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Regional meeting on applying methodology for  
programmes of measures and economic analysis in the NAP update

Athens, Greece, 11 – 13 May 2015

**Training materials (economic analysis in selecting the  
NAP programme of measures)**

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UNEP/MAP  
Athens, 2015



# UNEP/ MAP Guidance on CEA and CBA – Appendix G of the NAP update *Guidelines*

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Part 1: Deciding on the appropriate tools and levels of analysis, designing the steps and compiling information in the course of midterm assessment

NAP update meeting

11 – 13 May 2015, Athens



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# Why conduct economic analysis (EA)?

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- UNEP/ MAP and UfM mid-term assessments of NAP/ SAP implementation indicated slow progress with implementation of some measures
- Updated NAP portfolio expected to be more complex/ diverse due to
  - ECAP GES
  - Regional Plans

... therefore the need to select the most effective measures

- Integrated approach (links between human activities – state of the environment – responses)
- Improve the funding prospects (financial sustainability of NAPs)
- Ensure best possible allocation of (limited) resources
- Convince stakeholders it is worth to invest in environmental protection
- Focus on the most efficient (costs, benefits/ impacts) ways to reach GES



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# What are CEA and CBA?

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## Cost-effectiveness analysis (CEA)

- Analysis of the costs of alternative measures designed to meet a well specified/ quantified objective
  - dividing the costs of measures/ sets of measures by a quantified physical effect
- Helps find the least-cost solution for meeting a prescribed target

## Cost-benefit analysis (CBA)

- Compares measures/ projects/ policy options in terms of their advantages (benefits) and disadvantages (costs)
  - all of the negative and positive economic, social and environmental impacts are considered – monetisation (full scale CBA)
  - benefit to cost (B-C) ratio (total benefits divided by total costs); when  $> 1$ , measure is beneficial
  - net present value (NPV); positive NPV indicates a welfare improvement

## Both tools can be applied as:

- Quantitative (full monetisation of costs and benefits)
- Semi-quantitative (e.g. estimation of costs, qualitative assessment/ scoring for effects)
- Qualitative level (e.g. matrices with categories of costs and benefits – +++ / ---)



# Questions to guide decisions on the scope, type and role of EA tools in the NAP update

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- Availability of data, time and capacities?
- What is appropriate form of analysis (quantitative, semi-quantitative or qualitative)?
- Specific tools (CEA, CBA or alternatives) to be used?
- What role will they play:
  - inform policy makers and other stakeholders?
  - additional criteria for selecting final programme of measures?
- At which level should selected tool/s be applied:
  - for sets of measures identified under individual target?
  - for choosing between various policy approaches (or sets of measures) to address specific environmental problem (e.g. concentration of pollutants in a given hot spot area), identified gaps and/ or issues?



# How to integrate EA in the NAP update

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## Assessment of midterm baseline

- analyse human activities that depend on marine environment; compile data
- analyse implementation of the original NAP from economic/ financing perspective (country fact sheets, SAP/ NAP mid-term evaluation, UfM study as starting points)

## Analysis of gaps, prioritization of issues and target setting

- describe in qualitative and, if possible, in quantitative terms the costs that are expected to occur if the status of marine waters and ecosystems deteriorates
- use costs of degradation to prioritise issues
- use EA to derive a realistic set of operational targets until 2025

## Development of programme of measures

- estimate costs of shortlisted measures
- undertake economic analysis of shortlisted measures as appropriate: (to the applicable/ practicable extent) conduct CEA or CBA (or use alternative tools)
- select final NAP programme of measures based on economic analysis

**NAP update team: work together to identify and organise available data to describe linkages between uses and status of marine environment**



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# Main functions of economic analysis in the NAP update

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- link the assessment of midterm baseline, setting of objectives and operational targets, as well as identification and prioritisation of pollution reduction and control measures to socio-economic conditions in a given country, thus making the overall analysis more sound
- aid decision making on final selection of the programme of measures by providing information on costs and benefits of different measures/ policy options
- strengthen implementation prospects for the updated NAP and contribute to its overall financial sustainability.



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# Economic analysis in the midterm assessment

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- Identify and describe different uses of marine environment and link to related pressures and impacts
- Discuss trends (pressures and impacts)
- Assess direct and indirect benefits of different uses of marine environment
- When identifying issues (that e.g. prevented implementation of original NAP measures), group/ single out economic, fiscal, financial ones
  - funding available?
  - incentives and/ or pollution charges (economic instruments) in place?
  - tariffs adequate for sustainable financing of environmental infrastructure?



# EA in the midterm assessment – what information?

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- Distribution of population and key economic sectors and sub-sectors
- Standard measures of benefits (revenues, turnover, gross value added, employment, direct and indirect contribution to GDP) but also (if possible) data on value of services provided by ecosystems
- Pressures in economic terms (e.g. size of fishing fleet, total catches, number of overnight stays of tourists, type and capacity of tourist accommodation, type and size of coastal industries) and **impacts**
- Expected trends (demography, economy) with related pressures and impacts within the time span of the updated NAP

**Compile information needed to estimate costs of Regional Plans implementation (UNEP(DEPI)/MED WG.414/4)!**



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# Identification of impacts – Plan Blue ESA

