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Second Meeting of the Working Group of Experts on developing the new Regional Plans on Urban Wastewater Treatment and Sewage Sludge Management, and for updating the Regional Plan on Marine Litter in the Mediterranean

Videoconference, 25-26 May 2021

Agenda item 6. Cost estimates for the implementation of the key measures of the three Regional Plans with evaluation of related socio-economic benefits

Summary of country-specific information used for the socioeconomic assessment of the main measures proposed in the new/ upgraded Regional Plans with related questionnaires

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UNEP/MAP
Athens, 2021

Note by the Secretariat

The 21st Meeting of the Contracting Parties to the Barcelona Convention COP21 (Napoli, Italy, 2-5 December 2019) adopted Decision IG.24/10 which endorsed the main elements for development/ update of six Regional Plans related to the urban wastewater treatment, sewage sludge management, agriculture management, aquaculture management, storm water management and marine litter management.

COP21 also approved the way forward proposing the time frame for the development, negotiation and adoption of the six Regional Plans, with a view to submitting to COP22 in 2021 three regional plans, namely the upgraded/ new Regional Plans for Urban Wastewater Treatment and for Sewage Sludge Management, and Upgraded Regional Plan for Marine Litter Management in the Mediterranean. Moreover, the Secretariat to the Barcelona Convention was mandated (under Decision IG.24/10) to establish Working Groups with representatives designated by the Contracting Parties for reviewing the proposed upgrades/ new measures of the Regional Plans.

The Programme of Work (PoW) and Budget for the biennium 2020 – 2021 (Decision IG.24/14) mandated MED POL under Midterm Strategy (MTS) Key Output 2.2.2 to develop/ upgrade “Regional programmes of measures identified and negotiated for pollutants/ categories (sectors) showing increasing trends, including the revision of existing regional plans and areas of consumption and production.”

In parallel with the upgrade/ development of the new Regional Plans on urban wastewater treatment, sewage sludge and marine litter management, the Secretariat has undertaken a study to enable the Parties to assess the costs of implementation of the main regional and national measures proposed in the three Regional Plans and associated socioeconomic benefits.

This document contains data collected by the experts of the Working Group on Upgrading the Regional Plan on Urban Wastewater Treatment and developing a new Regional Plan on Sewage Sludge Management, and the Working Group on Upgrading the Regional Plan on Marine Litter Management, in line with the overall guidance/ questionnaires provided by the Secretariat. The information served as a basis for the analysis presented in UNEP/MED WG.508/6 “Assessment of costs of implementation of the main measures proposed in the new/ upgraded Regional Plans and associated socioeconomic benefits”.

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Annex I: Questionnaires used to collect country data

List of Abbreviations / Acronyms

BAT	Best available technique
BOD ₅	Biological oxygen demand
COD	Chemical oxygen demand
DM	Dry matter
DRRS/ DRS	Deposit return and restoration system/ deposit refund system
ELV	Emission limit values End-of-life vehicles
EPR	Extended producer responsibility
EU	European Union
FfL	Fishing-for-litter
GES	Good environmental status
ICZM	Integrated Coastal Zone Management
IMAP	Integrated Monitoring and Assessment Programme
LBS	Land-based sources
MBT	Mechanical biological treatment
MPA	Marine protected area
MED POL	Mediterranean Pollution Control and Assessment Programme
ML/ MLM	Marine litter/ marine litter management
MSFD	Marine Strategy Framework Directive
MW/ MWM	Municipal waste/ municipal waste management
N	Nitrogen
NBS	Nature-based solutions
P	Phosphorus
p.e.	Population equivalent
POPs	Persistent organic pollutants
RP	Regional Plan
SPAMI	Specially Protected Area of Mediterranean Importance
SS/ TSS	Suspended solids/ total suspended solids
SSM	Sewage sludge management
SUP	Single-use plastic products/ items/ packaging
TOC	Total organic content
UNEP/ MAP	United Nations Environment Programme / Mediterranean Action Plan
UWWT	Urban wastewater treatment
WEEE	Waste from electrical and electronic equipment
WW	Wastewater
WFD	Water Framework Directive
WWTP	Wastewater treatment plant

1. Introduction

1. Information presented in this document was collected by the members of the expert working groups for the preparation/ upgrading of the Regional Plans for Urban Wastewater Treatment, Sewage Sludge Management and Marine Litter Management. National data and information were collected to enable an assessment of costs of implementation of the main measures proposed in the new/ upgraded Regional Plans and evaluation of related benefits. The results of the assessment are presented in UNEP/MED WG.508/6 “Assessment of costs of implementation of the main measures proposed in the new/ upgraded Regional Plans and associated socioeconomic benefits”.

2. A starting point in the assessment of costs for the Regional Plans on urban wastewater treatment (UWWT) and sewage sludge management (SSM) was to determine the current status of wastewater management in various Contracting Parties and to identify the gap (primarily in terms of physical infrastructure as the most cost-intensive element) between the current status and full compliance with the RPs i.e. provision of tertiary treatment (with appropriate sludge management) for all agglomerations above 2,000 p.e. To this end, a questionnaire was developed (presented in Annex I) and shared with members of the Expert Working Group on Upgrading the Regional Plan on Urban Wastewater Treatment and developing a new Regional Plan on Sewage Sludge Management. Completed questionnaires were returned for Bosnia and Herzegovina, Croatia, Cyprus, Greece, Malta, Montenegro, Morocco and Slovenia (whereas data on collection systems and data on wastewater loads by agglomeration type were not available for Morocco). Summary of collected information is presented below (chapter 2).

3. For marine litter, a questionnaire was developed (presented in Annex I) and shared with members of the Working Group of Experts on Upgrading the Regional Plan on Marine Litter Management. The purpose was to collect data on the current state of municipal waste and marine litter management practices in different Contracting Parties for the key/ most mature measures of the existing Marine Litter Regional Plan and for some of the new measures proposed in the process of its upgrade. Completed questionnaires were returned for Bosnia and Herzegovina, Croatia, Cyprus, Malta, Montenegro, Slovenia and Turkey; partial information (on removal measures) was provided for Tunisia. Summary of collected information is presented below (chapter 3).

2. Summary of information provided in response to the questionnaires for the Regional Plans for Urban Wastewater Treatment and Sewage Sludge Management

2.1 Bosnia and Herzegovina

4. Watershed of the Adriatic River Basin in Bosnia and Herzegovina (B&H) (including areas in Federation of B&H and in Republika Srpska) has a total of 1,180 settlements¹ (1,144 below 2,000, 34 with 2,000 – 15,000 and 2 above 15,000 p.e.) and a population of 450,877; out of the total number of inhabitants, more than a half (235,608) lives in settlements below 2,000 p.e. while a population of 82,844 lives in the two settlements above 15,000 p.e.

5. Number of municipalities (usually comprising more than one settlement) in the area of application of the RP is assumed to correspond roughly with the number of agglomerations. A total of 23 smaller (2,000 – 15,000) municipalities is generating a wastewater load of 319,803 p.e. while two municipalities with more than 15,000 p.e. generate a WW load of 134,492 p.e. Connection to sewage is provided for 44.5% of population in the municipalities below 15,000 p.e. and 65% in the municipalities with more than 15,000 p.e. There is no data on the length of the existing collection

¹ Agglomerations have not been determined yet; population data is thus presented for settlements and municipalities, based on 2013 census.

system or their type/ condition, nor on the plans for their development, reconstruction and/ or separation (of stormwater collecting networks).

Table 1: Operational WWTPs for the area of application of the UWWT RP for B&H

WWTP/ area	Design capacity (p.e)	Load entering WWTP (p.e.)	Treatment (P, S, T)	Volume of WW treated (m ³)
Mostar	100,000	45,000	T	4,197,500
Citluk	14,000	14,000	T	394,930
Ljubuski	6,000	6,000	S	375,003
Konjic	5,000	5,000	T	n.a.
Jablanica ^{a)}	3,275	3,275	S	n.a.
Neum ^{b)}	30,000	3,000	P	n.a.
Grude	2,500	2,500	P	n.a.
Trebinje ^{c)}	30,000	12,443	S	1,152,600
Bileca ^{e)}	15,000	3,750	T	224,986
TOTAL	205,775	94,968		

Note: P = primary, S= secondary, T=tertiary treatment

- Jablanica system comprises five small WWTPs.
- Neum is a part of an interregional collection system Komarna – Neum – Mljet that gathers wastewater from smaller municipalities in Croatia and B&H for treatment and discharge in Croatia.
- Currently operates with capacity of 16,000 p.e. (whereas overall design capacity is 30,000 p.e.).
- Total design capacity planned in three phases; first phase (5,000 p.e.) is operational now.

6. Ten WWTPs (presented in table 1) with a total design capacity of 205,775 p.e. operate in the area of the RP application, three of which are designed for loads of more than 15,000 p.e. Total WW load entering the treatment plants is around 95,000 p.e. Share of the total load receiving primary treatment is around 6%, secondary treatment is provided for close to 23%, while the remaining 71% undergo tertiary treatment. There is no reuse of treated wastewater – the effluent is discharged into the environment.

7. Available information on industrial wastewater is presented in table 2, including estimated WW loads per sector/ group of activities, but without specific data on the shares of pre-treatment. Total load generated by industrial activities is estimated at around 174,000 p.e.

Table 2: Wastewater generation by industrial activities in the area of the RP application in B&H

Industrial sector*	Brief description of the sector	Generated WW load (p.e)
FEDERATION B&H		
Wastewater containing mineral oil	46 water permit holders for separation of stone material, concrete production, cutting stone and similar activities. Majority does not discharge to WWTPs, has oil and grease separators or sedimentation tanks, and meets effluent requirements for mineral oils and suspended solids.	4,711
Food sector – animal and vegetable products	28 water permit holders, mainly for dairy production (largest 2,027 p.e., most less than 500 p.e.) and production of alcoholic and non-alcoholic beverages (largest 1,186 p.e.); usually discharge to public collection systems following some pre-treatment (e.g. separation of oils and grease in dairy production). Most of installations discharging to the environment do not meet the ELVs.	10,023 ^{a)}
Food sector – Meat industry and fish processing	9 water permit holders for activities such as slaughter of animals (largest 722 p.e), meat processing (largest 668 p.e.), fish processing (3 installations, largest 5,730 p.e. remaining 2 below 500 p.e.). Most discharge directly to the environment, two have own WWT.	10,516

Industrial sector*	Brief description of the sector	Generated WW load (p.e)
Metal production and processing	13 water permit holders; most installations discharge directly to the environment, 3 have their own WWT and mainly report compliance with regulations (cases of non-compliance usually refer to some heavy metals and toxicity to <i>Daphnia magna</i>). Others have until the end of 2023 to comply.	13,638
Agriculture: chicken and pig farms, fish farms	25 water permit holders, including farms (9) and fish farms (16); load for fish farms estimated on a basis of total annual production. No discharges into collection system.	14,920
Waste and wastewater management	One sanitary landfill and many non-sanitary ones. Load estimated on the basis of landfill surface (197,946 ha), precipitation (1,320 mm/year) and average load of nitrogen for drained water (724 kg N per year per ha).	45,193
Chemical sector	5 water permit holders, mainly not including primary production of plastic materials or chemicals; one detergents factory with own WWT.	1,603
REPUBLIKA SRPSKA^{b)}		
Metals production and processing	Swisslion IAT Trebinje producing tools from high quality (molybdenum, cobalt and other grades) high speed steels.	4,151
Energy production	Lignite powered thermal power plant Gacko, total installed power of 600 MW, phase 1 (300 MW) operational at the moment.	69,468
TOTAL B&H		174,223

a) Load calculated based on the data for 15 installations that deliver monitoring or load reports.

b) Listed industries are the biggest ones, reported figures are for 2015; for smaller industries (including food, textile industry, hotels, gas stations etc.) data was not available.

8. In the Federation of B&H, Regulation on the conditions for discharging wastewater into the environment and the public sewerage system (Official Gazette of Federation of BH No 26/20, 96/20) sets limit values for discharges of treated wastewater for BOD, COD, TSS and NH₄-N, as well as for P tot and N tot for tertiary treatment. WWTP operators are obliged to conduct monitoring 2 – 12 times per year depending on their size, and to report on emission loads in p.e. every two years.

9. In Republika Srpska (RS), Rulebook on the conditions for discharging wastewater into surface waters and public sewers (Official Gazette of RS No. 44/01) determines conditions for wastewater discharges and WWTP effluents, sets limit values of harmful and hazardous substances that may be discharged into surface waters (limit values for WWTPs are set for BOD, COD, TSS, and for P tot and N tot for tertiary treatment), etc. The Rulebook also prescribes obligation for wastewater monitoring as follows:

- Collection of UWW without treatment for more than 2,000 p.e. – once a year with measurements for 7 consecutive days;
- Collection of UWW with any form of treatment:
 - <2,000 p.e. – 4 samples per year,
 - 2,000 – 10,000 p.e. – 12 samples per year in the first year of operation and 4 samples per year in the subsequent years,
 - 10,000 – 50,000 p.e. – 12 samples per year,
 - >50,000 p.e. – 24 samples per year.

10. The same Rulebook (Official Gazette of RS No. 44/01) prescribes conditions for wastewater discharges into the public sewerage system.

11. No data was provided/ available for sewage sludge.

Key elements for the estimation of investment costs and evaluation of benefits

12. The gap in WWT capacity is determined at the level of 366,237 p.e. (generated but not collected and/ or not treated WW load); of this number, 79% is for municipalities below 15,000 and

21% for larger municipalities. Moreover, an upgrade from primary and/ or secondary treatment is needed for around 27,300 p.e. (14,900 p.e. from smaller and 12,400 p.e. from larger municipalities).

13. Based on the density (population served per km) of collection systems in Croatia, it is estimated that construction of cca 710 km of new network (around 580 km in municipalities 2,000 – 15,000 and 130 km in municipalities >15,000 p.e.) would be needed to ensure complete coverage.

2.2 Croatia

14. A total of 175 agglomerations has been identified in the area of application of the Regional Plans, with slightly over 1 million inhabitants (1,021,006). Number of inhabitants in agglomerations for which UWWT is required under the Regional Plan is 993,349.

