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**Agenda item 7: Costing of the Regional Plans implementation**

**Approaches to estimating the costs for the Regional Plans/ legally  
binding measures adopted by the Contracting Parties**

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## **1 Introduction**

Purpose of this document is to assist Contracting Parties to identify information needed to estimate the costs of implementing measures necessary to meet the Regional Plans' requirements through the National Action Plans (NAP) update process. This is expected to enable estimation of overall costs of implementing the key requirements of the Regional Plans (RPs) on the national level and to allow for further aggregation on the regional level.

The analysis focuses on the four Regional Plans: a) on the reduction of BOD<sub>5</sub> from urban waste water; b) on the reduction of BOD<sub>5</sub> from food sector; c) on the reduction of inputs of mercury; and d) on marine litter management.

Each Regional Plan is analysed in respective section of the document (sections 2 – 5) by elaborating the scope of the Plan, its main objectives, key measures envisaged and steps to estimate the costs. Key measures necessary to implement the requirements of respective RPs are detailed in a table format in Annex I of the document, whereas a checklist-type of questions and examples of tables to guide the national experts in the process are included in Annex II.

The document is primarily intended for the economists in the NAP update team who will be responsible for identification of necessary data to estimate overall costs of the Regional Plans implementation. It will be necessary, however, that they are supported by key NAP experts and thematic groups in identifying, collecting and analysing relevant information, especially when it comes to environmental standards, pollution loads and sources and activities of interest to the NAP.

## **2 Regional Plan on the reduction of BOD<sub>5</sub> from urban waste water**

### **2.1 Scope of the Plan**

The Regional Plan on the reduction of BOD<sub>5</sub> from urban waste water (hereinafter referred to as the RP on BOD from UWW or the Plan) refers to collection, treatment and discharge of urban waste water including:

- domestic waste water from residential settlements and services (originating predominantly from human metabolism and from household activities);
- domestic waste water mixed with industrial (pre-treated or not) and/ or run-off water.

The geographic area to which the RP on BOD from UWW applies is the hydrological basin of the Mediterranean Sea, in line with Article 3 of the Protocol for the Protection of the Mediterranean Sea against Pollution from Land-Based Sources (LBS Protocol). All the direct or indirect discharges within the basin are subject to the Plan's provisions.

### **2.2 Main objectives**

The main objective of the RP on BOD from UWW is to protect coastal and marine environment and health from the adverse effects of direct and/ or indirect discharges of urban waste water within the hydrological basin of the Mediterranean Sea. The Plan in particular aims to address adverse effects on the oxygen content of the coastal and marine environment and eutrophication phenomena.

### **2.3 Key measures**

The RP on BOD from UWW requires Contracting Parties to ensure that urban waste waters are collected and treated prior to being discharged into the environment for all the agglomerations in the Mediterranean basin. For the purpose of the Plan, agglomerations are defined as areas where more

than 2,000 inhabitants and/ or economic activities are sufficiently concentrated for collection and treatment of waste water.

In designing and constructing waste water collection systems, the best technical knowledge regarding the volume and characteristics of UWW, high maintenance of piping system and of pumping equipment as well as separation of storm water (when applicable) need to be taken into account and applied.

The Plan also requires the Parties to:

- ensure treatment of all urban waste water;
- adopt national emission limit values (ELVs or maximum allowable concentrations of BOD<sub>5</sub> in treated waste water prior to discharge into environment);
- ensure that characteristics of collected and treated UWW meet the requirements of the following regional ELVs on BOD<sub>5</sub> (at 20°C without nitrification) for the effluents from every single wastewater treatment plant (WWTP):
  - o ≤ 50 mg/ l O<sub>2</sub> for secondary treatment,
  - o ≤ 200 mg/ l O<sub>2</sub> for primary treatment<sup>1</sup>.

The regional ELVs should only be adopted after consideration of local conditions and provided that total loads do not affect the receiving marine environment.

If stricter provisions are contained in the existing or future national, regional or international instruments or programmes, they will apply.

Discharges from WWTPs need to be monitored (in line with the Plan's Appendix II prescribing sampling method and frequency for different categories of agglomerations) by competent authorities to verify compliance.

Enforcement also needs to be ensured in line with national regulations.

The RP on BOD from UWW envisages two implementation deadlines: 2015 and 2019. The Contracting Parties are to decide on the appropriate deadline for implementation of ELVs taking into account national circumstances and ability to implement required measures. A national programme of action, including the adopted deadlines, was due for submission to the Secretariat within half a year from the Plan's adoption. National programmes and decisions on implementation deadlines should be prepared according to the guidelines and criteria included in Appendix III of the Plan. These guidelines and criteria aim at assisting the countries to take into account provisions of national legislation, size of agglomerations, and economic capacity to address collection and treatment of waste water in setting the implementation deadlines

The Parties are to report on the implementation of measures biannually and to review the status of implementation in 2013 and 2017.

## **2.4 Estimating the costs of the key measures**

In principle, five types of interventions are necessary to meet the requirements of the RP on BOD from UWW and they include:

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<sup>1</sup> Primary treatment: treatment of urban waste water by a physical and/or chemical process involving settlement of suspended solids, or other processes in which the BOD<sub>5</sub> of the incoming waste water is reduced by at least 20% before discharge and the total suspended solids of the incoming waste water are reduced by at least 50%.  
Secondary treatment: treatment of urban waste water by a process generally involving biological treatment with a secondary settlement or other process so that the treatment results in a minimum reduction of the initial load of 70-90% of BOD<sub>5</sub>.

1. Proper maintenance and upgrading (including rehabilitation) of the existing collection systems in line with best technical knowledge, including interventions on separation of storm water;
2. Expansion and/or development (new construction) of collection systems;
3. Upgrade of the existing WWTPs to meet regional ELVs (or national ones, if different than the regional);
4. Construction of new WWTPs to cover all agglomerations above 2,000;
5. Monitoring and enforcement activities.

Interventions 1 – 4 refer to investments or technical measures and their costs can be assessed in a three steps process

*STEP 1: Determine main cost elements*

- Quantify (in physical units such as km, number of pumping stations, population equivalent – p.e.<sup>2</sup> or similar) collection system maintenance and upgrade needs, including, where applicable, interventions to ensure separation of storm waters;
- Quantify the needs for new constructions of the collecting systems (in km, p.e);
- Quantify the necessary upgrade of existing WWTPs to reach the requirements of the RP (number and capacity of WWTPs needing upgrade, type of interventions necessary to ensure compliance with ELVs);
- Quantify the need for construction of new WWTPs to reach the requirements of the RP (how many, what capacity, what type of treatment).

In order to complete this step, national or regional waste water strategies, plans and goals need to be reviewed. If information is missing, estimations can be made based on comparative experiences/ data for urban centres where waste water collection and treatment needs have been assessed and quantified. National programme of action required under the RP on BOD from UWW, if prepared, should be taken into account as a reference for implementation deadlines. The same applies to the review of the implementation status performed in 2013 and biannual implementation reports (also required under the Plan), if any.

If the assessment of waste water collection and treatment needs will be done for the purpose of this exercise and not taken over (fully or partially) from other sources, it should be guided by criteria set out in the Appendix III and tailored according to national circumstances. In identifying the needs and assessing the costs, projects under implementation (where project documentation is completed, funding secured, works have started and/ or expected to start to lead to operation before national implementation deadline, e.g. 2019) should be excluded.