Ecological Objectives (EO)		Fisheries	Aquaculture	Tourism and Recreational Activities	Maritime transport	Offshore extraction of oil and gas
		Fishing activity, bycatches and discards		Coastal dev. and construction of infrastructure and Recreation		Presence of structures and operations & Marine pollution
EO1	Biological diversity	X	X	X	X	X
EO2	Non - indigenous species	X	X		X	X
EO3	Commercial species	X	X	X		
EO4	Food webs	X				
EO5	Eutrophication		X	X	X	
EO6	Sea - floor	X	X	X	X	X
EO7	Hydrographic conditions	X	X	X		X
EO8	Coastal areas's natural dynamics			X		X
EO9	Contaminants	X	X	X	X	X
EO10	Marine Litter	X	X	X	X	X
EO11	Noise	X		X	X	X

# Simplified example for assessment of impacts (if not available from other segments of analysis)

Economic sector/ subsector	Physical impacts		Chemical impacts			Biological impacts		
	Sea floor	Disturbance	Eutroph	Contamin	...	MPA	NIS	...
<b>1. Fishing</b>								
1.a. Commercial	5	3	1	1				
1.b. Recreational								
<b>2. Aquaculture</b>								
2.a. Enclosed water			5				4	
2.b. Open sea			3				2	
<b>3. Tourism</b>			5			5		
<b>4. Industry</b>								
4.a. Wineries			5					
4.b. Plants using mercury				5				

# Examples to illustrate what to aim for in midterm assessment

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Source: Plan Bleu Socio-economic Assessment for the Mediterranean – ESA report (includes information on all economic sectors)

“... circa **73 000 fishing vessels** operate in the Mediterranean Sea, accounting for **6 million tons in terms of deadweight tonnage**. A large share of the fleet recorded is made up of small-scale artisanal boats (80%).

Fish landings in the region almost reached **1 million tons in 2011** (around 1% of total world captures), and were mainly composed of small pelagics and demersal species.

In relation to production value, Mediterranean catches generated in 2008 **direct gross revenues of 3 200 million Euros** which rose up to **9 700 million Euros in terms of total (direct, indirect and induced) impacts**. **Gross value added exceeded 2 000 million Euros.**”



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# Challenges faced in socio-economic assessments

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## **Lack of data in general and disaggregated at the level of analysed area** (hydrological basin, administrative units):

- Value of ecosystem services (indirect benefits)
- Data related to tourism, employment may not be readily available for coastal area
- Links between drivers/ pressures and impacts – complexity of marine environment

## **How to overcome them in NAP update:**

- Be resourceful (identify all useful sources of information)
- Extrapolate
- Estimate
- Cooperate closely with other experts, thematic groups
- Present key issues to Steering Committee and seek guidance

# Costs of degradation – possible approaches

(based on Plan Bleu's *Scoping study for the assessment of the costs of degradation of the Mediterranean marine ecosystems*)

The ecosystem services approach	The thematic approach	The cost-based approach
<ol style="list-style-type: none"><li>1. Define GES (descriptors listed in the MSFD)</li><li>2. Assess the environmental status in a Business As Usual (BAU) scenario.</li><li>3. Describe in qualitative and, if possible, quantitative terms the difference between the GES and the environmental status in the BAU scenario, i.e. the degradation of the marine environment.</li><li>4. Describe the consequences to human well-being of degradation of the marine environment, either qualitatively, quantitatively or in monetary terms.</li></ol>	<ol style="list-style-type: none"><li>1. Define degradation themes, e.g. marine litter, chemical compounds etc.;</li><li>2. Define a reference condition (condition where targets for good environmental status are achieved);</li><li>3. Describe in qualitative and, if possible, quantitative terms the difference between the reference condition and the present environmental status for all the degradation themes;</li><li>4. Describe the consequences to human well-being of degradation of the marine environment, either qualitatively, quantitatively or in monetary terms.</li></ol>	<ol style="list-style-type: none"><li>1. Identify all current legislation that is intended to improve the marine environment;</li><li>2. Assess the costs of this legislation to the public and private sectors;</li><li>3. Assess the proportion of this legislation that can be justified on the basis of its effect on the marine environment (as opposed to health or on-shore environmental effects);</li><li>4. Add together costs that are attributable to protecting the marine environment from all the different legislation you have assessed.</li></ol>

# Examples to illustrate how to approach assessment of costs of degradation

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## ReGoKo results for costs of degradation

### Lebanon pilot study

- Assessment of costs related to poor bathing water quality at Ramlet-el-Bayda beach through additional medical costs born by those who contracted diseases
  - cca USD 340,000 per year
- Review of other available studies
  - 2006 oil spill in the Mediterranean – costs for Lebanon USD 729 mil
  - costs of environmental degradation of the Lebanese Northern Coastal Zone – USD 102 mil per year

Source: *Governance and Knowledge Generation: Socio-economic Evaluation of Maritime Activities, report for Lebanon (Jan 2015)*



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# Examples to illustrate how to approach assessment of costs of degradation

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## Croatian ESA

Reasons for using cost-based approach:

- the other approaches not possible as GES not defined
- not possible to quantify links between human activities and impacts
- difficult to project economic growth

Costs of existing and/ or planned environmental protection measures assessed as a proxy for costs of degradation

- Difficulties (costs on national – regional – local level)

Data on costs per administrative units linked to data on pressures - findings mapped

Source: *Socio-economic analysis of the uses and costs of degradation of marine environment and coastal area* (proposal, December 2014)



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# Examples to illustrate how to approach assessment of costs of degradation

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## Greece – ecosystem services approach

- 3 scenarios of degradation, 3 discount rates tested (2.38% used)
- Results

Maximum cumulative losses in % of GDP	Production value	Added value
Fisheries	0.07	0.03
Aquaculture	0.07	0.01
Processing	0.04	0.03
Tourism	0.81	0.15
Beaches	0.29	
Ports	0.002	

