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Study on the economic effects of Maritime Spatial Planning

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PREFACE

Maritime Spatial Planning (hereafter MSP) is a tool for improved decision-making, providing a framework for arbitrating between competing human activities and managing their impact on the marine environment. Authorities and other stakeholders expect that MSP will bring substantial benefits to maritime economies and the marine environment in Europe.

In this regard, the question is what kind of benefits will result from MSP and how large will these benefits be. This study aims to provide greater insight into MSP's economic effects, i.e. the effects of MSP for the maritime economy and stakeholders directly related to the maritime economy. Factors such as employment and environmental effects are not included in this study.

Unlike cost benefit analyses, the report is mostly limited to a qualitative assessment of the benefits associated with MSP, although it also includes a methodology which has been applied to provide an indication of the quantitative effects of MSP. These quantitative effects need to be interpreted with great care; they provide insights on a macro-economic level, but are based on assumptions and require additional studies on a case-by-case basis in order to be able to draw more accurate conclusions.

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EXECUTIVE SUMMARY

"Maritime Spatial Planning is a tool for improved decision-making. It provides a framework for arbitrating between competing human activities and managing their impact on the marine environment. Its objective is to balance sectoral interests and achieve sustainable use of marine resources in line with the EU Sustainable Development Strategy". The text above is taken from the Roadmap of Maritime Spatial Planning, published by the European Commission in November 2008. This roadmap was a first formal step on Maritime Spatial Planning taken by the European Commission and is part of the larger policy objectives incorporated in the Integrated Maritime Policy for the European Union.

Policy actions, such as the initiative on Maritime Spatial Planning, aim to create a framework for society to operate in such a way that unwanted effects are minimised and desired effects are maximised. In the case of Maritime Spatial Planning, the European Commission aims to support its Member States with a tool that enables their maritime economies to grow sustainably. This implies minimum conflicts between economic activities AND other economic or human activities, whilst a good environmental status of the marine areas is realised. The question to be answered in this study is whether Maritime Spatial Planning leads to these desired effects. More specifically, it aims to find out whether and on which scale economic effects for maritime stakeholders in the European Union will occur due to Maritime Spatial Planning.

In order to answer this question, Maritime Spatial Planning has first been conceptualised, addressing items such as the input and process needed to achieve Maritime Spatial Planning as well as the effects likely to result. It was found that if the process is managed properly the economic effects are fourfold: (1) enhanced coordination and simplified decision processes, (2) enhanced legal certainty for all stakeholders in the maritime arena, (3) enhanced cross border cooperation and (4) enhanced coherence with other planning systems. Furthermore, several additional non-economic effects are likely to result from MSP, such as support for management in realising a good environmental status in the coasts and seas[1]. The economic effects were subsequently studied in relation to dominant

[1] Required by European Commission (2000), *Water Framework Directive*, 2000/60/EC and European Commission, (2008), *Marine Strategy Framework Directive*, 2008/56/EC.

economic paradigms. This resulted in a clear and non-ambiguous set of three main economic effects of Maritime Spatial Planning. Firstly, *coordination efficiency* for governments is likely to result due to improved and integrated decision making. Secondly, proper Maritime Spatial Planning leads to *reduced transaction costs* for maritime activities (economic terminology for search, legal, administrative and opportunity costs) operating in the maritime arena. Thirdly, societies benefit from the enhanced certainty resulting in an improved *investment climate*.

The effects found were mostly not eligible for macro scale quantification, which was one of the initial objectives of this study. Hence, as economic effects of Maritime Spatial Planning should be considered as future benefits, results were calculated by using future scenarios on the evolvement of maritime industries and government programmes. The results indicate that Maritime Spatial Planning could lead to significant economic effects. For three scenarios, a reduction of 1% in transaction costs led to positive economic effects ranging from € 170 million to € 1.3 billion in 2020. Furthermore, accelerating investments in wind-farm and aqua-farm activity by 1, 2 or 3 years is likely to generate between € 60 million and over € 600 million in 2020. In 2030, the effects of Maritime Spatial Planning range from more than € 400 million to € 1.8 billion due to the reduction of transaction costs and from € 155 million to € 1.6 billion due to the acceleration of activities such as wind energy and aquafarming. These results should be interpreted with care as they are based on a number of assumptions.

To conclude, Maritime Spatial Planning can have a significant and substantial positive economic effect on Europe's maritime economy. Since the methods used in this study are generic and limited to a macro scale, effects on a regional or project scale have not been taken into account. Hence, the values presented should be interpreted as the minimum effect Maritime Spatial Planning will have. Maritime Spatial Planning should therefore be seen as one of the steps forward to improving the competitive position of European Member States.

I. INTRODUCTION: WHAT IS MARITIME SPATIAL PLANNING?

I.1. MARITIME ACTIVITIES AND MARITIME POLICY IN THE EUROPEAN UNION

The European continent borders five sea areas[2] with large and vital maritime economies making a significant economic impact on Europe's coastal and inland communities. The scope of the maritime economy is diverse, as can be seen in *Table 1*.

Table 1: Maritime activities currently taking place in the European sea areas

MARITIME ACTIVITIES	
Dumping zones	Dumping of dredged materials
Fisheries	Fisheries and aquaculture
Marine aggregates	Sand and gravel extraction, sand and gravel transport
Maritime services	Research and development, classification and inspection, bunkering, ship supply
Maritime works	Dredging and ship wreck dismantling
Nautical cables and pipelines	Oil and gas transportation, telecom
Navy and coastguard	Defense and rescue
Offshore activities	Oil and gas exploration and production, seismic research, carbon capture and storage (CCS)
Offshore supply	Construction of platforms, offshore-related transport
Recreational boating	Leisure navigation, boat chartering and renting, marinas
Renewable energy	Wind, waves and tide
Seaports	Shipping related storage, port development
Shipping	Merchant shipping, short-sea shipping, ferry services, ocean towage
Tourism at sea	Diving, sailing, recreational fishing, cruise tourism
ENVIRONMENTAL AND CULTURAL ASPECTS	
Coastal protection	Construction of dykes, beach nourishment, dune rehabilitation, protection against climate change
Marine protected areas	Areas for the sustainable use of marine resources and for the conservation of biodiversity
Quality of Life	Preservation of cultural heritage, environment protection

Source: Policy Research Corporation

[2] Baltic Sea, North Sea, North-East Atlantic, Mediterranean Sea and Black Sea.

In the past decades, maritime activities have grown substantially (shipping, tourism, etc), but human activities come with a price. The environmental quality of the sea areas and marine biodiversity are under substantial pressure around the continent. Not surprisingly, different measures have been taken to conserve the marine natural heritage of the European Union. One of these measures is the designation of marine protected areas[3]. A marine protected area is a geographically defined area, which is designated or regulated and managed to achieve specific conservation objectives. Marine Protected Areas cover many different types of protection. Some are "no-take zones" that are essential to enable fish stocks to recover while others allow multiple use of their resources. Besides environmental concerns, rising sea levels impose threats to the European continent. Hence, increased emphasis has been put on coastal protection.

With increasing activities and new activities in Europe's maritime arena on the one hand and increased environmental conservation and coastal protection on the other, competition for marine space is likely to occur. Finding a balance between economic value and environmental quality in Europe's sea areas has traditionally been a challenge for governments around the continent. Hence, on a national basis, governments have developed environmental and economic policies. On a sea basin level, international organisations have been established to address and combat the impact of environmental deterioration. Examples of these organisations are the Helsinki Commission[4] (HELCOM) for the Baltic Sea and OSPAR for the North Sea and North-East Atlantic Ocean[5]. On a European level, the European Commission is concerned with providing the Member States relevant guidance and instruments for managing their sea areas in order to protect the common good of the European Union, on both economic and environmental aspects. For this purpose, the European Commission has taken several actions, of which five are described below:

- The **EU Water Framework Directive**[6] covers all European waters including coastal waters. All EU member states should develop management plans to achieve good ecological status by 2021;
- In 2006 the European Commission published the **green paper** on the future maritime policy. The green paper identified the gaps between sea-related sectoral policy areas and attempted to adopt best practices and learn from obstacles and challenges[7];
- Based on the green paper, the **Integrated Maritime Policy** was launched in 2007. The Integrated Maritime Policy aims to incorporate interactions and synergies between different maritime-related policies to avoid conflicts. It encompasses all aspects of the oceans and seas

[3] Any area of intertidal or sub-tidal terrain, together with its overlying water and associated flora, fauna, historical and cultural features, which has been reserved by law or other effective means to protect part or all of the enclosed environment (Kelleher, 1999).

[4] www.helcom.fi, established 1974.

[5] www.ospar.org, established in 1992 unifying Oslo Convention against dumping (1972) and Paris Convention (1974).

[6] European Commission (2000), *Water Framework Directive*, 2000/60/EC.

