

Harmonising the Economic and Social Analysis for the MSFD Program of measures in the project's countries

RECOMMENDATIONS' REPORT

Prepared by AKTiiVS Ltd.

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List of abbreviations

BAU	"Business-as-usual" scenario
CBA	Cost-Benefit Analysis
CEA	Cost-Effectiveness Analysis
CIS	Common Implementation Strategy
ESA	Economic and Social Analysis
GES	Good Environmental Status
ImA	Impact Assessment
MCA	Multi-Criteria Analysis
MSFD	Marine Strategy Framework Directive (2008/56/EC)
РоМ	Program of measures
TEV	Total Economic Value
WG ESA	Working group on "Economic and Social Analysis" as part of the CIS for the MSFD
WFD	Water Framework Directive (2000/60/EC)





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Introduction

The work for developing this recommendations' document was conducted in frame of the GES-REG project¹ work package 5 (WP5) on the "Economic and Social analysis" (ESA) for the MSFD. WP5 of the project aimed to support development of cost-effective and socio-economically efficient programmes of measures for reaching 'Good Environmental Status' (GES) in the central and north-eastern sub-basins of the Baltic Sea.

The work was conducted under **WP5 Task 5.4 "Developing coordinated methodologies for the ESA of MSFD program of measures".** The recommendations build on the following inputs and activities conducted as part of the given task:

- 1. a study on examples from practice, which could provide useful knowledge on possible approaches for the ESA of MSFD Program of measures;
- 2. a workshop for the project's countries organised by the GES-REG WP5 in collaboration with Swedish partners on the ESA for MSFD Program of measures (in December of 2013), as part of which also the possible national ESA approaches and their coordination were discussed.

Detailed results of the workshop are not discussed in this document since a separate report has been prepared on the workshop's results.² This document summarises the main results from the study mentioned above (Chapter 3) and includes recommendations to support harmonising national approaches for the ESA of MSFD Program of measures in the project's countries (Chapter 4). Before that the overall idea of the ESA of Program of measures according to the MSFD requirements is explained (Chapter 1) and the commonly used methods for such analysis are briefly described (Chapter 2).

¹ The project "<u>G</u>ood <u>E</u>nvironmental <u>S</u>tatus through <u>Reg</u>ional Coordination and Capacity Building" (GES-REG) was co-financed by the European Regional Development Fund under the Central Baltic INTERREG IV A Programme 2007-2013. Its overall aim was to support coherent and coordinated implementation of the Marine Strategy Framework Directive (MSFD, 2008/56/EC) in the central and north-eastern sub-regions of the Baltic Sea – in the Gulf of Finland, northern part of the Baltic Proper and Gulf of Riga.

² Pakalniete K. (2013) "Workshop on Economic analysis for the MSFD Program of measures (on December 10-11, 2013 in Stockholm). Report on the results of the workshop".



1. Economic and Social Analysis (ESA) for the MSFD Program of measures (PoM) according to the Article 13.3

According to logic of the Directive, the starting point for developing the Program of measures (PoM) are the environmental targets and analysis of existing and planned policy measures in order to assess possible need for additional ('new') measures to achieve or maintain GES. Article 13.3 of the Directive requires conducting specific economic and social analysis (ESA) for the 'new' measures before including them in the PoM. In simple words, the 'new' means those measures that need to be added to reach GES on top of the existing and planned till 2020 policy measures with an impact on the marine environment. The existing and planned policy measures are analysed as part of the 'business-as-usual' scenario (BAU) in order to assess if there is a "policy gap" for 2020 to reach GES. If the "policy gap" between the BAU state and GES is expected, new measures need to be identified and analysed for possible inclusion in the PoM.

Overall analytical process for assessing and selecting measures for the PoM, including the ESA of 'new' measures, is characterised in the figure below. The part concerning the ESA of 'new' measures is explained in more details in the chapter 4.



Figure 1. Overall analytical process for assessing and selecting measures for the MSFD Program of measures, including the ESA of 'new' measures. (*Source: K. Pakalniete, GES-REG project.*)



This recommendations' document focuses on the ESA that needs to be conducted for the 'new' measures (according to the MSFD Art.13.3). A separate recommendations' document has been developed as part of the GES-REG project (WP5) to harmonise national approaches for analysis of the existing and planned policy measures (named as 'baseline policies') when building the MSFD PoM.³

The Art.13.3 of the MSFD says that "When drawing up the programme of measures pursuant to paragraph 2, Member States shall give due consideration to sustainable development and, in particular, to the social and economic impacts of the measures envisaged. (..)

Member States shall ensure that measures are cost-effective and technically feasible, and shall carry out impact assessments, including cost-benefit analyses, prior to the introduction of any new measure."

Assessment of 'technical feasibility' of possible 'new' measures can be seen as the first step in the analysis of 'new' measures. For the 'new' measures that are technically feasible the ESA according to the Article 13.3 needs to be applied. It should be stressed that **this ESA shall be performed for 'new' measures only** (see the box below for definitions and categories of the 'new' measures according to the CIS "Recommendations' Document for the MSFD POM"⁴).

Definitions and categories of the 'new' measures according to the CIS " Recommendations' Document for the MSFD PoM":

Category 2.a: Additional measures to maintain and reach GES which build on existing implementation processes regarding other EU legislation and international agreements but go beyond what is already required under these.

Category 2.b: Additional measures to maintain and reach GES which do not build on existing EU legislation or international agreements.

The Article 13.3 requires that due consideration is given to sustainable development and, in particular, to the social and economic impacts of measures. It is agreed internationally (at the MSFD's Common Implementation Strategy (CIS) working group on 'Economic and Social Analysis' (WG ESA), for the CIS "Recommendations' Document for the MSFD PoM") that the **sustainability concerns, how** far it relates to the ESA, could be taken into account sufficiently by conducting the impact assessment, thus no specific additional assessments are required in light of this.⁵

The process of developing the PoM will also require dealing with **exceptions** where relevant (according to the Article 14). This is highlighted in the figure 1, however not addressed in this document. A special ad-hoc activity is led by the Commission as part of the CIS for MSFD to build common understanding for application of the exceptions.

³ See the report of the GES-REG project K.Pakalniete (2013) "Harmonising the 'business-as-usual scenario' development for the MSFD in the project's countries. RECOMMENDATIONS' REPORT."

⁴ "Programmes of measures under MSFD: Recommendations for establishment / implementation and related reporting".

⁵ This concerns the ESA since additional environmental issues are recommended to be considered, (e.g. cumulative impacts of measures, overall impacts on the wider environment, transboundary impacts of measures). But this is out of the scope of this document.



Types of the ESA of 'new' measures are highlighted by the directive (e.g. the cost-effectiveness analysis, the cost-benefit analysis), but the way of applying them in practice may be decided by Member States. In particular, since the approaches in practice can depend on what specific assessments and with what purpose are needed for national policy and decision making process. While the role of the cost-effectiveness analysis is specified more clearly (that the selected measures should be cost-effective, thus – the CEA should substantiate the prioritisation and selection of measures), the role of the impact assessment and CBA remains open. It is commonly recognised that the **analysis in practice would depend on planned role of these assessments in the policy/decision making process for developing the PoM**, and this may be country-specific. It would depend also on national information and knowledge base, institutional capacity, resources available for developing the PoM in each country.

Discussions internationally, e.g. as part of the WG ESA, supports the opinion that the practical approaches may be country-specific. Emphasis is put on **building common understanding on general principles for conducting the required analysis and exchange of experience and information on the role the ESA can play, the range of approaches and their practical applications**. This is planned by various activities and documents of the CIS for the MSFD.⁶

Also discussions among experts from the project's countries indicated the importance of the information and experience exchange and the development of common understanding on general principles for conducting the Article 13.3 analysis. This would facilitate coherence of the national approaches as required by the MSFD (the Art.5.2).

Therefore this recommendations' document focuses on general principles and possible approaches for the ESA of PoM and it supports thinking about practical approaches that could be applicable in the project's countries. As noted, the document builds on review of experiences (examples) from practice from various countries. In addition, relevant general principles and practical issues for the Article 13.3 analysis were discussed during a workshop for the project's countries in December of 2013.

At time of conducting the work for this document the process of developing the national MSFD PoM was in its initial stage in the project's region. Mapping and assessment of existing policies was ongoing in Finland and Sweden, where the work for developing the PoM is organised in thematic expert groups.⁷ The work in Latvia and Estonia hadn't started yet. Results of the "policy gap" analysis were not known yet for any country, nor possible 'new' measures for filling the gaps.

Concerning the ESA, work on methodologies and building information and knowledge base was ongoing mainly in frame of various projects, including the GES-REG project (WP5). The national approaches for the ESA of PoM had not been elaborated in the countries. Thus activities of this project supported this early stage of thinking about the national ESA approaches.

⁶ For instance, the CIS "Recommendations document for the MSFD PoM" (under development), the planned document on "Best practice on CEA and CBA for the MSFD Program of measures" (will be produced by summer of 2014).

⁷ In **Sweden** 4 groups were formed: in relation to (i) input of nutrients and organic matters, (ii) input of hasardous substances, (iii) biological disturbance (incl., targets in relation to alien species, commercially exploited fish stocks), (iv) physical disturbance (incl., marine litter). In addition to the work in the 4 groups, complementary "gap analysis" was planned for the marine protected areas and marine restoration activities. In **Finland** 5 groups were formed for the work: in relation to (i) eutrophication, (ii) hasardous substances, (iii) species and ecosystem protection, (iv) marine traffic safety, (v) sustainable use of marine resources (including fish resources). In additiona, the Maritime Spatial Planning comes into all the groups.



2. Methods for the ESA of policy measures for PoM

This chapter describes briefly commonly used methods for the ESA of policy measures and their possible role in the context of implementing the MSFD Article 13.3 analysis.⁸

The Article 13.3 obliges that the introduction of 'new' policy measures requires *"impact assessments, including cost-benefit analyses"*. Given the spirit of the Article 13.3 which requires that consideration should be given to sustainable development, the term **Impact Assessment (ImA)** is understood as referring to the analysis of positive and negative social, economic and environmental impacts the policy measures could entail. ImA framework can be considered as a useful framework for evaluation and comparison of measures as it provides evidence on advantages and disadvantages of a policy choice. The three most relevant tools for comparing the options (measures) that can be used in this respect are cost-effectiveness analysis, cost-benefit analysis and multi-criteria analysis.

Cost-effectiveness Analysis (CEA) is used to determine the least cost means of achieving pre-defined target (e.g. GES for a specific MSFD Descriptor). CEA can help to achieve a certain objective at least cost (or to achieve as many of the targets as possible, given a limited budget). The main purpose of CEA is to establish a <u>ranking or prioritisation of measures</u>, when measures contributing the most to the target at least cost are presented at the top of the list. In theory, this ranking should be done by comparing the costs "per unit of effectiveness". This ideally (but not necessarily) implies the cost of achieving a per unit change in a specified physical outcome (e.g. EUR per 1 reduced kg of N). CEA can be applied to single measures or sets of measures.