Source: Plan Bleu's *Scoping study for the assessment of the costs of degradation of the Mediterranean marine ecosystems*



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# The most challenging aspects of the full scale economic analysis

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## 1. Costing of measures

- Type of measures
- Break down into inputs
- Use existing sources for unit costs

## 2. Full monetisation of costs and benefits (valuation of non-market goods and services)

- Different valuation methods, pros and cons
- Make best use of existing valuation studies

## 3. Discounting

- Controversial
- Apply sensitivity analysis
- Whatever the choice of discount rate – explain the reasons



# Costing of measures

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- Approaches to costing the implementation of RPs (UNEP(DEPI)/MED WG.414/4); some advices in the *NAP Guidelines, Appendix G*

## KEY STEPS: DISAGGREGATION, UNIT COSTS

- Technical measures
  - Costs per p.e., other physical units – km of sewage system, recycling station
  - Sources: WW and SWM strategies, feasibility studies, UNEP/ MAP Background document on MLRP (indicative costs)
- Legislative measures
  - Public (costs of passing and enforcing regulations) and private (compliance) costs
- Policy instruments
  - E.g. tax breaks, pollution charges
- Capacity building and awareness raising measures
  - Capacity building needs (training, equipment, etc.), publications costs, media time and similar



# Valuation (overall value of ecosystem services or value of changes in ecosystem services)

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## Types of values

- use (actual/ planned use, direct or indirect, and option value)
- non-use (for others, existence values)

## Main groups of valuation techniques:

- stated preferences (questionnaires to elicit individuals' preferences)
- revealed preferences (market prices, travel cost method...)

## Classification (CICES) of ecosystem services:

1. Provisioning (nutrition, materials, energy)
2. Regulating and maintenance (acceptance/ breakdown of waste, carbon sequestration, flood protection, maintenance of physical, chemical and biological conditions)
3. Cultural (recreation, aesthetic,... existence, bequest)



# Discounting

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- Method used to value at the same date costs and benefits occurring at different points in time
- Private and social discount rates
- Choice of discount rate may significantly affect results of analysis (justify the choice, perform sensitivity analysis)
- EC (WG ESA) 2010 Guidance document:

<b>Time horizon</b>	<b>Discount rate</b>
0-10 years	3 %
10-30 years	2 %
30-75 years	1 %
> 75 years	0.5%



# Recommendations for EA in the initial NAP update steps

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- Start preparations early
- Identify all relevant sources of information
- Know (agree upon) what role will the economic analysis have in the decision making process
- Assess available data and decide on appropriate tools (CEA, CBA or MCA)
- Organise data in the manner that will allow consequent steps in the analysis
- Identify any areas where new assessments/ data collection is necessary
- Focus on key pressures and impacts
- When quantification is not possible, use qualitative approaches
- Identify needs for the future



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# UNEP/ MAP Guidance on CEA and CBA – Appendix G of the NAP update *Guidelines*

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## Part 2 – Cost-effectiveness analysis

NAP update meeting

11 – 13 May 2015, Athens



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# Strengths and weaknesses of the concept

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- Requires good knowledge of functional relationships between measures – pressures – impacts/ targets (cause – effect relationship)
- Financial (private/ compliance) and economic/ social costs
- Does not include full range of benefits
- Effectiveness of combination of measures/ how to deal with co-benefits
- A more narrow scope compared to CBA, but on the other hand easier to implement



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# Questions to be answered before deciding to apply CEA

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- Well defined/ quantified target?
- Established/ known links between proposed measures – reduction of pressures/ effects
- What are the information gaps and can they be overcome in the course of the NAP update?

*Quantitative – semi-quantitative – qualitative?*



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# Practical experiences with CEA

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**REFRESH project:** *Pan-European review of cost-effectiveness analysis studies relating to water quality and WFD compliance challenges*

*«The choice of a particular methodological framework in the CEA highly depends on the specific environmental problem to be dealt with, **the availability and credibility of data, and the degree of uncertainty inherent in cost and effectiveness information.**»*