[7] European Commission (2006), *Towards a future Maritime Policy for the Union: A European Vision for the Oceans and Seas*, COM (2006) 275 final.

in a holistic, integrated approach and has been endorsed by all stakeholders. Maritime Spatial Planning and Integrated Coastal Zone Management are tools put forward for integrated policy making. Spatial planning is seen as a potential aid in overcoming potential conflicts as a result of the increase in often competing coastal and sea activities. Specific actions taken in this regard are the Roadmap for Maritime Spatial Planning, the establishment of a system for exchange of best practices and the examination of options needed to make the uses of different maritime activities more compatible[8];

- The environmental aspects of the Integrated Maritime Policy were further developed into the EU **Marine Strategy Framework Directive**[9] which was adopted in 2008. This Directive instructs Member States to give priority to achieving or maintaining good environmental status by 2020 by applying an ecosystem approach to the management of human activities and enabling a sustainable use of marine goods and services,
- Following the commitments within the Integrated Maritime Policy, the **Roadmap for Maritime Spatial Planning** was developed in 2008. The roadmap describes the concept and rationale of Maritime Spatial Planning and provides ten key principles based on the ecosystem approach for adequate Maritime Spatial Planning[10].

I.2. CONCEPTUALISING MARITIME SPATIAL PLANNING

Maritime Spatial Planning (hereafter MSP) is a tool for improved decision-making. It provides a framework for arbitrating between competing human activities and managing their impact on the marine environment in the marine zones around European Union Member States[11], with the ecosystem approach as an overarching principle. The objective of MSP is to balance sectoral interests, achieve sustainable use of marine resources in line with the EU Sustainable Development Strategy and to maintain good environmental status according to the Marine Strategy Framework Directive.

Ecosystem approach *(source: Secretariat of the convention on biological diversity)*
The ecosystem approach is a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way. An ecosystem approach is based on the application of appropriate scientific methodologies focused on levels of biological organisation which encompass the essential processes, functions and interactions among organisms and their environment. It recognises that humans, with their cultural diversity, are an integral component of ecosystems. To recapitulate, the ecosystem approach states that humans:

- Are a part of the world's ecosystem;
- AND should be aware of their impact on the ecosystem;
- AND should not exploit the ecosystem to a level it is not able to sustain.

8 European Commission (2007), *An Integrated Maritime Policy for the European Union*, COM (2007) 575 final and SEC (2007) 1278.
9 European Commission (2008), *Marine Strategy Framework Directive*, 2008/56/EC.
10 European Commission (2008), *Roadmap for Maritime Spatial Planning: Achieving Common Principles in the EU*, COM (2008) 791 final.
11 The coastal zones are not included in MSP, but in Integrated Coastal Zone Management.

MSP can contribute to the objectives of the ecosystem approach by improving the knowledge base of human impact on the ecosystem, as well as enhancing the appropriate mix of activities to enable a sustainable ecosystem in the long term. An example of MSP actions in this regard is the designation of marine protected areas for birds, fish or other habitats while taking into account the interests of the fishing industry.

a/ Key principles of MSP

Simply saying that MSP is equal to planning or zoning does not suffice. MSP is the concept of integrated decision making and managing uses of maritime space. Planning will always exist in the case of human activity (e.g. location plans exist for wind farms, shipping lanes are regulated in busy areas like the English Channel, etc).

Hence, MSP is a collection of actions leading to (among other things) the designation of zones for certain activities with the objective of creating the preconditions for human activity. In order to do so sensibly, data and knowledge are needed on a wide scope, for example the geological properties of the area involved, the environmental impact of an activity in such an area and the existence and intensity of other activities in the same area. But Europe's maritime regions are very different from one another, i.e. in terms of geological richness, knowledge base, economic development, environmental status, cultural elements etc. Due to these large differences, a single way of organising MSP would not suffice.

This is why the European Commission created a Roadmap on Maritime Spatial Planning. In this roadmap, the Commission provides ten instruments (key principles[12]) that can be used to organise MSP in a proper manner.

The key principles are[13]:

1. *Use MSP according to area and type of activity*: this principle emphasises that a detailed maritime spatial plan may not be necessary for an entire sea area but only in densely used or vulnerable areas. Furthermore, it implies that adequate MSP should incorporate three dimensions: (1) the sea bed, (2) the water column and (3) the surface;
2. *Define objectives to guide MSP*: this principle prescribes that MSP should be based on a clear strategy with detailed objectives, which should allow arbitration in case of conflicting interests;
3. *Develop MSP in a transparent manner*: in order to create acceptance, the steps followed in developing MSP should be easily understandable to all stakeholders involved;

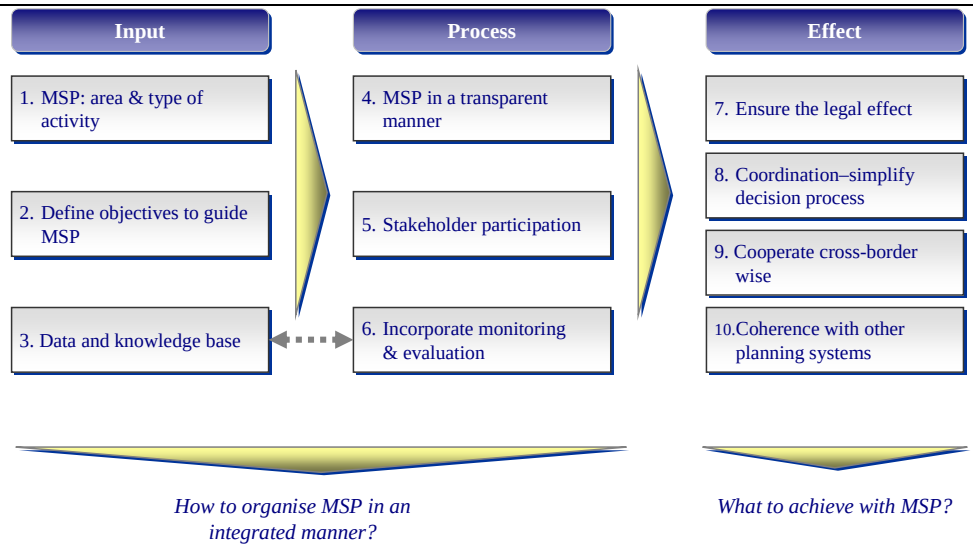
[12] The overall principle is the application of the ecosystem approach.

[13] European Commission (2008), *Roadmap for Maritime Spatial Planning: Achieving Common Principles in the EU*, COM (2008) 791 final.

4. *Encourage stakeholder participation*: the quality and acceptance of the maritime spatial plan largely determine its successful adoption. It is therefore essential to encourage stakeholders to participate in the process of Maritime Spatial Planning;
5. *Coordinate within Member States — simplify decision processes:* coordination mechanisms within a Member State can be significant obstacles for maritime activities and/or environmental programmes. MSP aims to integrate and subsequently simplify and speed up procedures;
6. *Ensure the legal effect of national MSP*: MSP should be legally binding if it is to be effective;
7. *Implement cross-border cooperation and consultation*: maritime activities take place across borders of Member States' sea areas. Hence, Member States should ensure coherence in their plans across ecosystems;
8. *Incorporate monitoring and evaluation in the planning process*: knowledge building and flexibility are crucial elements of every plan to prevent excessive rigidity. This principle therefore emphasises the need to incorporate monitoring and evaluation in the planning process;
9. *Achieve coherence between terrestrial and maritime spatial planning — relation with ICZM:* Successful MSP should be aligned with other planning mechanisms in order to prevent incompatibilities and/or discrepancies.
10. *Create a strong data and knowledge base*: a sound knowledge base is crucial for every plan to succeed. So this final principle underlines the need to obtain a comprehensive understanding of both the necessity and expected impact of MSP.

A detailed analysis of the key principles of MSP reveals basic differences between the characteristics of the ten principles. Three types of principles can be distinguished: (1) input, (2) process and (3) effect principles. On the input side, three principles need to be incorporated: (a) MSP according to area and type, (b) defining objectives and (c) data & knowledge. These three principles largely determine the scope of MSP, i.e. knowing what to achieve with MSP in which area. The second type of principles, the 'process principles' are dedicated to organising MSP in such a way that its objectives can be reached. The third type of principles, the 'effect principles', help define the objectives to be realised via MSP and are: (a) simplified decision process, (b) establishment of a legal framework, (c) cross-border cooperation and (d) coherence with other planning systems.