There are limitations of applying CEA method, as it concentrates on a single type of benefit (the intended environmental effect of the measure) and does not provide an answer whether a measure or a PoM would provide net gains to society. This is a key limitation concerning use of CEA that it does not explicitly address the question whether the benefits of policy measures outweigh the costs. But also it doesn't address other impacts that could be relevant for policy/decision making.

Carrying out CEA requires clear environmental targets and good knowledge of the functional relationships over the "measure-pressure-descriptor-environmental targets" chain.

Cost-benefit analysis (CBA) is a method for comparing policy measures in terms of their costs and benefits. CBA can be either a full CBA, in case the most significant part of both costs and benefits can be quantified and monetized, or a partial CBA in case only a part of the costs and benefits can be quantified and monetised. In the latter case, the resulting net benefits should be confronted with the qualitative assessment of the other costs and benefits. CBA is used to show whether the total advantages (benefits) of a measure (alternative sets of measures, programs of measures) exceed the disadvantages (costs). Thus is provides evidence on whether an option is beneficial to society, and/or supports comparing alternative options and identifying the most beneficial option(s). Moreover, the added value of CBA is also that the analysis process facilitate understanding the impacts of (sets of) new measures and allows trade-offs to be considered.

Besides CBA, the **Multi-Criteria Analysis (MCA)** can also be of high relevance for the Article 13.3 implementation. The term MCA covers a wide range of techniques that share the goal of combining positive and negative impacts into a single framework to allow <u>comparison (ranking) of measures</u>

⁸ The description has been prepared based on information from the MSFD CIS activities in relation to the ESA.



<u>based on multiple criteria</u>. Essentially, MCA applies the cost-benefit thinking to cases where there is a need to present impacts that are a mixture of qualitative, quantitative and monetary data, and where there are varying degrees of certainty. This mixture of units in which impacts are expressed is a typical feature in the MSFD context.

When looking into the impacts of a measure in a societal context, it may become clear that it is beneficial for society as a whole but has positive and negative impacts that are spread unevenly across society. Therefore, assessment of **distribution of the impacts** is important part of the impact assessment process. It addresses a question "who is affected by the impacts (and when)", which can be investigated by analysing who implements the measures, who bears the costs / incurs the burdens, who benefits? The distribution of the costs and benefits needs to be investigated taking into account various sectors, such as economic sectors (e.g. fisheries), non-commercial uses of the marine environment (e.g. water related recreation), public sector (e.g. national institutions, municipalities), "non-users" of the marine environment (e.g. society as a whole, next generations). The geographical scale of the distribution of costs and benefits may be highly important, since benefits and/or costs may be shared by various Member States or even regional seas.

The distributional analysis will help <u>structuring the stakeholder consultation process</u> (e.g. negotiations on future implementation of measures) and <u>identifying appropriate financing sources</u> <u>and mechanisms.</u>

The discussed analyses can have different functions in the PoM development process, and this depends on each individual Member State. Both CEA and CBA can be part of the prioritisation of measures process, in collaboration with stakeholders at various stages. ImA including CBA ensures that all economic, social and environmental impacts of a measure are looked at in advance of taking a decision on implementing measures, ensuring that the PoM is overall sustainable. It is expected also that, besides the cost-effectiveness and cost-benefit considerations for PoM development, also other criteria may be of importance such as technical feasibility, stakeholder support, the precautionary approach, availability of funding, etc. that can be incorporated by applying MCA approach.

Due to limited knowledge of the functioning of the marine environment, the inability, in some cases, to set quantified targets, and the difficulty of quantifying the potential effects of measures and their impacts on the marine environment it could not always be possible to properly estimate potential benefits/effectiveness. However, CBA does not necessarily have to be (fully) monetised and both CEA and CBA are possible even when no quantified target is set (e.g. qualitative/semiquantitative approaches are possible). Other factors creating complexity in the analysis could relate to types of measures (e.g. "technical measures" versus policy instruments), scale and timing of application of measures, types of costs (e.g. financial costs versus economic costs and wider economic impacts), types of benefits (e.g. "use" and "non-use value").



3. Study on examples for possible approaches of the ESA for the MSFD PoM

This chapter summarises results from a study that aimed to review experiences and examples from practice that could provide useful knowledge on possible approaches for the ESA of MSFD PoM (according to the Art.13.3).

Examples were identified based on review of literature and personal communications. Since limited number of examples could be found in the project's countries, European studies and examples from other EU countries were reviewed in particular. Recent examples with the MSFD context were seen as priority, although useful experiences from implementing the WFD (in the project's countries) were also considered.

The selection of the examples presented further in this chapter does not aim to provide comprehensive overview but to illustrate variety of the approaches and focusing on potentially applicable approaches for the project's countries.

Only brief information about each example is provided. The description of each example contains only those findings that are relevant in context of this study (to search for approaches applicable for the ESA of MSFD PoM in the project's countries). All studies contain more interesting and useful results than taken for this study and they can be learnt by reviewing their full results (the references are provided).

3.1.Initial CEA of 'new' measures for the MSFD PoM (a study for the Netherlands, 2011)

The description of the example has been prepared based on *WaterDienst (2011)"Measures for the MSFD: First overview of potential measures, related costs and effects of implementing the Marine strategy".*

This example illustrates application of CEA in the MSFD context, where the assessment of costs, effects and the cost-effetiveness were used as basis for initial prioritising measures (although other criteria have been considered in the analysis overall as well). It was conducted in early stage of analysis of the measures (in 2011) with limited information on issues relevant for the CEA of measures (e.g. definition of GES and environmental targets, effects of measures and their link to changes in the state). Thus qualitative approach (usinfassessment categories) applying expert judgement was used for the CEA of measures.⁹

⁹ A more recent study (in 2012) develops the national methodology for the CEA and CBA of 'new' measures for the Netherlands and applies it on the MSFD objectives and measures. Since it faces similar information limitations, it also largely relies on expert knowledge for the CEA of measures.

The results can be found in Reinhard S. et.al (2012) *"Cost-effectiveness and cost-benefit analysis for the MSFD: Framework for the Netherlands."* LEI report 2011-036 (Project code 2276000145). The Hague.

The project aimed (i) to elaborate a suitable methodology for the required CEA and a preliminary CBA for the MSFD, (ii) to apply this methodology on the MSFD objectives and measures using currently available data and data collected in time span of the project period and (iii) to indicate the need for additional information to carry out the CBA analysis in line with MSFD requirements.



Analysed measures

From long list of measures 40 measures were selected for the CEA. 5 types of measures were distinguished (see the table below). The measures address all relevant drivers (marine uses) and relevant pressures they put on the marine environment.

Major drivers	Policy and licensing	Volume reduction	Technical mitigation	Zoning with restrictions	Research needed
Shipping	X		X		X
Sand mining for coastal protection	X		X	X	X
Sand mining for coastal	X	X	X	X	X
management					
Sand mining for construction	X	X	X	X	X
Shell mining	X	X	X	X	X
Bottom trawlers	X	X	X	X	X
Shrimp fishing	X		X	X	X
Open sea fishing	X	X	X		x
Offshore oil and gas	X		X		x
Offshore windfarms	X		X	X	x
Cables and pipelines	X		X		x
Military zones and activities	X		X	X	x

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Effect of measures

Due to difficulties to link measures with the state (in terms of Decsriptors) the effect of measures was assessed mainly in terms of changes in relevant pressures (it was difficult to asses the effect in connection to the Descriptors). The **effect was estimated in terms of capacity to reduce addressed pressure**. By assessing further the relevance of each pressure in connection to the Decsriptors the effectiveness can be characterised in terms of capacity to contribute into achieving the targets for state. Such approach provides joint "effect indicator" independently on the analysed pressure/environmental problem. The effect for each measure was assessed with a scale of 4 classes (from "low" to "very high" capacity) based on expert judgement. Quantitative specification for each class is provided as capacity to reduce intensity of pressures (e.g by 5 %, by 5-15 % etc.).

The CEA indicated the ranking of possible measures according to their estimated cost and their effect on the pressure. This information facilitates the selection of measures to be elaborated in the next phases of MSFD. The CBA indicated the expected direction and scale of changes to human welfare from reaching the MSFD targets. This information helped to target the MSFD to a more balanced benefit cost ratio.

The elaborated CEA method is based on available information and input from experts. For the CEA <u>quantitative</u> <u>descriptions</u> are needed for both the BAU and for the MSFD targets. This information was not sufficiently available for a full CEA. Thus the amount of measures to be taken could not be estimated. The physical <u>effects</u> <u>of potential measures</u> could be identified, but not quantified. The pressures that are being addressed by a measure could easily be identified, but how much these measures (per unit) contribute to achieving GES was not yet known.

Most of the possible measures assessed in this study were new. Therefore, information about their effect was not yet available. In these cases, expert opinion is the only available source of information. The methodology applied is suitable in circumstances with limited data availability.



Costs of measures

Only rough assessment of the costs was possible for that time. The costs were estimated as annual costs, including capital costs, costs for operation and maintenance as well as for control and monitoring. They were assessed further for each measure with a scale of 4 classes (from "low" to "very high"), with quantitative specification provided for each class (e.g. " Low" means less than 1 million EUR/year).

Cost-effetiveness of measures

The cost-effectiveness (CE) is indicated on basis of the effect and costs. It is compared <u>for measures</u> <u>directed at the same pressure</u>. The CE is **estimated as effect divided by costs and ranked from "low" to "very high"** (with quantitatative specification of each class, e.g. "low" means the CE ratio < 5).

Although the CE was seen as the main criterion for prioritising the measures, other relevant aspects of measures have been assessed as well (e.g. possible disproportionality of the costs, need for precautionary principle for reducing the pressure).

In conclusion it is noted that:

- Good overview of pressures (incl. their expected development) and related effects on the marine environment is needed for the CEA of measures, also clear definition of the environmental targets is needed.
- The used "effect indicator" is not the only way to express cost-effectiveness, especially when scoring effects.
- The scores used for assessing the costs, effects and CE might have larger impact on final ranking of measures than the precise estimation of effects and costs. Thus, clear method is relevant to rank potential measures appropriately.
- The CEA is by itself not the only factor that should govern the ranking of possible measures. There are other factors that need to be taken into consideration, especially when CE is difficult to calculate because of lack of data. Important are:
 - Risk and precautionary principle,
 - CE and disproportionality,
 - Uncertainty and gradual development of measures.

Advantage of the presented approach is that it can be used in principle for any pressure/environmental problem and that it is practically feasible alternative for the situations with limited information availability. If full quantification of effects and costs is not feasible, the approach with qualitative categories and calculating ratios can help to indicate more promissing measures from the CEA point of view.