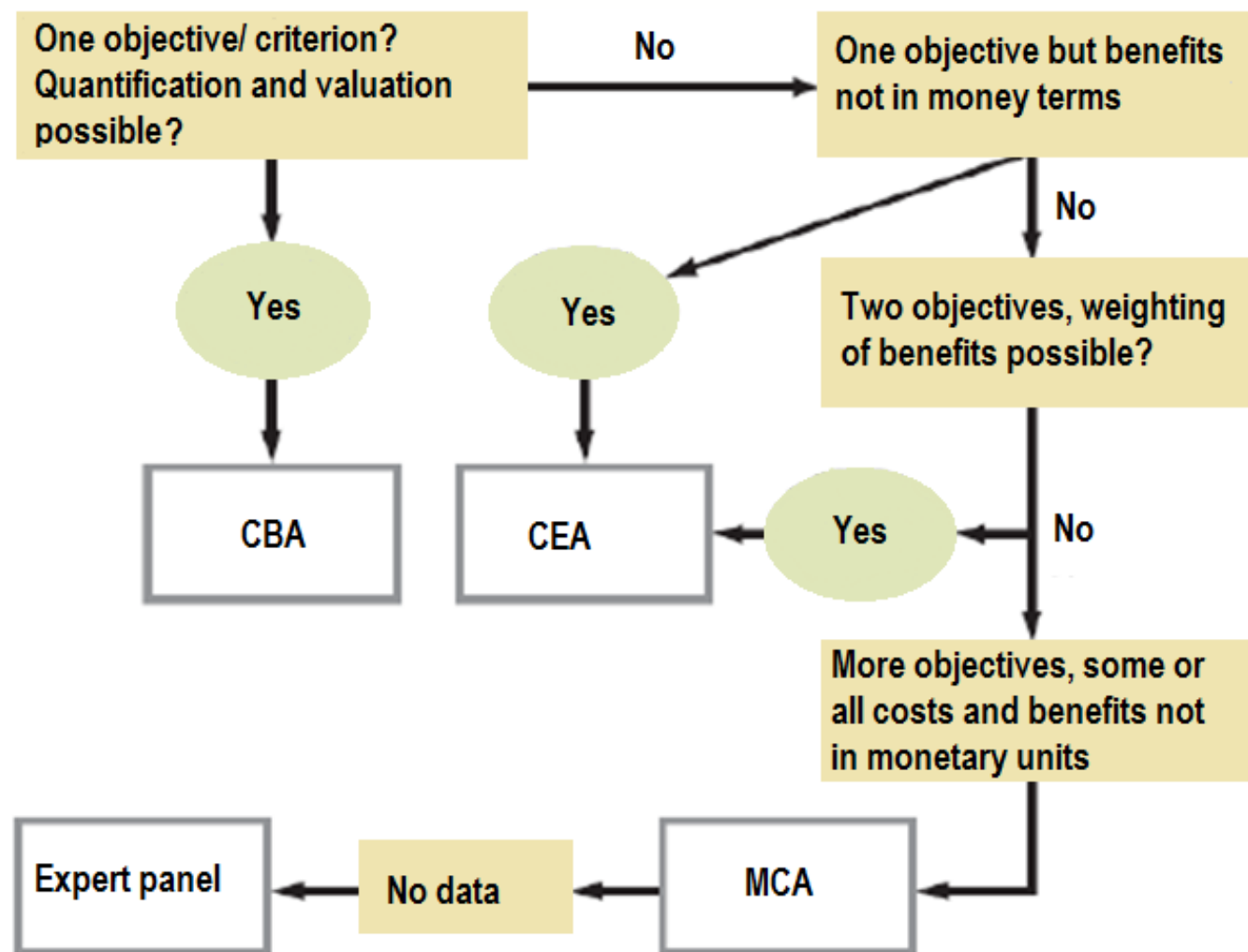
*To deal with this issue, the use of **intervals of costs and effectiveness estimates** as well as sensitivity and scenario analysis is advocated.*



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# REFRESH study (Pan-European review)



# Cost-effectiveness analysis: steps for quantitative assessment

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## Environmental objective?

## Alternative measures (sets of) to achieve it?

1. Assess the effectiveness of identified measures in reaching the environmental objective;
2. Assess the costs of these measures;
3. Rank measures in terms of increasing unit costs;
4. Establish the least cost way to reach the environmental objective/ target.



# Example of quantified CEA - Swedish nutrient reduction policy

**Sweden:** cost-effectiveness of the past (1995-2005) and current nutrient reduction policy

	National “zero eutrophication” target	BSAP* target for Sweden
Nitrogen load	- 16,890 t by 2010 (compared to 1995)	- 20,948 t
Phosphorus load	- 350 t by 2010 (compared to 1995)	- 291 t

\* Baltic Sea Action Plan

What was done:

- Past and current policy measures identified
  - [current: focus on increased cleaning at WWTPs, P-free detergents, reduction in cattle, pigs and poultry, fertilizer reduction, catch crops, creation of wetlands, etc.]



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# Example of quantified CEA – nutrient reduction policy Sweden

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## Costs estimated (and linked to effects)

- 1995-2005: total costs of measures € 336 mil; achieved nutrient reduction – 15,474 t of N, 527 t of P
  - total cost of current national policy € 299 mil; cost of meeting BSAP target € 585 mil
- 
- Results of the assessment:
    - Highlights the sectors with potential for cost-effective solutions (agriculture)
    - Highlights types of measures with highest contribution to meeting the targets in a cost-effective manner
      - e.g. bulk of the funding (139 out of € 196 mil for agricultural measures) to implement measures that reduce both N and P simultaneously

Source: REFRESH study



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# Examples from the EU MSFD implementation (semi-quantitative, qualitative)

Source: Arcadis *Background document* – overview of practices  
Scoring system

- Assess expected reduction of different pressures for each measure and relation/ importance of each pressure for each individual target (and indicator) – L, M, H, VH
- Multiply expected reduction in pressure with importance of a pressure - on-site effect
- Score pressures according to geographic dimension
- Multiply on-site and scale for the overall effectiveness of measures (categories 1 – 5)
- Compare with costs (categories 1 – 5) in a matrix form

		Effectiveness				
		5	4	3	2	1
Cost	1	3	3	2	1	1
	2	3	3	3	2	1
	3	4	4	3	2	2
	4	5	4	3	3	3
	5	5	5	4	3	3

The approach useful to overcome knowledge gaps on driver-effect-pressure relations

# Examples from the EU MSFD implementation (semi-quantitative, qualitative)

Source: *Arcadis Background* document – overview of practices

<b>Environmental effectiveness</b>	<b>Implementation costs</b> <i>(ranges to be defined)</i>
Strong	Low
Potentially strong	Moderate
Uncertain	High
<b>Four levels of cost-effectiveness</b>	
Cost-effective measures	
Moderate cost-effective measures	
Low cost-effective measures	
Non cost-effective measure	

# Introduction to group work/ exercises

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Explain hand-out materials:

- 1) List of pre-defined measures (linked to training exercise) for 2 groups
- 2) Methodology (assessment matrix) how to apply CEA