Figure 1: Cause and effect diagram of applying the key principles of MSP



Source: Policy Research Corporation

a/ Legal framework

A proper legal framework is a critical objective of MSP. Legal rights provide clarity to all actors involved. In the case of MSP, a proper legal framework provides clarity regarding maritime activities on location and what activities are permitted.

b/ Coordination

An efficient coordination mechanism is crucial for economies to be viable and adaptable. In the case of MSP, the coordination mechanism is the chain of administrative events/procedures needed for making decisions about (i.e. granting permits) maritime activities. A coordination system can paralyse economic activity if its processes are not in harmony, leading to lengthy procedures, faulty decisions and/or high administrative costs. An efficient coordination system is one in which the chain of events is managed via a single data source and commonly agreed objectives.
A prerequisite for an efficient coordination system is a proper legal framework.

c/ Coherence with ICZM

To be effective, MSP should be in line with integrated coastal zone management (ICZM). Prerequisites for coherence with ICZM are an efficient coordination system, a transparent MSP process and stakeholder consultation.

d/ Cross border cooperation

Optimal MSP is based on marine areas and not on country-specific sea areas. Since Europe's marine areas are crossed by multiple Member State borders, MSP should be developed cross-border-wise.

The common elements in these four effect principles provide the answer to the question "what to achieve with MSP", namely **integration** of administrations and policies with the objective of creating

a simplified decision making process, coherence with other planning systems and cross-border cooperation on both environmental and economic issues. Finding this balance and creating a holistic view on 'economic versus environment considerations' leads to **predictability** and **certainty**. From an economic perspective, these elements are extremely valuable.

II. THE EFFECTS OF MARITIME SPATIAL PLANNING

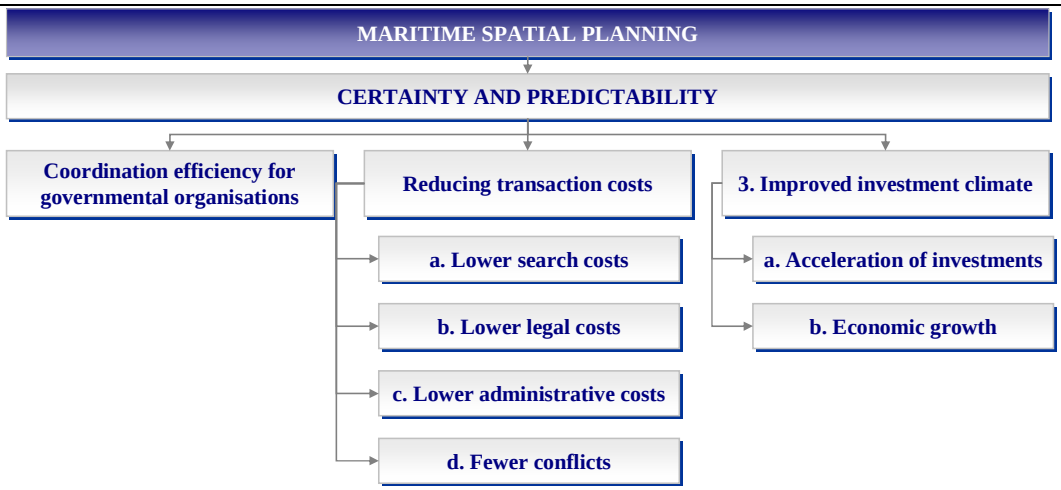
So far, it has been shown that MSP can be beneficial from both an environmental and economic perspective. But what exactly are the economic effects of MSP, as referred to at the end of the previous chapter? According to the Roadmap on Maritime Spatial Planning[14], the effects are to be found in reduced costs associated with non-coordination due to integrated (i.e. less fragmented) policy making and cross-border cooperation. For the internal market, MSP provides a basis for simplified permit systems, thus reducing the costs for regulatory and administrative procedures and creating a transparent and reliable planning framework. This chapter aims to describe the concrete effects of MSP.

II.1. DIRECT ECONOMIC EFFECTS

Integrating governmental procedures and enhancing predictability and certainty will lead to economic effects for maritime activities and EU governments. This paragraph aims to link concrete economic variables to the concept of predictability and certainty. A distinction needs to be made between direct and indirect effects. *Figure 2* displays the direct effects resulting from enhancing certainty and predictability.

[14] European Commission (2008), *Roadmap for Maritime Spatial Planning: Achieving Common Principles in the EU*, COM (2008) 791 final.

Figure 2: Direct economic effects of certainty and predictability



Source: Policy Research Corporation

An overview of the different variables behind the drivers of certainty and predictability is visualised in *Figure 2* and will be qualified in *Chapter IV Results*. Each effect is explained further below.

a/ Coordination efficiency for governmental organisations

MSP aims to lower the costs of non-coordination, mainly because it can enhance coordination systems by **integrating** and **aligning** governmental procedures. A clear example of increased coordination efficiency is the one-stop-shop model. A one-stop-model can, if set up and governed properly, integrate procedures into a single processing desk so that maritime activities have single-desk access for obtaining information, applying for permits and subsidies etc.

Integration and alignment are likely to lead to shorter procedures[15] and subsequently to lower administrative, employment and overhead costs *per procedure* or *activity* for the governmental bodies working in the maritime field. This effect can be attributed to proper application of the MSP principles. However, governments should be aware that, at least in the first phase of setting up and implementing MSP, this process can involve costs, for example for setting up a one-stop-shop for permits.

b/ Reducing transaction costs for activities in the maritime arena

The application of the key principles is beneficial for maritime activities, as significant clarity and **certainty** are likely to cause a decrease in transaction costs for activities in the marine areas of Europe. Transaction costs are "costs of arranging a contract ex-ante and monitoring a contract ex-post … or more generally, the costs of running the economic system." Transaction costs can be classified

in terms of information, negotiation, and monitoring & enforcement costs[16]. Transaction costs for maritime activities can be identified in four dimensions. The first dimension concerns *search costs*. Search costs are the costs to be made by a business to search for the right business process input elements (i.e. location, human capital, etc). As was shown in the previous chapter, adequate application of the key principles is likely to establish a common knowledge base in which the following information is included:

- Detailed properties of relevant[17] sea areas (*geological characteristics like depth, current, wind direction, availability of natural resources, etc.*);
- The characteristics of the current maritime activities in the sea area (*number of activities, intensity of activities, etc.*);
- Knowledge of any planned activities in the area (*establishment of tidal-, wave-, wind energy-turbines, artificial islands, etc.)*;
- The environmental impact of current and planned activities in the sea area *(emissions, noise, vibrations, etc.)*.

By centralising these data in a knowledge base, significant savings can be made on search costs for a maritime activity. In the text box below, the impact on search costs of centralising data is illustrated with an example[18].

GERMANY AND THE NETHERLANDS, REDUCING SEARCH COSTS FOR OFFSHORE WIND ENERGY ACTIVITIES

In Germany, it takes between two to three years to get a permit for installing an offshore wind farm. However, before a company can file for a permit, it has to examine the soil of a certain location, the wind speed, the depth, etc. The costs of such a study could amount to 5 million. In contrast, in The Netherlands, all this information is publicly available and these costs do not have to be made. The fact that this information is publically available implies that no two companies will have to make the same research costs and that scale advantages could appear if the government collects all this information.

To overcome these search costs, the German government is working on a database with all these data. However, setting up such a database comes with a cost. The past three to four years, one person has worked full-time on setting up this database.

The second dimension of transaction costs concerns *legal costs*. Legal costs are the costs with regard to ascertaining that the actions of a business are legitimate as well as setting up and enforcing compliance with regard to agreements (e.g. contracts). Since MSP aims to establish legal clarity and certainty, it is expected that legal costs will decrease accordingly. In the textbox below, a type of legal costs is further explained.

15 See examples of wind energy 'one-stop-shop' in countries like Denmark and the Netherlands.
16 Hubbard, 1997.
17 In conformity with the first key principle of the *Roadmap towards Maritime Spatial Planning*, relevant areas need to be defined which are eligible to the application of MSP.
18 As setting up a strong data and knowledge base is one of the key principles of MSP, it is assumed that the benefits of collecting data are attributable to MSP.

LEGAL COSTS: CONTRACTS AND CONTROLLING COMPLIANCE
A strong legal framework, accompanied with governance and appropriate sanctions is beneficial for economic activity. If a legal framework is not strong compliance is likely to be low. Hence, companies will need to spend more on legal assistance and devote time to combat opportunism of parties breaching agreements.

The third dimension concerns *administrative costs*. Administrative costs are the costs for permits, licenses and certification. Because of more efficient and integrated procedures (see previous paragraph), it is likely that application and approval processes will be better aligned. Hence, lower administrative procedural time is likely to result in lower administrative costs. An example is shown in the box below.

ADMINISTRATIVE COSTS: COSTS OF PERMITS
Aqua farms require permits from different authorities (e.g. location permits, environmental permits, operating licenses, etc). If one has to file for a permit at different authorities, this will lead to significant administrative costs, possible contrary decisions, delay, and so forth.