²Table 3: Operational WWTPs for the area of application of the UWWT RP for Croatia

County	Agglomeration type	No of WWTPs	Design capacity (p.e.)	Load entering (p.e.)	Type of treatment
Dubrovnik – Neretva	2,000 - 15,000	10	119,400	33,169	P or less, with LSO
	> 15,000	1	50,000	49,772	P or less, with LSO
Istria	2,000 - 15,000	2	15,400	10,576	P or less, with LSO
	> 15,000	9	283,800	311,410	P or less, with LSO
Lika - Senj	2,000 - 15,000	1	9,900	6,450	S
	> 15,000	1	14,500	23,081	P or less, with LSO
Primorsko – goranska	2,000 - 15,000	8	89,123	55,796	P or less, with LSO
		1			S
	> 15,000	6	706,300	206,095	P or less, with LSO
Split – Dalmatia	2,000 - 15,000	5	65,210	31,694	P or less, with LSO
	> 15,000	4	347,100	222,820	P or less, with LSO
Sibenik – Knin	2,000 - 15,000	2	23,975	5,878	P or less, with LSO
		1			70,000
	1	S			
Zadarska	2,000 - 15,000	1	16,400	6,482	P or less, with LSO
		1			S
	> 15,000	2	163,005	100,684	P or less, with LSO
		1			S
TOTAL		57	1,974,113	1,112,010	
By agglom. type	2,000 - 15,000	31	339,408	150,045	
	> 15,000	26	1,634,705	961,965	

15. There are 73 agglomerations of 2,000 – 15,000 p.e. and 31 agglomeration with more than 15,000 p.e.³; for the first group of agglomerations, 47% of population is connected to WW collection

² Note on abbreviations used in the table for the type of treatment: P = primary; LSO = long submarine outlet; S = Secondary

³ Two cities – Split and Rijeka – have population above 100,000.

systems, 71% for the latter (i.e. for agglomerations with more than 15,000 p.e.). Total length of WW collection systems for the agglomerations 2,000 – 15,000 p.e. is 720 km (out of which 106 km or 14.7% combined – stormwater and sewage – and 614 km of separated collection system). Total length of collection system in agglomerations with more than 15,000 p.e. is 2,944 km (917 km or 31.1% combined and 2,027 km separated).

16. Total generated wastewater load (from all agglomerations above 2,000 p.e.) is 2,064,914 p.e. (508,435 from agglomerations 2,000 – 15,000 p.e.); 54% of generated load is collected for smaller agglomerations and 69% for agglomerations above 15,000 p.e. For agglomerations up to 15,000 p.e. 52% of collected load undergoes primary treatment (P) and 2% secondary treatment (S). For larger agglomerations primary treatment is provided for 83% of the collected load and secondary treatment for 6%. There is no tertiary treatment. Total wastewater load treated is 1,112,010 p.e. (54% of the total generated wastewater).

17. Wastewater treatment is provided through 57 operational WWTPs (five of which are providing for secondary treatment) – 31 in agglomerations 2,000 – 15,000 p.e. and 26 in agglomerations of more than 15,000 p.e. (as presented in table 3). Total design capacity of operational WWTPs is 1,974,113 p.e. All treated water is discharged into environment (no reuse); WW load entering the plants is 1,112,000 p.e.

18. Reconstruction of the existing WW collection system/ construction of new ones (or both) is needed for most of the 104 agglomerations to which the RP applies; the same is true for collection of stormwaters, either in combined or separated systems. Since the area is a karstic one, these works are very demanding and expensive. The plans for WWTP development include primary treatment plants for 30 agglomerations, secondary treatment for 50 agglomerations and tertiary for 9 agglomerations⁴.

19. Industrial wastewater discharges are regulated through environmental and water rights permits. The permitting procedures are based on the Water Act (Official Gazette 66/19) and related plans (River Basin Management Plans), the Ordinance on issuing water rights documents (Official Gazette 26/20) as well as on the Ordinance on limit values for wastewater emissions (Official Gazette 26/20); best available techniques (BAT) are taken into account in the issuance of permits. Pre-treatment obligations to comply with environmental/ water right permits are largely met for textile, metal processing, agriculture and chemical sector installations operating in the area of application of the RP (where the shares of pre-treated wastewater vary between 97 and 100%). Share of pre-treatment in food sector is around 65%, and for waste and wastewater management around 55%.⁵

20. For the food sector (1,462.34 t/ year generated WW load), three facilities are discharging into recipients (following secondary treatment - membrane bioreactor). Eighteen facilities are discharging into collection systems; both primary (flotation, equalisation, neutralisation, settling, oil and grease separation) and secondary treatment (conventional treatment-activated sludge, rotational bio-reactor, cyclic-batch reactor) are applied. For the waste and wastewater management sector (5.3 t/year generated WW load) one facility discharges into recipient (secondary treatment - membrane bioreactor) and four to collection systems. For the latter, pre-treatment options include flotation, flocculation and coagulation as well as secondary treatment (cyclic-batch reactor with additional treatment with reverse osmosis).

21. Monitoring of WWTPs effluent depends on the size: for WWTPs $\geq 100,000$ p.e. 24 samples per year are analysed, whereas monitored parameters include BOD₅, CODCr, TSS; N tot, P tot, pH,

⁴ National plans are aligned with requirements of the Urban Waste Water Treatment Directive. Planned level of treatment, depending on the generated load of an agglomeration, is decided upon the sensitivity of the receiving area – more stringent treatment requirements apply to agglomerations with generated load above 10,000 p.e. which are discharging to the recipient delineated as sensitive area.

⁵ Leather production/ fur processing and printing blocks production/ publication and graphic arts industries are not present in the area of application of the RP.

Tot Oil, Min Oil (as total hydrocarbons with C10-C40), phenols, detergents and heavy metals. Frequency is reduced for smaller size WWTPs, for example to 4 times a year for 2,000 – 10,000 p.e. for BOD₅, CODCr, TSS and if appropriate N tot and P tot⁶; if needed, samples are analysed 4 times a year for Tot Oil, Min Oil (as total hydrocarbons with C10-C40), phenols, detergents and heavy metals.

22. Generation of sewage sludge is estimated at between 1,500 and 1,800 tonnes of dry matter annually; there are no detailed data on sludge treatment processes, but the general treatment provided includes dewatering and stabilisation. Around 90% of generated quantity is landfilled or kept at lagoons/ storage areas, while the remaining 10% is composted.

Key elements for the estimation of investment costs and evaluation of benefits

23. Based on the population connection rates and the existing density of the collection system (number of km serving given share of population), the gap or the need for new collection systems to reach 100% coverage has been estimated at 3,640 km in total. Significant additional costs would be incurred if reconstruction of the existing network and separation for combined sewers was implemented. Assuming that 35% of the existing separate collection system necessitates reconstruction and that separation is feasible for 75% of the combined sewage network, further interventions could be needed for another 1,690 km.

24. Taking into account currently generated load, it was estimated that new WWTPs are needed to allow for treatment of additional load of 952,451 p.e. – 360,989 in agglomerations 2,000 – 15,000 p.e. and 591,462 in agglomerations > 15,000 p.e. To meet the requirements of the UWWT RP, an upgrade is needed for a load of 1,112,463 p.e. from currently provided primary or secondary (6% of the total) to tertiary treatment.

2.3 Cyprus

25. Provisions of the Regional Plans apply to a total of 57 agglomerations: 49 with 2,000 – 15,000 p.e. and 8 with more than 15,000 p.e. Total number of inhabitants is 1.03 million (790,000 in agglomerations of more than 15,000 p.e.)⁷.

26. Share of population connected to wastewater collection systems is 33.7% for agglomerations 2,000-15,000 p.e. and 97.5% for agglomerations > 15,000 p.e. The existing collections systems are separated for waste/ stormwaters, and are 20 years old on average; Limassol has recently reconstructed its collection network. Construction of 3,213.4 km of separate collection systems is planned for the coming years.

27. Overview of the operational WWTPs is provided in table 4. Total design capacity is 1.3 million p.e. encompassing nine small WWTPs (individual design capacity below 15,000 p.e.) and eight WWTPs designed to accept wastewater from more than 15,000 p.e. (six of which are with the design capacity of more than 100,000 p.e.). Total load entering the plants is 857,851 p.e. Almost all wastewater (99,7%) receives tertiary treatment and is intended for reuse. Volume of treated wastewater is around 33.6 million m³.

⁶ If one result is above ELVs, next year 12 samples should be analysed

⁷ Major cities are Nicosia, Limassol, Larnaca and Paphos.

Table 4: Operational WWTPs for the area of application of the UWWT RP for Cyprus

WWTP/ area	Design capacity (p.e)	Load entering WWTP (p.e.)	Treatment (P, S, T)	Volume of WW treated (m ³)
Vathia-Gonia-A / Nicosia	201,667	63,203	T	3,150,940
Mia Milia B / Nicosia	269,117	156,322	T	8,160,987
Anthoupolis-B / Nicosia	130,000	35,976	T	1,653,768
Limassol	272,000	240,800	T	9,187,840
Paphos	162,500	120,100	T	4,711,449
Larnaca	100,000	80,800	T	2,318,360
Paralimni	68,750	68,750	T	2,251,945
Ayia Napa	56,250	56,250	T	1,148,054
Livadhia Refugee Camp	2,000	2,000	T	109,500
Athienou	8,983	5,000	T	127,338
Lythrodontas	3,500	3,500	T	182,500
Astomeritis	14,767	7,700	T	164,005
Kakopetria	2,200	2,200	S	52,560
Agros	2,500	5,250	T	91,250
Pelendri	2,200	3,000	T	131,400
Kyperounda	2,200	3,500	T	109,500
Platres	2,000	3,500	T	73,000
Total	1,300,634	857,851	99,7% T	33,624,396

28. No data on industrial activities subject to the RP was provided.

29. Most commonly monitored parameters (pH, conductivity, BOD₅, COD, suspended solids, P tot, N tot, *E. coli* etc.) are sampled at least 12 times a year; FOG (fats, oils and grease) and chloride concentrations are measured at least four times a year. Minimum number of samples per year for specific contaminants such as heavy metals and POPs is two.

30. Total quantity of sewage sludge generated in the country in 2018 was 8,177.04 t (dry matter). The main disposal/ use options included: incineration (3.25%), application in agriculture (11.12%), composting (57.53%), biogas production (15.67%), storage at the plants (11.18%) and reuse for green areas (1.25%). The sludge used in agriculture/ green areas (around 1,000 t dry matter in 2018) is treated in compliance with the quality standards set in 86/278/EC Directive.

Key elements for the estimation of investment costs and evaluation of benefits

31. There is a significant gap in wastewater collection for agglomerations 2,000 – 15,000 p.e. and construction of around 3,200 km of separate collection systems is planned. New connections will require additional treatment capacity (at the level of tertiary treatment) of at least 180,000 p.e. in agglomerations of less than 15,000 p.e. At the same time, it will be necessary to expand treatment capacity for 7 small and 2 larger (Paralimni and Ayia Napa) WWTPs that currently operate at or above their design capacity; additional capacity needed is estimated at around 53,400 p.e. (out of which cca 41,700 for agglomerations below 15,000 p.e.).

32. Direct benefits from the RP implementation include reuse of currently treated wastewater (33.6 million m³) and of future load estimated at around 10 million m³ (following provision of wastewater collection and treatment for additional 53,400 p.e. and increase in the capacity of existing WWTPs). In 2018, around 1,000 t of sewage sludge (dry mater) was used in agriculture/ for green areas, some 4,700 t was used in composting plants and around 1,300 t for biogas production.

2.4 Greece

33. Around 12,700 small agglomerations (<2,000 p.e.) are found in Greece; more than half of these have very low numbers of inhabitants (less than 100). As regards the agglomerations to which provisions of the European Directive 91/271/EEC and of the Regional Plans apply, total number is 482: 402 agglomerations with 2,000 – 15,000 p.e. and 80 with more than 15,000 p.e.⁸

34. Total generated load from agglomerations >2,000 p.e. is close to 11,890,000 p.e. (disaggregated data by the type of agglomeration was not made available). Around 90% of the generated load is collected via collecting system; the remaining 10% are managed through Individual Appropriate Systems or the generated sewerage is transferred by trucks to waste water treatment plants. Data on the type, length and condition of the collecting system (available to infrastructure operators) was not reported; activities on extension of collection systems to cover population that is currently not connected are underway⁹.

35. All collected wastewater receives at least secondary treatment before being disposed to the environment (or reused). Around 7 % of the generated load undergoes secondary treatment, while the remaining 93% receive tertiary treatment with N and/ or P removal.

36. Total design capacity of WWTPs is 14,205,017 p.e. Total load entering WWTPs is 11,265,000. The quality of the effluent is regulated in accordance with the Directive 91/271/EEC, depending on the equivalent population of the agglomeration and the type of the receiving area. Less than 5% of the effluent is reused, mainly for irrigation purposes. The need for additional treatment (in case of reuse) is determined based on the effluent quality (existing treatment of the plant) and any further requirements stemming from the relevant legislation.

37. Nature-based solutions (NBS) are mainly applied in Greece for small agglomerations, with population equivalent of less than 2,000 inhabitants; information on the scale of NBS application is not readily available (not collected at the level of the ministry responsible for WWT).

38. The terms, conditions and quality requirements for industrial wastewater (for industries that have own treatment systems) are included in the environmental permits. When industrial wastewater is being transferred for treatment to an UWWTP, the necessary quality of the wastewater and therefore the requirements for pre-treatment are specified by the competent body (municipality, water/ wastewater companies) in the operating regulations of the facilities.

39. The frequency of monitoring, the parameters monitored, the methods applied and other relevant data and obligations for each plant is included in the environmental permit, according to the European and national legislation. For UWWTPs, the requirements of Directive 91/271/EEC are implemented.

40. The quantity of sewage sludge generated by the WWTPs serving agglomerations that fall under the provisions of Directive 91/271/EEC is around 103,500 t per year. Landfilling and incineration are the main disposal options with 36 – 37% of the total quantity each; 17% is disposed of in other manners. Some 10% of generated sludge (around 10,000 t) is used in agriculture.

Key elements for the estimation of investment costs and evaluation of benefits

41. Length of collection systems was not available and it was therefore not possible to estimate needed extension and related investment costs. It is worth of noting, however, that the country has

⁸ According to Eurostat, country's population in 2019 was 10.7 million.