*STEP 2: Decide on unit costs to be applied*

Based on recent comparable projects or plans, identify realistic unit costs. Express in USD or EUR, or, when possible, in Purchasing Power Parity. Alternatively, available international costing methods could be applied<sup>3</sup>.

*STEP 3: Aggregate the numbers, estimate the costs*

In the final step, aggregation of total costs will be made by multiplying unit costs and needs.

<sup>2</sup> For the purpose of Regional Plans on BOD from urban waste water and from food sector, one population equivalent (.e.) is defined as the organic biodegradable load having a five-day biochemical oxygen demand (BOD<sub>5</sub>) of 60 g of oxygen per day.

<sup>3</sup> UfM report *Update priority investment projects for protecting the Mediterranean Sea from pollution: evaluation of NAP investment portfolio – regional analysis*, for example, assessed investment costs of priority wastewater projects by using cost functions developed by COWI under FEASIBLE model whereas an adjustment (reduction) of 80% was applied for Southern Mediterranean countries.

*Note: Level of detail in cost estimation can vary. Questions from the check list and associated table presented in Annex II of this document are meant to guide the countries to conduct detailed cost estimation. Nevertheless, if available data will not allow for such a level of detail, it will be possible to stop at more general level of analysis and have rougher estimates – the key question being what additional population<sup>4</sup> (p.e. estimate) needs to be served by adequate collection and treatment system by 2019 or other implementation deadline set in a given country to meet the RP requirements.*

Assessment of costs related to monitoring and enforcement activities required under the Plan can be made by determining the following elements:

- Number of samples that need to be tested annually and related prices; sampling method and frequency outlined in the Plan's Appendix II may be used as a reference.
- Inspection and other enforcement staff time and equipment needed to ensure compliance with ELVs.

Monitoring and inspection plans of competent authorities, when they exist, may be used as a source of information for estimating these costs. Capacity building needs, if estimated that current monitoring and enforcement capacities are insufficient to meet implement the Plan, should be also taken into account.

### **3 Regional Plan on the reduction of BOD<sub>5</sub> in the food sector**

#### **3.1 Scope of the Plan**

The Regional Plan on the reduction of BOD<sub>5</sub> in the food sector (hereinafter referred to as the RP on BOD from food sector or the Plan) refers to all the industries listed in the Plan's Appendix I within the hydrological basin (discharging directly or indirectly) of the Mediterranean Sea (the area is defined in accordance with Article 3 of the LBS Protocol). Industries included in Appendix I are: a) dairies; b) fruit and vegetable processing; c) breweries; d) wineries and distilleries; e) fish processing; f) sugar manufacturing; g) vegetable oil processing; h) canning and preserving; and i) meat processing and slaughtering.

#### **3.2 Main objectives**

The objective of this Regional Plan is to prevent pollution and to protect the coastal and marine environment from the adverse effects of discharges of organic load (BOD<sub>5</sub>) from food sectors.

#### **3.3 Key measures**

The main requirement of the Plan is for the Appendix I industries that discharge more than 4,000 p.e. to reduce pollution load through application of best available techniques (BAT)<sup>5</sup> or best environmental practices (BEP)<sup>6</sup>. In case respective industries discharge waste waters directly into recipient water bodies, the measures need to be tailored to ensure the following emission limit values (ELVs) are met:

- Chemical oxygen demand (COD) of 160 mg/l, or  
Total organic carbon (TOC) of 55 mg/l;
- Biochemical oxygen demand BOD<sub>5</sub> (or BOD<sub>7</sub>) of 30 mg/l.

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<sup>4</sup> Additional in the sense that is not covered by functional collection and treatment systems at the moment of assessment or by projects under implementation.

<sup>5</sup> BAT means latest stage of development (state of the art) of processes, of facilities or of methods of operation which indicate the practical suitability of a particular measure for limiting discharges, emissions and waste. (definition from Annex IV A of the LBS Protocol)

<sup>6</sup> BEP means the application of the most appropriate combination of environmental control measures and strategies. (definition from Annex IV B of the LBS Protocol)

In case industries discharge into sewerage systems, appropriate ELVs need to be set by competent authorities.

Provisions stricter than those set in the Plan may apply if they are adopted on the national level.

The Contracting Parties need to ensure appropriate monitoring takes place to verify compliance with the Plan's requirements.

The RP on BOD from food sector also requires Contracting Parties to enforce the set ELVs and application of necessary measures to reach them.

The emission limit values are to be reviewed by the Contracting Parties in 2015 based on experience with implementation of measures and recent developments, including any difficulties encountered with implementation and recent developments with BAT, BEP and/or environmental quality standard in the region.

The Contracting Parties have agreed upon adoption of the RP on BOD from food sector to implement the RPs ELVs by 2014 (taking into account national circumstances i.e. respective implementation capacities, as well as the need to reduce the use of water in food industries).

The Parties are to report on the implementation of measures biannually.

### **3.4 Estimating the costs of the key measures**

The costs associated with introduction of various measures listed as examples of BAT/ BEP in the RP on BOD from food sector will depend largely on the size of industry, local conditions and specificities and is therefore difficult to come up with generic cost units that could be applied to estimate overall costs on the national level. Instead, costs estimations will have to be made on a case by case basis. Some measures might be more demanding in terms of necessary investments as they may require major infrastructural interventions, purchase of specific technologies (equipment or know-how) and similar. On the other hand, for some measures (especially when it comes to BEP) expected costs would be rather low or negligible (or could even result with net savings).

Good sources of information would be industries themselves. Either on the planning basis (as part of their business and/ or investment plans) or through the already implemented upgrades, some industries might have available data on the scale of investments needed to bring their performance to the BAT/ BEP level. Certification for environmental standards (e.g. ISO 14000 family), if such processes had been applied in any of the industries under review, might also serve as a good source of information. There might be also available sector-specific studies in different countries (e.g. for modernisation of dairy sector, slaughter houses and meat processing etc.).

Similarly to the situation with the RP on BOD from UWW, monitoring and enforcement costs may be estimated by breaking down the task into:

- Number of samples that need to be tested annually and related prices (internationally accepted standardized sampling, analysis and quality assurance methods to be used whenever possible);
- Inspection and other enforcement staff time and equipment needed to ensure compliance of regulated industries with ELVs.

Monitoring and inspection plans of competent authorities, when they exist, may be used as a source of information for estimating these costs. Capacity building needs to ensure adequate monitoring and compliance, if any, should be also taken into account in estimating the costs of implementing the RP on BOD from food sector.

## **4 Regional Plan on the reduction of inputs of mercury**

### **4.1 Scope of the Plan**

The Regional Plan on the reduction of inputs of mercury (hereinafter referred to as the RP on mercury or the Plan) applies to the area defined in accordance with Article 3 of the LBS Protocol i.e. to the hydrological basin of the Mediterranean Sea. The Plan is intended to address all the anthropogenic releases in accordance with requirements of Article 4 of the LBS Protocol (primarily all land-based point and diffuse sources and activities within territories of the Contracting Parties that may affect directly or indirectly the Mediterranean Sea Area, as well as polluting substances transported by air).