3.2. CEA for selected environmental problem – marine litter (an European scale study, 2012)

The description of the example has been prepared based on *Arcadis (2012) "Pilot project '4 Seas' – plastic recycling cycle and marine environmental impact. Case studies on the plastic cycle and its*



loopholes in the four Europen regional seas areas" Final report of a project for the EC (Project N° BE011102328).¹⁰

This example illustrates application of CEA for measures to address specific problem of the marine environment – the marine litter. The CEA was applied as part of more comprehensive "feasibility analysis" of wide range of measures to address the given problem. The "feasibility analysis" aimed to evaluate economic, administrative and institutional implications of possible (additional) measures to identify appropriate policy mix for each sea region. Measures for the "feasibility analysis" come from an inventory of measures that was developed as part of the study. The CEA played important role in the "feasibility analysis" and it was used **for comparison and prioritisation of measures**.

Inventory of measures

The inventory of measures contains both existing measures that have been proven to be successful, and more innovative measures adapted to the identified sources of marine litter. In total about 270 measures are listed there.

The following categories of the measures are distinguished: (i) command and control measures, (ii) economic or market-based instruments, (iii) preventive measures, (iv) behavioural measures, (v) clean-up measures.

The long list of possible measures has been made up based on literature research and stakeholder interviews (regional workshops and interviews with individual stakeholders in each sea region). Information provided about each measure in the inventory: year of implementation of a measure, lead organisation, the regional sea targeted, category and type of the initiative, category and type of litter targeted, the sector addressed, indications on its effectiveness and costs, etc.

"Feasibility analysis" of the measures

46 measures from the inventory were selected for the "feasibility analysis" (based on stakeholders' priorities and the measures' capability to address the main sources and gaps). **Range of criteria was used for the evaluation of measures (part was used for the "feasibility analysis", few additional criteria for selecting appropriate policy mix).** The criteria for the "feasibility analysis" included the following: (i) costs of a measure, (ii) possibility for cost recovery (indicating funding possibilities), (iii) support by stakeholders, (iv) administrative capacity for implementing a measure, (v) effectiveness of a measure (in terms of changes in amount of litter on beach and entering marine system), (vi) impact on employment, (vii) time lag (time needed for implementing a measure), (viii) monitorability (in relation to effectiveness of a measure).

¹⁰ Key results of this study include overviews of the main types of litter found in coastal and marine environment, an analysis process and results of identification of their main sources, pathways and loopholes in the case areas, an analysis on potential measures that could be used to avoid litter to enter the marine environment, and an evaluation of measures' feasibility in order to evaluate their economic, administrative and institutional implications to identify appropriate policy mix. The final result is proposals on adequate mix of policy measures and strategies, targeting different key sectors and material flow phases.

A bottom-up approach was followed to achieve the objectives including additional site surveys on four selected sites, organisation of regional workshops as part of a step-wise consultation process. Stakeholders were interviewed to check the analysis results on the main sources and loopholes of marine litter, to inform about existing measures and propose new measures, to give input for the feasibility assessment of measures and to give feedback on draft proposal of the measures.



Initially evaluation criteria were scored qualitatively on a 5-point scale (++, +, 0, -, --). A specific interpretation of the scores was tailored to each criterion. A textual justification was given for each score in order to allow transparency in the scoring approach and also to allow a review by stakeholders and/or when better data comes available. Scores were applied to the measures based on information gathered through literature review and interviews with stakeholders at case study, regional and EU level. An expert knowledge was also used.

For the "feasibility analysis" the qualitative scores were translated into scores 0-5 (where initial 0score corresponds to a score 3), mainly to allow semi-quantitative approach (calculation of averages, visualisation using diagrams). The higher the score the more feasible is a measure.

CEA of measures

It is noted that the CEA is an important aspect in the "feasibility analysis". Considering that quantitative cost estimates are lacking for the majority of measures, **the costs have been classified in** "orders of magnitude" (by using 5-class scale as shown in the table below). The cost scores were compared to effectiveness assessed with similar scale (from 1 "very low" to 5 "very high").

Score	Cost	Effectiveness	Cost- effectiveness
1	100 million €	very low	very low
2	10 million €	low	low
3	1 million €	moderate	moderate
4	100,000 €	high	high
5	10,000 €	very high	very high

Table 2.Description of the scoring system (from 1-5) used in the CEA.

As a consequence of the limited data availability on costs and effectiveness, a qualitative assessment of cost-effectiveness (CE) was done. Using the next table, the combination of a cost score (1-5) and an effectiveness score (1-5) results in a score for CE (also ranging from 1-5). The most CE measure has a score of 5 and the least CE a score of 1.

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

Table 3. Qualitative assessment of cost-effectiveness as a matrix of cost scores and effectiveness scores.

The matrix above is used for combining the cost and effectiveness scores:

• The CE of a measure is very high (score 5) if the costs are very low or low and the effectiveness is either high or very high (the dark green area in the table).



- High CE (score 4) is assigned if cost and effectiveness are both at least moderate. A measure with a high or very high effectiveness (score 4 or 5) and a cost of 1 million Euro (score 3) is considered to be highly cost-effective. Likewise, a measure with moderate effectiveness (score 3) and a cost less than 10,000 Euro (score 5) is highly cost-effective.
- The CE of measures can be moderate (the yellow area in the table) for different reasons: 1) effectiveness is high, but measures are also very expensive (above 10 million Euro); 2) the cost and effectiveness are both moderate; and 3) measures have low effectiveness, but low cost. Even though these three groups have the same CE, the first group of measures is preferred as it brings the intended change but at high cost.
- Measure with low to moderate effectiveness and costs above 1 million Euro have low or very low cost-effectiveness (the orange and red areas in the table).

Results of the CEA are shown in the figure bellow. The cost scores of the measures are plotted against the effectiveness scores there. The measures closest to the upper right corner are the most CE.



Figure 2.Results of the CEA.

The results of the CE analysis need to be considered with care. Considering the qualitative nature of the presented CE assessment, the scores of cost and effectiveness are relative to each other. An effectiveness of "5" is hence simply substantially better than a score of "2.5" and cannot be considered as twice the effectiveness.

In addition, the CE results are combined with the results on possibilities for cost recovery (financing). **CE measures that score high also on the possibilities for cost recovery are considered as the most affordable** (from the analysed measures these are the measures 2e, 10 and 11). Some other highly



CE measures, but with limited potential for cost recovery are also expected to be affordable, mainly as a consequence of their low cost and high stakeholder support (5a, 5i, 6, 7, 17a,18, 21b, 22, 23a, 23b). Measures that are close to the bottom-right corner (high effectiveness, but expensive) are overall only affordable with substantial financial support. This could be the case of the measures 2a, 2b, 5c and 5d. But they were found with good possibilities for cost recovery, thus are seen as potentially affordable.

The approach used in this study is particularly useful for economic evaluation and prioritisation of measures when many alternative measures exist for addressing an environmental problem/target. Qualitative and semi-quantitative approaches and visualisation "tools" used in this study show nice example how complex results (with many evaluation criteria, for evaluating wide range of measures) can be demonstrated to indicate priorities (for more "feasible", CE measures).

3.3. From CEA to MCA approach for economic evaluation of 'additional' measures (a study for the WFD in Latvia, 2013)

The description of the example has been prepared based on internal information of a project¹¹, which was conducted to support implementation the WFD in Latvia and Estonia. The study investigated possibility to improve the national approach for economic evaluation of measures for WFD PoMs in Latvia. It aimed to analyse what aspects are relevant for the economic evaluation of measures, to test the MCA type approach for the evaluation of measures and to inventory knowledge and information base for applying such approach in practice.

The economic analysis for the WFD PoM, and the CEA of 'additional' measures in particular, provides useful experience for the work on MSFD PoM. Moreover, the WFD work is on-going to improve the approaches for the 2nd River Basin Management Plans (RBMPs).

Lessons from the CEA of "additional" measures for the 1st WFD management cycle:

- An Excel based (ECOLAS) model was used for the CEA in relation to nutrients' pollution problem. The model includes "technical measures" for addressing this problem. However, there are other types of measures relevant as well. Besides, the model helps with the nutrients' pollution problem only.
- More detailed/comprehensive assessment (than only the CEA) of the 'additional' measures and their implementation is necessary, also to improve public support for implementing the measures.
- Thus, it has been suggested that more comprehensive and transparent approach for the economic assessment of 'additional' measures is needed:
 - that the analysis supports better the discussions with stakeholders and decision making,

¹¹ The study was conducted as part of Gauja/Koiva project ("Towards joint management of the transboundary Gauja/Koiva river basin district") financed by the Estonian-Latvian program 2007-2013 and project partners. The project aimed to enhance management of shared surface and groundwater resources by development of a joint river basin management plan for the transboundary Gauja/Koiva river basin district. Results of the study will be published in a study report.



- that the approach would allow taking into account (besides the cost-effectiveness) all relevant aspects to ensure effective implementation of the measures,
- that the approach could be used for various environmental problems/pressures.

MCA approach for the economic evaluation of measures

The study was conducted with an aim to test possibility to improve the economic analysis of the 'additional' measures. The work was conducted in two stages:

- 1. Identifying **relevant criteria** for the evaluation and selection of 'additional' measures. The results show, for instance, that benefits of measures, public acceptance and funding availability are seen as important criteria as the cost-effectiveness of measures (see also the next table).
- 2. Developing a **database of 'additional' measures** (with measures addressing nutrients' pollution and hydro-morphological pressures from agriculture and forestry, 28 measures included in total), which could be used as a tool to support assessment of the measures.

Table 4. Criteria for economic evaluation of 'additional' measures and their average scores (based on a specially conducted inquiry).

Criteria	Average score of relevance (from 0 "low" to 5 "high")
[1] Cost-effectiveness of a measure (calculated based on direct effect and direct financial costs)	4.3
[2] Time until the effect after making a measure operational	2.8
[3] Multiple effects of a measure (effect on various water quality elements/pressures)	4.1
[4] Economic costs of a measure	3.6
[5] Administrative costs of implementing a measure	3.1
[6] Potential negative indirect costs and wider socioeconomic impacts	3.5
[7] Certainty in the costs and/or effect assessments of a measure	3.8
[8] Socioeconomic benefits from environmental improvements (from water- related and positive environment-related side effects)	4.3
[9] Availability of enforcement (incl. controlling) scheme(s) for implementing a measure	3.5
[10] Acceptance by stakeholders concerned by implementing a measure	4.2
[11] Certainty in funding availability	4.0

The database aims to provide information on all relevant characteristics of the measures (including the criteria identified during the stage 1. The information about measures is grouped in the database in thematic sections on (i) general characteristics of measures, (ii) application and implementation (incl., for instance, listing relevant stakeholders and assessment of stakeholders' acceptance, assessment of enforcement schemes/practices), (iii) effects and costs, (iv) financial and socioeconomic implications, (v) assessment of information availability and quality. Also assessments for all selected (11) criteria (evaluated in the first stage) are included in the database (see the table above for the list of criteria and their average scores from specially conducted inquiry). These assessments are developed for each measure based on available information from studies in Latvia,



literature and expert knowledge. The assessments are mostly qualitative by applying 5-category scale (e.g. the costs are from "low" to "high"). These assessments are tested afterwards for (multi-criteria) evaluation and prioritisation of measures.