The fourth dimension of transaction costs encompasses the costs associated with conflicts between maritime activities. One of the key objectives of MSP is to facilitate sustainable economic growth. Planning enables a government to *a priori* incorporate the interests of stakeholders to prevent conflicts between activities in maritime areas. A conflict is defined as a situation in which two or more maritime activities are incompatible and compete for the right to exist in a certain location. Maritime activities such as offshore wind farms, wave & tidal energy installations and sand & gravel extraction may compete for the same *shallow* areas. Furthermore, activities may conflict due to the impact one activity has on the other. An example would be an aqua farm which may cause environmental deterioration of a marine protected area within its proximity. The same applies for sand extraction activities which may have an impact on fisheries. The majority of maritime activities can co-exist with other activities[19]. To illustrate the scope of conflicts between maritime activities, a conflict matrix is shown in *Table 2* on the next page.

[19] Source: stakeholder consultation in country visits, online questionnaire and feedback by e-mail and phone.

Table 2: Conflict matrix for maritime activities[20]

No conflict	Incidental conflict, activities can co-exist (○)	Considerable conflict, co-existence may lead to costs (-)	Strong conflict, co-existence is implausible (x)

	Shipping	Cruise tourism	Dredging	Oil & gas	CCS	Offshore wind	Wave & tidal	Fishing	Aqua-culture	Marine tourism
Shipping										
Cruise tourism										
Dredging	○	○								
Oil & gas	○	○								
CCS	○	○	○							
Offshore wind	-	-	○	-	-					
Wave & tidal	-	-	-	-	x	○ (?)				
Fishing			-	○	-	x	x			
Aqua-culture	-	-	-	x	-	?	x	x		
Marine tourism				x		-	x	○	○	

(?) potential synergies apply

Source: Policy Research Corporation based on multiple sources[21]

Conflicts lead to costs. These costs can range from the loss/decrease of economic activity (i.e. opportunity costs[22]) to increased operational costs for maritime activities. Increased operational costs can be of a diverse nature. The following actual example[23] is used to illustrate this.

EXAMPLE OF A CONFLICT BETWEEN A FERRY AND OFFSHORE WIND FARMS

In the Irish Sea a ferry runs a service between Liverpool and the Isle of Man several times a day. However, due to the construction of an offshore wind farm on the route of the ferry, it has to divert. This brings along costs. Not only does the ferry have to take a longer route, which is reflected in the amount of fuel needed. It will also take longer to make the trip between Liverpool and the Isle of Man, increasing personnel hours and costs

[20] Although military use is an important maritime activity, it is not included in this study as it is not an economic activity.

[21] Cieslak Andrzej et al. (2009), *Compendium on Maritime Spatial Planning Systems in the Baltic Sea Region Countries*; UNESCO (2009), *Maritime Spatial Planning: A Step-by-Step Approach toward ecosystem-based Management;* expert interviews, survey and conference calls.

[22] Opportunity costs are: the costs of an alternative that must be forgone in order to pursue a certain action, or put differently, the benefits you could have received by taking an alternative action.

[23] British Chamber of Shipping.

c/ Improved investment climate

Economists[24] commonly agree on the positive relationship between the degree of certainty and the investment climate of a country. To what extent certainty contributes to a country's economy is dependent on many variables. The application of the MSP principles is likely to enhance **certainty** and **predictability** for maritime activities, which may lead to two effects:

- Acceleration of economic activity;
- Economic growth.

Acceleration of economic activity

For economic activities requiring permits, location or governmental approval/licensing, MSP can be of significant value. Optimised procedures, increased legal certainty and subsequent lower transaction costs may motivate investors to accelerate their investments. As was mentioned in previous paragraphs, the potential for acceleration applies to those activities that are currently limited in their expansion, like the aquaculture and renewable energy industries. For these industries, target objectives have been set, but significant information, legal and administrative obstacles may slow down investments in these activities[25]. In the case of renewable energy, MSP may add significant value, as locations for wind energy are currently being designated. This will to a large extent determine where these activities can take place (hence decreasing search costs). If the key principles of MSP (i.e. properly set objectives, simplified decision procedures, and ensured legal effect) together with the criteria for good environmental status set out in the Marine Strategy Framework Directive are properly incorporated, it may also accelerate the investments in renewable energy. This, together with the political momentum to invest in renewable energy to obtain a cleaner future energy mix, is likely to lead to acceleration of these activities. To illustrate how MSP may lead to the acceleration of activity, a current and relevant example in Germany is shown in the textbox below.

GERMANY, THE CASE FOR ACCELERATING INVESTMENTS IN WIND ENERGY

Germany has two maritime spatial plans, one for the North Sea and one for the Baltic Sea, that have been legally binding since the end of 2009. Within these maritime spatial plans, zones for offshore wind farms have been designated. Although there is no single permitting administration in place, licensing procedures are now quicker as a result of the Maritime Spatial Plan, as thorough discussion has already taken place between the different responsible authorities on why certain zones are suitable for offshore wind farms and why certain areas are not. In practice this means that the licensing process will be shortened by approx. one year. Before the plans were implemented, it could take three to four years to receive all permits needed to build an offshore wind farm, whereas with the implementation of the new maritime spatial plan, it will probably only take two to three years.

Economic growth

In addition, MSP can be of value if its effects lead to new investments that would otherwise not be done. To make an assessment of the economic growth potential due to MSP, insight needs to be

[24] Kochendörfer-Lucius, G. & Pleskovič, B. (2005), *Investment climate, growth, and poverty*, Volume 2003.
United Nations Economic Commission for Europe (2004), *Review of the implementation of OSCE commitments in the economic and environmental dimension. Investment climate: a UNECE report.*

acquired on vital and sustainable[26] economic activities currently being blocked due to the lack of predictability and certainty. A clear example of this is the development of offshore aquaculture in Ireland, which is shown in the textbox below.

IRELAND, MORE INVESTMENT IN THE AQUACULTURE INDUSTRY

Aquaculture in Ireland is a substantial maritime activity and is estimated to contribute 66 million value added in 2010 or 4.72% of the total maritime value added in Ireland. However, according to experts, the aquaculture industry has stalled the past years due to a lack of: integrated knowledge, national integrated objectives, stakeholder participation, transparency, an easy decision process and ensured legal effect (six of the ten key principles).

To overcome these difficulties, the Irish Sea Fisheries Board has installed the C.L.A.M.S. project. The Co-ordinated Local Aquaculture Management System (C.L.A.M.S.) process is a nationwide initiative to manage the development of aquaculture throughout Ireland at a local level. The projects are very similar to local MSP initiatives for aquaculture. However, even with the installation of this C.L.A.M.S project, the industry keeps being stalled and investments are lost due to a lack of a holistic approach towards maritime activities.

This example shows that proper application of the key principles may therefore bring about significant benefits.

Economic effects of optimal locations

Another effect of MSP, commonly referred to in discussions on MSP, is the economic benefit of finding optimal locations for maritime activities (for example low depth locations for wind farms). In the study at hand, this is not considered to be an additional economic benefit of MSP. It is assumed that, as a result of planning (i.e. applying the key principles), all activities can take place at the optimal location. If this were not the case, MSP would be suboptimal and the effects attributed to MSP in this report (or parts of the effects) would be eliminated.

II.2. INDIRECT ECONOMIC EFFECTS OF MARITIME SPATIAL PLANNING

Combining activities

A subject which is commonly referred to in discussions on MSP is the option of combining activities in the maritime arena. One example is the combination of wind farms with aquaculture. The foundations of wind farms, experts argue, are ideal structural objects to combine with aqua farming (e.g. farming mussels or shellfish, and also provide deep water cage anchorage possibilities). Combining economic activities may be economically beneficial if it is both environmentally sustainable and economically profitable. But should benefits in this regard be attributed to MSP? After all, the application of the key principles will not create this type of activity. However, MSP may enhance this market driven combination and accelerate it or drive economic growth. In effect, the

[25] Expert interviews.

[26] The concepts of '*vital*' and '*sustainable*' have been added to explicitly refer to concepts that are both economically and socially viable and acceptable.

benefit of finding optimal locations is already incorporated under the denominators "acceleration" and "economic growth".

II.3. OTHER NON-ECONOMIC EFFECTS

MSP aims to create sustainable growth with the ecosystem approach as the overall principle. This means that humans should not have more impact on the ecosystems than it can cope with or recover from. The ecosystem approach will create substantial environmental benefits (like sustainable fishing activities, higher biodiversity, etc.). An example of the environmental benefits that MSP could bring is illustrated in the box below.

EFFECTS OF MSP ON MARINE ECO-TOURISM

Maritime Spatial Planning could have important environmental benefits since MSP applies the eco-system approach as its overarching principle and balances between economic benefits and environmental benefits. In this respect, when implementing MSP, the environmental benefits will also be taken into account when assigning certain areas to well-defined activities. As a result, important environmental areas can be safeguarded and chances of economic activities negatively influencing important environmental sites are strongly reduced.

Beside the positive impact of MSP on the environment through safeguarding important environmental areas, there is also an economic impact i.e. the positive impact on eco-tourism, which is a growing market. However, if marine areas were to be destroyed or heavily damaged by economic activities, this form of tourism will subsequently suffer. If MSP can safeguard the environmentally most important areas, a basic requirement is fulfilled for the sustainable development of eco-tourism.