### **4.2 Main objectives**

The objective of this Regional Plan is to protect the coastal and marine environment and human health from the adverse effects of mercury.

### **4.3 Key measures**

The measures that need to be implemented to fulfil the Plan's requirements refer primarily to chlor-alkali industries and non chlor-alkali industries using mercury in production processes. The RP on mercury also contains provisions pertinent to incineration plants and other sectors causing releases of mercury, to mercury containing wastes, contaminated sites and mercury mining. All the measures envisaged by the Plans can be categorised as:

1. Prohibiting (certain industrial processes, re-entry into the market, new mercury mines, including re-opening of the closed ones);
2. Phasing out releases of mercury from chlor-alkali plants;
3. Limiting emissions of mercury by adopting and enforcing emission limit values (ELVs); and
4. Ensuring environmentally sound management of metallic mercury from decommissioned plants, of wastes containing mercury as well as of contaminated sites.

Prohibiting requirements of the RP on mercury do not have direct cost implications<sup>7</sup> (and as such they are not of immediate interest for this cost estimation). They oblige Contracting Parties to:

- Prohibit installation of new chlor-alkali plants using mercury cells;
- Prohibit installation of vinyl chloride monomer production plants using mercury as catalyst;
- Prohibit re-entry into the market of metallic mercury from decommissioned plants;
- Prohibit opening of new, or re-opening of old mercury mining sites.

The remaining three groups of measures (progressive reduction, until final cessation, of total releases of mercury from chlor-alkali plants; ELVs for non chlor-alkali industries and other processes; and environmentally sound management of contaminated sites, wastes and remaining metallic mercury from decommissioned plants) will require specific interventions and technological upgrades (and thus have a direct cost attached to them) to ensure compliance with the Plan's provisions.

Commitment to phase out releases of mercury from chlor-alkali plants the latest by 2020 is to be achieved by:

- Ensuring metallic mercury from decommissioned plants is managed in an environmentally sound manner;

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<sup>7</sup> Indirect cost linked to implementation of these measures include for example costs of drafting and enforcing necessary legal acts.

- Progressively limiting total releases of mercury (until their final cessation) from operational chlor-alkali plants with the view not to exceed 1.0 g per metric tonne of installed chlorine production capacity in each plant; in doing so, emissions to air should not exceed 0.9 g per metric tonne of installed chlorine production capacity in each plant.

Contracting parties are to adopt (and enforce) ELVs for:

- Chemical industries using mercury catalysts;
- Batteries industries;
- Non-ferrous metal industry;
- Plants for the treatment of wastes (effluent and gaseous emissions from incineration plants).

Environmentally sound management requires measures to ensure there is no further contamination of air, soil or water from: metallic mercury remaining from decommissioned chlor-alkali plants; mercury containing wastes; and contaminated sites.

The Plan further specifies requirements regarding contaminated sites in the following manner:

- Contracting Parties are to identify sites that have been historically contaminated with mercury (including at least old mines and decommissioned chlor-alkali plants);
- Report the identified sites to the Secretariat by January 2013;
- Undertake measures (such as safety works, restrictions, or decontamination, as appropriate; apply BEPs<sup>8</sup>) to ensure environmentally sound management of these sites;
- Report in 2015 on the measures envisaged for identified sites.

Moreover, the RP on mercury requires Contracting Parties to take appropriate measures to reduce releases of mercury from other sectors (not regulated under the Plan).

The Contracting Parties need to ensure monitoring of releases of mercury into water, air and soil to verify compliance with the Plan's requirements.

The RP on mercury also requires Contracting Parties to enforce the stipulated measures.

Timetable for implementation: Prohibiting requirements of the Plan were to take immediate effect upon its adoption. Implementation deadline for phasing out existing chlor-alkali plants is 2020. As for the adoption of ELVs for non chlor-alkali industries, two sets of ELVs (50 and 5 µg/l of effluent) are to apply respectively as of 2015 and 2019. These ELVs are to be reviewed in 2015 with a view to establishing new ones in the framework of the implementation of Article 15 of the LBS Protocol. Finally, implementation deadlines for contaminated sites are 2013 and 2015.

The Parties are to report on the implementation of measures biannually.

#### **4.4 Estimating the costs of the key measures**

Technological improvements to progressively reduce and/ or eliminate total releases from chlor-alkali plants and other regulated industries and processes comprise a range of interventions. The cost of these will to large degree depend on the existing technological state of the plants, their overall environmental performance, knowledge of their employees, their production capacity, compliance culture (i.e. degree to which the regulations are respected and enforced) and similar factors. Cost estimation is therefore possible only on a case by case basis (unless sectoral assessments for modernisation/ upgrading of certain industries have been carried out and related costs assessed), through identification of specific plants and processes that are affected by the Plan and of measures they need to implement to comply. Checklist included in Annex II of this document provides a series of questions to facilitate the process. Industries themselves might be a good source of information if

<sup>8</sup> The Secretariat was to prepare Guidelines on BEPs

they have, through planning or already made investments, considered or implemented technological and management improvements to limit releases of pollutants, in particular mercury.

Costs related to sound management of remaining metallic mercury, mercury containing wastes and contaminated sites will also highly depend on the specific characteristics of each location, in particular on size of the sites and quantities that need to be managed.

For the estimation of costs related to sound management of contaminated sites, inventory that was required for submission to the Secretariat in 2013 may be used as a starting point (provided that such an identification was completed). Alternatively, information may be retrieved from the data held by environmental authorities. Remediation plans or comparable implemented projects may be used as a basis for cost estimation.

Similarly to the situation with other Plans, assessment of costs related to monitoring and enforcement activities can be made by determining the efforts needed to sample and analyse effluents/ emissions from regulated industries, processes and sites, to control them and to enforce legal provisions.

## **5 Regional Plan on marine litter management**

### **5.1 Scope of the Plan**

The Regional Plan on marine litter management in the Mediterranean (hereinafter referred to as the RP on marine litter or the Plan) applies to the area defined in Article 3 of the LBS Protocol (paragraphs a., c., and d., i.e. the Mediterranean Sea Area, internal waters<sup>9</sup>, brackish waters, marshes and coastal lagoons, as well as groundwater communicating with the Mediterranean Sea). Moreover, the Plan applies to discharges referred to in Article 4 (a.) of the LBS Protocol (discharges from land-based point and diffuse sources and activities that may affect directly or indirectly the Mediterranean Sea Area), and any operational discharge from ships, platforms and any other man-made structures at sea.

### **5.2 Main objectives**

Objectives of the Plan are to:

- Prevent and reduce to the minimum marine litter pollution in the Mediterranean;
- Remove to the extent possible already existent marine litter by using environmentally respectful methods;
- Enhance knowledge on marine litter;
- Bring management of marine litter in the Mediterranean in line with accepted international standards and approaches.

The marine litter RP is guided by the set of principles including the principles of integration (of marine litter issues into solid waste management and other relevant strategies), prevention (requiring prevention of marine litter at source) and others (including precautionary and polluter pays principles, ecosystem-based approach, public participation and stakeholder involvement, and sustainable consumption and production).

The objectives and principles of the marine litter RP mean that costs associated with this Plan will to a large extent coincide with costs related to sound management of solid waste from land-based and sea-based sources. Other costs that will arise from implementation of the RP on marine litter are the costs related to removal of already accumulated litter.