Lessons in light of practically feasible approach

The results highlight that the assessment of measures in reality:

- requires economic analysis of various types of measures, including measures with and without "direct" effect (but with costs), the latter can be necessary as "precondition" (e.g. research, informational, administrative measures) for "technical" measures with direct effect;
- leads the analysis to assessing "sets" of measures (linked measures, accompanying measures/instruments) rather than single measures;
- can involve limited number of alternative ("technical") measures for reaching the target (except the case of nutrients' pollution), which limits role of the CEA;
- can involve measures with significant multiple effects (which is highly scored criterion by stakeholders and policy makers), but the "conventional" CEA is not the best suited frame for considering this.

In terms of the information provision for the various assessments the study concluded that:

- Concerning the socioeconomic impacts information was not sufficient for assessing many impacts even with qualitative categories based on expert knowledge. It concerns in particular, administrative costs, economic costs and gains, wider socioeconomic impacts.
- For some types of impacts (e.g. benefits, wider socioeconomic impacts) they are "hypothetically known" (e.g. from literature/other studies), but there is not enough information for estimating them since they are "case-specific" (depends on where and how a measure is implemented).
- Systematic assessment for all measures was difficult due to different availability of information for various measures.

In spite of the difficulties above, it is concluded overall that the wider (multi-criteria type) analysis of the measures is seen as useful framework to support the evaluation of measures, discussions with stakeholders and decision-making. Even if the approach is largely qualitative, it has an advantage of ability to incorporate various relevant evaluation criteria and of beeing suitable for various environmental problems/pressures.

3.4.Assessment of benefits for CBA of the MSFD PoM – a background study for developing the national methodology (a study for Germany, 2013)

The description of the example has been prepared based on *Interviews E. et.al (2013)* "Methodologies regarding Economic and Social Analysis and Impact Assessment of Measures including Cost-Benefit-Analysis in the context of the MSFD." Summary report of a project for the German Federal Environment Agency.

This example provides illustration on a study aiming to develop national methodology and background information for assessment of benefits for CBA of the MSFD PoM. The study involved



developing a methodological framework and operational guidance for **analysing the national benefits of reducing pressures** on the marine environment. The methodology was applied (i) to design "quantity structure" to describe relations between ecological improvements and resulting economic benefits and (ii) to develop information on monetising these benefits as well as alternative procedures, if no quantitative data are available. The methodology was tested in two case studies (addressing two pressures – marine litter in the North Sea and eutrophication in the Baltic Sea). The testing aimed (i) to quantify the economic benefits of reduced pressures on the environment as far as possible, using available data and testing the limits of quantification with present data availability and (ii) to test and refine the developed methodology. Additionally, data gaps and research needs were identified. Results of the testing exercise were used to develop a practically oriented "Practitioners' Guidebook".

Main elements and principles of the practical approach

The work is based on <u>the 'ecosystem services approach' and</u> uses <u>the 'Total Economic Value' (TEV)</u> <u>framework to categorize economic benefits of measures, including 'non-use values'</u>.

<u>The "quantity structure"</u> presents an overview of pressures and impacts, and elaborates on the <u>interconnectivity between ecological improvements and the resulting benefits</u> (focusing on the German marine waters). Because of limited data availability and high uncertainties surrounding the complex processes of marine ecosystems, <u>interactions between various pressures and impacts are not considered</u> in the development of the quantity structure. Such interactions are nevertheless described qualitatively, if information is available.

<u>Benefits for coastal waters</u> are also considered (although they are covered by the WFD). <u>Benefits</u> realized in other marine regions or other Member States' waters are excluded from the analysis, like (additional) benefits that are created by land-based measures in addition to the improvement of the marine environment (nevertheless, if such benefits evolve, they are marked as additional benefits and described qualitatively).

<u>Benefitting sectors of the economy</u> are categorized according to the sectors listed in the German "Initial Assessment". To be able also to depict benefits created in non-economic sectors (i.e. the society), e.g. the 'non-use values', the additional sector "society" has been added.

Benefits that evolve in the different sectors are classified into <u>primary and secondary benefits</u>. Primary benefits describe benefits that are realized directly in the economic or societal sectors. These are depicted quantitatively, as far as possible. The secondary benefits (co-benefits) are created in functionally connected sectors or companies, e.g. in suppliers, and are excluded from the "quantity structure" for the reason of greater accessibility and simplicity. Such co-benefits are nevertheless described qualitatively, as far as possible.

<u>The 'cost-based' and 'price-based' approaches to monetize benefits</u> (such as the 'replacement cost method') were used to derive proxy or as alternative data if no other information was available, as general methodological difficulties exist in using results from these approaches in CBA.

Existing studies aimed at valuation of benefits were collected and summarised in a database.

"Quantity structure" on ecological improvements and corresponding benefits

It aims to devise a structure that can be used <u>to identify and classify all benefits of reduced pressures</u> <u>into a comprehensive and practical structure</u>. It allows describing the "overall benefits" of a reduction of a certain pressure on the one hand, and on the other hand, helps to evaluate the individual benefits. It was used as basis for monetising the benefits.



Its development involved the following steps:

- 1. Definition and summary of pressure reduction, including analysis of interconnections between pressures reduction and resulting ecological improvements and benefits.
- Analysis of bio-physical impacts of measures to reduce pressures, including analysis of interconnections between sectors contributing into the pressures, changes in biological, physical and chemical structures, processes and functions due to pressures reduction and resulting changes in the 'ecosystem services' provision and benefits (according to the TEV framework).
- 3. Identification of societal benefits of pressures reduction, including for each pressure the benefits of a reduction were examined and described individually and they were then attributed to different economic sectors and societal groups (the "profiting sectors").
- 4. Description of the benefits through common "quantity structure" see the next table.

A checkmark $\sqrt{}$ in cells of the table indicates that benefits in this economic or societal sector should be expected through the reduction of the respective pressure. A checkmark in brackets ($\sqrt{}$) illustrates that, while the respective reduction of the pressure has potentially positive effects, these are, at the same time, dependent on either the importance of the pressure, or whether a reduction of the pressure is actually perceptible to humans or not (e.g. in the case of reduced "physical loss – sealing" and its effects on tourism).

Although the focus of the study is on the benefits, specific steps were conducted to include in the "quantity structure" also information on sectors affected negatively by implementing measures for reducing the pressures (sectors for which the costs of implementing measures are created). Moreover, the indirect (secondary) negative effects from implementing the measures are also briefly addressed (negative economic effects on functionally connected sectors).



Table 5. Benefits of pressure reduction (common "quantity structure").

		Use Va	lues										Non-use values
		Direct use values (consumptive)			Direct consu	Direct use values (non- consumptive)				use	Option values		Altruistic/existenc e/heritage values
Pressure		Fisheries	Angling	Aquaculture	Tourism	Recreation	Shipping	Industry	Health	Agriculture	All affected	sectors	Society
Physical Loss	Smothering Sealing	~	~		(*)	(*)						√	4
	Siltation	(*)	(*)				*					✓	~
Physical	Abrasion	~	~									✓	√
Damage	Selective Extraction	~	~		(*)	(*)						✓	√
Other physical	Underwater noise	~	~		~	~						~	√
disturbance	Marine litter	~	~	~	~	~	✓	✓	~	~		✓	~
Interference with	Thermal regime	(•	(•)	(•							((✔)	~
hydrological processes	Salinity regime												~
Contamination through hazardous	Synthetic compounds Non-synthetic substances (Oil)	v	¥	~	*	~			v			*	¥
	Radio-nuclides												
Systematic and/or intentional release of substances	Introduction of other substances (solid, liquid, gaseous)	¥	*	~	*	~			v			✓	¥



Table 5 continue.

Use Values									Non-use values				
		Direct use values (consumptive)			Direct use values (non- consumptive)				Indirect use values		Optic value	on :S	Altruistic/existenc e/heritage values
Pressure		Fisheries	Angling	Aquaculture	Tourism	Recreation	Shipping	Industry	Health	Agriculture	All affected	sectors	Society
Nutrient and organic matter enrichment	Fertilizers Organic matter	*	√	*	~	*			~			√	~
2. 1	Microbial pathogens	~	√	✓	~	✓			~			✓	~
Biological disturbances	Invasive species	~	√				~		~			√	~
	Fisheries	✓	~		✓	~						✓	~

Approach for developing the benefit estimates

The methodology is oriented on serving <u>quantitative (monetary) benefit estimates</u>, although it considers also alternative methods and identifying research gaps and needs where monetary information is not available.

The approach for developing the information base and the assessment of benefits is presented in the next figure. It started with identifying and analysis of valuation studies suitable for application and summing up the relevant contents and parameters of these studies. The values were analysed for the required benefit categories and economic/societal sectors. They were then "adjusted" for the study context. The values generated in this way were referred to respective pressures, to generate <u>values per unit of pressure</u>. This step was the most complex step and the one with the highest uncertainties (due to limitations of information available from valuation studies).

The valuation studies and the values determined therein were classified into four categories, which reflect the reliability of the values generated (based on the recommended prioritization of their utilization):

- Category a: values based on market prices OR avoided damages OR contingent valuation studies conducted in the German North or Baltic Sea;
- Category b: values based on evaluation studies from other regions, that were transferred to the conditions in Germany via a "Benefit Transfer";
- Category c: Values generated by applying avoidance costs OR costs of recovery; and
- Category d: no quantitative values available; instead, qualitative descriptions of the benefits is preferable.



Figure 3. Approach for developing the benefit estimates.



It was found that a significant part of the valuation studies were not suitable for utilization in the context of this project. Examples include studies that value not a single benefit, but a bundle of benefits created through a measure – e.g. the establishment of a marine protected area – or studies that do not contain enough information for attributing the benefit to a quantified reduction of a pressure. For some benefit categories or pressures, no valuation studies exist at all (underwater noise is a good example for this). Nevertheless, in these cases, the benefits were described in a qualitative way (the Step C in the figure). A qualitative description of secondary effects (co-benefits), which can result in functionally connected economic sectors, was completed at the end (the Step D in the figure).

