as supervision of waste management is under authority of State Inspectorate and at present its regular work and administrative procedures in waste management are within scope of MoESD, therefore it seems redundant to define this as a separate target within NWMP.
355. Considering that NWMP covers period until the end of 2022 it doesn't seem efficient to change defined targets as a part of the revision of the existing plan, but to **apply aforementioned recommendations within the waste management plan for the period (2023-2028).** Also, local waste management plans (556 local self-government units) are prepared and transpose targets in line-with the current NWMP - changing the targets by the end of NWMP period would create additional problems, requiring changing of all local waste management plans.
356. Measures and activities defined by NWMP and NWMP ID are to a large extent, determined at achieving the target defined for improvement of municipal waste management. The same seems reasonable given that this waste area is a complex and multi-sector activity for which achieving the EU targets is the most demanding. Foreseen development of re-use network, procurement of equipment and construction of infrastructure for separate collection, sorting and treatment of

separately collected useful fractions of municipal waste, as well as construction of treatment facilities for residual mixed municipal waste, all together represent an **indispensable part of the integral and efficient waste management system**, yet implementation of these activities is logistically, technically and financially most challenging.

357. **Measures and activities covering infrastructural development for municipal waste** are financially and technically less demanding, but also useful and efficient measures, are defined like: measure for monitoring of biodegradable waste in mixed municipal waste, which is of great importance for sizing the municipal waste management system, the preparation of different analytical studies, developing technological demands that waste must satisfy in order to be applicable for recycling, etc.
358. These NWMP and NWMP ID measures are in line with EU waste legislation requirements however certain improvements can be made to ensure more enhanced and more effective implementation. In general, **it is necessary to ensure that planning of waste management infrastructure capacities is based on comprehensive and reliable technical and economic analysis** which will provide the most environmentally and economically viable solution. For example, NWMP ID for each county (20 counties) and City of Zagreb, defines sorting capacity (t/year) that must be established by the end of current planning period. Sorting capacity should be result of detailed technical study which has to consider separate collection objectives and re-use and recycling needs (planned re-use and recycling capacity) at national level. Therefore, this analysis can be conducted as a part of activity for determining national recycling needs<sup>94</sup>.
359. Certain activities are defined as a group of different activities (e.g. activity that covers construction of facilities for biological treatment, procurement of equipment and vehicles for bio-waste<sup>95</sup>), yet performance indicator is defined as capacity (t/year). For successful monitoring it would be reasonable that **all activities are systematically and separately defined and accompanied by individual indicator**.
360. With respect to group of measures covering special waste categories **marine litter is the waste category that can be singled-out as the one that should be given special attention**. The measures currently defined in the NWMP and NWMP ID for this waste stream are broad in their scope, while there is a lack of clear and targeted activities that should ensure their implementation. Therefore, it is recommended to prepare a comprehensive national action plan on marine litter by which more precise definition and prioritization of action needed will be provided. This action plan should clarify issues of competent authorities, define concise measures and activities, needed investments and implementation timeline. Prior preparation of action plan assessment on marine litter sources, quantities etc, analytical work should be conducted as a background for defining measures/activities within the action plan. Preparation of analytical background could start during this planning period (2021).
361. **Implementation of all existing infrastructure measures, educative and informative projects and activities, waste prevention measures, measures aimed at improvement of waste management information system should continue in the next planning period (2023-2028)**. Implementation of measures that cover analytical studies (e.g. recycling capacity needs study) should be intensified and finished by the end of this planning period.
362. As **policy making** fall under regular work of public state institutions **it is recommended not be within the scope of NWMP**. The same recommendation can be applied to **measures governing**

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<sup>94</sup> NWMP ID activity 8.1. - Determination of lack of recycling capacities on a national level

<sup>95</sup> M 10.3. NWMP ID



**amendments of spatial planning legislation** under the responsibility of Ministry of Construction, Physical Planning and State Assets.