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<sup>9</sup> Waters on the landward side of the baselines from which the breadth of the territorial sea is measured and extending, in the case of watercourses, up to the freshwater limit.

### 5.3 Key measures

The core of the RP on marine litter management are requirements set out in Articles 9 and 10 detailing measures to prevent marine litter (from land-based and sea-based sources) as well as those necessary to remove existing litter and dispose it in an environmentally sound manner.

#### 5.3.1 Prevention of marine litter

The following requirements (with implementation deadlines) are stipulated in the Plan (Article 9):

##### *For land-based sources*

1. Ensure urban solid waste management is based on reduction at source (application of waste hierarchy: prevention, preparing for re-use, recycling, other recovery – e.g. energy recovery, and environmentally sound disposal) by 2025 at latest.
2. Implement adequate waste reducing/ reusing/ recycling measures in order to reduce the fraction of plastic packaging waste that goes to landfill or incineration without energy recovery by 2019.
3. Explore and implement to the extent possible the following prevention measures by 2017:
  - a. Extended Producer Responsibility;
  - b. Sustainable Procurement Policies;
  - c. Establishment of voluntary agreements aiming to reduce plastic bags consumption and selling of appropriate products in special and reusable containers;
  - d. Fiscal and economic instruments to promote the reduction of plastic bag consumption;
  - e. Establishment of Deposits, Return and Restoration System for expandable polystyrene boxes in the fishing sector;
  - f. Establishment of Deposits, Return and Restoration System for beverage packaging prioritizing, when possible, their recycling;
  - g. In cooperation with plastics industry, establish procedures and manufacturing methodologies to minimize the decomposition characteristics of plastic, to reduce micro-plastic.
4. Establish as appropriate adequate urban sewers, wastewater treatment plants and waste management systems to prevent run-off and riverine inputs of litter by 2020.

##### *For sea-based sources*

5. By 2017, explore and implement to the extent possible ways and means to charge reasonable cost for the use of port reception facilities or when applicable, apply No-Special-Fee system; provide ships with updated information on obligations arising from Annex V of MARPOL Convention<sup>10</sup> and from applicable national legislation.
6. By 2017, explore and implement to the extent possible the “Fishing for Litter” environmentally sound practices.
7. By 2017, explore and implement to the extent possible “Gear marking to indicate ownership” concept and ‘reduced ghost catches through the use of environmental neutral upon degradation of nets, pots and traps concept’
8. By 2020 apply the cost effective measures to prevent any marine littering from dredging activities taking into account the relevant guidelines adopted in the framework of Dumping Protocol of the Barcelona Convention.
9. By 2020 take the necessary measures to close to the extent possible the existing illegal dump sites on land in the area of the application of the Regional Plan.
10. Undertake enforcement measures to combat dumping in accordance with national and regional legislation including littering on the beach, illegal sewage disposal in the sea, the coastal zone and rivers in the area of the application of the Regional Plan.

<sup>10</sup> International Convention for the Prevention of Pollution from Ships.

### 5.3.2 Removal of accumulated marine litter and its environmentally sound disposal

Article 10 requires Contracting Parties to remove existing accumulated litter, where it is environmentally sound and cost effective (subject to Environmental Impact Assessment procedure). Priority should be given to specially protected areas and Specially Protected Areas of Mediterranean Importance (SPAMI), as well as to litter impacting endangered species. Specific measures that should be explored and implemented to the extent possible by 2019 are:

- a. Identification of accumulations/ hotspots of marine litter and implementation of national programmes on their regular removal and sound disposal;
- b. Implementation of National Marine Litter Cleanup Campaigns on a regular basis;
- c. Participation in International Coastal Cleanup Campaigns and Programmes;
- d. Application, as appropriate, of Adopt-a-Beach or similar practices and enhancement of public participation role with regard to marine litter management;
- e. Application of Fishing for Litter and ensure adequate collection, sorting, recycling and/or environmentally sound disposal of the fished litter;
- f. Charging reasonable costs for the use of port reception facilities or, when applicable application of No-Special-Fee system (when port reception facilities are used for implementing the measures provided for in Article 10).

### 5.3.3 Other measures

Other measures envisaged by the Plan include assessment of marine litter in the framework of ecosystem approach, establishment of national marine litter monitoring programmes and development of the regional one (with establishment of regional data bank by 2016), research and educational/ awareness raising activities.

Similar to other regional plans, the RP on marine litter also contains provisions on enforcement of measures to which the Parties have committed as well as on reporting (biannually).

## 5.4 Estimating the costs of the key measures

In comparison with other regional plans, the RP on marine litter is specific in terms of cost estimation due to several reasons.

First of all, the Plan envisages implementation of some measures that overlap (fully or partially) with measures required under other policy instruments. On the national level, a clear example would be national waste management legislation and strategies/ plans. On the regional level, requirement to establish adequate sewers and waste water treatment overlap with requirements of the RP on BOD from UWW. The fact that the Plan's requirements (to a certain extent, depending on specific conditions in different countries) coincide with national solid waste management frameworks can be utilised to draw information on costs for the purpose of this assessment. At the same, precautions should be taken to avoid possible duplications (e.g. assessment of costs for RP on BOD from UWW and for measure number 4 from Article 9 of the RP on marine litter – establishment of adequate urban waste water collection and treatment system).

Another specificity is linked to the fact that the RP on marine litter management allows for flexibility in determining measures that will be implemented as it leaves to the Contracting Parties to determine what measures are feasible, cost-effective, etc. (e.g. use of formulation 'implement ... to the extent possible').

Article 7 of the Plan requires that marine litter management measures are integrated into the LBS National Action Plans (NAPs), which should include the following:

- Development and implementation of appropriate policy, legal instruments and institutional arrangements to incorporate marine litter prevention and reduction measures;

- Monitoring and assessment programmes for marine litter;
- Measures to prevent and reduce marine litter;
- Programmes of removal and environmentally sound disposal of existing marine litter according to the national legislation on management of this kind of waste; and
- Awareness raising and education programmes.

This means that key information needed for costing the Plan's implementation requirements will be identified through the NAP update when country-specific measures will be decided upon. Once set of measures to implement the Plan is agreed on the national level, the advices laid out in the following paragraphs may be used to assess the costs.

For prevention of marine litter, the bulk of costs will be related to development and implementation of adequate urban waste management strategies in the area to which the Plan applies, in particular to the investments in waste management infrastructure, equipment and organisational improvements. Existing waste management strategies and Plans should be used to the extent possible for specific figures. If such plans do not exist, attempts should be made to identify (quantify) needs for:

- upgrading of waste collection and separation systems;
- facilities to provide for waste re-use, recovery and recycling;
- appropriate disposal options;
- organisational improvements/ capacity development for waste management utilities.

The type of questions that need to be answered include: how many and what type of containers are needed, how many and what type of vehicles, how many recycling yards, what different disposal options (landfills, composting sites, incinerators, etc.) and with what capacity, how many staff needs to be employed in waste management companies, and similar. Once these are determined, costs can be assessed based on information from comparable projects, market or information from waste management utilities.