Conclusions in light of data availability for estimating the benefits

It is noted that the presented approach is a pragmatic reaction to the <u>significant gaps in base data</u> (i.e. basic natural science information regarding marine ecosystems and pressures) and benefit information (i.e. missing or inadequate valuation studies), that incorporates many uncertainties. These uncertainties are mainly due to methodological issues (i.e. benefit transfers, inherent uncertainties of valuation studies etc.) or the previously mentioned data gaps. It became clear that the <u>data and information gaps are significant regarding the quantification of economic benefits resulting from reduced pressures</u>. Beside the natural science data, there is a great lack of good and suitable valuation studies for the marine environment. For some pressures – e.g. nutrients and



organic matter enrichment, marine litter, contamination through hazardous substances (oil), or the introduction of microbial pathogens – a relatively wide range of studies is available, but of varying quality. Most of these, however, could not be utilizable, as important information is lacking. Other pressures – e.g. physical loss (an exception is the visual disturbance through wind farms), physical damage, underwater noise, interference with hydrological processes or alien species – are not covered at all by valuation studies.

It is concluded overall that <u>there are more studies available that value direct and indirect 'use</u> values', as there are for 'non-use' and 'option values'. These latter values, however, are the ones mostly affected by pressure reductions, and they are therefore become underrepresented. In such situations a qualitative description of the 'non-use value' benefits is strongly recommended. It is noted that the lack of quantifiable data results in the necessity of combining quantitative and qualitative information.

Suitability of the approach for the ESA of the MSFD PoM

Because of high uncertainties in the results due to data and information gaps and rather high amount of work required for analysis following the given methodology, it is concluded that the methodology, as it was tested in the case studies, was deemed to be usable only in limited way, as the main criteria set for the national MSFD methodology – practicability, simplicity of application and acceptability through decision makers – were not fulfilled.

It is concluded that <u>an approach to economic valuation of benefits of marine protection measures</u> and to cost-benefit analyses that focuses strongly on "monetizing everything" does not seem feasible. The necessary amount of work, and the uncertainties of such an approach, resulting in figures that are not usable by authorities to justify decisions, is too significant. It is therefore additionally recommended to clearly differentiate between sound and transparent base data, and base data that come with great uncertainties. Only benefits whose valuation can be grounded on good and reliable data should be assessed quantitatively. In the cases where good data is lacking, all other benefits should not be monetized. Instead, these benefits should be described qualitatively, and considered in decision making via an alternative approach (such as a Multi-Criteria Analysis).

The study indicates that quantitative (monetary) estimation of benefits from reducing pressures (by implementing measures) might be challenging and involve high uncertainties, or might be even impossible (for some pressures/Descriptors). It should also be noted that the given approach doesn't address directly the requirement for assessing benefits of *"any new measure"* (benefits of single measures). At the same time some methodological elements/steps of the given approach illustrate relevant issues that need to be addressed for assessing the benefits (e.g. analysis of interconnections between pressure reductions and resulting ecological improvements and benefits, combining quantitative and qualitative information to capture all relevant benefit categories).

3.5.Assessment of benefits of achieving the MSFD targets using a primary valuation study (a study for the Latvian marine waters, 2013)

The description of the example has been prepared based on *Pakalniete K. et al (2013) "Valuing benefits of reaching the MSFD targets by applying the "Choice Experiment" method: Latvian study report." Report of the GES-REG project.*



This example provides illustration where **benefits of achieving targets** in relation to various problems of the marine environment have been **valued by primary economic valuation study** (applying the 'Choice Experiment' method). The study estimated national benefits of reaching GES for priority marine environment problems, and the **benefit estimates aim to be used to support CBA of the national MSFD PoM**.

The study has been conducted as part of the GES-REG project (WP5). Similar valuation study was conducted for the Estonian marine waters also. 12

Valued marine environment problems and scenarios

The marine environment problems valued in this study are the priority ones for the Latvian marine waters where a "policy gap" till GES for 2020 is likely (according to information for time of the study). Thus, 'new' measures could be required, and assessment of benefits of their implementation would support the CBA. The problems are (i) decline of the marine biodiversity, (ii) reduced water quality due to nutrients pollution and (iii) establishing of alien species. The used valuation scenarios aim to be consistent with the BAU and GES according to the MSFD needs.

According to the used valuation method (the 'Choice Experiment') valued environmental problems and improvements are expressed via "attributes", which take specific levels in proposed improvement scenarios (see the next table). The method allows eliciting for each "attribute" societal preferences and "willingness-to-pay" (WTP) for the described changes in state in these scenarios.

Scenarios "Attributes"	No additional actions	BAU (according to MSFD)	GES (according to MSFD)			
Reduced number of native species [reduction %-tage of "natural areas" – where species naturally should be present]	on Large areas [30 %]	on Small areas [10-20 %]	No such areas [0 % - species are present in all their "natural areas"]			
Water quality for recreation at the sea	Bad	Moderate	Good			
[explained by - visual quality (clarity) - algae washed ashore]	[in each scenario – quantitative specification for the clarity and frequency & amount of algae washed ashore is provided]					
New harmful alien species' establishing [1 new species on average]	Often [in 5 years]	Rarely [in 15-20 years]	In exceptional cases [not more often than in 50 years]			

 Table 6. "Attributes" of the marine environment quality and scenarios valued in the study.

NOTE. The formulation of "attributes" and environmental quality levels in the scenarios are presented here as they were provided to respondents (translated from Latvian). "Non-professional" terms/interpretations were used intentionally that the formulations can be understood by layman.

* A term used to name "invasive" alien species (those alien species that cause economic damage).

¹² Results can be found in Tuhkanen H. et.al (2013) *"Valuing the Estonian benefits and costs of improved environmental quality of the Baltic Sea: a discrete choice experiment approach. Estonian case study report."* Report of the GES-REG project. SEIT Tallinn.



Societal preferences and WTP

From all valued problems, the highest WTP was found for improving water quality for recreation, the lowest WTP for improving situation with the marine biodiversity.

Difficulties were faced to value benefits from protecting the marine biodiversity, which could be explained by (i) relatively marginal changes between the scenarios (although the status of biodiversity fails GES, the "gap", thus the valued improvements, can be seen as relatively small), (ii) finding that the marine biodiversity is quite "intangible" environmental feature for people.

Potential role of such benefit estimates for developing the MSFD PoM

Advantage of the given approach is that it provides **monetary estimates of the benefits, besides also for types of the benefits that could not be valued effectively by other methods** (than the 'Stated Preference Methods', to which the used method belongs). Since the study was customised for the MSFD needs (e.g. it "values" expected environmental improvements from achieving the MSFD targets) and provides benefit estimates for own national waters (instead of transferring benefit estimates from valuation studies in other countries/regions), the results can be seen with acceptable confidence.

In the context of development of the national MSFD PoM, it is important **how the benefit estimates from the study are afterwards linked to effect of specific measures for achieving the environmental targets**. When using these estimates in the CBA, the types of benefits "measured" by each "attribute" need to be interpreted carefully when linking the benefit estimates to (the costs of) specific measures.

It is expected that a "set" of 'new' measures could be required to reach the target for each valued environmental problem. Thus the benefit estimates from such a study could not be attributed to effects of single measures but rather to a "set" of measures. The benefits can be compared with costs of these measures for reaching the target. Thus the role of such estimates is seen for indicating welfare gains for society from reaching the targets rather than indicating benefits of single measures.

3.6. Economic assessment of measures for the MSFD (an European scale study, 2012)

The description of the example has been prepared based on **ARCADIS (2012)** "Economic assessment of policy measures for the implementation of the MSFD". Final report of a study for the EC DG ENV (Project N° 11601).

The study aimed to support Member States' work on developing the MSFD PoM, in particular for identification and economic assessment of possible 'new' measures. It consists of an inventory of possible measures, their assessment according to a set of criteria (e.g. costs, effectiveness, benefits, feasibility) and the identification of key success and limiting factors for each measure or group of measures. The collected evidence aims to support Member States to compile a set of measures suited for their implementation of the MSFD.

An inventory (database) of measures

Almost 140 policy measures/instruments have been inventorised and their assessments summarised in a database (Excel format). Types of the measures and instruments included are (i) "comand-and-



control" instruments, (ii) economic instruments, (iii) techncial measures, (iv) social instruments. The measures tackle the most important pressures in different regional seas.

The main sections in the database (information provided for each measures): (1) addressed pressures and impacts, (ii) addressed GES Descriptors, (iii) addressed uses/sectors, (iv) impacts of measures, (v) information on data quality and sources. Links between measures and the pressures/impacts and GES descriptors have been used as a guiding principle for the structure of inventory. The links have been identified based on literature or expert judgement.

Approach for economic assessment of the measures

The approach for assessing measures overall includes two stages – (1) **"quick scan"** have been done to collect information and assessments for all (140) measures, this information is filled in the database and (2) **in-depth analysis/assessment** of selected measures within case studies (one is from the Baltic Sea), this information is summarised in the study report.

Data collection for the database and "quick-scan" assessment of measures was done based on literature review and semi-structured interviews with experts. Assessments for various measures under various assessment criteria are provided in the database as far as they could be found/developed. **Assessment criteria** are related to:

- Environmental effectiveness (in terms of extent to which a measure helps achieving the specified objective),
- Costs and benefits:
 - direct and indirect costs, administrative, compliance, external (environmental and resource) costs,
 - benefits little information on monetary benefits of specific measures could be found (reference is given to work of the THRESHOLDS (<u>www.thresholds-eu.org</u>) and the KNOWSEAS project (<u>www.knowseas.com</u>) that have produced databases of values available from literature).
- Suitability (to status of the marine waters, possible/required geographical scale of implementing a measure),
- Social (distributional) impacts and institutional context,
- Flexibility and adaptability,
- Timing issues (e.g. taking into account the "time lag" between implementation and ecosystem's response).

The last two have been analysed only as part of the in-depth analysi in case studies. **Qualitative or scale-based assessments are used for various criteria in the "quick scan"** (for assessing measures in the database). For instance, for the effectiveness a scale from "+++" to "---" is used (to assess effect/impact of a measures on each Descriptor), for the costs quantitative evidences/illustrations are provided where available or they are described qualitatively, for distributional impacts 3-class scale is used.

Also success and limiting factors to make the measures implemented are analysed (based on broad desk research and interviews). They are specified where relevant for measures in the database.

Common success factors:

- Public acceptability of measures. Stakeholders engagement and acceptance.
- Capacity to implement and enforce measures. Clear responsibilities.



- Strong institutional framework and legislative conditions.
- Low costs, effective use of resources and optimal scale of implementation.
- International cooperation in monitoring and enforcement.

Common limiting factors:

- Power of lobby groups as serious threat to some proposed actions.
- (Lack of) monitoring, control and enforcement hinders the success of measures.
- Measures with serious (negative) impacts on key economic sectors will experience difficulties in implementation.