Groups will be invited to:

- 1) Review pre-defined list of measures and amend/ change them as appropriate, having in mind results of the day 1 training
- 2) Apply proposed methodology, identify possible issues
- 3) Prepare brief summary of the exercise for plenary session



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# UNEP/ MAP Guidance on CEA and CBA – Appendix G of the NAP update *Guidelines*

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## Part 3 – Cost-benefit analysis

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# Strengths and weaknesses

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- Can provide a very useful and reliable input for decision-making system, when carried out fully and impartially
- Translating all the costs and benefits of a project, policy option or measure/ management scenario into monetary terms can be impractical or it may not give useful results - valuation of non-priced goods and services demanding and challenging
- Possible pitfalls linked to discounting
- CBA only provides an aid to decision making: option providing highest benefit per unit cost may not be the most appropriate on other grounds



# WG ESA, analysis of experiences in EU MSs

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## Role of CBA in the decision making process

How was CBA used	Number of MS (multiple answers)
To illustrate relevant trade-offs and support decision making	8
To narrow down and fine-tune possible measures	8
To inform policy makers and the wider public	5
To create support among stakeholders	3
CBA not started yet	10

# Questions to be answered before deciding to apply CBA

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- Are alternative options to be assessed well defined and comparable?
- Is the necessary information on costs and benefits available?
- What is value added from carrying out CBA? Does it justify the time and effort needed?

*Quantitative – semi-quantitative – qualitative?*



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# Cost-benefit analysis: steps for quantitative analysis

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1. Definition of the details of each measure/ set of measures/ policy option subject to the analysis (including 'do nothing' i.e. projection of trends in pressures and impacts without analysed intervention/s)
2. Determining the spatial and temporal scales of the analysis (i.e. over what population is it appropriate to sum the costs and benefits and over what time period do the costs and benefits arise?)
3. Identify all costs and benefits (monetary values)
4. Calculate 'present' values (choose/ apply discount rate)
5. Compare the economic efficiency of various options through comparison of their benefit-cost ratios or net present values



# Example of CBA: Plan Bleu's study

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*Economic study of the impacts of marine and coastal protected areas in the Mediterranean* (Mangos A., Claudot M.-A. (2013))

[http://planbleu.org/sites/default/files/publications/cahier\\_13\\_amp\\_en\\_0.pdf](http://planbleu.org/sites/default/files/publications/cahier_13_amp_en_0.pdf)

- Application of the CBA on various MCPAs
  - Cap de Creus Natural Park (Spain)
  - Sensitive Area of the Kuriat Islands (Tunisia)
  - Specially Protected Area of Kas Kekova (Turkey)
  - National Marine Park of Zakynthos (Greece)
  - Mount Chenoua and Kouali Coves protection project (Algeria)
- Quantitative assessment possible for a '...fraction of benefits stemming from the ecosystems and protective actions...'
- 3 scenarios 2010 – 2030: BaU, increasing, and decreasing protection



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# Example of CBA: Plan Bleu's study (selected) results

		Kuriat islands (Tunisia)			Cap de Creus (Spain)		
		S1	S2	S3	S1	S2	S3
Present value of benefits	Commercial fishing	30,915	32,312	29,953	6,785	6,547	5,406
	Recreational fishing	2,334	503	2,614	7,584	8,338	7,259
	Tourism	14,020	15,519	15,182	2,989,260	3,477,665	2,755,540
	Scuba diving	440	460	446	27,387	30,050	24,180
	Boat day trip	NA	NA	NA	NA	NA	NA
	CO2 sequestration	2,809	2,913	2,600	11,878	11,977	11,739
	<b>Total</b>	<b>50,517</b>	<b>51,707</b>	<b>50,794</b>	<b>3,042,893</b>	<b>3,534,576</b>	<b>2,804,126</b>
Present value of costs	Administrartion budget	164	283	27	26,316	64,675	22,699
	Surveillance expenses	-	193	-	2,074	1,171	1,597
	Environmental education	0	249	0	NA	NA	NA
	Expenses of a partner (NGO...)	NA	NA	NA	NA	NA	NA
	<b>Total</b>	<b>164</b>	<b>726</b>	<b>27</b>	<b>28,391</b>	<b>65,846</b>	<b>24,296</b>
	<b>Net present value</b>	<b>50,353</b>	<b>50,981</b>	<b>50,767</b>	<b>3,014,502</b>	<b>3,468,730</b>	<b>2,779,830</b>

# Examples from the EU MSFD implementation – UK approach

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[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/82627/msfd-consultfinal-ia-20121220.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/82627/msfd-consultfinal-ia-20121220.pdf)

- For the IA, a range of illustrative management measures (to reach GES targets) has been chosen by experts and policy makers
- Wherever possible, costs and benefits have been monetised; otherwise – qualitative description
- The plan was to subject final measures for achieving GES to a full cost-benefit analysis