For addressing the marine litter from sea-based sources, it is important to assess the needs for infrastructural and organisational improvements for port reception facilities and in the fishing sector.

Assessment of costs related to development and implementation of appropriate legal and policy instruments (e.g. legislation, administration of specific schemes such as voluntary agreements, deposit-refund systems, fishing for litter, etc.) and of those related to educational and awareness raising activities can be approached in the following manner:

- For legal measures, the main costs elements are linked to time needed to draft the laws and implement them.
- For policy instruments, costs can be assessed by identifying necessary time to design and administer the schemes (e.g. work of civil servants), the needs for specific equipment that might be necessary (to be e.g. distributed to fishermen), level and scope of any incentives to be paid out, etc.
- Educational and awareness raising measures can be costed by e.g. determining how many people need to undergo different educational courses, what are the costs of amending curricula to include marine litter issues and of additional engagement of teachers, and similar. Public campaigns costs can be assessed by breaking down the measures into type of communication materials, media time, work of specialized consultants etc.

Costs of removal of marine litter need to be established on case by case basis (an example of steps that might be needed is provided in Annex II of the document).

Annex II of the Plan contains detailed breakdown of tasks and timetables for implementing measures and operational targets of the Plan, and it includes cost estimates for some of the tasks (primarily those

that are to be implemented on supra-national level). These can be used as a reference for estimating national costs for certain types of measures.

Moreover, *Background Document on Marine Litter Regional Plan Measures and Indicative Cost Estimation of Measures Implementation* (UNEP(DEPI)/MED WG 387/Inf. 13) contains (based on comparative practices and clean up actions) information on the costs of relevant programmes and unit costs for e.g. costs per km of beach cleaned, costs per person employed to control litter etc.) and should be used as a reference in estimating national costs in the framework of NAP update.

**Annex I**  
**Overview of the key requirements of the  
analysed Regional Plans**



**Regional Plan on the reduction of BOD<sub>5</sub> from urban waste water**

<b>Key requirements</b>		<b>Responsibilities/ who is affected</b>	<b>Measures including investments</b>	<b>Other measures</b>
Art III	<ol style="list-style-type: none"> <li>1. Collect and treat UWW for all agglomerations (where &gt; 2,000 inhabitants and/or economic activities are sufficiently concentrated)</li> <li>2. Adopt and implement national ELVs on BOD<sub>5</sub> for discharges into recipient waters (as appropriate by 2015 or 2019): <ol style="list-style-type: none"> <li>a. BOD<sub>5</sub> ≤ 50 after secondary treatment,</li> <li>b. BOD<sub>5</sub> ≤ 200 after primary treatment, while taking into account local conditions</li> </ol> </li> </ol>	<p><b>Utilities</b> and/ or <b>public administrations</b> responsible for provision of water/ waste water services in agglomerations with more than 2,000 inhabitants within the hydrological basin of the Mediterranean Sea</p> <p><b>Competent</b> environmental/ water <b>authorities</b> (monitoring, enforcement)</p>	<p>Maintenance, upgrade and/ or construction of WW collection systems (including separation of storm waters)</p> <p>Upgrade, construction and adequate operation of WWTPs</p>	<p>Monitor discharges to ensure compliance</p> <p>Enforcement activities</p>
Art IV	Commitment to implement the Regional Plan	Competent environmental/ water authorities		Prepare national programme of action with implementation deadlines
Art V	Reporting	Competent environmental/ water authorities		Biannual reports; review of the status of implementation in 2013 and 2017



**Regional Plan on the reduction of BOD<sub>5</sub> in the food sector**

	<b>Key requirements</b>	<b>Responsibilities/ who is affected</b>	<b>Measures including investments</b>	<b>Other measures</b>
Art IV	<p>1. Food industries discharging more than 4,000 p.e. shall apply BAT and/or BEP to meet the following requirements:</p> <p style="padding-left: 40px;">a. COD &lt; 160 mg/l or TOC &lt; 55 mg/l</p> <p style="padding-left: 40px;">b. BOD<sub>5</sub> (or BOD<sub>7</sub>) &lt; 30 mg/l</p> <p>ELVs may be set differently when installation discharges into sewages systems; all ELVs to be reviewed in 2015</p>	<p><b>Food industries</b> discharging more than 4,000 p.e. into water bodies (of the Mediterranean hydrological basin), including:</p> <ul style="list-style-type: none"> <li>- Dairies</li> <li>- Fruit and vegetable processing plants</li> <li>- Breweries</li> <li>- Wineries and distilleries</li> <li>- Fish processing plants</li> <li>- Sugar manufacturing</li> <li>- Vegetable oil processing</li> <li>- Canning and preserving</li> <li>- Meat processing and slaughter houses</li> </ul> <p><b>Competent environmental/ water authorities</b></p>	<p>Replacement and/ or upgrading of technologies to achieve ELVs</p> <p>Introduction and implementation of BEP</p>	<p>Monitoring to verify compliance with ELVs (internationally accepted standardized sampling, analysis and quality assurance methods to be used whenever possible)</p> <p>Enforcement</p> <p>Review of regional ELVs in 2015 based on prepared implementation reports (difficulties encountered, new developments on BAT, BEP or environmental quality standards); consider possibility to develop ELVs based on</p>
Art V	<p>Commitment to implement RP ELVs by 2014 taking into account national circumstances and capacity to implement required measures as well as the need to reduce the use of water by using BAT and BEP</p>	<p>Competent environmental/ water authorities</p>		<p>Consideration of national circumstances</p>
Art VI	<p>Reporting</p>	<p>Competent environmental/ water authorities</p>		<p>Biannual reports</p>

**Regional Plan on the reduction of inputs of Mercury**

	<b>Key requirements</b>	<b>Responsibilities/ who is affected</b>	<b>Measures including investments</b>	<b>Other measures</b>
Art IV	<p><b>A Chlor alkali industry</b></p> <ol style="list-style-type: none"> <li>1. prohibit new chlor alkali plants using mercury cells</li> <li>2. prohibit new vinyl chloride monomer production plants using mercury as a catalyst</li> <li>3. cease releases of mercury from the activity of Chlor alkali plants by 2020 at the latest and:               <ol style="list-style-type: none"> <li>a. ensure environmentally sound management of metallic mercury from the decommissioned plants (prohibit re-entry into the market)</li> <li>b. ensure progressive reduction (until cessation) of releases with the view not to exceed 1.0 g per mt of installed chlorine production capacity in each plant (air emissions should not exceed 0.9 g per mt)</li> </ol> </li> </ol> <p><b>B Non Chlor alkali industries</b></p> <ol style="list-style-type: none"> <li>1. ELVs for emissions from non Chlor alkali industries to be adopted: less than 50 µg/ l of effluent by 2015 and less than 5 µg/ l of effluent by 2019</li> <li>2. ELVs for mercury emissions from incineration plants – less than 0.05 mg/ Nm<sup>3</sup> in the waste gas</li> <li>3. Other sectors – reduce emissions of mercury as appropriate</li> <li>4. Isolate and contain the mercury containing wastes to avoid potential contamination of air, soil or water</li> <li>5. Identify existing sites which have been historically contaminated with mercury (at least the old mines and decommissioned Chlor alkali plants) and implement environmentally sound management measures such as safety works, restrictions or decontamination, as appropriate</li> <li>6. Non-opening of new and/ or old mercury mines</li> </ol>	<p><b>Chlor alkali industry</b></p> <p><b>Non Chlor alkali industries</b> including:</p> <ul style="list-style-type: none"> <li>- chemical industries using Mercury catalysts</li> <li>- batteries industries</li> <li>- non-ferrous metal industry</li> <li>- waste treatment plants</li> </ul> <p><b>Incineration plants</b></p> <p><b>Other sectors</b> emitting mercury</p> <p>Those responsible for <b>management of mercury containing wastes</b></p> <p>Those responsible for <b>management of contaminated sites</b></p>	<p>Upgrading and/ or replacement of technologies or introduction of BEPs in order to comply with:</p> <ul style="list-style-type: none"> <li>• requirement to phase out (by 2020) emissions from chlor alkali industry</li> <li>• ELVs for emissions from non chlor alkali industries by 2015 and 2019</li> </ul> <p>Technologies/ procedures to keep emissions from incineration plants below .05 mg/ Nm<sup>3</sup> in the waste gas</p> <p>Identify appropriate measures</p> <p>Interventions to prevent contamination of air, soil and water through mercury containing wastes (isolation, containment)</p> <p>Safety works, imposing restrictions or decontamination of contaminated sites (at least old mines and decommissioned chlor alkali plants)</p>	<p>Monitoring of releases of mercury to water, air and soil by competent authorities or appropriate bodies to ensure compliance with ELvs</p> <p>Enforcement measures</p>