Conclusion in light of possible approaches for the national ESA of MSFD PoM

- The approach allows the impact assessment of the 'new' measures to support prioritisation and selection of measures based on wide range of assessment criteria /impacts, including the costs, effectiveness, benefits. It is applicable for evaluation of single measures.
- Concerning potential use of the economic assessments of measures (in the database), although they could be provided for part of measures only – where evidences could be found or knowledge exist, they indicate important socioecnomic issues/impacts that should be considered for specific measures.
- <u>The two-stage assessment approach (with the "quick scan" for all possible measures and indepth analysis for selected measures) can be seen as pragmatic solution in practice. The "quick scan" can be carried out based on information from literature and use of expert knowledge, with applying qualitative and semi-quantitative assessments (e.g. scales with categories).
 </u>
- <u>The "database of measures" can be seen as a useful practial tool for collecting information</u> <u>and assessments for the measures</u>.
- Only part of <u>relevant measures' assessment criteria/issues</u> relates to the socioeconomic assessments (e.g. costs, benefits, wider socioeconomic impacts). Many other criteria/issues (e.g. insitutional/policy) can be relevant and should be evaluated to ensure effective implementation of measures.



4. Recommendations for harmonising the ESA for the MSFD PoM

This section provides recommendations for conducting the ESA for the MSFD PoM in the project's countries. They aim to harmonise the national approaches in the project's region. According to the directive specific ESA of 'new' measures is required, involving the cost-effectiveness analysis (CEA) and Impact Assessment (ImA), including cost-benefit analysis (CBA), of these measures. Overall analytical process for development of the PoM, including the ESA of 'new' measures, was explained in the section 1. This section starts with more detailed discussion on the main elements and types of the ESA of 'new' measures according to the Article 13.3. Then each type of the ESA is looked closer. The section ends with highlighting issues that would be relevant for further collaboration in light of coordination and exchange of experiences among the countries.

At time of conducting the work for this document the process of developing the national MSFD PoM was in its initial stage in the project's countries. Results of the "policy gap" analysis were not known, thus also possible marine environment problems where the 'new' measures would be required. Consequently, thinking on the national approaches for the ESA for PoM had not started in the project's countries.

The recommendations build on review of experiences (examples) from practice from various countries and, in particular, on discussing these experiences and relevant genera principles and practical issues of the ESA for MSFD PoM during a workshop for the project's countries in December of 2013.¹³ The discussions indicated importance of **development of common understanding on general principles and possible practical approaches for conducting the ESA for PoM,** hence the recommendations aim to address these issues. It supported thinking about practical approaches that could be applicable in the project's countries and aimed to facilitate coherence of the national approaches.

4.1. The main elements and principles of the ESA of 'new' measures

The overall analytical process for assessing and selecting measures for the PoM, including the ESA of 'new' measures, was summarised in the figure 1 of the section 1. The diagram has been developed as part of the project and discussed among specialists from the project's countries. It was concluded that the diagram provides good visualisation of the overall process, it is comprehensive in terms of relevant steps/elements/issues and useful for communications with specialists from various disciplines who would be involved in the process of development of the PoM.

Concerning the ESA of 'new' measures according to the Article 13.3, while the role of the costeffectiveness analysis is specified more clearly (that the selected measures should be cost-effective, thus – CEA should substantiate the prioritisation and selection of measures), the role of the ImA and CBA remains open. It is commonly recognised that the analysis in practice would depend on planned role of these assessments in the national policy/decision making process for developing the PoM, and it may be country-specific. It would depend also on national information and knowledge base, institutional capacity, resources available for developing the PoM in each country. Thus **the**

¹³ More information can be found in the project's report Pakalniete K. (2013) "Workshop on Economic analysis for the MSFD Program of measures (on December 10-11, 2013 in Stockholm). Report on the results of the workshop".



methodological framework for conducting the ESA may be country-specific. In light of coordinating the national approaches in the project's countries, proposed way was to clarify common principles and socioeconomic aspects (e.g. impacts) of the analysis rather than propose the same methods to be followed in all the countries. This was the main reason why the diagram focuses on the main socioeconomic aspects of the 'new' measures that should be covered by the analysis (rather than on the approaches/methods for the analysis). According to the Article 13.3 requirements these aspects include cost-effectiveness, benefits and other socioeconomic impacts of the measures. While the methodological framework remains open (e.g. for the *"impact assessment, including CBA"*), it is clear that the socioeconomic aspects mentioned above need to be addressed by the ESA of 'new' measures. Clarifying common principles and aspects of the ESA and exchange of experiences could facilitate the coherence but the methodological approaches should not be necessary the same in all the countries.

Some of the **assessment aspects** are clearly defined by the directive (e.g. technical feasibility, costeffectiveness). Possible additional aspects were discussed among the project's countries (e.g. what to consider under the "other relevant socioeconomic impacts of the measures" in the ImA). It relates to the planned role of these assessment in the national policy/decision making process, since specific additional criteria could be condsidered for prioritisation of measures and determining overall sustainability of the PoM, such as, for example, the availability of funding, stakeholders views/acceptance (this issue is discussed in more details in the chapter 4.3).

It should be explained why the "reducing risk to the marine environment" is included among the aspects in the diagram since it would serve benefits, thus overlap could be seen between the respective two boxes. Although there is no reference in the Article 13.3 to reducing risk to the marine environment as relevant issue for the ESA of 'new' measures, separation of this aspect aimed to highlight situations when "additional" measures need to be implemented due to this reason independently on their cost-effectiveness. It indeed links to (and may be seen as overlapping with) the benefits' assessment. But the idea was to separate it from the cost-effectiveness as required criterion for prioritisation and selection of measures. Examples of environmental pressures relevant in light of the environmental risk reduction are accidental oil pollution and pollution with hazardous substances (e.g. in light of health risks). On the other hand, it was also discussed what is the difference between the "environmental effectiveness" and "risk reduction to the marine environment". The risk assessment could be viewed in light of other pressures/environmental problems also – where there is risk of passing "threshold" of irreversible changes (e.g. regime shifts). Thus, it could relate in principle to any environmental problem (e.g. eutrophication). Besides, it doesn't relate to specific/single measure(s), but to environmental problem as such. Such situation would suggest that actions are needed (independently on the cost-effectiveness of measures), but could not be viewed in light of impact of a specific/single measure(s). Thus, if alternative measures for reaching the risk reduction are available, CEA still can form basis for prioritisation and selection of the most effective measures.

The ESA approaches in practice would largely be determined by **available environmental information/assessments, in particular, on environmental targets, environmental effectiveness and impacts of the measures.** It is expected that due to limited knowledge of the functioning of the marine environment, the inability, in some cases, to set quantified targets, and the difficulty of quantifying effects of measures and their impacts on the marine environment it could be possible to estimate properly potential socioeconomic impacts on limited extent. However, both CEA and CBA are possible even when no quantified target is set, and not necessarily have to be fully quantified (or



monetised). It is recognised that literature and expert knowledge would be important sources of information and basis for the assessments. And semi-quantitative and even qualitative assessments from the ESA can also be supportive, for instance, for indicating more priority measures.

Issues where information and assessments are needed as basis for the ESA of 'new' measures include:

- impacts of pressures on the marine environment that extent of an environmental problem can be understood and measures can be identified;
- understanding on "activities-pressures-state (in terms of Descriptors and Indicators)" linkages chain, including sources and pathways of pressures;
- environmental targets;
- appropriate (suitable and technically feasible) measures for addressing an environmental problem and closing the gap between the BAU state and the GES;
- environmental effectiveness of possible 'new' measures;
- environmental impacts of possible 'new' measures in terms of changes in the marine environment.

As noted, the ESA approach in practice could be determined by **expected role of the assessments in the national policy/decision making process** for development of the PoM. In order to take a pragmatic approach the role should be clarified in advance. An important issue here is **what type of the assessments wants to be used directly as basis for prioritisation and selection of 'new' measures to be included in the PoM.** It leads to a question – **based on what impacts (criteria) the possible 'new' measures want to be prioritised**, e.g. only the costs and environmental effect (CEA needs to be carried out), also the benefits (CBA needs to be carried out), also other socioeconomic impacts ("wider" ImA needs to be carried out, where MCA can be a useful tool)). At the same time, even if the various impacts (criteria) are not taken directly in the prioritisation of the 'new' measures, such assessments can be supportive for stakeholder consultation process and policy/decision making to develop sustainable PoM.

Reality in the project's countries and discussions during the work indicated that **a pragmatic approach for the ESA of 'new' measures could involve the following elements and principles:**

- 1. <u>Carrying out CEA of the 'new' measures as basis for prioritisation and selection of the measures for the PoM.</u> It would be conducted for each relevant pressure separately (although, keeping link with the Descriptors and Environmental Targets). The costs and effects of each measure would be assessed and compared to find the least cost way for reaching a target. This step is discussed in more details in the chapter 4.2.
- 2. <u>Carrying out socioeconomic ImA of the 'new' measures, including, assessing benefits of the measures among the impacts</u>. The impacts would be assessed on measures' level, and the analysis could be conducted by relevant pressures (or Environmental Targets). If necessary, MCA frame could be used for the ImA, since it could require combining various types of information and assessments (quantitative/qualitative). The results could indicate more priority measures (if MCA is applied), but would mainly <u>aim to highlight relevant positive and negative impacts of the measures that can be discussed for selection of the measures or for determining actions to be taken to mitigate possible negative impacts (e.g. by developing compensation instruments). Assessment of the benefits of each</u>



measure could be done as far as possible, although in many cases it might remain as qualitative description. Literature, national examples from practice and expert knowledge could be the main information sources for the assessments. This step is discussed in more details in the chapter 4.3.

- 3. <u>Using a "database of measures" as a practical tool for collecting the required information</u> <u>and assessments for the ImA</u> (also see the chapter 4.3 for more information).
- 4. <u>Assessment of benefits and CBA, as far as possible, for the main pressures/environmental targets</u>. It is expected that the costs and, in particular, the benefits of each measure would remain described qualitatively (or semi-quantitatively) in many cases. It means that confronting the costs and benefits of a measure (as required in the CBA) would be rather impossible that it could be used for the comparison and prioritisation of measures. But the CBA could be possible on the level of relevant pressures/targets, to indicate welfare gains for society from implementing measures for achieving the targets and the most beneficial directions of the actions. This issue is discussed in more details in the chapter 4.3.

4.2. Cost-effectiveness analysis (CEA) of 'new' measures

The following issues should be mentioned as precondition for applying CEA for 'new' measures:

- knowledge on impacts of pressures on the marine environment and "activities-pressuresstate" linkages chain that extent of the problem can be assessed and possible suitable 'new' measures can be identified;
- availability of alternative 'new' measures for achieving an environmental target.

With the lack of this base information and/or alternative measures the CEA is not aplicable (like it might be expected, for instance, concerning D11 on underwater noise due to the lack of the base information).

For pressures where many alternative measures are available it could be a pragmatic approach to conduct the CEA in two stages – (1) initial assessment of cost-effectiveness of measures for rough prioritisation of measures, and, if relevant, reducing the list of measures, ¹⁴ (2) more profound evaluation of the effects, costs and cost-effectiveness of (a "short-list") of measures and prioritisation and selection of the measures for PoM that allow reaching a target in the least-cost way.