⁹ In the 10th Technical assessment on UWWT Directive implementation (EC, 2020), under the National Implementation Programme for Greece it was reported that €880 million was planned investment need for the upgrade of collection systems over the period 2016 – 2023.

planned an investment of €880 million to improve collection systems (in the framework of UWTT Directive implementation, as reported in the 10th Technical assessment, EC, 2020) over the period 2019 - 2023.

42. Collection gap for all agglomerations above 2,000 can be estimated at 1,188,789 p.e. and allocated (proportional to the shares of population in respective agglomerations) in the following manner: 208,038 in 2,000 – 15,000 p.e. and 980,751 in agglomerations with more than 15,000 p.e. Additional WWT capacity will be needed for the entire load from the new collection systems (1,188,789 p.e.). Moreover, the existing capacity providing secondary treatment (cca 832,000 p.e.) will need to be upgraded to tertiary (assumed distribution is cca 145,600 from smaller and cca 686,500 from agglomerations of more than 15,000 p.e.

43. Current benefits from sewage sludge use in agriculture are low (around 10,350 t are applied); around 70% of the total quantity is incinerated and/ or disposed. Less than 5% of treated wastewater is reused.

2.5 Israel

Note: Information provided by MED POL experts for the Regional Plans development is included herewith to illustrate part of Israeli experiences with wastewater and sewage sludge management and reuse of treated wastewater; some elements are also used for the overall assessment of costs and analysis of potential benefits.

Sludge treatment and use

44. Costs of sewage sludge thickening and other treatments on and off the treatment plant in Israel is estimated at €530 per t of sludge (20% DM) or €350 per 1,000 m³ of treated WW.

45. Costs of individual treatment methods range from €10 per tonne of biosolids (20% DM) for composting in open windrows (the main composting method applied in the country) to €60 per tonne for thermal drying.

46. Out of 1 t of sludge (20% dry mater), 300 kg of compost is generated; sludge is mixed with yard wastes for composting therefore 600 kg of compost is normally produced from 1 t of sludge.

47. Farmer pays between 0 and 2.5 €per cubic metre (0.5 t) of compost. The cost of treatment is paid by WWTPs, the farmer pays for the composting plant profit; only farmers producing more profitable crops are willing to pay (others are not), but the interest of the composting plants is to release produced quantities and free their capacities (as their main income is from WWTPs).

Wastewater treatment and reuse¹⁰

48. Key figures on wastewater treatment and reuse:

- Collected and treated wastewater – 480 million cubic metres (94% of produced water);
- Reclaimed wastewater – 419 million cubic metres (86% of treated wastewater);
- Use of treated wastewater for irrigation/ in agriculture accounts for more than 40% of the total water used in agriculture;
- In 2017, share of treated wastewater in total consumption was 21% (50% came from natural sources and 29% from desalination).

¹⁰ Data from the presentation made on behalf of the Standards Institution of Israel at the ISO/TC 282 Water Reuse International Workshop held in Lisbon in May 2019.

49. As regards the reuse of treated wastewater in agriculture, three categories/ levels of treatment are of interest:

- Water effluent for restricted irrigation – after secondary treatment (activated sludge);
- Water effluent for unrestricted irrigation – tertiary treatment after depth filtration and disinfection;
- Reclaimed water from Shefdan treatment plant – after secondary treatment, water is infiltrated into a closed cell of an aquifer and after about one year of retention time it is pumped out for irrigation; it can be used without restrictions (but not as drinking water for humans and animals).

50. Water pricing reflects different resource costs and stimulates water savings. Tariffs for domestic, industrial and agricultural users are presented below:

DOMESTIC						
- first 7m ³ / person – 1.43 € m ³						
- more than 7 m ³ per person – 2.7 € m ³						
INDUSTRIAL (€ m ³)		AGRICULTURE	(€ m ³)			
			Fresh water	Reclaimed and SHEFDAN	Unrestricted irrigation	Restricted irrigation
First 15,000 m ³ per year	2.7	Within quota	0.56	0.27	0.29	0.25
15,000 – 250,000 m ³ per year	2.5	Up to 10% above quota	0.88	0.81	0.36	0.31
>250,000 m ³ per year	2.4	More than 10% above quota	1.46	1.39	0.43	0.37

WWTPs operation and maintenance costs

51. Based on a review of recent projects, O&M costs for WWTPs with design capacity >100,000 p.e. were determined at a level of cca €33 per p.e. per annum.

2.6 Malta

52. Three agglomerations (of more than 15,000 p.e.) have been identified in the area of application of the RPs in Malta, with a total number of 493,559 inhabitants. A network of 1,626 km of separate collection systems serves population in the three agglomerations. Average renewal rate of the collection systems over the past 5 years was 0.33% per annum; an estimated 5% of the network will need an upgrade over the next 15 years.

53. Total generated WW load is estimated at 620,786 p.e. Out of this amount, 89% or 552,500 p.e. is collected and treated. All WWTPs are equipped to treat to a minimum of secondary level standard, but primary treatment level is being achieved due to overloading (from non-domestic wastewater discharges i.e. from farms).

Table 5: Operational WWTPs for the area of application of the UWWT RP for Malta

WWTP/ area	Design capacity (p.e)	Load entering WWTP (p.e.)	Treatment (P, S, T)	Volume of WW treated (m ³)	Destination of the effluent (E, R)
Sant Antnin/ Malta South	120,000	9,224	S	480,000	E
Ta' Barkat/ Malta South	500,000	437,278	S	19,240,000	E and R
Cumnija/ Malta North	80,000	36,897	S	3,560,000	E and R

Gozo	46,000	31,008	S	1,490,000	E and R
TOTAL	746,000	514,407		24,770,000	

Note: P = primary, S = secondary, T = tertiary, E = environment, R = reuse

54. Four operational WWTPs (table 5) have a total design capacity of 746,000 p.e. and receive an average load of 514,407 p.e. Volume of treated wastewater is 24.8 million m³ per annum. A small but growing share of the effluent is reused, after additional treatment¹¹. In 2019, 0.88 million m³ was reused, predominately in agriculture (only 2.7% for industry). In 2020, total amount of reused water almost doubled in comparison to 2019, reaching 1.5 million m³ or 6.1% of the total volume of treated WW. A dedicated storage/ distribution system is in place for reuse in agriculture comprising seven reservoirs and a 19 km long network with dispensers. This network will be extended by an additional 65 km by the end of 2023. It is expected that the treated effluent will continue to be predominantly used in agriculture.

55. No data on industrial activities of relevance for the RP was made available. Discharges into sewage network are regulated based on ELVs set out in the Sewage Discharge Control Regulation S.L. 545.08 from 2002, the revision of which is planned by 2022.

56. Frequency of monitoring and monitored parameters depend on the size of WWTPs. For example, for 46,000 p.e. and 80,000 p.e. plants, ammonia, COD, conductivity, pH, TSS, turbidity and TOC are monitored twice a week at the WWTP inlet and outlet, using 24-hour time proportional sampling method; BOD, P tot and N tot are monitored on a weekly basis. Total costs of UWW monitoring are estimated at around €80,000 per annum.

57. Sewage sludge generation is estimated at 8,300 t of dry solids per annum. Out of this amount, 80% (6,700 t) is obtained following anaerobic digestion and the remaining 20% (1,600 t) through aerobic digestion. The entire quantity is landfilled. Malta is appraising a number of options to divert sludge from landfilling for possible reuse and/ or energy recovery. This exercise is still at a very early stage, following a Preliminary Market Consultation exercise concluded during the first quarter 2021.

Key elements for the estimation of investment costs and evaluation of benefits

58. A small (68.300 p.e. – the difference between generated and collected load) collection gap is identified. Information on the possible need of sewage network extension to collect the additional load was not available, but a planned reconstruction of 81 km of sewers was reported. The existing treatment capacity needs to be upgraded to allow for tertiary treatment. For the purpose of cost estimation, it was assumed the upgrade is needed for the currently generated load of cca 620,800 p.e.

59. Costs of the national plans to increase WWT capacity and optimise/ upgrade WWTPs for Malta south and Malta north agglomerations have been estimated at €30.8 million.

60. As regards direct benefits, around 1,5 million m³ of WWTP effluent has been reused in Malta in 2020, predominantly for agriculture; there are plans to increase reuse by more than tripling the existing distribution system by the end of 2023.

2.7 Montenegro

61. Population in the six municipalities comprising coastal zone of Montenegro (as defined in line with the ICZM Protocol)¹² was estimated at 152,896 in 2018. Overall sewage connection stands at 52%.

¹¹ Additional treatment comprises Ultra Filtration, Reverse Osmosis and advanced oxidation (UV + hydrogen peroxide).

¹² Preparation of the Adriatic River Basin Management Plan is in the final phase.

62. There are 17 agglomerations in the coastal zone: 7 with less than 2,000 p.e., 4 with 2,000 – 15,000 p.e. and 6 with more than 15,000. The wastewater load currently generated by the agglomerations subject to the RPs provisions is estimated at 23,500 p.e. in agglomerations 2,000 – 15,000 and 246,000 p.e. in agglomerations >15,000 p.e. (269,500 in total) ¹³.

63. Share of population connected to sewers (in all agglomerations) ranges from one municipality to another: from 37% in Kotor to 80% in Budva overall, but with much higher rates of 80 – 95% in dense urban areas of larger agglomerations. Total length of the existing (separate) collection systems is 406 km; their average age ranges from 10 to 40 years, and an estimated 10% of the network is in need of rehabilitation.

64. Out of the total estimated WW load of 269,500 p.e. in agglomerations above 2,000 p.e. in 2021, around 75% (203,730 p.e.) is collected. Treatment is provided for a WW load of 3,910 p.e. from smaller agglomerations (2,000 – 15,000 p.e.) and for 152,465 p.e. from agglomerations with more than 15,000 p.e. while 81% of wastewater receives tertiary and 19% secondary treatment.

Table 6: Operational WWTPs in the coastal zone of Montenegro

WWTP	Design capacity (p.e)	Load entering WWTP (p.e.)	Treatment (P, S, T)	Volume of WW treated (m ³)
Budva	100,000	78,963	T	2,885,026
Herceg Novi	69,100	49,673	T	1,923,109
Kotor – Tivat	72,500	29,619	S	1,055,317
TOTAL	242,600	158,255		5,863,452

Note: P = primary, S = secondary, T = tertiary

65. Three operational WWTPs (table 6) have a total design capacity of 242,600 p.e. and receive an average daily load of 158,255 p.e; volume of treated wastewater is 5.9 million m³ per annum. WWTP effluent is discharged into environment (no reuse).

66. Some small-scale food and metals processing industries are operating in the coastal zone, but the data on the size of these installations, generated loads and wastewater management are not readily available. The Rulebook on Wastewater Discharges into the Recipient and Public Sewerage¹⁴ stipulates the limits of pollutant concentrations for industrial wastewater discharge to a public sewerage system. For example, these pre-treatment requirements address pH adjustment to 6 – 9, temperature up to 40°C, TSS to 500 mg/l, BOD₅ to 500 mg/l, COD to 700 mg/l, P tot to 7 mg/l, oil and grease to 50 mg/l.

67. No data was available (in the reviewed sources) on how wastewater monitoring is conducted in practice; the existing legislation is highly aligned with requirements of the EU UWWT Directive.

68. Based on the volume of treated wastewater in the currently operational WWTPs, sewage sludge generation is estimated at around 3,900 t per annum (actual data was not available). Sludge treatment includes stabilisation/ aerobic digestion and dewatering; the entire quantity of dry solids is exported.

Key elements for the estimation of investment costs and evaluation of benefits

69. Rehabilitation of 45 km and construction of cca 250 km of new collections system (the latter based on the detailed assessment of a recent national WW management plan) is needed to provide for full and appropriate coverage in agglomerations above 2,000 p.e. The national WW management plan (finalised in 2019) has estimated total investment needs for the improvements in the collection

¹³ Additional load of 8,900 p.e. is estimated to be generated in agglomerations with less than 2,000 p.e.

¹⁴ Official Gazette of Montenegro Nos 045/08, 009/10, 026/12, 052/12 and 059/13.

network (including sewers, pumping stations, upgrade of sea outfalls) at €79.8 million, the bulk of which (56.3 million or 71%) is for construction of new sewers.

70. For a full compliance with the RPs requirements a new treatment capacity (tertiary) is needed for an estimated 19,950 p.e. from agglomerations 2,000 – 15,000 and 93,540 p.e. from agglomerations >15,000. At the same time, upgrade from secondary to tertiary treatment is needed for a load of around 29,000 p.e.

2.8 Morocco

71. In the area of application of the Regional Plans, there are 39 agglomerations of 2,000 – 15,000 p.e. with population of 356,100, and 27 agglomerations of more than 15,000 p.e. with population of 2,325,478; total population in the agglomerations subject to the Regional Plans is 2,681,578.

72. Overall, 152.3 million m³ of wastewater is generated per year. National level connection rate to sewage systems is 35.2%; the share of connected population in urban areas is 68.5%, while in rural areas it is 5.6%. The collection system is mainly a combined one. There is a need for rehabilitation of the existing sewers, especially the ones serving population in the old Moroccan towns. There are plans (e.g. through the national sanitation programme) for separation of stormwater collecting systems in urban areas where there is a risk of overflowing. Data on the length of new collecting systems needed to achieve full coverage with WW collection services as well as data on the share of the existing systems in need of reconstruction/ separation were not made available.

73. Around 40 million m³ of wastewater is treated in the 15 WWTPs operating in the area of application of the RPs (overview in table 7); tertiary treatment is provided for around 78% of WW entering these plants. Moreover, construction of 10 new WWTPs is underway to cover population of around 120,000, majority of which for settlements with population of less than 15,000 (3 of the new WWTPs are for settlements of 15,000 – 20,000 inhabitants). A high share (around 45%) of treated wastewater is reused (actually or with ongoing projects to provide for its reuse), mainly for watering of green spaces, stadiums, golf courses, and tourist complexes. In 2018, 16.53 million m³ of treated WW were reused; the surface of irrigated area was 825 ha.