Art V	Commitment to implementation timetable			Consideration of ELVs for non chlor-alkali industries in 2015
Art VI	Reporting	Competent environmental authorities		Identification of contaminated sites in 2013 and report on envisaged measures in 2015  Biannual reports

**Regional Plan on marine litter management**

Key requirements		Responsibilities/ who is affected	Measures including investments	Other measures
Art 9	<p><b>PREVENTION</b></p> <p><u>Land-based sources</u></p> <ol style="list-style-type: none"> <li>1. Implement waste hierarchy in managing urban solid waste</li> <li>2. Reduce the fraction of plastic packaging through adequate waste reducing/ reusing/ recycling measures</li> <li>3. Extended Producer Responsibility</li> <li>4. Sustainable Procurement Policies</li> <li>5. Voluntary agreements</li> <li>6. Fiscal and economic instruments</li> <li>7. Deposits, Return and Restoration System for expandable polystyrene boxes</li> <li>8. Deposits, Return and Restoration System for beverage packaging</li> <li>9. Reduce micro-plastic</li> <li>10. Prevent run-off and riverine inputs of litter (through adequate collection and treatment of waste water)</li> </ol> <p><u>Sea-based sources</u></p> <ol style="list-style-type: none"> <li>1. Charges for the use of port reception facilities or No-Special-Fee system</li> <li>2. Fishing for Litter</li> <li>3. Gear marking to indicate ownership” concept and ‘reduced ghost catches concept’</li> <li>4. Prevent marine littering from dredging activities</li> <li>5. Close the existing illegal dump sites on land</li> <li>6. Combat dumping including littering on the beach, illegal sewage disposal in the sea, the coastal zone and rivers</li> </ol>	<p>Environmental authorities at national, regional and local level</p> <p>International and regional organisations</p> <p>Waste management utilities</p> <p>Producers, importers/ distributors and retailers (in particular products entailing plastic packaging, beverages and similar)</p> <p>Associations</p> <p>Fisheries authorities, fishermen</p> <p>Port authorities</p> <p>Water/ wastewater utilities</p> <p>Plastics industry</p>	<p>Establishment of adequate waste management system (collection, transport, treatment, final disposal)</p> <p>Establishment of adequate reusing/ recovery/ recycling system</p> <p>Upgrade of port reception facilities</p> <p>Adequate collection and treatment of waste water</p> <p>Closure of existing illegal dump sites on land</p>	<p>Design and implementation of appropriate legal and policy instruments</p> <p>Enforcement activities</p>
Art 10	<p><b>REMOVING</b> existing marine litter and its environmentally sound disposal</p> <p>Remove existing accumulated litter, where it is environmentally sound and cost effective (subject to EIA); priority to specially protected areas, SPAMIs and litter impacting endangered species.</p>	<p>Environmental authorities at national, regional and local level</p>	<p>Removal of litter from selected locations</p>	

	Specifically: a. Identify accumulations/ hotspots of marine litter and implementation of national programmes on their regular removal and sound disposal b. National Marine Litter Cleanup Campaigns c. Participate in International Coastal Cleanup Campaigns and Programmes; d. Adopt-a-Beach or similar practices e. Fishing for Litter and ensure adequate collection, sorting, recycling and/or environmentally sound disposal f. Charging for the use of port reception facilities or No-Special-Fee system (when port reception facilities are used for implementing the measures provided for in Article 10).	International and regional organisations  Fishery authorities, fishermen  Port authorities  Communities, schools, non-governmental organisations	Clean up campaigns	Education and awareness raising
Art 11	Assessment of marine litter	Environmental authorities at national, regional and local level		Assessments of the state and impacts of marine litter
Art 12	Monitoring Programme	International and regional organisations		National Monitoring Programme by 2017 based on ecosystem approach
Art 13	Research and scientific cooperation	Educational institutions  Research/ academic institutions		Enhance cooperation and research to improve knowledge on marine litter and minimise impacts
Art 16	Education and public awareness	Industries  Civil society		Partnerships and synergy with sustainable development initiatives in carrying out public awareness and educational activities



**Annex II**  
**Checklists for cost estimation**



## Checklist and table for the estimation of costs of the RP on BOD<sub>5</sub> from UWW on the national level

### GENERAL DATA

1. How many agglomerations (according to the definition adopted by the Plan) are discharging urban waste water (directly or indirectly) within the Mediterranean Sea hydrological basin? List agglomerations and provide necessary data (proposal how to organize data is provided in the table below).

### COLLECTION SYSTEMS

2. Does the collecting system exist:
  - a. What is the share of population served by the existing collection system?
  - b. What is the estimated p.e. served by the collection system?
3. Identify maintenance and upgrading needs for the existing collection system:
  - a. How many km of piping needs to be replaced to prevent leaking?
  - b. How many outfalls need to be repaired/ replaced?
  - c. How many pumping stations need to be replaced?
  - d. How many km of separate storm water collection system are needed?
  - e. What other types of interventions are needed to bring the existing collection systems in line with requirements set forth in Appendix I of the Plan?
4. Identify needs for construction of new collection systems

### WASTE WATER TREATEMENT

5. Identify needs for upgrade of the existing WWTPs
6. Identify needs for construction of new WWTPs
- 7.

Agglomeration	Size (no of inhab)	Connections to sewage (share or p.e.)	WWT, if any (share of total or in p.e.)		Collection system needs				Waste water treatment needs		Unit cost	Total cost
					Maintain/upgrade ( km, units, p.e.)			New km or p.e.	If ELVs not met – type of intervention needed , capacity	New WWTP (capacity)		
					prim	sec	piping					
A												
B												
C												
D												

Note: for easier management of data, excel tables may be created using this proposed template

MONITORING AND ENFORCEMENT

8. How many samples annually?
9. Time and equipment of enforcement authorities (inspectorates, others)?

### Checklist and table for the estimation of costs of the RP on BOD<sub>5</sub> from food sector on the national level

1. List industries from Appendix I of the RP discharging more than 4,000 p.e., directly or indirectly into the Mediterranean and provide their key characteristics; proposed format to structure necessary information for cost estimates is presented in the table below.
2. Do they discharge directly into environment or into the sewage system? Do they meet Regional Plan's (or applicable national) ELVs?
3. Identify industries and type of measures needed to comply with applicable ELVs.
4. Provide information on costs needed to implemented identified measures.