363. The remediation of **“hot spots”** requires significant financial resources, and implementation of these measures is significantly delayed. Therefore, it is recommended **to finalize the preparation of project documentation by the end of this planning period and the implementation of measures to continue during the next planning period.**
364. Although it does not have to be an integral part of the NWMP, policy instrument that is strongly recommended to be adopted and implemented by the end of this planning period is **introduction of landfill fee**<sup>96</sup>. According to Directive 2018/851 amending WFD, in order to contribute to achieving WFD targets, Member States should make use of economic instruments and other measures to provide incentives for the application of the waste hierarchy such as those indicated in Annex IVa, which includes, inter alia, landfill and incineration charges. Municipal waste management depend on regional and local self-government units and thus achievement of waste targets depends on their performance. Introducing landfill fee could intensify, willingness and cooperation between them, consequently speeding up implementation of measures necessary to move toward recycling society. Also, the revenues can be used for financing investments in waste sector.
365. It would be beneficial to **include measures that support implementation of Circular Economy Action Plan** (in particular to address plastic pollution) and the SUPD requirements in revised NWMP. For a start, easily enforceable "soft measure" like: informative and educational instruments on SUPD and GPP, setting up voluntary programmes and agreements for waste prevention and re-use, etc. should be implemented.
366. Along with improvements of measures and activities, **it would be worthwhile to engage more a private sector** in activities like separate waste collection, construction of sorting facilities, recycling yards, facilities for biological treatment and treatment of mixed municipal waste. The waste management system in Croatia is heavily reliant on public funding and the markets role is limited. Within NWMP and NWMP ID, 67 percent of investments are to come from the EU, 21 percent from central and local budgets, 9 percent from EPEEF (all adding to a total public investment of 98 percent), and only 2 percent comes from private investments.<sup>97</sup> Mobilizing private sector, for example into the collection and treatment system of municipal waste, can reduce pressures on limited public budgetary resources (e.g. reducing the costs and management burden of LSGUs) and help deliver innovations in waste management infrastructure and services more hastily than public sector alone.
367. It is recommended to **start with intensive and transparent communication campaigns with the interested public / citizens / civil society groups**. Currently in Croatia, there is a great resistance toward any waste management related project by default. There is a low level of confidence of citizens in institutions and for successful transition to circularity in waste management it is necessary that public understand why it is important to ensure transition to more circular approaches and principles, what will this require, how this will reflect on public costs, etc.
368. **Seven priority areas for investment pipeline** activities in the waste sector are identified as follows:
- i. strengthening waste prevention,
  - ii. improvement of preparation for re-use and recycling,

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<sup>96</sup> According to the current Act on Sustainable Waste Management, in the case that the permissible annual amounts of landfilled municipal waste, defined by the Ministry at an annual level, are exceeded, persons in charge of the landfill must pay the municipal waste disposal fee. It is supposed to be paid to the EPEEF for the purpose of recycling yards construction. This fee is still not implemented.

<sup>97</sup> „Solid Waste Sector Review - Catching up and getting ahead“, World Bank

- iii. establishment system for marine litter,
- iv. ensuring economically and environmentally sound management for residual waste,
- v. improvement of hazardous waste management system,
- vi. remediation of waste polluted sites,
- vii. improvement of waste management information system.

369. It is important that future investments are directed in projects and activities higher up the waste hierarchy and further transition to circular economy.