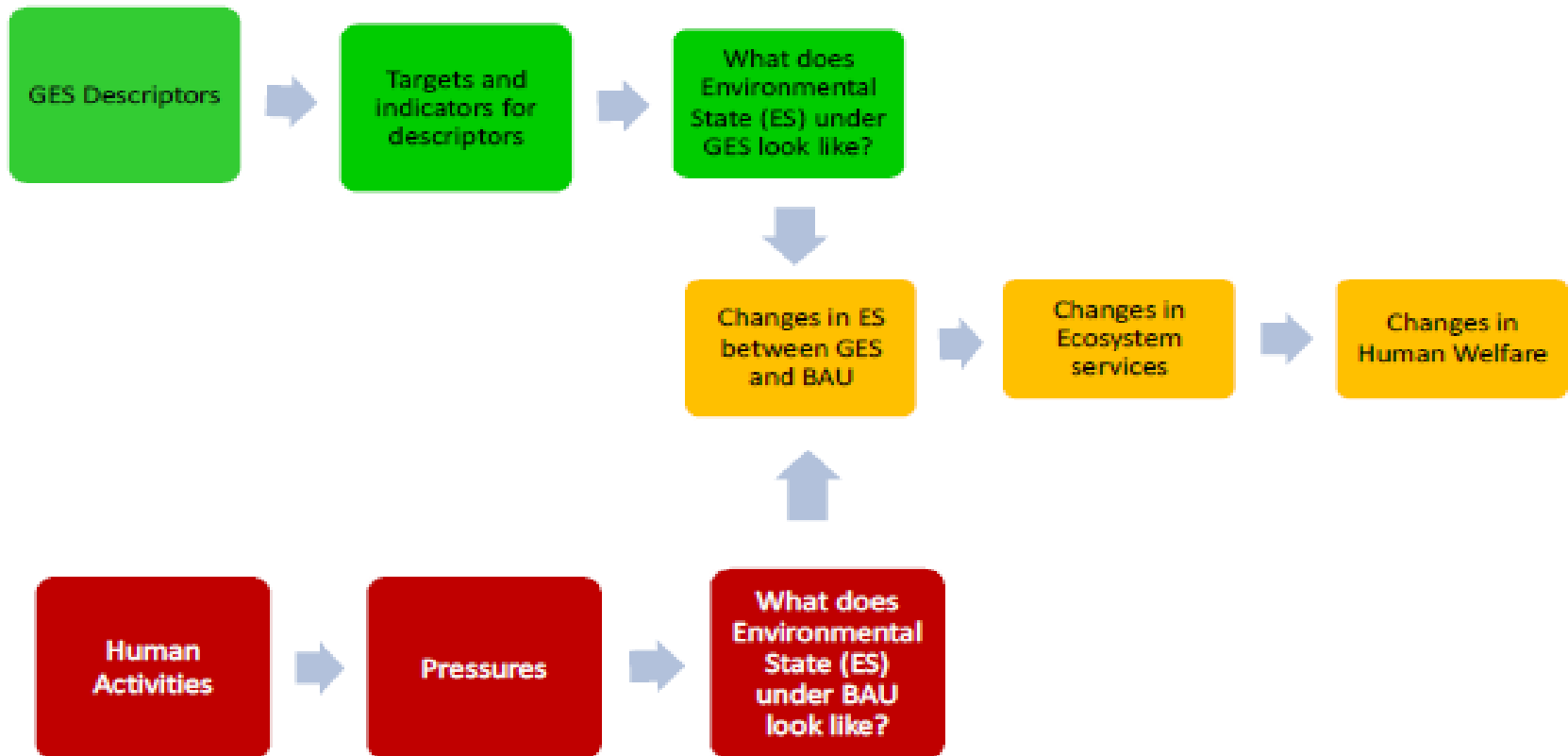


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# Examples from the EU MSFD implementation – UK approach

Summary of the approach to assessing costs of degradation and benefits of achieving GES



# Examples from the EU MSFD implementation – UK

Descriptor	PV costs over 10 years	Qualitative description of costs
D 5 – Eutrophication	Potential costs to business: No additional costs (no new measures over WFD measures).	No un-quantified costs identified.
	Potential costs to government: Additional monitoring costs between 75K and £750K	
	Total potential costs: 75K- 750K over the appraisal period.	
D 10 – marine litter	Potential costs to business: Not possible to estimate, qualitative description	Potential measures: extending codes of practice for the fishing industry, or extending fishing for litter schemes (depending on the impact and effectiveness of existing pilots).
	Costs of additional monitoring for England and Wales are estimated at £412.5K-£938K	
	Total potential costs: £412.5k-£938K over the appraisal period (covers England and Wales only).	



# Introduction to group work/ exercises

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## Explain hand-out materials:

- 1) List of pre-defined measures/ policy options (linked to training exercise) for 2 groups
- 2) Methodological guidance how to apply CBA

## Groups will be invited to:

- 1) Review pre-defined list of measures/ policy options and amend/ change them as appropriate, having in mind results of the day 1 training
- 2) Apply proposed methodology, identify possible issues
- 3) Prepare brief summary of the exercise for plenary session



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# UNEP/ MAP Guidance on CEA and CBA – Appendix G of the NAP update *Guidelines*

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## Part 4 – Multi-criteria analysis

NAP update meeting

11 – 13 May 2015, Athens



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# What is a multi-criteria analysis?

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- Decision support tool
- Used to evaluate different alternatives (e.g. different policy options) according to their performance against a selected set of evaluation criteria
- Applies cost-benefit thinking to cases where it is necessary to deal with impacts that are a mixture of qualitative, quantitative and monetary data and where there are varying degrees of certainty



# Strengths and weaknesses of the concept

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<b>Strengths</b>	<b>Weaknesses</b>
Enables taking into account impacts that are not easily given monetary values	No built-in standard value, as it applies values (criteria and weights) specific to the evaluated option
Facilitates stakeholder involvement	Comparisons between studies with different valuation criteria and weights are very limited
Makes the appraisal and decision-making process more transparent	Requires well developed participation processes and strongly depends on stakeholder willingness to participate.