Table 7: Operational WWTPs for the area of application of the UWWT RP for Malta

WWTP	Province	Design capacity (m ³ /day)	Load entering WWTP (kg BOD ₅ /d)	Type of treatment (P, S, T)	Volume of treated WW (m ³ / year)	Destination of effluent (E, R)
BEN TAYEB	DRIOUCH	560	180	S	204,400	E
BERKANE	BERKANE	13,000	5,600	S	4,745,000	E
DRIOUCH	DRIOUCH	1,500	550	T	547,500	R (project)
EL AROUI	Nador	1,378	550	S	502,970	E
EL HOCEIMA	EL HOCEIMA	9,600	3,800	T	3,504,000	R (project)
IMZOUREN-BNI BOUAYACH and surrounding centres	EI HOCEIMA	10,800	4,500	T	3,942,000	R (project)
KARIAT AREKMANE	Nador	1,500	500	T	547,500	R (project)
MIDAR	DRIOUCH	847	300	S	309,155	E
Nador	Nador	20,600	6,900	T	7,519,000	E
OUED LAO	TETOUAN	1,154	400	T	421,210	R (project)
M'DIQ-FNIDEQ	TETOUAN	23,405		T	3,700,000	R
RAS EL MA	Nador	5,500	1,900	S	2,007,500	R
SAIDIA	BERKANE	20,400	7,300	T	7,446,000	E
ZAIO	Nador	2,454	1,364	S	895,710	E
BOUKHALEF	Tangier	10,400		T	3,000,000	R
TOTAL		123,098	33,844		39,291,945	

Note: P = primary, S = secondary, T = tertiary, E = environment, R = reuse

74. Uses of treated wastewater and sewage sludge are regulated and/ or promoted under several pieces of legislation and national plans, most notably through the new Law 36-15 (which contains specific provisions on the 'use of unconventional water sources' and implementation of projects to ensure reuse of treated wastewater/ sewage sludge), national water plan (providing for recovery of unconventional water to strengthen water supply) and reuse master plan (aiming to: a) prevent uncontrolled use of wastewater; b) provide for reuse of the entire potential volume of 325 million m³ of treated WW by 2030; and c) preserve water resources, especially groundwater, quantitatively and qualitatively).

75. Since 2006, wastewater collection and treatment improvements were mainly implemented in line with the National Sanitation and Wastewater Treatment Programme, which gave priority to the Mediterranean Provinces. In parallel, rural sanitation programme was developed/ implemented, aiming to set up systems for collection and treatment of wastewater adapted to rural areas, also prioritising coastal municipalities. Some of the key objectives and achievements that were set and/ or implemented under the National Sanitation and Wastewater Treatment Programme are:

- Objective: achieve an overall network connection rate of 80% in urban areas and reduce pollution by at least 60% until 2020;
- Achievements in 2020:
 - connection rate 82% compared to 70% in 2005,
 - wastewater treatment rate 56% compared to 8% in 2005,
 - 153 WWTPs, including 63 with tertiary treatment,
 - 66 WWTPs under construction.

76. Building up on the results of national sanitation/ wastewater treatment programmes in urban and rural areas, the national reuse programme (approved in 2018, launched as of 2019) has the following expected results:

- Completion of 154 projects to achieve 90% connection rate and 80% wastewater treatment rate (in urban areas) by 2040;
- Completion of 1,207 projects to reach a connection rate of 50% by 2030 and 80% in 2040 and a treatment rate of 40% by 2030 and 60% in 2040 (in rural areas);
- Reuse of 474 million m³ of treated wastewater annually by 2030 and 573 million m³ by 2040.

77. The following set out the regulatory requirements on the quality of the effluent from the existing WWTPs:

- Order 1607-06 of 25 July 2006 setting specific limits for domestic discharges;
- General requirements for wastewater discharges that do not have specific discharge limit values (Official Bulletin No. 6199 of 28/10/2013 as amended by Order 17-3286 of 4/09/2017);
- Limit values for watering golf courses or green spaces.

78. Industrial sector is not well developed within Moroccan Mediterranean area, except in the Tangier – Tetouan region where significant industrial developments were seen over the course of last decade, particularly in Tangier Prefecture and Fahs Anjra Province. Basic data on the sources of industrial wastewater in the area of application of the RPs is provided in table 8.

Table 8: Industrial activities in the area of the RP application in Morocco

Industrial sector	Brief description of the sector	Generated WW load	Share of pre-treated WW
Food sector	450 facilities: production of cereals (flour), canned fish, fruits and vegetables, meat, milk, etc.	WW characteristics: high concentrations of BOD5, COD, suspended matter, nitrogen and phosphorous	
Textile sector	13+114 facilities: clothing and furs, other textiles		
Metal processing	196 installations: metalworks, metal elements and structures, construction metal, non-ferrous metals, ferro-alloys, metal processing	WW characteristics: acidic (hydrochloric, sulphuric) or alkaline (soda, cyanide) discharges, containing detergents and heavy metals (chrome, nickel, copper, zinc, cadmium, aluminum, iron, chromium, cadmium)	
Automotive industry	19 facilities (the most important is Renault plant - Port Tangier-Med)		
Cardboard industry	5 facilities		
Waste and wastewater management	16 facilities		
Rubber and plastics	37 facilities		
Shipbuilding	7 facilities		
Chemical sector	24 facilities: inorganic chemicals, fertilizers, soap, gelatin, pharmaceuticals, etc.		

79. Regulations pertinent to industrial wastewater discharges are:

- Order No. 1606-06 of 25 July 2006 setting specific limit values for discharges from pulp, paper and cardboard industries;
- Order No. 1608-06 of 25 July 2006 setting specific limit values for discharges from sugar industries;
- Order No. 862-10 of 13 April 2010 setting specific limit values for discharges from industries applying hot-dip galvanization.

80. Under the law 36-15, all discharges with potential impact on water resources are subject to a permitting procedure. Industrial discharges are also subject to authorization before any discharge is made into the public sewerage system. The permit specifies discharge conditions (such as volume, maximum throughput, discharge location, sampling procedures, etc.) and relevant limit values. In case of non-compliance, administrative or criminal charges can be raised, including the closure of non-compliant facilities. Reporting procedures and payments of pollution charges are regulated under Decree 2-04-553 of 24 January 2005 and the following bylaws:

- Order No. 3286-17 of 4 September 4 2017 setting general limit values for discharges to surface or groundwater;
- Order No. 2943-13 of 7 October 2013 on the performance of WWTPs;
- Order No. 2944-13 of 7 October 2013 setting out typical sizes and specific pollution coefficients of industrial activities.

81. Around 30,000 t of sewage sludge is produced annually (solar drying is applied); the entire quantity is disposed.

Key elements for the estimation of investment costs and evaluation of benefits

82. Based on population data and connection/ treatment rates, treatment gap i.e. the need for new WWTP capacity was roughly estimated at 265,000 p.e. in agglomerations 2,000 – 15,000 and 1,720,000 p.e. in agglomerations with more than 15,000 p.e. The need for upgrade to tertiary treatment was estimated at 20,400 p.e. in smaller agglomerations and 133,400 p.e. in larger agglomerations. It was not possible to estimate the need for extension of collecting systems.

83. Around 16 – 17 million cubic metres of treated wastewater undergoing tertiary treatment is available for reuse – mainly for irrigation of green and recreational areas.

2.9 Slovenia

84. The area of application of the Regional Plans in Slovenia comprises 4 municipalities (Koper, Izola, Piran and Ankaran) with total population of 86,784. Population is distributed in 54 agglomerations with less than 2,000 p.e. (12,923), 5 agglomerations 2,000 – 15,000 p.e. (15,570) and 3 agglomerations with more than 15,000 p.e. (49,371 inhabitants).

85. Overall share of population connected to wastewater collection systems is 91% - 70% in agglomerations 2,000 – 15,000 and 97% in agglomerations >15,000 p.e. Total length of sewers is 677 km; their average age is 33 years. Approximately 34% of the existing collection systems needs to be upgraded or renovated. No data was provided as regards type of collections systems (combined or separate).

86. Total generated WW load from agglomerations to which the RPs apply is 103,430 p.e. – 18,145 in agglomerations below 15,000 and 85,285 in agglomerations above 15,000 p.e. For smaller agglomerations, 74% of generated load (13,427 p.e.) is collected and treated (tertiary treatment is provided). Collection rate is significantly higher for agglomerations above 15,000 p.e. where 98% of

the generated load (83,579 p.e.) is collected and undergoes tertiary treatment. Overall collection/treatment rate is 94%. Key figures for the operational WWTPs are provided in table 9. The entire amount of WWTP effluent is discharged in the environment (no reuse).

Table 9: Operational WWTPs for the area of application of the UWWT RP for Slovenia

UWWTP	Design capacity (p.e.)	Load entering WWTP (p.e.)	Treatment (P, S, T)	Volume of WW treated (m ³)
Koper	84,500	70,534	T	5,926,000
Piran	33,000	12,888	T	2,202,000
Secovlje	2,000	807	T	83,000
TOTAL	119,500	84,229		8,211,000

Note: P = primary, S = secondary, T = tertiary

87. Nature-based solutions are applied in Slovenia but the information on them is not systematically collected.

88. In the area of application of the RPs, there are 3 food sector installations (generating a WW load of 3,792 p.e.) and 2 metals processing installations (1,161 p.e.). No data was provided on the share of wastewater from these installations that is discharged into collection system and/ or pre-treated. Discharges of industrial wastewater is however well regulated, based on ELVs for different activities.

89. Monitoring of wastewater discharge and treatment is conducted in the following manner (monitored parameters include BOD₅, COD, undissolved substances, ammonium, nitrogen, N tot, P tot):

- for WWTPs serving 2,000 – 10,000 p.e. – initial measurements 4 times a year, periodic measurements 12 times in the first year of operation, then 4 measurements each subsequent year;
- for WWTPs serving 10,000 – 50,000 p.e. – initial measurements 4 times a year, periodic measurements 12 times a year;
- for WWTPs serving > 50,000 p.e. – initial measurements 4 times a year, periodic measurements 24 times a year.

90. A total of 82,135 m³ of sewage sludge is generated in the operational WWTPs. The treatment processes applied are aerobic digestion and solids thickening, resulting with around 1,241 t od dry solids a year. The entire amount is disposed.

Key elements for the estimation of investment costs and evaluation of benefits

91. Slovenia is very close to full implementation of the UWWT Regional Plan requirements in terms of urban wastewater collection and treatment. Analysis of the provided data suggests that construction of additional 67 km of sewers is needed alongside with reconstruction of some 230 km of the existing network for full/ adequate coverage. In terms of load, collection gap is assessed at around 6,500 p.e. (4,718 p.e. in agglomerations 2,000 – 15,000 and 1,706 p.e. in agglomerations above 15,000 p.e.) but is not taken into account for the estimation of investment costs as the existing WWTP design capacity is sufficient.

92. Additional costs are expected to arise as the country move towards implementation of the Regional Plans' provisions on reuse of treated wastewater and diverting from sludge disposal to beneficial uses.

3. Summary of information provided in response to the questionnaires for the Upgraded Regional Plan for Marine Litter Management

3.1 Bosnia and Herzegovina

Municipal waste

93. Federal Waste Management Strategy 2008 – 2018 (development of a new strategy is underway) and Waste Management Plan of Republika Srpska are the key documents. They include objectives such as:

- reduction of waste for final disposal/ more efficient use of resources;
- increasing coverage with organized waste collection and disposal services (target is 85% of population by 2024);
- establishment of a system of separate collection of municipal waste components (the goal is 10% of the total amount of collected municipal waste i.e. 25% total quantities of packaging waste by 2024).

94. Waste management is regulated through an elaborate set of laws and bylaws, the objectives of which refer to specific elements of the waste hierarchy. Implementation of the is, however, not evident as recycling rates remain low and many targets are not reached. In the absence of other measures, low waste management costs are insufficient to allow for a more substantial progress.

95. Main issues faced in the implementation of current policies and plans include lack of measures to support waste prevention and transition to a circular waste management economy, inadequate system for data collection, monitoring and reporting, lack of financial incentives, insufficiently developed infrastructure for waste collection and disposal, under-developed public awareness on proper separation, collection and disposal of waste, etc.

Key figures:

Population (area of the RP implementation)	450,877
Urban – rural share	41% urban and 59% rural
Share of population covered with waste collection	77% (more or less full coverage in larger settlements but dropping to lower levels in rural areas)
Separate waste collection	Introduced in some municipalities for electrical and electronic waste, glass, paper and plastic; two waste sorting lines have been installed (Mostar, Konjic) where sorting of previously separated dry recyclable or mixed waste is performed
Reuse and recycling rates	Only 9 out of 25 municipalities in the Adriatic Sea Basin are recycling part of their waste. Around 3.5% of total collected waste is recycled
Targets on plastic waste collection and recycling	Waste Management Plan in RS: at least 20% of plastic packaging by 2024 Federation Waste Management Strategy and relevant legislation: 15 – 16% of plastic packaging waste by 2016. 2018
Main disposal options	Landfills (including non-sanitary landfills for urban areas and illegal waste dumps for rural areas)
Share of plastic waste going to landfill or incineration without energy recovery	n.a.