Traditional steps that CEA should include:

- 1. Assessment of the gap between BAU state and an environmental target, including analysis of the pressures and their impacts that contribute to failing the target;
- 2. Identification of possible additional measures for closing the gap;
- 3. Description and assessment of effect of each additional measure for achieving the target;
- 4. Assessment of costs of the measures;

¹⁴ In principle, other relevant socioeconomic criteria besides the effect and costs can be taken into account in this stage as well. However, it is recommended to keep the CEA pure at this stage and to leave assessment of other aspects of measures for the ImA stage.



5. Assessment of least costs to reach the target, based on a ranking of measures on their costeffectiveness (costs per effect unit).

As can be seen from these steps, the analysis requires close collaboration of specialists from environmental and economic disciplines.

The gap analysis is crucial starting point, since it determines whether additional measures would be required and to what extent (e.g. how large is the gap to be closed by the additional measures).

Overall the "policy gap" analysis should be carried out in relation to the GES Descriptors based on quantitative indicators and environmental targets specified for them. However, in practice it can involve many challenges. For part of the Descriptors the targets would be specified qualitatively only. Moreover, the GES Descriptors are not independent – they are interlinked and could be seen in certain hierarchy (when directly "pressures-related" Descriptors impact "state-oriented" or high-level biological integration Descriptors like D1 and D4 on Biodiversity and Food-webs). The linkages between the GES Descriptors can be investigated by analysing pressures and their impacts and linking the pressures to the targets in relation to the GES Descriptors. Then additional measures can be targeted to reduce these pressures and their effect could be expressed in terms of capacity to reduce the pressure.

This step requires considering policy measures that should be included in the BAU and assessment of their expected effect. Distinction between the BAU measures and 'new' measures needs to be made (this issue is elaborated in more details in the project's report on recommendations for the BAU development¹⁵).

It is expected for many Descriptors that the gap could be assessed only qualitatively. In particular when the targets are defined qualitatively without setting quantitative "end points", which should be achieved, but might be also due to difficulties to define clearly the BAU state.

In the next step, **additional measures are identified** with potential to reduce the pressures with an impact on the target. It could be suggested to conduct the CEA for each relevant (broad) pressure separately¹⁶, however multiple effects of measures on various GES Descriptors should be considered at some point of building the PoM (e.g. in prioritisation of the measures if relevant, or at least to prevent from the situation of "over-implementation of measures").

The **description and assessment of effect of each measure** requires understanding effects of measures on the target. Even if the effect is assessed in terms of capacity to reduce the pressure (which might be expected in many cases), <u>linkages over the "measures-activities-pressures-target"</u> <u>chain and effect of each measure for achieving the target need to be determined</u>. This could be done based on literature review and expert knowledge if no quantitative estimates are available (e.g. from modelling studies), as it is expected in many cases.

¹⁵ See the report of the GES-REG project K.Pakalniete (2013) *"Harmonising the 'business-as-usual scenario'* development for the MSFD in the project's countries. RECOMMENDATIONS' REPORT."

¹⁶ In particular, since it is expected in many cases that just one "broad" pressure would related to an analysed target (e.g. nutrients pollution in relation to a target for eutrophication, marine litter in relation to a target for this problem, introductions of alien species in relation to a target for invasive species etc.).



Ideally, a quantitative unit of effect should be determined (e.g. kg of P reduced, km of beach cleaned)¹⁷ and the effect of each measure should be quantified using this unit. But this quantification is expected to be impossible for many pressures/targets. Qualitative or semi-quantitative assessments of the effect (with assessment categories) then could be used, which could be derived based on evidences from literature/case studies and expert opinion. Such approach creates uncertainty in the results, thus the <u>sensitivity analysis of the CEA results would be recommended</u>.

The next step involves **assessment of costs of each measure.** In order to compare the effect and costs for assessing the cost-effectiveness, both the costs and the effect should be assessed in a similar way (e.g. quantitatively or qualitatively with assessment categories). Types of the costs that should be considered are discussed latter in this chapter.

The last step includes **assessment of the least costs to reach the target.** Using information on the costs of measures and the effect, the cost-effectiveness can be estimated by dividing the costs and the effect. The measures can be ranked based on their cost-effectiveness ratio (the costs per 1 unit of effect or activity) and those measures ensuring the least-cost way for reaching the target can be selected.

As noted, the CEA can first be carried out in relation to each GES Descriptor/Environmental Target. However, since some of the measures are expected to have multiple effects (also on other Descriptors/targets), the **contributions to other Descriptors/targets should be assessed** at least qualitatively.

The last but not the least, the **sensitivity analysis of the CEA result** should be carried out to highlight the assumptions and uncertainties that have the most significant impact on the proposed cost-effective set of measures.

Involvement of stakeholders is expected to play an important role for developing the PoM. In CEA the stakeholder involvement could be relevant in particular for identifying additional measures (the step 2), to input by providing information and opinions on effects and costs of measures (the steps 3 and 4). Moreover, early involvement of stakeholders could support understanding and acceptance of the results.

Summarising, due to expected information and data gaps the following issues would be of high relevance:

- ➡ Using semi-quantitative or qualitative assessments where quantitative assessments are not possible.
- ⇒ Using literature reviews and expert opinion as sources of information/assessments.
- ⇒ Involving stakeholders for collecting relevant input information and opinions (as well as to support understanding and acceptance of the results).
- ➡ Recording uncertainties in the assessments and carrying out sensitivity analysis of the results.

¹⁷ In practice, the effect could be expressed also in terms of percentage of reduction of pressure (where the unit is 1 % of reduction of pressure), e.g. reducing nutrient input to the sea by x %, reducing risk of oil spill by x %, reducing risk of introduction of new alien species by x %.



From the practical perspective of possible approaches, two issues should be discussed in more details:

- 1. types of the costs and effects that should be included in CEA,
- 2. assessment of single measures and/or "sets" of measures.

Types of the costs and effects that should be included in CEA (for a specific pressure/target)

It is important to be clear what types of the costs of measures (e.g. direct financial costs, direct economic costs, indirect administrative and economic costs) and effects of measures (e.g. "direct" effect on the analysed target, multiple effects – also on other targets/Descriptors, positive environment-related side effects) are accounted. In theory, all these types of costs and effects of measures should be accounted in CEA. However it is expected unfeasible in practice (at least for the 1^{st} PoM).

This issue appears important in light of available information base to be able to assess various types of costs and effects in a systematic manner (accounting the same types of effects and costs) for all analysed measures, which is needed for proper comparison and ranking of measures. Such situation should be avoided that information gaps impact ranking of measures (e.g. gives misrepresented cost-effectiveness assessment and ranking of measures). Suggested practical soluation is to start with the "direct" costs and effects only when other types of the costs/effects can not be assessed systematically for all analysed measures due to information limitations.¹⁸

Moreover, there could be situation that for some measures (specific type of) the costs and/or effect can be quantified, but for some not. To avoid situation that measures are evaluated differently (with different estimates e.g. quantitative, semi-quantitative, qualitative), the same "metric" that is possible for all measures should be used (e.g. qualitative or semi-quantitative assessment with categories based on expert judgement).

In practice for the CEA, when assessing the effect of measures, the focus could be on the "targeted" Descriptor/target (due to which a measure is proposed). Impact on other Descriptors/targets (may be positive or negative) could also be assessed, at least qualitatively, like also positive environment-related side effects, and considered in the ImA stage. Although, the impact on other Descriptors/targets may be considered in the CEA stage also, but it might then require applying the MCA frame to allow including this as additional criterion for comparison (ranking) of measures.

Concerning the costs, the direct financial costs¹⁹ and economic costs (for instance, foregone yield due to setting "no-take" zones/times) should be included in the CEA. "Indirect" costs (e.g. indirect administrative costs, indirect economic costs) are usually difficult to estimate in practice. Available information might not allow estimating them systematically for all measures. <u>The overall key principle should be that, if a specific type of the costs wants to be included for comparison and ranking of measures, it should be assessed systematically for all analysed measures to avoid that</u>

¹⁸ Other possible practical solution, which was noted during discussions, is suggestion to focus in the 1st cycle on "well known" additional measures with good information and knowledge base on various types of the costs and effects. This would mean that information base and confidence of the assessments (on costs and effects) are taken as criteria, in addition to the cost-effectiveness, for selection of measures.

In addition, in case of knowledge gaps on the effect, a pragmatic approach could be also to include in the 1st cycle pilot projects and research studies (as "support measures") for leraning the effect before a measure is applied on larger scale.

¹⁹ Including direct financial costs of "administrative" measures.



information gaps impact ranking of measures. Other types of the costs, where systematic assessment for all measures is not possible, could be taken into account in the ImA stage, where the main aim would be to indicate relevant negative impacts (not necessarily using these assessments directly for comparison (ranking) of measures).

In any case, it is important to ensure <u>transparency</u> of the analysis that the limitations (what is accounted and what not) are clearly indicated and presented to/discussed with stakeholders and decision makers. In practical terms, it could be useful to add assessment of information availability and/or confidence of the assessment for costs and effects.

Assessmenf of single measures and/or "sets" of measures

As can be seen from PoM of the WFD, "technical" measures can make limited part of a PoM, since other types of measures are needed also, for instance, before the "technical" measures can be defined and put in place. Also for the MSFD PoM, it is expected that it could involve:

- various types of measures (technical, administrative/legislative, informational measures, economic instruments), which means also measures with and without "direct" effect but with costs;
- need for building "sets" of linked, accompanying measures/instruments, for instance, when such measures are necessary for effective implementation of a "technical" measure (e.g. research, informational, administrative measures/instruments).

A step-wise approach can be suggested in practice:

- starting with assessment of single measures ("technical" measures, with direct effect), since CEA for "sets" of measures at the start could be less transparent;
- building "sets" of related/accompanying measures/instruments, re-assessment of effect and costs (and cost-effectiveness if relevant) of the "sets".

4.3. Impact Assessment (ImA) of 'new' measures, including Cost-Benefit Analysis (CBA)

As noted in the chapter 4.1, a pragmatic approach could include further evaluation of measures after the CEA by conducting:

1. Socioeconomic ImA of 'new' measures, including, assessment of benefits of the measures among the impacts. If measures wants to be compared and prioritised (ranked) based on additional criteria besides their cost-effectiveness, MCA could be used instead of CEA (see the previous chapter) since it allows considering multiple criteria and combining different assessments (qualitative, semi-quantitative, quantitative). Otherwise even a simple ImA framework would allow highlighting relevant positive and negative impacts of measures that can be discussed for selection of measures (or for determining actions to be taken to mitigate the negative impacts). Assessment of the benefits of each measure could be done as far as possible, although in many cases it might remain as qualitative description. From the practical methodological perspective, an important question is – what aspects/impacts of measures could be relevant to be included in such analysis. This is discussed in details further in this chapter.