Although the positive impact of MSP on the environment could be significant, this is left outside the scope of this study.

II.4. SUMMARY OF THE BENEFITS OF MARITIME SPATIAL PLANNING

This chapter explained what kinds of economic effects can result from MSP. Three dimensions of benefits were identified:

- Coordination efficiency and effectiveness for governments;
- Lower costs for companies;
- Enhanced investment climate.

For each dimension a number of concrete benefits were listed, seven in total. In the following chapter the methodology used to calculate these benefits is explained.

III. METHODOLOGICAL APPROACH TO DEMONSTRATING THE ECONOMIC EFFECTS OF MARITIME SPATIAL PLANNING

The first two chapters of this report identified the implications of MSP in three economic dimensions (1) coordination efficiency for governments, (2) lower transaction costs for businesses operating in the maritime areas of Europe and (3) economic effects for society due to an enhanced investment climate. The assessment so far has been of a qualitative nature, i.e. the identification of the benefits as well as the extent to which these benefits can be attributed to MSP. This chapter is dedicated to delivering a methodological approach that ultimately enables the demonstration of the monetary impact MSP has. First the methodological restrictions are elaborated on. In the second and third paragraphs, a methodological approach is suggested and elaborated on.

III.1. METHODOLOGICAL RESTRICTIONS WHEN QUANTIFYING THE BENEFITS OF MSP

Measuring the economic effects of a concept like MSP can not be done without making assumptions on a number of situations in which multiple parameters can play a role. Examples of such parameters are: autonomous (ceteris paribus) growth and/or decline of industries, technological changes, societal changes and environmental issues. Making 'hard' valid and reliable calculations of the economic effects associated with MSP is a challenging task, if not an impossible one. The following restrictions need to be incorporated into making a methodological framework:

Differences between Member States of the European Union

Europe has 22 Member States with a coastline. There is a significant difference between these Member States in the level to which MSP principles have been developed and/or implemented. Furthermore, it is impractical to attach a non-arbitrary scale on each Member State, i.e. the level to which it has adopted the key principles. Some key principles can be partly implemented or may prove to be unfeasible (like cross border cooperation in some parts of the Mediterranean). This affects the study integrally as it is virtually impossible to set a non arbitrary baseline for the study. A baseline is the situation that is used to compare a study focal point with, for example, 'the absence of MSP', compared to 'ultimate MSP'.

Differences between sea areas

Europe has five sea areas that are very different from both a geological and geographic perspective. The North and Baltic Sea, for example, are relatively shallow, while the Black Sea and the Atlantic Ocean are very deep seas. This is of great relevance for a tool like MSP, since shallow water proves to be more valuable than deeper water due to its economic possibilities, e.g. the installation of wind turbines. The shallowness of the water is just one example of the many differences that exist between the sea areas. Others are: geological/mineral richness, currents, tides, wind abundance, biodiversity and many more. Hence, each sea area requires an interactive simulation model to calculate the impact between these regional variables. Such models will take years to develop and validate.

Differences between maritime activities

Maritime companies around Europe are different in cultural and governance aspects. Furthermore, cost structures will be different due to different labour & social laws, tax regimes and so forth. Accordingly, the impact of MSP (in terms of transaction costs) will be different per activity.

Next to these generic restrictions, restrictions apply for the individual effects found in the previous chapters.

III.1.1. COORDINATION EFFICIENCY

In *Paragraph II.1.a/* it was explained that the application of MSP can impact the costs of coordination in a European Member State. These costs can be reduced by improving coordination systems and procedures through **integration** within governmental organisations. Lower administrative, employment and overhead costs *per procedure* or *activity* can then result. On the other hand, additional costs can result from setting up a monitoring, coordination and control system, thereby introducing costs via MSP instead of benefits. It is therefore impossible to determine the exact degree to which coordination costs can be impacted by MSP without further study.

III.1.2. REDUCING TRANSACTION COSTS

In the previous chapter, it was explained that MSP can reduce the cost base of maritime activities in terms of search costs, legal costs, administrative costs and costs of conflict.

a/ Search, legal and administrative costs

Search, legal and administrative costs do not equally apply for all maritime activities. For example, shipping is hardly impacted by the application of the key principles of MSP, as ships do not require specific permits or need to search for shipping lanes (shipping lanes are already known, as well as nautical navigation maps). One industry which is heavily impacted by search, legal and administrative costs is the renewable energy industry. This industry needs to: (1) apply for permits, (2) search for suitable areas and (3) negotiate and accompany contracts with energy suppliers.

In *Table 3* an overview is provided of the expected effects of MSP on search, legal and administrative costs per maritime industry. Search, legal and administrative costs can add up to significant costs for maritime businesses, especially if multiple governmental bodies are involved. The problem in quantifying these costs is their high variability per Member State, maritime activity, maritime area involved and size of the activity.

Table 3: Effects to be expected from applying the key MSP principles on search, legal & administrative costs

	Administrative costs	Search costs	Legal costs
Shipping			
Commercial fishing	√		√
Recreational fishing			
Aquaculture	√	√	√
Offshore wind energy	√	√	√
Wave energy	√	√	√
Tidal energy	√	√	√
Oil and gas exploration	√	√	√
CCS	√		√
Sand and gravel extraction	√	√	
Dredging	√		
Marine tourism			
Cables and pipelines	√		

√ = *applies to this activity*

Source: Policy Research Corporation based on multiple sources[27]

As mentioned in the introduction to this paragraph, there are substantial difficulties in making valid assumptions and reliable estimations of the overall impact by MSP on these costs. An analysis of the exact impact MSP has on these costs needs to be done on a case by case basis.

b/ Fewer conflicts

One of the main drivers behind developing MSP is allowing maritime activities to take place simultaneously, i.e. without creating conflicts. A conflict in this regard is considered to be a situation in which two or more maritime activities are based on methods or objectives that are incompatible either in terms of space or time.

The value of MSP is determined by the level to which conflicts can be prevented. Currently (2010), the level of conflicts between activities is small. Only a few examples are known of existing conflicts which lead to actual costs (see the ferry and wind farm example in the Irish Sea in *Paragraph II.1.b/).* But growth of maritime activities, increasing pressure on the environment and an increasing claim for maritime space by new players (for instance wind farms and aquaculture) may impose competition

[27] Maes et al. (2005), *A flood of space. Towards a Spatial Structure Plan for the Sustainable Management of the North Sea* and expert interviews.

issues in the future. Calculating the exact value of conflict pevention would require a crystal ball and would only be reliable and valid if conducted *ex post*.

III.1.3. ENHANCED INVESTMENT CLIMATE

The third and final dimension of economic effects caused by MSP is enhancing a country's maritime investment climate. Two types of benefits were listed in the previous chapter, i.e. (1) economic growth and (2) accelerating economic activity.

a/ Economic growth

The concept of economic growth implies that economic activity can be enhanced if the four effects of MSP are realised. *Policy Research* asked stakeholders to identify industries that could profit from a proper application of the MSP principles. Based on these interviews[28], confirmed by the survey[29] results, the most relevant case can be made for aquaculture. As the demand for fish products continues to rise and fish stocks and the fishing fleet around the continent continue to be under pressure, aquaculture is seen by experts as the industry that can profit most in this regard. However, due to the expected strong autonomous growth, an estimation of the additional growth the industry could realise due to MSP is difficult, especially if other market driven factors apply. Furthermore, due to the lack of data on how many investors are being withheld from making investments in aquaculture[30], no quantitative assessment of this benefit can be made.

b/ Accelerating economic activity

Proper application of the MSP principles is likely to lead to the acceleration of economic activity. As explained in *Paragraph III.2.1.2.c/* the value of money today is higher than the same amount next year. The same applies to economic activity; having € 100 of economic activity today is worth more than € 100 of economic activity next year. The value of accelerating the activity is therefore equal to the return on investment that could have been made if the money would have been re-invested. But it is difficult to determine the exact acceleration time industries can r due to the application of the MSP principles. For this purpose, an ex post case by case analysis is needed.