The LBS National Action Plan

96. National Action Plan (2015) in Bosnia and Herzegovina includes following measures related to marine litter:

Measures	Timeframe	Costs
Development of legislation and institutional authority (based on state administration and in accordance with institutional responsibilities) for marine monitoring methodology and management strategies that will include, in addition to sea water, and monitoring of marine litter, sediments and biota by 2019	Until 2019	250,000 €
Development of a monitoring program for the Mediterranean area in B&H with an emphasis on the marine environment and protection until 2019	Until 2019	200,000 €
Establishment of a legal instrument that will require separate waste collection in industries as a mandatory activity by 2025	Until 2025	50,000 €
Establishment of a system (companies in charge of waste management, infrastructure for municipal waste collection, management of collection / separation / reuse / safe disposal of separate waste components schemes) for municipalities with more than 10,000 inhabitants (50% of municipalities by 2019, 95% of municipalities by 2025)	Until 2025	300,000 €
Ensuring an adequate hazardous waste management system (with an emphasis on waste containing POPs) and contaminated areas.	Until 2021	2,800,000 €
Establishment of a coordination mechanism and improvement of the institutional framework for the implementation of the Stockholm Convention by 2019	Until 2019	250,000 €
Development of a cost-effective tool that would make internal waste disposal more competitive.	Until 2020	50,000 €
Construction of a sanitary landfill in line with EU standards for Mostar. This landfill will be used for accepting waste from the municipalities of Jablanica, Konjic, Čitluk, Čapljina, Stolac, Ravno with a planned place for disposal of inert waste - until 2020	Until 2020	18,500,000 €
Construction of a sanitary landfill in accordance with EU standards for the municipalities of Livno, Bosansko Grahovo and Glamoč with a planned site for inert waste disposal - by 2020	Until 2020	2,500,000 €
Construction of sanitary landfills in accordance with EU standards for the municipality of Neum and closure - by 2019 - designated in advance as a waste collection and recycling centre	Until 2019	500,000 €
Closure of illegal landfills in the cross-border area by 2019	Until 2019	40,000,000 €
Construction of a sanitary landfill in accordance with EU standards in the Trebišnjica river basin with a planned place for inert waste disposal - by 2020	Until 2020	2,500,000 €
Construction of stations for initial separation and sorting of waste for municipalities (more than 10,000 inhabitants) in all river basins - by 2020	Until 2020	13,500,000 €
Support, promote and facilitate a program to assist in the control and reduction of pollution in the field of scientific, technical and human resources. Especially multi-year programs (3-5 years)	Until 2025	2,000,000 €

Closure of the existing dump sites

97. Cost related to the closure of illegal dump sites estimated at €40 million in the NAP.

Prevention measures

98. **Extended producer responsibility** system introduced for packaging and packaging waste in the FBiH and RS, for electric and electronic waste in the FBiH; application is unsystematic due to different approaches in the two entities.

99. Dm retail chain stopped using **plastic bags** in all its stores and is offering various types of recycled durable shopping bags to customers as an alternative. In 2014, a fee was introduced in FBiH for bags with wall thickness of 20 microns or less; legislation introducing a new fee for all plastic bags with wall thickness up to 50 microns is currently being prepared in the FBiH. Effectiveness of the measure is reduced since RS does not implement such instruments, which complicates control of production and placing on the market plastic bags in BiH.

100. **Deposit refund system** is in place (with a limited scope) for glass bottles.

Removal of the existing marine litter

101. Regular **clean-up activities** organise in Neum involving various stakeholders (e.g. divers, small businesses, beach concession holders, etc.), addressing litter from beaches and from seabed. Moreover, clean-up campaigns have been organised as a part of various projects.

102. **Adopt-a-beach** pilot projects were implemented in 2018 – 2020 as a part of activities aiming to promote marine litter management and best practices in the Adriatic and enhance MLM in the Mediterranean. Some **Fishing-for-litter** activities implemented in the framework of DeFish gear project.

National ML monitoring and assessment

103. No systematic marine litter monitoring yet. National monitoring programme for pollution and marine litter has been prepared but not adopted. Some ML monitoring activities have been implemented through different projects, including two pilots in 2018 and 2019 that were carried out in line with IMAP requirements.

Awareness raising and education

104. Awareness raising campaigns o marine litter were implemented through the projects such as DeFish gear, pilots to promote MLM management and dm's "TOGETHER" initiative.

3.2 Croatia

Municipal waste

105. Applicable plan (relevant for all types of wastes) is Waste management plan of the Republic of Croatia for the period 2017-2022. Sustainable Waste Management Act (OG 94/13, 73/17, 14/19, 98/19) – article 7 (1) prescribes/ stipulates waste management hierarchy; article 16 regulates waste management in marine environment.

Key figures:

Population (area of the RP implementation)	1,021,006
Urban – rural share	
Share of population covered with waste collection (2019)	99% in 2019
Separate waste collection (2019)	94% of local self-government units for least one fraction (paper, plastic, glass ore metal); 75% of LSGUs for all 4 fractions
Reuse and recycling rates (2019)	Recycling rates: - 30% of total MW - 37% for separated metal, glass, plastic and paper (in relation to generated quantities)
Targets on plastic waste collection and recycling	60% of individual types of MW (paper / cardboard, glass, plastic, metal, biowaste and bulky waste) collected separately by 2022 Minimum recycling of 22.5% of packaging waste
Main disposal options (2019)	59% of total generated MW landfilled
Share of plastic waste going to landfill or incineration without energy recovery (2019)	- 1.6% of separately collected plastic packaging landfilled; no reliable data on the total quantity landfilled, assumed to be significant - no incineration without energy recovery for plastic packaging

106. **Informal sector** does not play an important role in waste collection and recycling.

The LBS National Action Plan

107. The main marine litter measures are included in the programme of implementation of the Waste Management Plan of the Republic of Croatia for the period 2017 – 2022 (measures 22 – 31). Marine Strategy's Programme of Measures also addresses marine litter.

Closure of the existing dump sites

108. Data is only available for the official landfills; during the past 5 years, total of 48 official landfills have been closed.

109. Total number of active and closed landfills (total landfilled waste) by the end of 2019:

Year	Number of official landfills	Active	Closed	TOTAL DISPOSED WASTE (kt)
2016	316	141	175	1,769.572
2017	316	130	186	1,683.640
2018	317	127	190	1,601.602
2019	317	116	201	1,593.402
2020	317	93	224	Not available yet

110. Remediation and closure of the existing landfills or their conversion into transfer stations or recycling yards will continue in parallel with the construction of the new waste management centres, complying with the requirements of the Landfill Directive. 11 centres are planned. This activity combined with planned increase of primary separation will further lead to the considerable reduction of biodegradable municipal and other waste on landfills.

111. An initiative was launched in 2020 to register unofficial (illegal) waste disposal sites.

Primary and secondary microplastics

112. There are still no legislative requirements and regulations related to the treatment of microplastics in Croatia.

Prevention measures

113. **EPR system** for packaging (non-hazardous¹⁵), WEEE, Batteries, ELVs, waste lubricant oils and waste tyres, was established in the period from 2005-2007 and is still in force. The existing systems cover costs of separate collection of waste and its subsequent transport and treatment, costs of providing adequate information to waste holders and costs of data gathering and reporting. When placing products (covered by EPR) on the market, producers are obliged to register, submit reports and pay the prescribed fees (waste management fees) to the Environmental Protection and Energy Efficiency Fund, which entirely covers the above costs from these fees. Producers or distributors that paid the prescribed fees to the Fund have no further obligations in connection with the collection and treatment of waste generated from their products.

114. Improvements in the EPR system are planned, including fee modulation in order to ensure that financial contributions paid by the producers of the product are modulated for individual products, or groups of products, by taking into account their durability, reparability, re-usability and recyclability and the presence of hazardous substances. The aim is to ensure the fees do not exceed the costs that are necessary to provide waste management services in a cost-efficient way and that they are established in a transparent way between the actors concerned.

¹⁵ Producers of products containing hazardous substances are obliged to organize collection system and treatment of respective packaging waste (there are no prescribed fees for such packaging and no authorised collectors) at their own expense.

115. Special measures are planned the problem of “free-riders” (long distance sellers) in order to include these entities in the national EPR systems, which would make the distribution of EPR fees and costs fairer and more transparent.

116. Moreover, digitalisation of the EPR systems and the establishment of a register of producers (EPR payer) is planned alongside with information and educational activities (including educational campaigns to inform the public about waste management, including on changes in the waste management system at the national and EU levels.

117. The following provisions on **plastic bags** apply:

- provision of free-of-charge lightweight plastic carrier bags is prohibited as of 2019; if providing lightweight plastic carrier bags free of charge, the sellers are obliged to post notices that these bags should be used sparingly;
- as of 2017, producers and distributors are obliged to keep records and submit reports on the quantities of plastic bags (< 15 microns, ≥ 15 < 50 microns and ≥ 50 microns) placed on the market in Croatia;
- Energy Efficiency and Environmental Protection Fund is obliged to conduct a public information and awareness campaign about the negative impact of excessive consumption of plastic carrier bags on the environment.

118. The new Waste Management Act (expected this year) proposes a ban on the placing on the market and use of plastic carrier bags with a wall thickness of less than 50 microns. Placing on the market and use of plastic carrier bags with a wall thickness below 15 microns which are required for hygiene purposes or provided as primary packaging for loose food when this helps to prevent food wastage will be still allowed. Placing on the market and use of plastic carrier bags with a wall thickness of 50 microns and/ or more will be also allowed. The ban is intended to encourage the use of thicker plastic bags as they end up discarded in the environment much less frequently than lightweight plastic bags due to their higher weight and reusability. In addition, the use of bags made of alternative materials, such as textile bags or paper bags, is encouraged.

119. Since 2005, sellers (producers) who sold products in plastic bags were obliged to pay a prescribed fee to the Croatian Environmental Protection and Energy Efficiency Fund. Until 2008, this fee amounted to cca 98 €750 HRK per tonne and from 2008 it was especially prescribed for plastic bags as a product and raised to cca 196 €1.500 HRK per tonne. This fee applies to all plastic bags, regardless of their thickness, and regardless of whether they are single-use carrier bags or reusable bags. The fee contributed to termination of uncontrolled and free of charge distribution of plastic bags. Leading retail chains, covering 80% of the Croatian market, have begun charging for plastic bags and today most of plastic bags in stores are paid for (app. 4 euro cents/ unit or more). As a result, reduction in the consumption of plastic bags of 65% was recorded compared to 2010.

120. The new Waste Management Act will transpose provisions of the Directive (EU) 2019/904 on the reduction of the impact of certain plastic products on the environment, especially in view of restrictions on placing on the market and marking requirements of **single-use plastic products** (SUP) products.

121. Croatian "returnable fee system" (**deposit refund system**) established in 2005 is the system for managing single use beverage¹⁶ packaging made of PET, Al/Fe and glass with volumes equal to or exceeding 0.20 l. The system includes payment of a fee as an incentive stimulating the waste holder to separate beverage packaging from other waste and deliver it to the seller or recycling site manager in

¹⁶ Milk and liquid dairy products will be included in the system as of 1 July 2021.

exchange for app 7 euro cents/ 0.50 HRK per packaging unit. The refundable fee is a cash amount paid to the Environmental Protection and Energy Efficiency Fund from the producers that place on the market beverages. A producer charges the amount of the refundable fee to the buyer, and the end-user or consumer can get it back from the seller or recycling site manager. A seller of beverages at a point of sale larger than 200 square meters is obliged to accept beverage packaging waste from consumers non-stop during the working.

122. Croatia is a contracting party to the International Convention for the Prevention of Pollution from Ships (MARPOL 73/78 Convention), which *inter alia* requires the contracting parties to provide appropriate **reception facilities in ports**. The Maritime Code (Official Gazette 181/04, 76/07, 146/08, 61/11, 56/13, 26/15, 17/19) provides that vessels and floating facilities may empty the storage of solid and liquid waste, oily water, faeces and cargo residues as well as all other substances that pollute the sea and coast only in places in the port or outside where there are devices for receiving these substances. Other bylaws regulate port reception facilities and acceptance of waste from ships (including reporting) in more detail. Transposition of the Directive (EU) 2019/883 on port installations for the acceptance of ship-generated waste (amending Directive 2010/65 / EU and repealing Directive 2000/59 / EC) into national law is planned. New legal provisions are to be implemented in fishing ports of Tribunj, Brizine near Split and Vir on the island of Hvar, planned after completion of the fishing port Sustjepan near Dubrovnik.

123. Introduction of a **management fee for placing on the market of fishing gear containing plastic** is planned under the new Waste Management Act. Producers will pay this fee to the Fund, while the Fund will finance the entire costs of collection, transportation and treatment of waste fishing gear containing plastic and also the costs of awareness-raising measures.

Removal of the existing marine litter

124. In 2018, about 60 eco-actions of collecting waste from the sea and the coast were carried out in the area of competence of the Port Authorities, organized by coastal units of local or regional self-government, institutions, associations and interested individuals, while activities continued in the following years. In 2019, ten waste clean-up actions were organized in the coastal and/ or submarine area and 8.6 tonnes of mixed and bulky waste was collected. In 2020, six waste collection actions were organized in the coastal and/ or submarine area, and a total of 7 tonnes of mixed and bulky waste was collected.

125. Croatia is taking part in Coastal Clean-up Campaigns, organised with participation of local population, NGOs, volunteer groups, scuba diving associations and other stakeholders, logistically assisted by the local government. These actions lack a systematic approach.

126. The experiences on the implementation of the Fishing-for-litter initiative were gathered within two EU projects: DeFishGear implemented between 2014 and 2016 and ML-REPAIR between 2018 – 2019. During the DeFishGear project, Ffl pilot-activities were carried out in cooperation with the two fishing cooperatives. With the ML-REPAIR project, the same activities were expanded in agreement with port authorities and local governments, whereas 9 fishing ports and/ or landing sites were included. In total, 37 trawlers with about 130 fishermen were participating in the both pilot-activities.

127. Through the DeFishGear project, 30.8 t of ML were collected in the Central Adriatic Sea. Plastic was the most common item representing 42% of the total amount. Costs of litter removal and disposal during project implementation were paid by project funds. With the completion of the project, the activities continued with the costs incurred by the City of Hvar, and the fishery cooperation "Adria".

128. With the ML-REPAIR project, the pilot project activities have been continued and expanded. Waste reception facilities (bins) were installed in fishing ports near the mooring areas. During the project activities from June 2018 to May 2019, around 37 t of litter were collected from an area covering nearly 30% of the sea bottom of the Croatian Adriatic. Fishermen collected between 6 - 20 kg of litter/ day.

The most common type of litter was still plastic, including plastic bags and their parts, wrappers and plastic bottles.

National ML monitoring and assessment

129. Since 2017, Croatia has been implementing a systematic monitoring for all elements of marine litter. This includes the litter deposited on beaches, floating and seabed litter, as well as microplastic in sandy sediment on beaches, the sea surface, and in the digestive tract of fish. ML monitoring is conducted in compliance with MSFD monitoring and reporting obligations stated in document “Monitoring system for ongoing assessment of Adriatic Sea (OG 21/2021) which takes in account elements and elements criteria defined in Commission Decision (EU) 2017/848 (GES Decision). Monitoring is currently conducted 2 times a year; before and after the tourist season.