Type and name of industry (discharging > 4,000 p.e.)	Production capacity (or other indication of the size of industry, e.g. wastewater discharges in p.e.)	Discharges		ELVs met <sup>11</sup>		Select one or more measures (list below the table/ Appendix II or other applicable measures) needed to reach ELVs	Costs of applying measures (BAT/ BEP)
		Direct	Sewage	Yes	No		
<b>DAIRIES</b>							
1. Abc							
2. Def							
3. Ghi							
<b>FRUIT AND VEGETABLE PROCESS</b>							
list							
<b>BREWERIES</b>							
list							
<b>WINERIES AND DISTILLERIES</b>							
<b>FISH PROCESSING</b>							
<b>SUGAR MANUFACTURING</b>							
<b>VEGETABLE OIL</b>							
<b>CANNING AND PRESERVING</b>							
<b>MEAT PROCESSING AND SLAUGHTERING</b>							

<sup>11</sup> Provide applicable ELV, if different from those set by the RP on BOD from food sector

**List of measures leading to reduction of waste water volume and pollution load (Appendix II of the Plan)**

- A. automatic control of processes;
- B. installation of cooling circuits instead of run-through-cooling;
- C. use of vapour condensates for cleaning operations;
- D. recycling of preheated water from heat exchangers for cleaning operations;
- E. recycling of low polluted waste waters for cleaning operations;
- F. multiple use of cleaning waters;
- G. use of biodegradable cleaning agents;
- H. decentralized cleaning stations in order to shorten the pipes for cleaning agents;
- I. push away of liquid products in pipes with compressed air and vacuum instead of water;
- J. use of nitric acid for cleaning operations instead of other acids;
- K. control of product losses by continuous waste water sampling and analyses;
- L. improving the basic technology for reducing raw material losses;
- M. installation of safety mechanisms to prevent overfilling;
- N. use of peroxyacids instead of chlorine-containing cleaning agents and disinfectants to avoid generation of hazardous chlorinated substances;
- O. mechanical cleaning before cleaning with liquids and disinfection to minimize the use of cleaning agents and disinfectants;
- P. controlled discharge of waters containing disinfectants in order to protect subsequent biological treatment;
- Q. collection of product residues for further use, e.g. as feed for animals and fertilizers;
- R. separate collection and disposal of disinfectant rests and used concentrates;
- S. separate collection and treatment of fat, blood and nutrients;
- T. transportation of processed fish and sea products in a plant preferably without water;
- U. equipment of floor drains with fixed sink strainers.

*Checklist questions continued...*

- 5. What is the annual number of samples needed to verify compliance?
- 6. Enforcement staff time and equipment needed to enforce the ELVs?
- 7. Is 2015 review of the RP ELVs planned? If yes, are there any indications of the new ELVs?
- 8. Is it possible to assess what industries will be affected by the new ELVs and what level of investment will be needed to attain them?

## Checklist for the estimation of costs of the RP on mercury on the national level

### UPGRADING AND/ OR REPLACEMENT OF TECHNOLOGIES OR INTRODUCTION OF BEPs

1. Existing chlor-alkali plants
  - a. List operational plants, if any; provide capacity
  - c. Are current releases of mercury exceeding 1.0 g per mt of installed chlorine production capacity in each plant? Are air emissions exceeding 0.9 g per mt of installed chlorine production capacity in each plant?
  - b. For the plants exceeding these thresholds, are there any plans or programmes on how compliance should be achieved? If yes, take over identified measures and related costs while cross-checking (to the extent possible) existing data.
  - c. If not, identify measures (specific technological improvements, installation of equipment, etc.) that need to be implemented to comply with above requirements.
  - d. Assess the costs of implementing necessary measures (through comparative examples of plants that have already aligned their performance with standards, survey of market prices of equipment, existing assessments/ plans or similar).
  
2. Decommissioned chlor-alkali plants
  - a. Are there any such installations within hydrological basin?
  - b. If so, provide quantities of remaining metallic mercury not managed in an environmentally sound manner; environmental reports of competent authorities or records of the plants themselves may be used to this end.
  - c. Identify measures that need to be implemented to ensure environmentally sound management and break them down into specific tasks/ works.
  - d. Assess the costs for specific sites (by finding, for example, comparative examples; unit costs might be available for physical measure/ quantity of metallic mercury; alternatively, costs of implementing specific tasks/ works will need to be assessed).
  
3. Chemical industries using mercury catalysis
  - a. Determine are there any individual operational plants (and what are their capacities) in each of the following categories:
    - i. Use of mercury catalysts in the manufacture of polyurethane elastomers
    - ii. Acetaldehyde production with mercury-sulphate (HgSO<sub>4</sub>) as catalyst
    - iii. Vinyl acetate production with Hg catalysts
    - iv. Production of the cube (1-amino anthrachion) colours/pigments with Hg catalyst
    - v. Use of mercury intermediates for production of other mercury compounds
    - vi. Use of mercury intermediates in the pharmaceutical/ chemical industry
    - vii. Manufacture of mercury catalysts
    - viii. Manufacture of organic and non-organic mercury compounds

- b. Are current releases of mercury in line with the ELV of 50µg per litre of effluent?
    - c. If not, identify measures (specific technological improvements, installation of new equipment, use of know-how, improvement of management practices etc.) that need to be implemented to comply with 2015 ELV.
    - d. Identify measures that need to be implemented to comply with 2019 ELV (5µg per litre of effluent).
    - e. Assess the costs of implementing necessary measures.
4. Industries manufacturing batteries containing mercury
  - a. Determine are there any such individual operational plants (and what are their capacities)?
  - b. If yes, repeat the same questions (b – e) as under point 3.
5. Non-ferrous metal industry
  - a. Determine are there any individual operational plants (and what are their capacities) in each of the following categories:
    - i. Mercury recovery plants;
    - ii. Extraction and refining of non-ferrous metals.
  - b. If yes, repeat the same questions (b – e) as under point 3
6. Plants for the treatment of wastes
  - a. Determine are there any such individual operational plants in the hydrological basin?
  - b. If yes, repeat the same questions (b – e) as under point 3
7. Incineration plants
  - a. Determine are there any operational incineration plants that may affect directly or indirectly the Mediterranean Sea Area?
  - b. If yes, establish whether current emissions are below the limit of 0.05 mg/ Nm<sup>3</sup> of the waste gas.
  - c. If not, identify measures that need to be implemented to comply with the target.
  - d. Assess the costs of implementing necessary measures.
8. Other sectors emitting mercury
  - a. Identify any other industrial facilities or processes that cause releases of mercury into the environment and may affect directly or indirectly the Mediterranean Sea Area.
  - b. Identify appropriate measures to reduce releases of mercury from such facilities/ processes.
  - c. Assess the cost of implementing such measures

#### SITES WITH MERCURY CONTAINING WASTES

- a. Identify sites with mercury containing wastes that have potential to contaminate air, soil or water; reports of environmental authorities and other relevant documentation may be used to that end.
- b. Identify measures needed to avoid contamination; break down into tasks/ works.
- c. Assess the costs of implementing such measures.