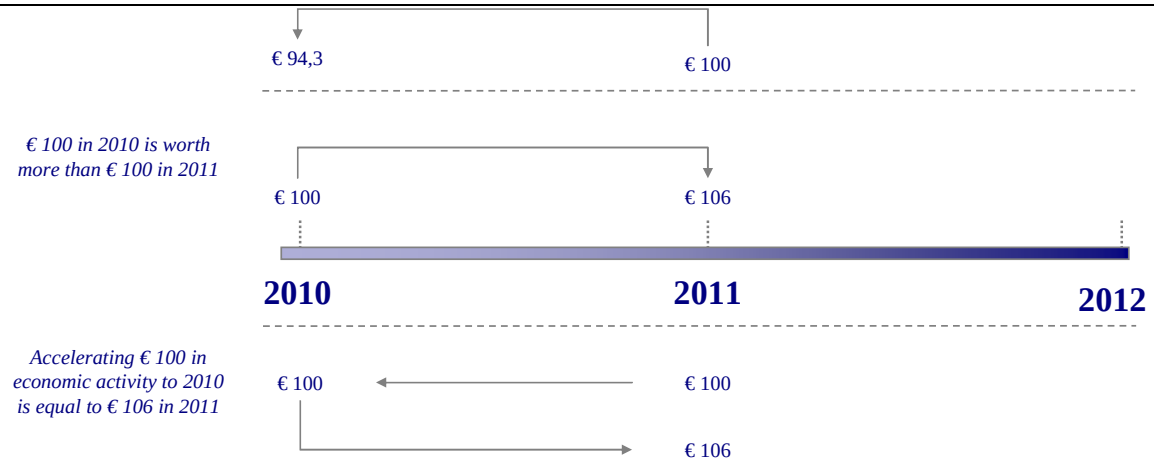
In *Figure 3*, the value of 'accelerating economic activity' is explained, using € 100 of economic activity (value added) as an example and an interest rate of 6%.

[28] Expert interviews in Belgium, Denmark, France, Germany, Greece, Ireland, Norway, Poland, Portugal, Spain, the Netherlands, the United Kingdom, conference calls and a survey send out to stakeholders in Bulgaria, Cyprus, Estonia, Finland, Latvia, Lithuania, Malta, Romania, Slovenia and Sweden.

[29] A survey was sent to 260 stakeholders within European Member States.

[30] No available data; experts were not able to give an indication.

Figure 3: Example of calculation methods for enhancing investment certainty



Source: Policy Research Corporation

In *Table 4* an overview of the methodological difficulties per MSP effect is displayed.

Table 4: Methodological difficulties when quantifying the effects of MSP

Effect of MSP	Methodological difficulties
Coordination efficiency	- Exact coordination costs to be attributed to the maritime economy are unknown (overlap with other coordination mechanisms) - Costs of setting up MSP are unknown
Transaction costs	- High variability of transaction costs per Member State, sea area, type of activity and even individual companies - Probability of conflict is dependent on a large number of variables, requiring ex post analysis to be valid and reliable
Enhanced investment climate	- Economic growth is dependent on many variables MSP can not influence - The level to which economic activity can be accelerated by MSP is dependent on a number of factors

Source: Policy Research Corporation based on multiple sources[31]

In summary, making valid predictions about the impact of MSP on the European Union requires a process of case by case analysis. Such a process requires years, a vast amount of resources, and will nevertheless rely upon exogenous factors that MSP can not influence. One of these exogenous factors is the development of the world economy, which is the main driver for the maritime economy.

Because of these considerable difficulties in the quantification of the economic effects of MSP, the following paragraphs are dedicated to providing a broad methodological approach instead of delivering a detailed methodological framework.

[31] Maes et al. (2005), *A flood of space. Towards a Spatial Structure Plan for the Sustainable Management of the North Sea* and expert interviews.

III.1.4. STUDY SCENARIOS AND BASELINE

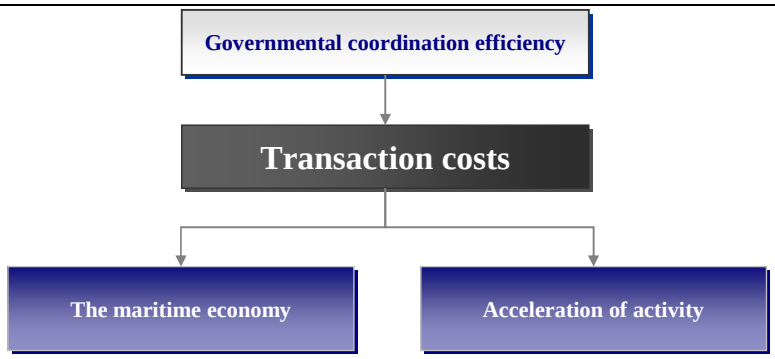
The previous paragraph highlighted the methodological difficulties of quantifying the effects of MSP. Therefore an alternative approach is suggested: scenario analysis. Scenario analysis is a suitable way of demonstrating **how** a certain factor (in this case MSP) can be of value **if** an additional factor (in this case Europe's maritime economy) develops in a certain way. Scenario analysis is a common tool used in economic studies to provide impact figures on future, hence difficult to quantify, effects.

The scenarios created show the impact of MSP is based on two variable building blocks:

- The level to which MSP impacts ***transaction costs***: Transaction costs in this regard encompass legal, search, administrative and opportunity costs (cost of conflict); see *Paragraph II.1* for a detailed explanation. Based on extensive scientific research that was conducted globally into transaction cost theory, it was found that transaction costs of a company can add up to significant share of a company's procurement costs[32].
- The level to which ***acceleration*** of activity can occur: Based on a stakeholder consultation[33] it was found that two industries are candidates for acceleration of planned investments - the renewable energy industry and aquaculture[34]. Investments for these industries have been planned (or objectives have been set) for 2020 and 2030.

In *Figure 4* the relationship between transaction costs and its impact on the acceleration of economic activity and economic growth is explained.

Figure 4: Transaction costs and the maritime economy



Source: Policy Research Corporation

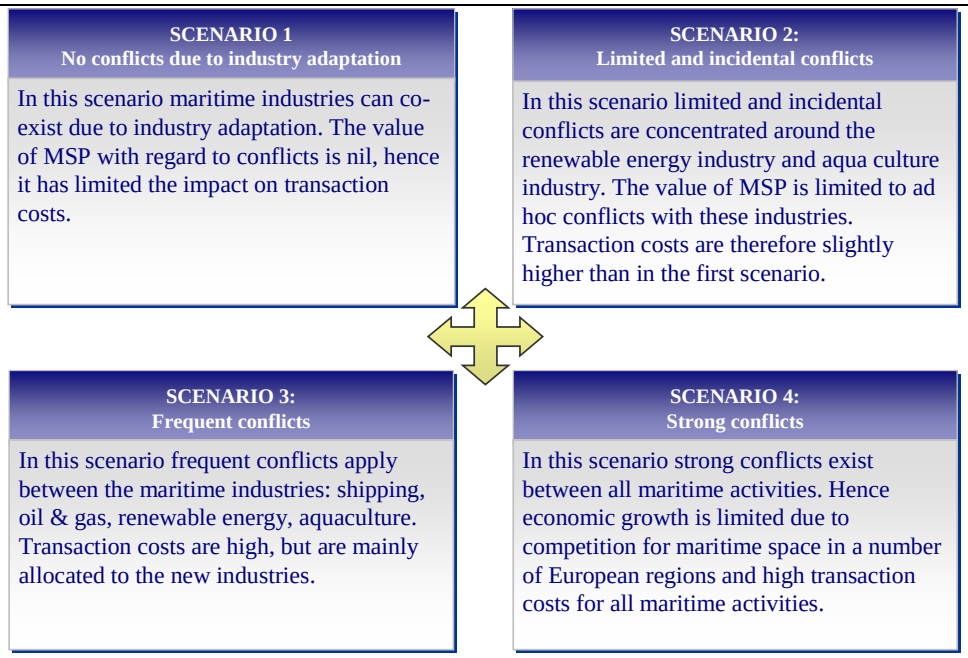
Due to governmental efficiency, i.e. integrated policies, and effectiveness, transaction costs can be reduced. Transaction costs are legal, search, administrative and opportunity costs (costs of conflict), as was explained in the previous chapter. Hence, reducing transaction costs is likely to enhance the

[32] Masten, Meehan & Snyder, (1991), *"The costs of Organisation"*, Journal of Law and Economics.
[33] A representative sample of stakeholders per Member State was interviewed.
[34] Source: stakeholder consultation, expert opinions and survey results.

maritime economy and accelerate economic activity. Transaction costs should therefore be seen as costs *directly* affecting the value added of maritime activities. After all, the loss of business due to high transaction costs leads to the loss of value added.

Now, four scenarios can be drawn, as displayed in *Figure 5*.