130. Marine litter assessments (including socio-economic aspects) are not carried out.

Awareness raising and education

131. The Institute for Environmental Protection and Nature has developed the Waste Prevention Portal with general information on waste prevention, prescribed measures, activities conducted in Croatia, as well as other information relevant for the topic. The Portal allows data entry and search of the waste prevention projects and activities carried out by municipalities or public service providers. These are mostly activities co-financed through Cohesion Fund and Croatian Environment Protection and Energy Efficiency Fund (7.2 million € 54.6 mil. HRK), related to implementation of Croatian Educational and Information Programme on Sustainable Waste Management.

3.3 Cyprus

Municipal waste

132. A set of waste management plans and programmes is in place (with a time horizon up to 2021 or 2022) on prevention, waste management in general and for specific waste streams. Reduction at source and prevention are at the core of the Waste Prevention Programme 2015 – 2021 and Municipal Waste Management Strategy 2015 – 2021 that include measures to implement separate collection and provide incentives for the reduction and appropriate management of wastes (such as Pay-As-You-Throw scheme and information and awareness-raising to change production and consumption patterns). The aim was to implement waste hierarchy by reducing waste generation, including through a change in consumers' habits for all major waste streams, in particular for food and other organic waste, and by promoting re-use and recycling alongside with the principles of circular economy. The waste hierarchy is integrated in the national legislation which transposes the EU waste directives.

133. Targets set under the Municipal Waste Management Strategy includes are aligned with the EU ones (50% recycling by 2020, 60% recycling for packaging waste etc.) or go further in some cases (40% separate collection of MW or 20% landfilling). The Strategy has provided a framework for the implementation of a number of important measures including important infrastructure improvements, such as the construction of the two MBT plants; enabling the closure of all illegal landfills and the construction, operation and scheduled expansion of the Green Points Network; the implementation of separate collection programmes for recyclable and organic waste in coastal tourist areas; and the initiation of nation-wide training programmes. More importantly, it has provided the basis for preparation of the necessary legislative framework for the management of municipal waste by local authorities, assigning obligations for the preparation of local waste management plans and waste prevention programmes, the establishment of separate collection systems for a number of waste streams, including organic waste and the adoption of a pay-as-you-throw scheme. It is expected that the relevant regulations will be adopted in the first half of 2021.

Key figures:

Population (area of the RP implementation)	1,030,000
Urban – rural share	
Share of population covered with waste collection	
Separate waste collection	Separate collection of municipal waste will become mandatory throughout upon adoption of regulations expected in 2021
Reuse and recycling rates (2019)	15% of the total municipal waste produced
Targets on plastic waste collection and recycling	The EU targets for the separate collection of plastic packaging waste and single use plastic bottles apply
Main disposal options	
Share of plastic waste going to landfill or incineration without energy recovery (2017)	65% of plastic packaging placed on the market was recycled, the rest landfilled

The LBS National Action Plan

134. The LBS National Action Plan has been prepared.

Closure of the existing dump sites

135. In 2005, the Strategic Plan for the Restoration of Uncontrolled Waste Disposal Areas was adopted for the rehabilitation of the uncontrolled waste disposal sites registered throughout the territory of Cyprus. 37 uncontrolled waste disposal sites in Paphos ceased operation in July 2005, when the Paphos landfill site came into operation, while 15 sites in Larnaca-Famagusta were shut down in 2010, when the Integrated Waste Management Facility of Koshi came into operation. Their rehabilitation was completed in 2014-2015, by the Ministry of Interior.

136. The uncontrolled waste disposal sites in Limassol (excluding the illegal landfill at Vati) and Nicosia (excluding the illegal landfill in Kotsiatis) were closed in 2012. The sites in Kotsiatis and Vati permanently ceased operation for all waste streams. The rehabilitation of the 23 sites in Nicosia and the 19 sites in Limassol is expected to be completed by the beginning of the end of 2022/beginning of 2023. The rehabilitation of Kotsiatis and Vati is also expected to be completed by the end of 2022/beginning of 2023, while the possibility of utilizing the biogas for electricity generation is currently assessed.

Prevention measures

137. **EPR schemes** are in place for packaging waste, WEEE, batteries and accumulators, non-packaging paper and tires. Regulations have been prepared for the establishment of EPR schemes for household medical products and plastic from greenhouses.

138. A National Action Plan for **Green Public Procurement** has been adopted in 2007 and is under revision to include restrictions and prohibitions of **SUP** according to EU Directive. A National Regulation to adopt the EU Directive for SUP has been prepared; online webinars were organised on the content of the SUP Directive to inform and provide clarifications to industry (manufacturers, importers and distributors).

139. Use of lightweight **plastic bags** is charged at all points of sale (€0.05 plus VAT); regulations have been prepared to ban their use at points of sale.

140. Regulations have been prepared for the establishment of a national **DRS scheme for beverage packaging**.

Removal of the existing marine litter

141. In the framework of LIFE EUROTURTLES¹⁷, around 500 kg of ghost nets were removed from the seafloor of the Polis bay in Cyprus.

142. Clean-up campaigns are regularly organized by NGOs and private companies during and out of tourist season.

National ML monitoring and assessment

143. Systematic monitoring is in force according to the EU Directives – WFD and MSFD, and IMAP of UNEP/MAP. National Monitoring Programs for Marine Litter on Beach Litter and Seafloor Litter, started in 2018 according to EU and IMAP Protocols. Monitoring takes place every three months on at least 6 beaches and seafloors.

144. Seafloor marine litter data are also gathered by the MEDITS programme every year from different areas of Cyprus. Other relevant projects include Interreg projects MELTEMI, RECONNECT and BLUEISLANDS¹⁸, as well as ZERO WASTE BEACH” (extensive awareness-raising campaign, targeting all coastal businesses on the island) and MARLISCO MARine Litter in Europe Seas: Social Awareness and CO-Responsibility (2012-2015).

Awareness raising and education

145. The above-mentioned projects also relevant for awareness raising activities.

3.4 Malta

Municipal waste

146. The new National Waste Management Plan for the period 2021-2030 shall be published shortly. The objectives of the Plan are the following:

- Maximise the resource value in waste through different management options;
- Innovate by designing waste prevention initiatives to lower Malta’s per capita generation rate;
- Reform the collection system to increase economies of scale, harmonise collection practices and modernise the collection fleet;
- Build the necessary waste management facilities to treat recyclable, organic and residual waste to achieve Malta’s targets;
- Study the feasibility of an enhanced producer responsibility framework to complement Malta’s transition to a circular economy and reflect further on the true cost of waste management; and
- Promote further the involvement of the private sector in waste management.

The Plan is developed based on the waste hierarchy principles, whereby waste prevention is favoured upon preparing for re-use, recycling and other waste management operation.

¹⁷ <https://www.euroturtles.eu/>

¹⁸ <https://meltemi-balkanmed.eu/>; <https://reconnect.hcmr.gr/>; <https://blueislands.interreg-med.eu/>

Key figures:

Population	450,877
Urban – rural share	No distinction, high population density (1,500 inhabitants/km ²)
Share of population covered with waste collection	100%
Separate waste collection	Yes, from households for: comingled recyclables (plastic, paper, metal); glass; organic waste; and bulky refuse (free service for bulky waste, upon request)
Reuse and recycling rates (2017)	Recycling rates: 17% household waste; 36% packaging waste; 29% glass packaging; 19% plastic packaging; paper and cardboard 51%; 42% metal packaging
Targets on plastic waste collection and recycling	In line with the EU Directive 94/62/EC on Packaging and Packaging Waste
Main disposal options	For plastics: export for recycling, export as mixed waste for incineration with energy recovery, and landfilling
Share of plastic waste going to landfill or incineration without energy recovery	

147. Given Malta's geographical characteristics, which do not allow for the development of a full array of treatment solutions, the country lacks waste recycling infrastructure. This makes Malta highly dependent on export of waste for recycling. A direct consequence of this is that the associated costs for recycling are driven by certain market factors.

Primary and secondary microplastics

148. Measures on microplastics will be taken within the framework of the EU MSFD.

Prevention measures

149. **EPR** is in place for packaging materials, batteries and accumulators, electrical and electronic equipment and vehicles. Transposition of the SUP Directive is underway, whereby the existing EPR scheme will be strengthened and products included.

150. **Green Procurement Policies (GPP)** are seen as a means of achieving reduction in the use of single-use plastic products. Malta's GPP is based on a mixture of mandatory and non-mandatory product groups; there is an intention to revise it in the future and to move from voluntary to mandatory approaches.

151. A **ban on** placing on the market **lightweight plastic carrier bags** is in force as of 2021 (except for the bags with wall thickness below 15 microns needed for hygiene purposes or to prevent food wastage, reusable plastic carrier bags and biodegradable and compostable plastic carrier bags).

152. The draft SUP Strategy for Malta includes a proposed assistance scheme (**voluntary agreement**) for grocery shops to set up '**green corners**' where consumers would be able to bring their own refillable containers for food and other products sold by weight (to avoid single use plastic packaging); subsidies to shops for setting up such green corners are planned in the amount of up to € 3,000.

153. The **Beverage Container Refund Scheme (BCRS)** is developed and will come into effect in 2022 to encourage consumers to dispose of beverage containers in an environmentally-sound manner. Under the scheme, consumers will be enabled to deposit used beverage containers in the Reverse Vending Machines (RVM), which will automatically register the container in accordance with its typology, and issue a cash voucher with a value of € 0.10 per container that may be redeemed at

establishments in the proximity of the particular RVM in which the container is deposited, within two years from the date of issue. The scheme targets various beverages (including water, soft drinks, beers, ready to drink coffees etc.) sold in containers of 0.1 – 3 litres. The beverage container materials which fall within the scope of the scheme include steel, aluminium, glass, and polyethylene terephthalate (PET). The scheme will be managed by a licensed operator. A total of 350 Reverse Vending Machines are planned to be placed all over Malta.

154. At the moment, the costs for disposal of ship-generated waste and cargo residues are not controlled by Malta's Transport Authority as vessels/ ship agents are directly charged by the authorised waste carrier/ contractor. The Authority collects **port reception facilities** fees charged to every ship calling in a port on Malta (€15 per 1,000 gross tonnage up to a maximum of €500, or €2.5 per each 50 persons on board), but the vessels that make use of an authorised port reception facility and provide sufficient proof to the Authority are exempted from these fees. This is going to change in the future as the new EU Directive requires Member States to put in place a cost recovery system (fee) which is fairer and more transparent.

155. Options for re-designing certain fishing gear or practices to reduce **discarded or lost fishing gear** are being considered.

Removal of the existing marine litter

156. Several measures addressing removal of the existing marine litter are in place, including *Identification and mapping of areas with accumulated litter on the seabed or in the water column and potential removal of such litter* (part of Malta's MSFD Programme of Measures). This measure is designed to collate data on the areas where accumulations of marine litter have either been reported through seabed surveys or are otherwise known to stakeholders. The reporting system for lost fishing gear which cannot be retrieved (as being set up by the Department of Fisheries and Aquaculture) will also provide data for the implementation of this measure. All the information will be mapped and analysed to determine whether the accumulated litter can be removed without causing any further damage to the marine ecosystems. The costs of this measure have been estimated to range around € 35,000 - €40,000.

157. Malta Government is also collaborating with NGOs to ensure that marine litter is removed from the marine environment, for example through the following initiatives:

- Development of a mechanism to ensure effective collaboration with NGOs/ local organisations for coordination of clean-up events;
- Litter clean-up sponsorships;
- Agreements between national entities and national e-NGOs;
- 'Saving our Blue campaign'.

158. *Litter clean-up sponsorships*: The Environment & Resources Authority sponsored various clean-up activities targeting mostly marine protected areas (MPAs) but also other locations where litter had accumulated. Through 6 separate clean-up initiatives in MPAs, around 10,000 kg of litter was collected, mainly through underwater clean-ups. Items such as tyres, propellers, cars, batteries, plastic items, glass, metal and fishing gear were removed.

159. *Saving Our Blue* campaign: Overall objective is to further educate and encourage the public to stop littering, reduce waste generation, and opt for product alternatives to single-use items. Through collaboration with NGOs and local organisations, various clean-up actions to remove litter from MPA sites were organised. As a part of Saving Our Blue campaign in 2020, four clean-ups were held at 4 different locations (including MPAs). Several other clean-ups were held on various beaches. Total amount of waste collected in 2020 was 5,202.4 kg. Dive clean ups were also organised through collaborations with stakeholder groups.

160. A pilot project scheme was launched in December 2018 by the Department of Fisheries and Aquaculture (DFA) and implemented for 3 years. The pilot provided financial support to eligible and interested applicants/ boat owners with valid trawling license authorised for bottom otter trawls. Participants are provided with jumbo bags to collect plastic waste that is recovered incidentally from the sea during normal bottom trawling fishing activities. Once such bags are filled with marine plastic litter, DFA is notified. The costs of the scheme for the period of 2018-2021 were originally estimated at €20,000 - 25,000.

National ML monitoring and assessment

161. The national ML monitoring programme is based on the MSFD requirements and is also harmonised with the UNEP/MAP Integrated Monitoring and Assessment Guidance to the extent possible. The last national marine litter monitoring programme was implemented between 2017 and 2019. Allocated budget for monitoring the coastline, surface layer of water column and seabed litter was €40,000. Marine litter in biota was assessed through complementary initiatives.

162. Micro-litter (particles < 5mm) were not covered by the previous national marine litter monitoring programme, pending further development of monitoring and analytical protocols. It is intended to address this gap through the update of the monitoring programme in 2021.

163. The programme is in general aligned with Article 12 of the RP on MLM. Consistency with IMAF in respect to litter monitoring in highly sensitive areas will be further considered, and there are ongoing discussions on how monitoring litter originating from riverine inputs can be incorporated in Malta's monitoring programme.

164. Assessment of marine litter impacts is conducted as a part of the MSFD implementation (e.g. through the assessments of costs of degradation of marine environment).

Awareness raising and education

165. Several awareness raising campaigns and training programmes were implemented including educational courses for seafarers (including information on marine litter, its environmental and economic impacts and the role of seafarers in addressing this pressure). Work is currently ongoing to develop information on marine litter to be included as a part of nautical courses.

166. Awareness raising activities are regularly carried out as a part of clean-up campaigns and through other activities of environmental and maritime authorities.