# When to conduct MCA in NAP update?

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- If monetary data on costs and benefits would be too difficult to obtain
- When conducting CEA/ CBA (quantitative, semi-quantitative, qualitative) will be deemed impracticable
- When additional involvement of stakeholders will be deemed necessary for NAP elaboration and implementation
- To evaluate measures contributing to more than one objective



# MCA steps

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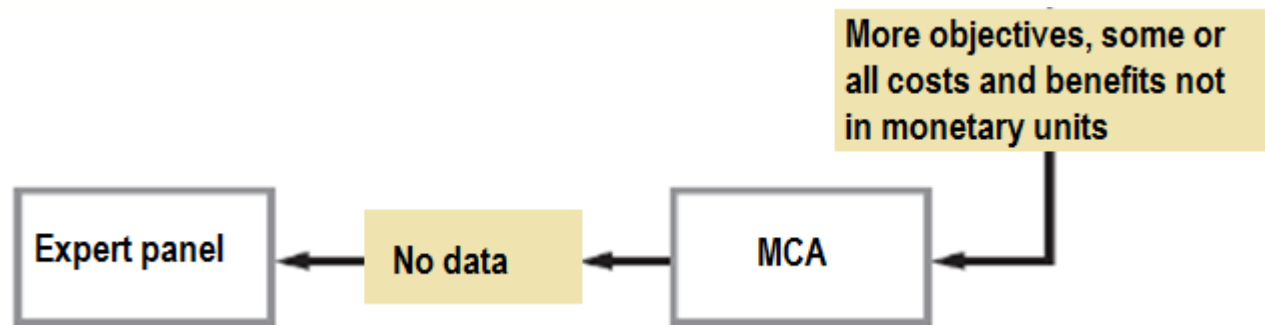
1. Establish the aims of the MCA, the decision makers and other stakeholders
2. Identify alternatives
3. Define the criteria (and the corresponding objectives) that reflect the relevant consequences of each option
4. Describe the performance of each alternative against the criteria in the performance matrix and determine the score matrix (scoring)
5. Assign weights to each of the criteria to reflect their relative importance (weighting)
6. Combine the weights and scores for each of the options to derive overall values
7. Analyse the results



# Conducting MCA in the NAP update

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Revisiting facts/ requirements important to design MCA



- Measures evaluated on a number of important criteria through prioritisation exercise
- Elements of MCA found in the examples provided for CEA

# How to design MCA in the NAP update

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- What stakeholders to involve? Use NAP institutional set-up?
- How to assess measures? Individual or group scoring?
- Potential categories of criteria
  - Contribution to NAP objective
  - Overall effectiveness
  - Costs
  - Benefits
  - Acceptability to stakeholders
  - Synergy with other policy frameworks





# Introduction to group work/ exercises

---

Explain hand-out materials:

- 1) List of measures developed through the day 1 training exercise
- 2) Methodology (assessment matrix) how to apply MCA

Groups will be invited to:

- 1) Review proposed criteria and weights
- 2) Apply proposed methodology, identify possible issues
- 3) Prepare brief summary of the exercise for plenary session



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# **Economic analysis in the NAP update: approaches to assessing the costs of Regional Plans implementation (UNEP(DEPI)/MED WG.414/4)**

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NAP update meeting

11 – 13 May 2015, Athens



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# Purpose of the document

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- To assist Contracting Parties to identify information needed to estimate the costs of implementing measures necessary to meet the Regional Plans' requirements through the NAP update process
- Ultimate goal: 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 in the Mediterranean
- Regional Plans analysed
  - BOD from urban waste water
  - BOD from food industries
  - Mercury
  - Marine litter



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# Structure the document

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For each Regional Plan:

## 1. Description:

- Scope of the Plan
- Main objectives
- Key measures
- Estimating the costs of key measures

## 2. Annexes

- Summary of the main requirements (table format)
- Checklists and/ or tables to guide identification of necessary information and cost estimations



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# RP on BOD from WWT

---

## Objective

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



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# Key requirements of the RP on BOD from WWT

Key requirements	Responsibilities/ who is affected	Measures including investments
<p>1. Collect and treat UWW for all agglomerations (where &gt; 2,000 inhabitants and/or economic activities are sufficiently concentrated)</p> <p>1. Adopt and implement national ELVs on BOD5 for discharges into recipient waters (as appropriate by 2015 or 2019):</p> <p>a. BOD5 ≤ 50 after secondary treatment,</p> <p>b. BOD5 ≤ 200 after primary treatment, while taking into account local conditions</p>	<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 environmental/ water 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>

# How to estimate costs?

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## *STEP 1: Determine main cost elements*

- Quantify (in physical units such as km, number of pumping stations, population equivalent – p.e. or similar) collection system maintenance and upgrade needs (incl. as appropriate 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).

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Note: one population equivalent (p.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





# How to estimate costs?

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*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.