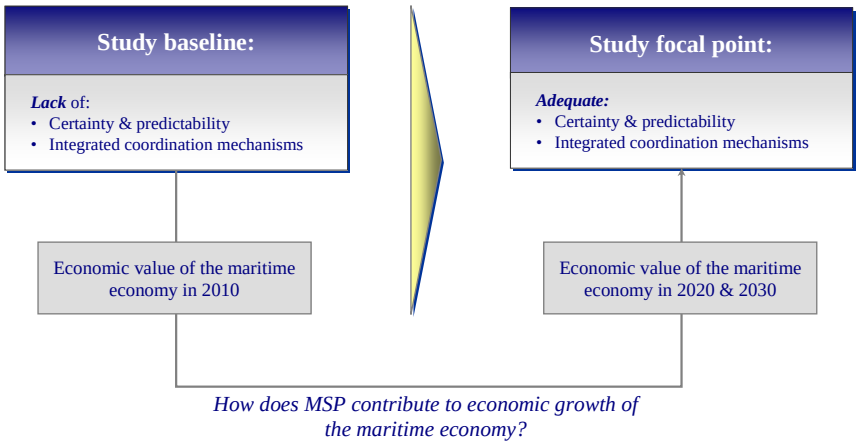
Figure 5: Scenarios for the development of the maritime economy



Source: Policy Research Corporation

The scenarios provide the baseline needed to calculate the effects of MSP, since they reflect a potential future situation if MSP is not developed in Europe. The baseline used for these scenarios is the situation in which there is a lack of certainty & predictability and lack of integrated coordination systems. In the first scenario, this leads to few difficulties with regard to conflicts; industries will adapt and can subsequently co-exist with no cost of conflict as a result. The value of MSP will be to enhance administrative procedures so economic activities can be developed faster. In the fourth scenario, substantial conflicts between all maritime activities exist. The value of MSP will be to organise marine space in such a way that all industries can co-exist, transaction costs (specifically cost of conflict) are reduced and acceleration of economic activity can take place.

Figure 6: Study baseline and focal point



Source: Policy Research Corporation

The values in these scenarios will be calculated using both 2020 and 2030 as a point in time. For this purpose the value of MSP will be measured in terms of its contribution to economic activity.

III.2. THE EFFECTS OF MSP ON ECONOMIC GROWTH OF THE MARITIME ECONOMY

The effects of MSP on the growth of the maritime economy will be demonstrated by (1) the level to which it impacts transaction costs and (2) the level to which it accelerates economic activity.

III.2.1.1. Transaction costs

Extensive research has been conducted on the subject of transaction costs in a broad range of industries and applications. Scientists commonly agree[35] on the existence of transaction costs but, due to the high variability and number of parameters, little hard evidence exists on the magnitude of transaction costs. Evidence[36] has been found that transaction costs can form up to 14% of a company's procurement costs, but this result can not be generalised to other industries and is outdated.

Nevertheless, transaction costs do exist. Therefore, the impact of this cost type will be illustrated by conducting a sensitivity analysis, showing its impact if MSP results in the decrease of only 1% in transaction costs for maritime activities. If it is assumed that transaction costs affect value added directly, reducing transaction costs prevents the loss of 1% value added. After all, transaction costs impact the cost base of business directly by preventing economic activity from taking place (opportunity costs) or by blocking autonomous growth. A 1% decrease in transaction costs is therefore plausible, especially for upcoming industries like the renewable energy industry and aqua farming.

[35] Rindfleisch & Heide, (1997), *Transaction cost analysis: past, present and future applications*, Journal of Marketing.
[36] Masten, Meehan & Snyder, (1991), *"The costs of Organisation"*, Journal of Law and Economics.

III.2.1.2. Accelerating economic activity

Based on the time frame for the study (2020 and 2030), an acceleration period of 1, 2 and 3 years will be investigated. The cost of capital used will be 4%, an interest rate commonly used to discount investments in public sector finance and similar to long term interest for money put on deposit[37].
The value of the activities that can be accelerated will be assessed by taking future objectives (for example the objective to realise 1000 GW in a certain sea area in 2030) and converted into monetary values. Before the economic value of maritime activities, is measured the following questions need to be answered:

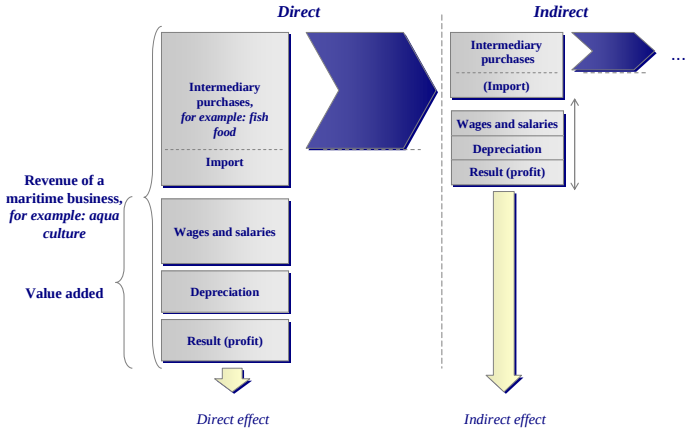
- Should economic activity be measured in terms of gross revenue or net value added?
- How to include activity that is driven by government subsidies (i.e. cost or benefit)?
- How should future effects be incorporated, based on future or present values?

a/ Measuring economic activity

In the previous chapter, it was explained that MSP can enhance and accelerate economic activities. The effects likely to be generated by applying the key principles are the enhancement and/or acceleration of revenues by maritime businesses. But revenues can not be fully labelled as a direct benefit of MSP. In order to produce revenue, a company needs inputs (materials, labour, etc). The value created by purchasing materials or services at suppliers should therefore not be incorporated as a benefit of MSP. The effect to be attributed directly to MSP is called the value added, i.e. the direct value created at the company affected by MSP. This value added consists of wages being paid, profit and depreciation of assets; the value added created in a country equals its Gross Domestic Product. The purchase of services and/or products at suppliers creates economic value for the supplier and is therefore an indirect economic effect. This study works with direct value added. In *Figure 7* the concept of value added is explained.

[37] Actual minimum long term deposit interest by all Dutch banks April 2010.

Figure 7: Production value (turnover) and value added



Source: Policy Research Corporation

b/ Subsidies and innovation effects

Another important aspect to consider when economic effects of MSP are demonstrated is the effect of government subsidies. Currently, some activities require government subsidies to be economically viable (e.g. wind energy). If government subsidies are needed for an activity, this activity actually reflects a cost for society instead of a benefit (i.e. the unprofitable part is compensated by the government). MSP may also lead to the acceleration of subsidised activity. Accelerating economic activity is qualified as a benefit, but the acceleration of subsidised activity can be qualified as the acceleration of costs. In this study, the effect of accelerating costs is ignored since subsidies are needed to create long term profitability in these industries via innovation and cost improvements. Subsidised economic activity is therefore incorporated as an economically beneficial activity. Secondly, it may be rational from an investment point of view to postpone investments until products are likely to be more efficient. This can be the case for windmills; postponing investments to 2020 is likely to lead to higher efficiency ratios due to technical improvements of the wind turbines. Since demand for products drives incremental innovation (i.e. improving products), this effect is considered to be necessary and/or desirable. For this reason, the effect of postponing investment is left outside the scope of this study.

c/ Future or present value

For the calculation of the contribution MSP in terms of transaction costs and acceleration, the value added of maritime economic activity in constant prices (i.e. today's prices) will be used. This means that inflation is not taken into account in the report.

In the next chapter, the effects of MSP will be demonstrated using the assumptions mentioned above.

IV. RESULTS

In this chapter, the results of the study are presented as follows. The first paragraph elaborates on the data collection methods. In the second paragraph, the maritime activities are introduced according to their size, value added and importance for the European Union. Since this study is concerned with the economic effects of MSP for the European Union Member States, the results will be shown on a European scale. Due to the large differences between individual Member States within the European Union, country fact sheets are included in a separate document. To show how results apply on a detailed basis, two case studies are included in a separate document. The first case study concerns Portugal; the second has an international perspective and is concerned with the installation/implementation of an offshore transnational electricity grid.

IV.1. DATA COLLECTION

Collecting valid and reliable data is of the utmost importance for any study to be accepted. In this case, with 22 Member States and Norway involved in the maritime areas of Europe and a substantial number of maritime businesses, collection of data was done with great care. Three types of data collecting methods were incorporated in the process:

- Expert interviews;
- Survey;
- Validation by stakeholders.

a/ Expert interviews

Out of the 22 Member States, 12 Member States were visited to conduct interviews with experts on Maritime Spatial Planning, individual maritime industries, governmental organisations or research institutes. *Table 5* lists the EU Member States that were visited[38]. In close cooperation with the European Commission, *Policy Research* selected a representative sample[39] of stakeholders with an interest in MSP, i.e. stakeholders for the different maritime activities, governmental institutions and

[38] Although Sweden was visited, this was in the context of the Maritime Spatial Planning conference that was held there. No specific MSP stakeholders were visited in Sweden.

[39] A representative sample is a small number of a targeted group whose characteristics represent (as accurately as possible) the entire batch, lot or population.

scientific institutes, in every Member State. Besides these EU Member States, Norway was also visited as a best practice example. For a complete overview of the institutes and/or people that were visited and/or interviewed, see *Annex II: Overview of stakeholders.*

Table 5: EU Member States that were visited

EU Member States that were visited	
Belgium	Poland
Denmark	Portugal
France	Spain
Germany	Sweden
Greece	The Netherlands
Ireland	United Kingdom

Source: Policy Research Corporation

b/ Surveys

Besides the country visits, *Policy Research Corporation* constructed an online questionnaire to validate the views and data that were gathered during the country visits. The survey was sent out to 260 respondents, which are all relevant stakeholders from all 22 Member States. The response to the survey proved to be significant: 142 surveys were partially completed and 30 surveys were fully completed by stakeholders from all corners of the European Union. The survey input proved to be of significant value to the data validating process of the study.

c/ Validation by stakeholders

Once assumptions and calculations were made, draft versions of the country fact sheets were circulated amongst relevant stakeholders for validation. The response was significant and valuable. As a final step, the draft final report was circulated to all stakeholders that participated in this study for feedback.