3.5 Montenegro

Municipal waste

167. National and local waste management plans with time horizon until 2020 are the key documents; a new generation of waste management plans is expected. The existing documents were the basis for significant waste management improvements, including development of adequate landfills, recycling centres and facilities to treat specific waste streams (ELV, WEEE). Preparation of new plans and strategies represents an opportunity to integrate waste prevention, reuse and recycling more firmly into the planning framework, and to provide for implementation. The main weaknesses in the implementation of waste management plans so far included insufficient capacities (financial, technical, organisational) of local authorities and waste management companies, poor enforcement and low public awareness on e.g. importance of waste separation, recycling and adequate disposal. Lack of incentives for waste reduction and appropriate management is also hampering implementation.

Key figures:

Population (area of the RP implementation)	152,869
Urban – rural share	58% urban, 42% rural
Share of population covered with waste collection	95% overall (with differences for urban – rural areas)
Separate waste collection	Applied, still in a non-systematic manner
Reuse and recycling rates	5% recycling rate (est.)
Targets on plastic waste collection and recycling	55% of the total weight of packaging materials (60% for paper and cardboard, 22.5% for recyclable plastic materials)
Main disposal options	Landfilling, open disposal sites, recycling
Share of plastic waste going to landfill or incineration without energy recovery	n.a.

168. Informal activities have been recorded but there is no data on the size/ significance of the informal sector.

The LBS National Action Plan

169. National Action Plan (NAP) for the implementation of the LBS protocol and its regional plans was adopted in 2016; it includes marine litter measures.

Closure of the existing dump sites

170. According to the NAP, there are **37 unregulated disposal sites** in the coastal zone: 11 with a volume of less than 100 m³, 14 with 100 – 1,000 m³ and 14 with more than 1,000 m³. Total costs needed for rehabilitation of the existing dumps was estimated at €19.8 million (NAP).

Prevention measures

171. **EPR** not implemented, prevention measures underdeveloped. Some **sustainable procurement policies** targeting SUP are in place, there are considerations to introduce a **plastic bags tax**.

Removal of the existing marine litter

172. Ad hoc clean-up campaigns are carried out, often project related. **Adopt-a-beach** project was implemented in 2018 and 2019, encompassing clean-up, monitoring and awareness raising activities. **Fishing-for-litter** activities were piloted through the DeFishGear project.

National ML monitoring and assessment

173. National monitoring programme has been prepared but is not operational yet (pending final adoption). The programme covers beach litter (based on the methodology developed under the Adopt-a-beach pilot project), seabed litter (in line with FIF methodology applied for Bokokotorski bay and MEDITS surveys for the open sea) and floating litter for the area of Bokokotorski bay. The programme does not include monitoring of riverine inputs and monitoring in highly sensitive areas. The programme has been proposed for implementation in 2021, with an estimated cost of €10,000.

174. An evaluation of **socioeconomic impacts of marine litter** has been conducted as a part of the Initial Assessment. The analysis suggested the loss of tourism revenues (assuming an estimated reduction of 0.5% of total revenues, as applied in the relevant EU studies) could reach €5.7 million per annum due to marine litter and related degradation of aesthetic and recreational services provided by the beaches and coastal sea. Costs and losses (totalling additional €2.12 million) related to marine litter clean-up for different businesses/ public sector were estimated as follows:

- costs of around €232,000 for fisheries and aquaculture (out of which €224,000 for fishermen);
- €98,000 for ports and marinas operators;
- €819,000 for tourism-related business; and
- €960,00 (including remediation of inadequate disposal sites and enforcement of regulations to prevent uncontrolled dumping of wastes) for public sector/ municipalities.

Awareness raising and education

175. Mainly implemented through projects, including for example WELCOME project financed through the EU Instrument for Pre-Accession Assistance funds.

3.6 Slovenia

Municipal waste

176. National Waste Management and Prevention Programme with relevant legislation regulates waste management including responsibilities (for e.g. Slovenian Maritime Administration, Water Agency, municipalities, property users and owners etc.) for managing land and sea-based sources of waste and for conducting clean-up of the sea/ coastline. Reduction at source and waste hierarchy is applied in the urban solid waste policy. Separate collection for paper, metals, plastics and glass is established.

177. Some of the objectives of the Waste Management and Prevention Programme are:

- Introduce new policy instruments, including economic ones, to promote waste prevention, make reuse and recycling more economically attractive and shift reusable and recyclable waste away from incineration;
- Improve and extend separate collection of waste, including for bio-waste. Set mandatory recycling targets for municipalities with measures in case of non-compliance (e.g. fines);
- Improve the functioning of extended producer responsibility systems, in line with the general minimum requirements on EPR;
- Improve data on waste management;
- Close and rehabilitate the non-compliant landfills as a matter of priority.

Key figures:

Population (area of the RP implementation)	86,784 (89,820 in 2019); number of tourists ¹⁹ in 2020 around 613,000 (2.22 million overnights)
Urban – rural share	
Share of population covered with waste collection	
Separate waste collection (2019)	62% of municipal waste was separately collected in the coastal region (73% for the country)
Reuse and recycling rates (2017)	58% recycling rate for municipal waste
Targets on plastic waste collection and recycling	50% recycling of municipal waste by 2020
Main disposal options	Recycling, incineration, landfilling
Share of plastic waste going to landfill or incineration without energy recovery	

¹⁹ In the coastal municipalities i.e. in the area of application of the Regional Plan, 422 – 518 kg of wastes per person were collected in 2019, which is significantly higher than the national average.

178. In addition to 58% of the municipal waste that is recycled, other treatment/ disposal options include incineration with energy recovery – 19%, incineration for disposal – 3.5% and landfilling – 16% (table below presents data for the entire country):

Waste quantities	t	% of generated
Municipal waste generated	1,064,321	
Separately collected municipal waste	775,004	72.8
Waste recycling - TOTAL	3,448,297	-
Incineration - use of waste as fuel	203,332	19.1
Waste disposal - total	169,049	15.9
Incineration of waste for disposal	37,485	3.5

Closure of the existing dump sites

179. Dragonja landfill has been closed and the waste is being transported to landfills in other part of the country.

Primary and secondary microplastics

180. The main source of primary microplastic are waste water treatment plants, while in Slovenia fibers are the most common microplastic category in all kind of samples. The main source of secondary microplastic are most probably big rivers, flowing into the Adriatic Sea in other countries. So the majority of secondary microplastic come in Slovenia with cross border transport.

181. With the construction of a modern WWTP (2016) with membrane technology for the agglomeration of Nova Gorica and Mirna, Slovenia was the first in the Adriatic eco region to establish a system for removing microplastics from wastewater, which also has a perceived cross-border effect on improving the Soča / Isonzo, coast and sea and Bay of Trieste.

Prevention measures

182. **EPR** is applied in separate collection of municipal waste and separate collection of: WEEE; batteries and accumulators; used tyres; used vehicles; used or waste grave candles; phytopharmaceutical waste; and medicinal pills waste. A rgulation implementing the SUP Directive is expected shortly, and the EPR will be extended to new products in line with the SUP Directive.

183. **Sustainable Procurement Policies** are defined in the Decree on green public procurement which seeks to promote less environmentally harmful goods. The public sector acts in this case as an example to the private sector.

184. There are several **voluntary agreements** in place, including for example the Code to reduce sales of plastic carrier bags in the supermarkets.

185. **Fiscal and economic incentives** are introduced based on the Decree on packaging and packaging waste handling.

186. **Fishing gear marking** is defined in the Rules on detailed marking of fishing gear and to ensure sustainable use of fish

Removal of the existing marine litter

187. Actions to **remove accumulated litter particular from protected** areas have been planned/undertaken within Act4Litter project²⁰ in Landscape park Strunjan.

188. The Slovenian Maritime Administration takes care of cleaning the sea surface. The collected waste is handed over to an authorized waste collection organization.

189. National **clean-up campaigns** are organised every year (including when the Ministry for the Environment and Spatial Planning co-organised beach clean-up action Clean Coast). Clean-up actions are also regularly organised by coastal municipalities, NGO's, diving schools, marinas and beach visitors. The most systematic clean-up action is called "Čista obala" (Clean Coast) and is organised for more than 10 years, including activities to collect data on beach litter. "Čista obala" is implemented in the framework of International Coastal Clean-up Day.

190. Pilot project "Adopt-A-Beach in Slovenia" – part of the national campaign "Living with sea" – is being implemented to assess quantities of beach litter in Strunjan Landscape Park, raise public awareness and promote prevention activities for local tourist service providers.

191. Marine litter assessment implemented through the project achieved engagement of local youth and interested groups to perform clean-ups through citizen participatory science approach, where an expert assessed the results and trained volunteers and group coordinators (e.g. teachers and school groups) on how to perform clean-up with data collection.

192. As part of the Interreg MED project "Plastic Busters", initiative "Piloting marine litter Prevention and Mitigation Measures in Mediterranean Marine Protected Areas" supported by MIO-ECSDE is carried out with two pilot actions ("POSVOJI OBALO" and "SUPER GOSTINCI") to combat marine litter in Slovenia; these are managed at the Strunjan Landscape Park Public Institution, in cooperation with Slovenian Chamber of Commerce and Industry, and the TRI-NITI institute.

193. Another initiative - ADOPT THE COAST – is underway, intended in particular for educational institutions (schools) and aiming to raise awareness of the youngest on the problem of marine litter through lectures and regular cleaning and collection of data for the "adopted" part of the coast. This is a part of an action plan for the prevention and mitigation of marine litter prepared under the "Act4litter" project.

194. In 2014, two collections points were established in fishing ports of Koper and Izola through the EU funded DeFishGear project to which Slovenia was a partner. The project was quite successful since fishermen collected both marine litter (FfL activities) and derelict or used fishing gear. After the end of the project, financial support for the fishermen was not provided by municipalities nevertheless some of them are still doing FfL activities.

195. DIZRO project addressed retrieval of derelict and lost fishing gear from the seafloor in 2018.

National ML monitoring and assessment

196. Institute for Water of the Republic of Slovenia is implementing pilot monitoring according to MSFD, performed for on sea-surface, sea-floor, beach, beach sediment and biota; micro and macro litter analyses are included. Setting up of an official ML monitoring programme is planned.

Awareness raising and education

²⁰ https://act4litter.interreg-med.eu/what-we-wish-to-achieve/our-deliverables/detail/?tx_elibrary_pi1%5Blivable%5D=5836&tx_elibrary_pi1%5Baction%5D=show&tx_elibrary_pi1%5Bcontroller%5D=Frontend%5Clivable&cHash=c25de59d06d45a5329ae55ab19986c12

197. The Ministry for the Environment and Spatial Planning financed awareness raising activities in schools, including preparation of teaching materials for students and teachers, initiative “Be a star” and similar. The Ministry also co-financed the above-mentioned clean-up action Clean Coast. Among other awareness raising activities, workshops for children were organised.

3.7 Tunisia

Removal of the existing marine litter

198. In 2016 – 2017, Coastal Protection and Planning Agency (APAL) organised clean-up actions for marine and coastal protected areas. The following coastal sites were included: Maamoura lagoon (Ramsar site and an Important Biod Area), Tazarka lagoon Ramsar site and an Important Biod Area), Korba lagoon (Ramsar site and an Important Biod Area), Klebia lagoon, Hammam laghez lagoon, Jbel El Haouria, Port aux Princes beach (including the banks of Rtiba, Laabid, and Sidi Ali Meki wadis) and Kneiss (SPAMI). La Galite and Zembra archipelagos (SPAMIs) and Kuriat islands were also included. Two separate campaigns were conducted for each site, involving workers that collected litter manually; mechanical devices were also used. Collected wastes were landfilled. An area of 839 ha was covered with clean-up campaigns whereas 2,111 m³ of waste were collected at a cost of around €42,000.

199. APAL is currently developing a plan for managing marine litter in Tunisian marine and coastal area and procuring equipment needed for collection and recycling. APAL is organizing annual beach cleaning actions in sea resorts before the summer season (March, April, May) through a framework agreement with a specialized company.

200. In cooperation with UNEP/ MAP, APAL has launched activities (as of February 2021) on the implementation of adopt-a-beach and fishing-for-litter concepts. The following sites and associations/partners were selected (criteria for the selection of sites is also provided):

Sites	Criteria for selection	Associations involved
Sidi Othaman river mouth/ Korba beach (Nabeul region)	Riverine input of litter through Sidi Othaman wadi to Korba beach	Tunisian Association for the Protection of Nature and Environment – ATPNE Korba
El Haouaria beach (Nabeul region)	Marine washout and various wastes left at the beach by visitors	Association for the protection of ecological and natural heritage – ASPEN El Haouaria
Port El Kraten Kerkennah (Sfax region)	Plastic and other waste in the fishing port	Association of young scientists of Tunisia/ Club of young scientists Kerkennah (JSK)

201. Tunisia is participating in the regional marine litter projects (BlueMed, INDICIT) with involvement of institutions such as the National Institute of Marine Sciences and Technologies, Coastal Management and Monitoring Network, and Environment and Quality of Life Department within the Ministry of Local Affairs and the Environment. Through these projects, efforts are made to prevent pollution from single-use plastic bags in Tunisia and to promote extended producer responsibility.

3.8 Turkey

Municipal waste

202. The National Waste Management and Action Plan (NWMAP) 2016 – 2023 was published in 2017 in order to set goals for local authorities in all 81 provinces towards an integrated waste management system, which will require more recovering, recycling and energy production from waste thus reducing landfilling and moving towards circular economy. The key National Waste Management and Action Plan targets are recycling of 35% generated of generated waste by 2023 and landfilling the remaining 65%.

203. The studies have been initiated to update NWMAP for the period 2023 – 2035 in order to harmonize the existing management plans with the zero waste approach, to increase and to disseminate separate collection efficiency at the source, to determine the recovery and disposal methods.

The LBS National Action Plan

204. The LBS National Action Plan was prepared in 2017 and includes marine litter measures.

Closure of the existing dump sites

205. The metropolitan municipalities and municipalities are responsible for rehabilitation of dumpsites, therefore aggregated data is not available.

Prevention measures

206. Various products such as plastic bags, packaging, tires, batteries, oil, medicine and electronic goods are or will be subject to payments and waste recovery scheme (based on **EPR** principles) through a compulsory deposit refund system; these instruments have been introduced under the Zero Waste Project and subsequent legislative changes initiated in 2017 - 2018. The instruments are aiming at waste reduction as well as at collection of funds to finance waste management infrastructure.