2. Assessment of benefits and CBA, as far as possible, for the main pressures/targets. As concluded, the CBA on a single measures level might be rather unfeasible,²⁰ however it could be possible on the level of relevant pressures/environmental targets. It could indicate welfare gains to society from implementing measures for achieving the targets and the most beneficial directions of the actions. Relevant issue that should be taken into account in such assessment are also discussed further in this chapter.

Socioeconomic ImA of measures – what impacts should be considered

Previous experiences (for instance, with implementation of the WFD) indicate that in reality other aspects than only the costs and effects are important for developing PoM that is accepted by involved parties and get implemented. On the other hand, in terms of the methodological approaches it is important to understand what is relevant to be done and what is practically feasible, in particular for the 1st PoM (with the available time and budget resources), since sophisticated ImA methodologies might not be feasible for the reality.

The discussions among specialists of the project's countries indicate that the cost-effectiveness should be seen as the main criterion for prioritisation of measures. However there are additional socioeconomic criteria that should also be considered for the selection of measures, in particular in the 1st implementation cycle, e.g. public acceptance, funding possibilities (instruments) of measures, since they can be arranged for new measures appropriately over longer time period. These could be used as "complementary criteria" for the selection of measures that are included in the (1st) PoM. At the same time it was suggested to keep transparency in applying these criteria that the initial prioritisation of measures is based on their cost-effectiveness and these additional criteria are discussed complementary for selection of measures for inclusion in the PoM.

Relevant socioeconomic²¹ "complementary criteria" could be the mentioned two:

- Acceptance by stakeholders who should implement measures. Experience shows that it is
 improtant issue for getting measures implemented, and it takes time to build this
 acceptance. Applying this criterion would require that information about the acceptance of
 the possible 'new' measures is collected.
- Financing possibilities. Experience from the 1st implementation cycle of the WFD confirms that it is pointless to suggest measures that can not be financed (with unknown financing sources/instruments). New financing instruments can also be proposed (e.g. together with a 'new' measure in a "set"), but it takes longer time to design, get agreement and run them.

In addition, other aspects (impacts) of measures that should be considerd in the ImA to indicate relevant positive and negative impacts of measures are:

 $^{^{20}}$ There could be specific cases of measures where CBA is possible and important on a measures' level. For instance, for a measures "setting new Marine Protected Area(s)" – CBA can be used for prioritising alternative options and selecting the area(s) that brings the largest (net) benefits. However, these might be rather individual cases. The recommendations here don't exclude such cases (when CBA on a measures' level is recommended), but the need for such CBA could be evaluated on case-by-case basis when possible 'new' measures are known.

²¹ Additional institutional criteria might want to be considered as well, for instance, whether there is strong institutional framework, legislative conditions and institutional capacity to implement and enforce a measure, which also can take longer time to be arranged.



- Direct economic impact (costs) of measures (on those who implement a measure) could be indicated/assessed for the measures where expected to be relevant, <u>if not included already</u> <u>in the CEA</u>, even if they are characterised qualitatively only.
- Benefits of measures, which relate primarily to ecological improvements ensured by implementing a measure, but might include also other socioeconomic benefits. The benefits from multiple effects of measures (also on other Descriptors/targets) and positive environment-related side effects could also be indicated if not covered already in the CEA.
- Relevant distributional impacts. This might concern both economic impacts (e.g. impact on SMEs, additional costs' burden for specific economic actors' groups) and social impacts (e.g. impact on specific societal groups). It requires analysing who is affected and how by implementing a measure.

The need for including assessment of (other) wider socioeconomic impacts (e.g. impact on competition or employment in specific sector), is unclear at this stage, in particular for the analysis on measures' level, since:

- these might be limited cases where a single measure would create such significat impact, thus might be more relevant for analysis on the level of "sets" or "packages" of measures (addressing specific pressures or sectors);
- when relevant on the measures' level, they might appear in the "distributional analysis" (proposed above), e.g. impact on sectoral/regional employment, impacts on local communities. Then it should be taken into account that such regional or sector-specific impacts most often don't create impacts on macro-economic scale.

The practical approaches for the ImA in the countries might largely depend on available information. In countries with more background studies the assessments could be more detailed and quantitative. Other countries could rely more on literature reviews and expert knowledge.

It is recommended to continue information exchange among the project's countries when the ESA work for PoM is in progress on what impacts should and can be included, as well as on practically feasible approaches for their assessment.

"Database of measures" as a practical tool for collecting information for the ImA

It comes from practice that databases of measures are often used as a practical tool to support development of programs of measures. Such database allows compiling relevant information for characterising and evaluation of measures. It is seen also as useful tool for compiling relevant information for the ImA of 'new' measures. Some advantages of using such a tool:

- it can be built gradually (adding new information when it becomes available), it can also be used to support planning of filling information gaps,
- it can be used for collecting together different types of information/assessments, opinions of concerned parties,
- it can be shared among neighbouring countries.



Assessment of benefits and CBA for the main pressures/targets – relevant issues that should be taken into account

The costs' assessments would come from the CEA stage (as discussed in the previous chapter). The issues discussed below concern assessment of the benefits of implementing measures for achieving environmental targets. It is expected that the main benefits would be created from ecological improvements of the marine environment achieved by implementing measures.²² Very much literature exists on theoretical and methodological issues of such benefit assessment and monetary valuation, thus these issues are not touched here.²³ Only the main principles for the work in practice in relation to the benefit assessment are highlighted.

An important first step is to clarify **relations between impacts of measures in terms of ecological improvements and resulting benefits.** Examples on how this can be done in practice can be found, for instance, in the presented example for the Germany (where ecological improvements from pressures' reduction are linked to benefitting sectors/societal groups and types of benefits according to 'TEV' framework, see the chapter 3.4 for more information), in the Dutch study on CEA and CBA for the national MSFD PoM²⁴ (where so-called "Logical Diagram of Impacts" is elaborate in relation to each GES Descriptor, which structures and characterises physical effects and welfare effects from the achieved ecological improvements). Experience from UK can be reviewed for applying the 'Ecosystem Services Approach'. Moreover, much literature exists that could support this work.²⁵

'TEV' framework²⁶ can be recommended for categorising the benefits for their assessment, as it would support accounting all relevant types of the benefits and avoiding their double counting.

For **monetising the benefits**, valuation studies specially customised for the needs (valuing the environmental changes that would be brought by implementing the measures) would provide reliable assessments. But such studies are scarce and conducting new studies would be unfeasible since it could be too expensive and time consuming. Transferring values from studies in other countries should be used with care since it could increase uncertainty in the assessments that they are not suitable for decision making. However, it is expected that the existing valuation studies in the project's countries could provide basis for developing monetary estimates. For some environmental issues there are valuation studies customised for the MSFD needs (for instance, the valuation studies in Latvia and Estonian as part of this project). And there are other existing studies that can also be used (for instance, a study in relation to eutrophication "BalticSUN" conducted by the research network BalticSTERN in 2011). They can be used at least for characterising magnitude of the benefits.

²² Although other socioeconomic benefits of implementing measures might be created as well and could be indicated, where relevant, as part of the ImA.

²³ The same applies to theoretical and methodological issues of conducting CBA.

²⁴ Reinhard S. et.al (2012) *"Cost-effectiveness and cost-benefit analysis for the MSFD: Framework for the Netherlands."* LEI report 2011-036 (Project code 2276000145). The Hague.

²⁵ See for instance, the "linkage tables" developed by the research project ODEMM, which links Activities – Pressures – Ecological characteristics – Descriptors and 'Ecosystem Services' of the marine ecosystem (available at: <u>http://www.liv.ac.uk/odemm/data/</u>).

²⁶ The 'TEV' framework classifies the total economic value into 'use' and 'non-use' values. The 'use values' can be further divided into 'direct consumptive values' (e.g. the consumption of fish and other marine "products") and 'direct non-consumptive values' (e.g. "use" of a landscape for recreation or the use of waterways for transportation), as well as 'indirect use values' (e.g. the natural purification of drinking water or the biological decomposition of waste) and 'option values' (i.e. the potential use in the future). The 'non-use values' are classified into 'altruistic', 'bequest' and 'existence values'.



At the same time, lack of appropriate quantifiable data is expected for part of environmental issues or types of the benefits. This would result in necessity of combining quantitative and qualitative information. And it is important to include **qualitative characterisation of the types of benefits** where quantitative assessment is not possible in order to capture all relevant types of the benefits.

4.4. Relevant issues for international collaboration for developing the PoM and the ESA of measures

The following issues for information exchange, coordination, possible joint work internationally have been identified as important during discussions of specialists from the project's countries:

- <u>Exchanging information on expected nutrient pollution load reductions from countries</u> sharing the same sea basins. <u>Joint and coordinated work for the "policy gap" analysis</u> concerning this problem (to see whether 'new' measures would be required, including, internationally).
- Possibility to develop joint modelling tool for the CEA of nutrient pollution reduction measures that could be used nationally. The two BalticSTERN models could be further developed for this purpose. Such models would help for necessary simulations nationally and also would facilitate the necessary exchange of information about expected load reductions in the countries. This is seen as an idea for future research (e.g. within the BONUS program), and would require adapting the modelling frameworks to the national scale, adding new country-relevant measures and transferring these tools to end-users (incl. training on their use). The results could then be used in the next MSFD planning cycle.
- Exchanging results from the national "policy gap" analyses to identify common environmental problems with the "policy gap" where 'new' measures would be needed. This would allow identifying needs for possible 'new' international measures and for exchange of information and maybe even joint work for their socioeconomic analysis. The information exchanged so far indicates that introduction of non-indigenous species and biodiversity protection could be among the common problems. The eutrophication problem would need coordinated and joint work to assess effectiveness of policies, "policy gap" and need for additional measures (incl., internationally). The common problems could be defined more concretely after countries have results from the analysis of "existing policies" and the "policy gap" analysis.
- <u>Discussing the common environmental problems/themes in light of needs for 'new'</u> <u>international measures and for their joint or international socioeconomic analysis</u> (incl., as part of HELCOM).
- <u>Discussing the common environmental problems/themes in light of gaps in the information</u> <u>& knowledge base for assessing the socioeconomic impacts of 'new' measures</u>. This would help to look for possible joint solutions to develop the assessments. Since coordinated work takes time the information should be exchanged as early as possible. Since the ESA for PoM is not really started in the countries, the gaps could not be specified yet. The discussions indicated possible gap in relation to the socioeconomic assessment of measures addressing non-indigenous species.
- Exchange of experience in relation to approaches for the socioeconomic ImA of measures (e.g. the covered impacts, practical approaches). This would facilitate coordination (and coherence) of the national approaches and assessments. In particular, what and how should be assessed as "other" socioeconomic impacts of measures.



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