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

*Link to the table*

*Level of detail can vary*



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# RP on BOD from food industries

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## Objective

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



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# Key requirements of the RP on BOD from food sector

Key requirements	Responsibilities/ who is affected	Measures including investments
<p>1. Food industries discharging more than 4,000 p.e. shall apply BAT and/or BEP to meet the following requirements:</p> <p>COD &lt; 160 mg/l or TOC &lt; 55 mg/l 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</b> environmental/ water authorities</p>	<p>Replacement and/ or upgrading of technologies to achieve ELVs</p> <p>Introduction and implementation of BEP</p>

# How to estimate costs?

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- Cost estimations on a 'case by case' basis
- Various measures listed as examples of BAT/ BEP in the RP on BOD from food sector
- Costs of will depend largely on the size of industry, local conditions and specificities
- Sources:
  - implemented projects
  - plans of the industries themselves, certification processes
  - sector-wide surveys, if any

*Link to the table*



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# RP on mercury

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## Objective

to protect the coastal and marine environment and human health from the adverse effects of mercury

## Groups of requirements

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);
4. Environmentally sound management (metallic mercury from decommissioned plants, wastes containing mercury, contaminated sites)



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# Key requirements of the RP on mercury (significant for costing)

Key requirements	Responsibilities/ who is affected	Measures including investments
<p><b>A Chlor alkali industry</b></p> <p>1. Cease releases of mercury from the activity of Chlor alkali plants by 2020 at the latest and:</p> <ol style="list-style-type: none"> <li>ensure environmentally sound management of metallic mercury from the decommissioned plants</li> <li>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)</li> </ol> <p><b>B Non Chlor alkali industries</b></p> <ol style="list-style-type: none"> <li>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>ELVs for mercury emissions from incineration plants – less than 0.05 mg/ Nm3 in the waste gas</li> <li>Other sectors – reduce emissions of mercury as appropriate</li> <li>Isolate and contain the mercury containing wastes to avoid potential contamination of air, soil or water</li> <li>Identify contaminated sites (at least the old mines and decommissioned Chlor alkali plants) and implement environmentally sound management</li> </ol>	<p>Chlor alkali industry</p> <p>Non Chlor alkali industries 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> <li>- Incineration plants</li> </ul> <p>Other sectors emitting mercury</p> <p>Those responsible for management of mercury containing wastes</p> <p>Those responsible for management of contaminated sites</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/ Nm3 in the waste gas</p> <p>Identify appropriate measures</p> <p>Interventions to prevent contamination - mercury containing wastes (isolation, containment)</p> <p>Contaminated sites – safety works, remediation</p>

# How to estimate costs

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- Case by case approach depending on
  - existing technological state of the plants,
  - overall environmental performance
  - knowledge of employees
  - production capacity
  - compliance culture, etc.
- Possible sources:
  - sectoral assessments for modernisation/ upgrading of certain industries (if existent)
  - similar projects/ technological improvements implemented



# Example of questions

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## Chemical industries using mercury catalysts

- Are there any individual operational plants (and what are their capacities) in each of the categories listed in the Plan?
- Are current releases of mercury in line with the ELV of 50µg per litre of effluent?
- 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.
- Identify measures that need to be implemented to comply with 2019 ELV (5µg per litre of effluent).
- Assess the costs of implementing necessary measures.





# RP on marine litter

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## Objectives

- 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.



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# Key requirements of the RP on marine litter

## Key requirements

### PREVENTION

#### Land-based sources

1. Implement waste hierarchy in managing urban solid waste
2. Reduce the fraction of plastic packaging through adequate waste reducing/ reusing/ recycling measures
3. Extended Producer Responsibility
4. Sustainable Procurement Policies
5. Voluntary agreements
6. Fiscal and economic instruments
7. Deposits, Return and Restoration System for expandable polystyrene boxes
8. Deposits, Return and Restoration System for beverage packaging
9. Reduce micro-plastic
10. Prevent run-off and riverine inputs of litter (through adequate collection and treatment of waste water)

#### Sea-based sources

1. Charges for the use of port reception facilities or No-Special-Fee system
2. Fishing for Litter
3. Gear marking to indicate ownership” concept and ‘reduced ghost catches concept’
4. Prevent marine littering from dredging activities
5. Close the existing illegal dump sites on land
6. Combat dumping including littering on the beach, illegal sewage disposal in the sea, the coastal zone and rivers



# Key requirements of the RP on marine litter (cnt)

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## REMOVING existing marine litter and its environmentally sound disposal

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. Specifically:

- Identify accumulations/ hotspots of marine litter and implementation of national programmes on their regular removal and sound disposal
- National Marine Litter Cleanup Campaigns
- Participate in International Coastal Cleanup Campaigns and Programmes;
- Adopt-a-Beach or similar practices
- Fishing for Litter and ensure adequate collection, sorting, recycling and/or environmentally sound disposal
- 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).



# How to assess the costs – marine litter RP

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## STEP 1:

*Decide on the appropriate level of the Plan's implementation on the national level (what is feasible, environmentally sound)*

1. What does waste hierarchy in managing SW entail?
  - Quantified needs for upgrading waste collection and separation
  - Facilities (e.g. separation points, transfer stations, recycling yards) to provide for re-use, recovery, recycling
  - Identification of different disposal options and capacities
2. Waste reducing/ reusing/ recycling measures
  - What specific measures *[do not repeat estimation]*
3. Extended Producer Responsibility
4. Fiscal and economic instruments, deposit refunds
5. No special fee system
6. Fishing for litter
7. Clean up campaigns, removal from location XY



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# How to assess the costs – marine litter RP

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## STEP 2:

*Disaggregate measures into actions and further into inputs*

1. Identify actions and inputs needed to implement them (e.g. what equipment for port reception facilities, how many boats in Fishing for Litter scheme/ what incentives, time and equipment needed for removal actions etc.)
2. Decide on unit costs to be used
  - Waste management strategies, policies, plans
  - UNEP/ MAP Background Document on Marine Litter
  - Costs of implemented projects and comparative processes
3. Assess overall costs

*Link to the table*

*Level of detail can vary*



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# Estimation of costs of other measures

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- Monitoring and reporting
  - Number of samples that need to be tested annually and related prices
- Enforcement
  - Inspection and other enforcement staff time and equipment needed to ensure compliance

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, should be also taken into account.



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