370. NWMP estimates the cost of implementing measures for achieving targets by 2022 at HRK 5,1 billion and by 2020 HRK 3,7 billion. Assessment of financial progress showed that in the period from 2017 to 2020 total expenditure on the implementation of NWMP measures was HRK 1,2 billion which is 32% of envisaged funds for the analysed four-year period and 24% of funds planned for the whole NWMP period. Financing came predominantly from EU funds (60%). Additionally, for certain activities procedure of procurement and/or contracting is underway (for approximately HRK3 billion) and it is to be expected that the amount of spent funds by the end of the planning period will be higher. Expenditure of funds for the first four years of planning period indicates implementation problems. This is mainly due to: long-term resolution of property legal relations; lengthy process of establishing the necessary infrastructure on the sites (such as electricity, water, telecommunication, access roads etc.); complex and lengthy public procurement process to contract all the services needed for project implementation. Additionally, as previously mentioned, “not in my back yard” effect is also important factor which slows down implementation. Although the availability and reliability of data on planned costs limits analysis and affects the results, rough cost re-evaluation of investment planned for executing measures defined by NWMP and NWMP ID showed that planned investment costs are underestimated. For example, the total value of the 9 projects (HRK 4,75 billion<sup>98</sup>) exceeds significantly the funding envisaged under item “constructing waste management centres”<sup>99</sup> (HRK1,60 billion). **Cost re-evaluation indicates that more reliable investment planning is needed**, which is directly related to the previously described requirement for better quality planning of the entire waste management system and the implementation of analytical studies.

371. Given the limitations of the state budget and local (regional) budgets, Croatia will need to **consider and other sources of financing** NWMP projects, like: EU funds, EPEEF, Croatian Waters, loans and private investments. For the funding NWMP projects, in the period from 2021 to 2027, the Croatia will have available funds from the cohesion policy (ERDF and CF) and funds from the new instrument Next Generation EU.

372. The document has shown limitations of present NWMP implementation and has indicated areas where interventions are immediately necessary to get NWMP back on track in existing and during the new implementation period. This will require substantial financial resources as indicated by the cost estimate and making decisions – some unpopular. The next steps recognized as immediately necessary are as follows.

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<sup>98</sup> Data provided by EPEEF

<sup>99</sup> Measure M 1.4.5 in NWMP

## Next steps

373. Fully align national legislation with the EU “waste package” and SUPD. This will help strengthen the waste prevention, in particular food and marine litter prevention; strengthen the extended producer responsibility; boost the recycling and re-use (especially of municipal and packaging waste); and phasing out waste landfilling. Along with that, it will promote circular approaches that give priority to sustainable and non-toxic re-usable products and re-use systems, rather than to single-use products, aiming first and foremost at reducing the quantity of waste generated;
374. Parallel with the process of harmonization of the national legislation with the EU revise current NWMP along with NWMP ID and WPP, considering the content and new measures that support implementation of Circular Economy Action Plan and the SUPD requirements;
375. Set up interministerial working group which will facilitate efficient implementation of measures and work together in further improvement and creating new CE solutions;
376. Intensify activities of preparation studies for determination of existing recycling capacities and need for additional capacities which present pre-condition step in the process of sizing waste management system.
377. Conduct determination of national municipal waste composition on the basis of field conducted sorting analysis considering regional concept, which is necessary for successful dimensioning of municipal waste management and the important tool for monitoring waste management system establishment progress and its effectiveness.
378. Given the limited public budgetary resources, engage more a private sector in infrastructural measures. This would also help in delivering innovations in waste management infrastructure and services.
379. To increase the level of confidence of citizens in institutions and for successful transition to circularity in waste management intensify communication campaigns with the interested public / citizens / civil society groups.

## 12 Annexes

**All Annexes are available in the “Book of Annexes”**

**Annex 1 An overview of EU and national waste targets**

**Annex 2 An overview of additional requirements for waste management**

**Annex 3 ANNEX IV of the Directive 2008/98/EC - Examples of waste prevention measures referred to in Article 29 and waste prevention measures defined by Article 9 of the same Directive**

**Annex 4 NWMP and NWMP ID implementation status and evaluation results**

**Annex 5 Sizing reuse centers**

**Annex 6 Separate collection and treatment of dry recyclables and biowaste**

**Annex 7 Description of EU Funds/Programmes**

**Annex 8 Analysis of compliance of the NWMP content**

**Annex 9 Priority areas for investment pipeline activities in the waste sector transition to circular economy**

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