#### CONTAMINATED SITES

- a. Identify sites contaminated with mercury in the past (as a minimum, old mercury mines and de-commissioned chlor-alkali plants); reports of environmental authorities and/ or the Report of the Contracting Party o the Secretariat (if submitted under the RP on mercury) could be used to this end.
- b. Identify measures needed to ensure environmentally sound management (e.g. safety works, restrictions, decontamination); break down into tasks/ works.
- c. Assess the costs of implementing such measures

**Checklist and table for the estimation of costs of the RP on marine litter management on the national level**

<b>PREVENTION</b>			
<b>Land-based sources</b>			
<b>Measures prescribed by the Plan</b>	<b>Deadlines</b>	<b>Appropriate national measures to implement the Plan</b>	<b>Costs</b>
Urban solid waste management is based on reduction at source	2025	<i>Details to be taken over from waste management strategies and plans, if any</i>	
		Quantified needs for upgrading waste collection and separation system	
		Facilities (e.g. separation points, transfer stations, recycling yards) to provide for re-use, recovery, recycling	
		Identification of different disposal options (e.g. landfills, incinerators, composting sites) with capacities	
		Organisational improvements in waste management utilities	
Implement adequate waste reducing/ reusing/ recycling measures to reduce the fraction of plastic packaging waste that goes to landfill or incineration without energy recovery	2019	<i>Details to be taken over from waste management strategies and plans, if any</i>	
		Identify specific measures needed to reduce, reuse and/or recycle the share of plastic packaging that goes to final disposal [if measures are already included under solid waste management, do not repeat assessment of costs]	
Extended Producer Responsibility	2017	Define the scope of scheme, identify inputs needed to design and administer	
Sustainable Procurement Policies	2017	Identify inputs needed to develop and implement policy	
Voluntary agreements to reduce plastic bags consumption and selling of appropriate products in special and reusable containers	2017	Define the scope of such schemes, determine how many would be needed. Identify inputs needed to administer each scheme if more than one are needed	
Fiscal and economic instruments to promote the reduction of plastic bag consumption	2017	Assess options, determine scope of the scheme and identify inputs needed to administer it	
Deposits, Return and Restoration System for expandable polystyrene boxes in the fishing sector	2017	Identify inputs needed to design and implement the scheme	
Deposits, Return and Restoration System for beverage packaging prioritizing when possible their recycling	2017	Identify inputs needed to design and implement the scheme [link the assessment to previously assessed re-use and recycling measures, avoid overlaps]	
Procedures and manufacturing methodologies to minimize the decomposition characteristics of plastic, to reduce micro-plastic	2017	Identify the needs to develop appropriate procedures and manufacturing methodologies	

Adequate urban sewers, wastewater treatment plants and waste management systems to prevent run-off and riverine inputs of litter	2020	Determine whether measures identified under Regional Plan on BOD from UWW are sufficient to implement this requirement. If yes, do not assess costs here. If not, identify additional measures needed to address marine litter from urban sewers and/ or WWTPs	
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<b>PREVENTION</b>			
<b>Sea-based sources</b>			
<b>Measures prescribed by the Plan</b>	<b>Deadlines</b>	<b>Appropriate national measures to implement the Plan</b>	<b>Costs</b>
Charge reasonable cost for the use of port reception facilities or when applicable, apply No-Special-Fee system; provide ships with updated information on obligations	2017	Decide on the appropriate scope of national efforts to comply with the Plan; break down into tasks (e.g. upgrading port infrastructure, improve organisation) and assess costs	
“Fishing for Litter” environmentally sound practices	2017	Decide on the extent to which it is possible to implement the measure on the national level; breakdown into tasks and assess costs	
“Gear marking to indicate ownership” concept and ‘reduced ghost catches through the use of environmental neutral upon degradation of nets, pots and traps concept’	2017	Decide on the extent to which it is possible to implement the measure on the national level; breakdown into tasks and assess costs	
Prevent marine littering from dredging activities	2020	Identify needs (regulations, technical measures, enforcement) and assess costs	
Close the existing illegal dump sites on land in the area of the application of the Regional Plan	2020	Identify number of improper waste disposal sites in the area to which the Plan refers and specify the tasks/ works related to their closure	
Combat dumping in accordance with national and regional legislation including littering on the beach, illegal sewage disposal in the sea, the coastal zone and rivers in the area of the application of the Regional Plan.		Specify scope and level of enforcement activities needed to implement the requirement; identify any other possible actions to contribute to fulfilment of this requirements (as provided for in the national and regional legislation) [avoid duplication of costs of actions that might be included under other requirements]	

## REMOVAL

Example of steps that need to be taken to assess the costs of removal of accumulations/ hot spots of marine litter (if any such locations have been identified in the so far implementation of the Plan on the national level or will be identified in the course of NAP update) are provided below. Suggestions on how to estimate costs related to other removal measures required by the Plan (e.g. cleanup campaigns, fishing for litter etc.) can be found in section 5.4 of this document and in the above tables).

Article 10 of the Plan: “Where environmentally sound and cost effective, remove existing accumulated litter, subject to EIA procedure, in particular from SPAs and SPAMIs, and when impacting endangered species listed in Annexes II and III of the SPA and Biodiversity Protocol”

Prior to cost estimation, the following questions need to be considered: What is environmentally sound? What actions would environmentally sound removal entail and what are the associated costs? What is cost-effective? To determine cost-effectiveness of an action, effects (improvement to be achieved by intervention) need to be quantified. Is a unit of removed marine litter a sufficient measure of effect, or can e.g. one tone of removed litter from one location have a more significant effect than a tone removed from another?

Possible steps to enable estimation of costs and decision on the final selection of sites for which removal of accumulated marine litter will be carried out to comply with the RP on marine litter:

1. Identify sites under national jurisdictions (SPAs, SPAMIs, distribution of species from Annexes II and III) affected by accumulated litter; describe sites (include data on surfaces that need to be cleaned up, quantities of litter to be taken out and/ or similar).
2. Prioritise sites based on existing data and scientific knowledge (on the biological importance of sites, the level of threat marine litter poses to endangered species, overall impacts on affected marine ecosystems, etc.).
3. Perform EIA for priority sites.
4. Ascertain for which ones it is environmentally sound to carry out clean-up.
5. Look for comparable studies/ interventions for estimation of costs, or, if these are not available, breakdown the measure into following cost elements:
  - a. How many people, what qualifications, for how long are needed to carry out clean-up;
  - b. What equipment is needed, for how long (scuba diving, ships with adequate equipment, etc.);
  - c. What ways to transport removed litter (how many boats, distances, road transport on land, etc.);
  - d. Disposal costs (per unit);
6. Calculate costs for different sites.
7. Find costs-effectiveness ratios for considered sites.
8. Select site/s with highest cost effectiveness ratios and include its/their costs in the overall cost estimation.