207. Charging for **plastic bags** – applied as of 2019 – reduced per capita number of bags used in Turkey from around 440 to 90. In the two years of implementation (2019 and 2020), an overall reduction of 75% was achieved, preventing waste generation of around 290,000 t of plastic waste and saving an estimated 2 billion Turkish Liras (around €200 million).

208. A **deposit refund system** will come into effect as of 2022 for a range of products and packaging (to be specified). In an economic assessment of the measure, it was estimated the benefits would outweigh the costs and a contribution to the national economy of €5.8 billion would be made through savings and emission reduction resulting from the use of recycled instead of raw materials, lower emissions due to avoided landfilling of packaging wastes and reduced waste disposal costs for local governments. It was also assessed that the system would create 3,500 to 6,000 new jobs.

209. Administration of the national scale deposit refund system will be a task of recently (end of 2020) established Turkish Environmental Agency established in 2020. Other tasks of the Agency include contribution to the establishment of the zero-waste management system, awareness raising and communication activities, training, research, cooperation with various stakeholders at national and international levels and similar.

210. Grounds for market-based instruments to address the use of plastic-containing bags or packaging and single use materials is found in the revised Turkish Environmental Law.

Removal of the existing marine litter and awareness raising

211. Zero Waste – Blue project launched in 2019 aims to protect the marine environment and support clean-up activities, including through awareness raising.

212. As of 2019, new legislation has been enacted calling for preparation of Marine Litter Provincial Action Plans in order to:

- Establish current situation with marine litter in the provinces and conduct clean-up activities;
- Develop region-specific measures to prevent marine litter;
- Implement awareness raising activities.

213. Information on the implementation of Provincial Action Plans, including on the amounts of marine litter collected, is reported regularly to the Ministry. Amounts of marine litter collected (from

the sea surface, shore, beach and seabed) and sent to the disposal were 65,250 and 20.000 tonnes respectively in 2019 and 2020.

Annex I

Questionnaires used to collect country data

QUESTIONNAIRE FOR THE SOCIO-ECONOMIC ASSESSMENT OF THE NATIONAL LEVEL IMPLEMENTATION OF THE REGIONAL PLANS ON URBAN WASTEWATER TREATMENT AND SEWAGE SLUDGE MANAGEMENT

1. CONTRACTING PARTY

2. POPULATION

2.1. Please complete the following table for the area of application of the Regional Plans (in line with Article 3 of the LBS Protocol):

Agglomeration (AGL) type	No of agglomerations	Population in agglomerations
< 2,000 p.e.		
2,000 – 15,000 p.e.		
> 15,000 p.e.		

If data structured in this manner are not available, please estimate and/ or provide population and settlements data in a comparable manner

3. WASTEWATER COLLECTION AND TREATMENT

3.1. Please complete to following table:

AGL type	No of AGL	Total generated WW load (p.e.)	Collected load (%)	Treated load (% by type of treatment)		
				Primary (P)	Secondary (S)	Tertiary (T)
2,000 – 15,000 p.e.						
> 15,000 p.e.						

3.2. Please provide information on the state of wastewater collection systems, if/ as available:

- Share of population connected to wastewater collection systems (if possible, by agglomeration type)?
- Type and size (length) of the existing collection systems (if possible, by agglomeration type)?
- Average age of the existing collection system and their condition (if possible, please indicate share of the existing collection systems where reconstruction is needed/ planned)?
- Share of wastewater collection systems where reconstruction and/ or separation of storm water collectors (where technically and economically feasible) is necessary and planned over the next 15²¹ years?
- Type and size (length) of the collections systems (if possible, by agglomeration type) planned to be developed over the next 15 years (if such plans exist)?

²¹ If the national plans have a different planning horizon, please provide data as addressed in the national plans.

3.3. Please provide information on the **existing** wastewater treatment plants (please list individual WWTPs or provide summary data at the level of administrative units, as appropriate):

WWTP/ area	Design capacity (p.e)	Load entering WWTP (p.e.)	Treatment (P, S, T)	Volume of WW treated (m ³)	Destination of the effluent (E, R)*
Pls add rows as needed					

*Use E to mark discharges into the environment and R for reuse, while indicating respective shares (%)

- Please provide information on the **quality of the effluent** obtained from the existing WWTPs (including, as appropriate, information on the applicable regulations/ quality standards and share of treated WW complying with them).

3.4. [OPTIONAL²²] Please provide available information on the reuse of treated wastewater:

- What are the main uses of treated wastewater (agriculture/ industry/ aquifer recharge)? Please provide information on the respective quantities/ shares.
- Please describe if/ how additional treatment is applied for the existing reuses?
- Are there any storage/ distribution systems in place for the use of treated wastewater? If yes, please describe briefly.
- In case of managed aquifer recharge, what methods are used? What quality of the effluent is required (please provide supplementary information on national quality standards, as appropriate)?
 - Please describe briefly plans for future reuse of treated wastewater, if such plans are in place. Alternatively, please describe the main potential users/ customers (including, for example, the need for irrigation and proximity of agricultural areas to major population centres).

3.5. [OPTIONAL] If nature-based solutions (NBS), in particular constructed wetlands, are applied in your country (in the area of the Regional Plan's application), please provide brief information (or else provide sources/ reports that can be used to derive such information)? Type of information to be provided includes number of NBS, design capacity, load entering, quality obtained and current destination of the effluent, as well as potential for NBS application.

3.6. Please provide available information and/ or estimates, as appropriate, and complete the table below to describe situation with pre-treatment of industrial wastewater in your country (for the area of the Regional Plan's application):

²² Please provide information for the optional questions in case you believe experiences in your country could be presented as good practices relevant for the Mediterranean region.

Industrial sector*	Brief description of the sector (No. of installations, capacity, technologies, share discharging to UWWTP/ environment, ...)	Generated WW load	Current share of pre-treated WW**
Food sector			
Textile sector			
Metals processing			
Agriculture			
Leather production, fur processing, leather fibreboard manufacturing			
Waste and wastewater management			
Production of printing blocks, publications and graphic arts products			
Chemical sector			

* *Industrial sectors/ sub-sectors as defined in the Appendix III of the draft Regional Plan on Urban Wastewater Treatment*

***In compliance with the draft Regional Plan*

- Please describe briefly how are discharges of industrial wastewater (for industries listed in the table above) regulated under national legislation in your country (please feel free to share relevant national regulations).

3.7. In case such information is readily available, please describe how/ where urban wastewater monitoring is currently conducted in your country (for the area of the Regional Plan's application) and what are the related costs? If possible, please complete the following table:

WWTP size	Frequency of monitoring	Parameters monitored	Data collection methods	Current destination of the effluent (E, R)
Pls add rows as needed				

4. SEWAGE SLUDGE MANAGEMENT

- 4.1. Please provide information on the quantity of sewage sludge generated in your country (for the area of the Regional Plan's application)?
- 4.2. Please provide information on the **current sewage sludge treatment processes** (applied in your country (for the area of the Regional Plan's application) by completing the table below (and/ or in other appropriate manner):

Type of treatment		Quantity	Share of total
Sludge stabilisation	Anaerobic digestion		
	Aerobic digestion		
	Alkaline treatment		
	Composting		
Sludge incineration			
Sludge drying	Direct dryers		
	Indirect dryers		
	Solar drying		
Thickening/ dewatering systems	Solids thickening		
	Solids dewatering		
Phosphorus recovery			
Temporary/ permanent storage of biosolids			

4.3. Please provide information on the main **current disposal options and/ or uses** of sewage sludge (for the area of the Regional Plan's application)

Generated quantity (t DS/ year)	Disposal (% of total)			Uses (%)		Other options (%)
	Landfill	Incineration	Other	Agriculture	Others	

4.4. Could you please estimate what share of the total generated quantity is already treated in compliance with the quality standards set under the new Regional Plan (for agricultural/ land reclamation uses and for energy recovery)?

5. INFORMATION SOURCES

Please provide any references you may find relevant for the socio-economic assessment (by listing the relevant titles/ links, and/ or by sending relevant documents and publications), in particular:

- Recent national wastewater management plans, and
- Studies on valuation of ecosystem services (if available in English).

QUESTIONNAIRE FOR THE SOCIOECONOMIC ASSESSMENT OF THE NATIONAL LEVEL IMPLEMENTATION OF THE REGIONAL PLAN ON MARINE LITTER

1. CONTRACTING PARTY

2. SOLID WASTE MANAGEMENT

2.1. Please describe situation with solid waste management for the area of application of the Regional Plan (the area of application defined in line with Article 3 of the LBS Protocol). To the extent possible, please address the following questions:

- What is/ are the applicable solid waste management plan/s (please provide title/s and copy/ies of the documents if available in English)? What objectives are set under the applicable waste management policies and plans?
- Is reduction at source and waste hierarchy (prevention, preparing for re-use, recycling, other recovery, e.g. energy recovery and environmentally sound disposal) applied in the urban solid waste management policy and practice? Please provide available details.
- What is population of the area of application of the Regional Plan? What are urban/ rural shares?
- How is solid waste managed in the area of application of the Regional Plan:
 - o What shares of population are covered with organised waste collection?
 - o Is there a separate waste collection and for what waste fractions? What shares of population are covered with such collection?
 - o What are re-use and recycling rates?
 - o Are there specific targets on plastic waste collection and recycling?
 - o What are the main disposal options (please provide respective shares of waste disposed)?
 - o What is the share of plastic packaging waste that goes to landfill or incineration without energy recovery?
 - o What are the key issues faced in implementing current policies and plans?
- Does the informal sector play an important role in waste collection and recycling schemes in your country? Please provide any information that might be available on the scale of activities performed by the informal sector (reference to Article 8, paragraph 13 of the draft upgraded Regional Plan on MLM).

2.2. Does the LBS National Action Plan for your country include ML measures? Please provide brief information (what targets are set for which timeframe, what are the key NAP measures and their costs)?

3. IMPLEMENTATION OF ARTICLE 9

3.1. Please provide information on the plans and practices related to the closure of the existing illegal dump sites on land for the area of application of the Regional Plan, including to the extent possible:

- number of the dump sites closed during the past 5 years, their size (estimated quantities of deposited waste) and associated costs;

- number of sites planned to be closed (if any), their size and planned timing (deadline); please include information on costs (if estimated).
- 3.2. If possible, please provide the following information on primary and secondary microplastics for the area of application of the Regional Plan in your country:
- Have the sources of primary and secondary microplastics been identified? What are they?
 - Please briefly describe any measures (legal, economic, technical or others) or schemes that might be in place in your country to regulate the use of microplastics.
- 3.3. Please describe briefly experiences in your country with implementation of any of the following land- or sea-based prevention measures (if available, please include information on how is the scheme organised/ administered, what is it applied to, what are its effects and costs to different actors; alternatively, please provide any studies that might exist with *ex ante* or *ex post* assessments of the measure):
- Extended Producer Responsibility (EPR);
 - Sustainable Procurement Policies prioritising the phase out of single-use plastic products and promoting reuse options;
 - Voluntary agreements (VA) targeting in particular plastic bags and food packaging;
 - Fiscal and economic incentives targeting the use of plastic bags and other single-use plastic products;
 - Deposit, Return and Restoration System (DRRS) for: i) expandable polystyrene boxes in the commercial and recreational fishing sector and aquaculture; and ii) food and beverage packaging (including deposit refund systems for bottles, containers and cans);
 - Dedicated collection and recycling schemes supported by EPR approach for end-of-life products;
 - Reasonable cost for the use of Port Reception Facilities or No-special-fee system;
 - Incentives for fishing vessels to retrieve derelict fishing gear and deliver it to port reception facilities;
 - ‘Gear marking to indicate ownership’ and ‘reduced [fishing] catches through the use of environmental neutral upon degradation of nets, pots and traps concept’;
 - Measures to minimize amount of ML associated with fishing/ aquaculture.

4. IMPLEMENTATION OF ARTICLE 10

- 4.1. Please describe activities that may have been implemented in your country over the course of the past 5 years to remove and dispose in an environmentally sound manner existing accumulated litter, in line with relevant national legislation and Article 10 of the draft upgraded Regional Plan on MLM (paragraphs 19 and 20). To the extent possible, please address the following questions:
- Have there been any actions to remove accumulated litter, in particular from marine protected areas, SPAMIs and/ or litter affecting endangered species? If yes, please provide available details (e.g. how were they implemented, what procedures were followed, what were the results and at what cost)?
 - Are national programmes on regular removal and sound disposal of accumulations/ hotspots of marine litter [at sea] prepared and implemented? Please provide available details.
 - Are National Marine Litter Clean-up Campaigns regularly organised, how often, with what objectives and resources, and what are their results? Are regular beach clean-up actions organised outside tourist seasons and how/ by whom?
 - Is your country taking part in International Coastal Clean-up Campaigns and Programmes, and how?

- Have you had any experiences in your country with implementation of Adopt-a-Beach activities; if yes, please provide available details?
- Have you had any experiences in your country with implementation of Fishing for Litter activities; if yes, please provide available details?

5. IMPLEMENTATION OF ARTICLE 11

5.1. Please describe briefly national ML assessment programme (if in place), including, to the extent possible:

- is there a regular assessment of the state, impacts and socio-economic aspects of ML in your country (in line with Article 11 of the draft upgraded Regional Plan on MLM, paragraph 20); please provide copies of any such assessments that might be available for the past 5 years?

6. IMPLEMENTATION OF ARTICLE 12

6.1. Please describe briefly national ML monitoring programme (if in place), including, to the extent possible:

- scope, methods and frequency (what, how, when) of the ML monitoring, as well as annual costs (if available);
- is ML monitoring in your country conducted in compliance with Article 12 of the draft upgraded Regional Plan on MLM (paragraph 27); if not, what elements are missing?

7. IMPLEMENTATION OF ARTICLE 16

7.1. Please describe briefly the main awareness raising and education programmes implemented in your country to address ML; to the extent possible, please provide information on the number, extent and objectives of such activities and how were they implemented (including information on costs, if available). Please also include information on whether these programmes address all the elements included in Article 16, paragraph 34 of the draft upgraded Regional Plan on MLM.