IV.2. MARITIME ACTIVITIES IN THE EUROPEAN UNION[40]

a/ The shipping industry in the EU

Shipping has always been an important maritime industry and is a major driver of economic trade. In 2010, the shipping industry is estimated to contribute almost 26% of the value added generated by maritime activities in Europe[41] or about € 26 billion. Due to the long history of this maritime activity

[40] The numbers used in this paragraph do not include figures for Norway, unless explicitly mentioned, as it is not a member of the European Union.

[41] *Policy Research Corporation* based on Eurostat. This number does not include the value added for Bulgaria and Norway.

and its importance both for the European and the global economy, the industry has been internationally regulated by the United Nations Convention on the Law of the Sea (UNCLOS) and the International Maritime Organisation (IMO). Challenges in narrow straits with heavy traffic have been solved by traffic separation schemes which are internationally acknowledged.

In the future, the shipping industry is expected to grow[42] and more and bigger ships will be used to meet the global demand. The challenges posed by this trend will have to be settled on an international level to maintain a level playing field for the European shipping industry.

b/ The cruise industry in the EU

Cruise tourism is an upcoming and fast growing industry, especially in the EU. In 2010, the industry is expected to create a value added of € 938 million[43], or 0.90% of the value added generated by maritime activities in Europe. As with shipping, the cruise ships follow traffic separation schemes in narrow areas with heavy traffic.

According to experts, the industry is likely to grow further, especially in the Mediterranean Sea. Furthermore, a trend of visiting new destinations and ports is expected.

c/ Dredging and sand and gravel extraction in the EU

The dredging industry is driven by other activities such as shipping, ports, infrastructure, energy etc. Six main drivers of the sector can be identified, namely trade capital, trade maintenance, coastal, urban, energy and tourism. Currently, trade capital and energy account for 55% of worldwide turnover. The estimated value added of the industry in Europe is € 558 million in 2010[44].

However, due to climate change and rising sea levels, the industry will increasingly focus on activities such as land reclamation and beach nourishment. Moreover, there is a growing shift of sand and gravel extraction from land to sea. These future changes will have to be taken into account in current policies.

d/ The offshore oil and gas industry in the EU

The offshore oil and gas industry is an important maritime industry and will account for an estimated € 64[45] billion value added in Europe in 2010, i.e. over 60% of the total value added by maritime activities in Europe. Offshore oil and gas activities in Europe are mainly concentrated on the Norwegian Continental Shelf and the Continental Shelf of the United Kingdom. Norway and the

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42 Expert interview and also based on the historical link between the growth of the world's GDP and world seaborne trade.
43 European Commission (2009), *Tourist Facilities in Ports.* (Norway excluded).
44 International Association of Dredging Companies.
45 *Policy Research Corporation* based on country specific data. See separate country files for more detailed information. This number does not include Norway, Germany, Malta, Romania, Spain and Sweden.

United Kingdom account for more than 85% of the European value added from the offshore oil and gas industry. Other countries that produce offshore oil and gas are Bulgaria, Denmark, Germany, Greece, Ireland, Italy, Malta, Poland, Romania and the Netherlands.

In the future, the offshore oil and gas industry will continue to play an important role in the maritime field, although there is a shift towards alternative forms of energy. This shift to renewable forms of energy and more specifically wind energy may impose significant conflicts of interest. However, experts[46] indicate that these conflicts could be resolved by an early dialogue.

e/ Carbon storage in the EU

Carbon Capture and Storage (CCS) is a technology capable of abating 90% (and more) of the CO_2 emitted by industrial/energy sources (e.g. power plants fired with fossil fuels, cement and steel plants, refineries). First, the CO_2 is captured at the source, then transported to a storage site and injected into geological formations deep underground[47].

CCS is considered to be one of the ways to combat global warming. Hence several European countries are investing in examining the possibilities for offshore storage of carbon (i.e. oil & gas fields and aquifers). Currently, there is one commercial project in Norway and exploration studies are being conducted in countries such as Denmark, Finland, Italy, the Netherlands, Norway and the United Kingdom[48].No figures are available to estimate the economics behind carbon storage.

f/ Offshore wind energy in the EU

The offshore wind energy sector in Europe is still in an early stage and has mostly been developed in the northern European countries around the North Sea and the Baltic Sea. In 2010 it is expected that the industry will account for € 238 million or 0.23% of the total maritime value added in Europe.

However, as Member States have agreed to produce 20% of the total EU electricity demand from renewable sources by 2020, of which 12% should come from wind energy, the industry is likely to grow fast. By 2020, it is expected that the offshore wind energy industry will account for about 11% of the total maritime value added in Europe and by 2030 for about 22%. The future of offshore wind energy will also be influenced by new technological developments such as floating turbines which will enhance the development of offshore wind farms in deeper sea waters[49].

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46 Expert interviews in the oil and gas industry.

47 http://www.zeroemissionsplatform.eu/inside-css.html/the-workings-of-co2-capture-transport-and-storage.

48 European Technology Platform for Zero Emission Fossil Fuel Power Plants (ZEP) (2008), *EU Demonstration Programme for CO_2 Capture and Storage (CCS).*

49 *Policy Research Corporation* based on European Wind Energy Association.

g/ Wave and tidal energy in the EU

Wave and tidal energy in Europe is still in an early stage of development. Many test projects have been successfully completed, but the challenge is to develop the first full-scale devices at sea. In 2009, a capacity of 2.75 MW of wave energy and 241.45 MW of tidal energy was installed in European waters[50]. The key players in these two forms of ocean energy are Portugal, the UK and France. These three countries will generate an expected € 4[51] million value added from wave and tidal energy in 2010.

Future prototypes are being tested in Spain and the UK. However, even in 2030, wave and tidal energy is expected to remain a rather small industry with a value added of € 12 million.

h/ Fisheries in the EU

Fishing is perhaps the most traditional activity at sea. Despite the fact that the fishing industry is a declining industry in terms of revenues and value added, the contribution to the total maritime value added in Europe is still significant, namely an expected 6.75% or about € 7 billion in 2010[52].

The fishing industry is facing substantial challenges for the future. Global warming is causing fish populations to move or change. Moreover, there is overcapacity and the fish stocks are likely to experience problems in reproducing[53]. Finally, new maritime activities are putting more pressure on the space available for fisheries.

i/ Aquaculture in the EU

Aquaculture is a fast growing sector, both worldwide and in Europe. Europe is the third largest producer of farmed fish, both in terms of quantity and value. In 2010, the industry is expected to contribute 1.2% to the maritime value added in Europe or 1.3 billion euros[54]. This number does not include Norway, which is responsible for 50% of the value added in Europe, followed by other players such as the United Kingdom, Greece, France, Spain and Italy.

j/ Marine tourism in the EU

Marine tourism (diving, recreational fishing, sailing, yachting, marine ecotourism, etc), of which recreational fishing is an important part, is a growing form of tourism. In the future, this industry is expected to grow, especially in the Mediterranean. Due to the fact that there is little aggregated data

[50] This number includes Norway.
[51] *Policy Research Corporation* based on country specific data. See separate country files for more detailed information.
[52] *Policy Research Corporation* based on Eurostat.
[53] European Commission (2009), *Fisheries and Aquaculture in Europe,* No 44.
[54] Food and Agriculture Organisation of the United Nations (2009), *The State of World Fisheries and Aquaculture 2008.*

on this industry, an estimate based on tourism in general was made. In 2010, maritime tourism is expected to generate € 2.9 billion of value added in Europe[55].

k/ The maritime economy in the EU

It is estimated that, in 2010, total maritime activities will create value added of € 104 billion. The offshore oil and gas industry and shipping account for almost 90% of the total value.

Table 6: Value added of maritime activities in the EU – Estimate 2010[56]

€ million	Shipping	Cruise tourism	Dredging	Oil and gas	CCS	Offshore wind energy	Wave and tidal energy	Fishing	Aqua-culture	Marine tourism	Total
2010	26 477	938	558	64 220	n.a.	238	4	6 992	1 246	2 868	103 541
% of value added	25.58%	0.91%	0.54%	62.02%	n.a.	0.23%	0.004%	6.75%	1.20%	2.77%	100%

Source: Policy Research Corporation

IV.3. THE ECONOMIC EFFECTS OF MARITIME SPATIAL PLANNING[57]

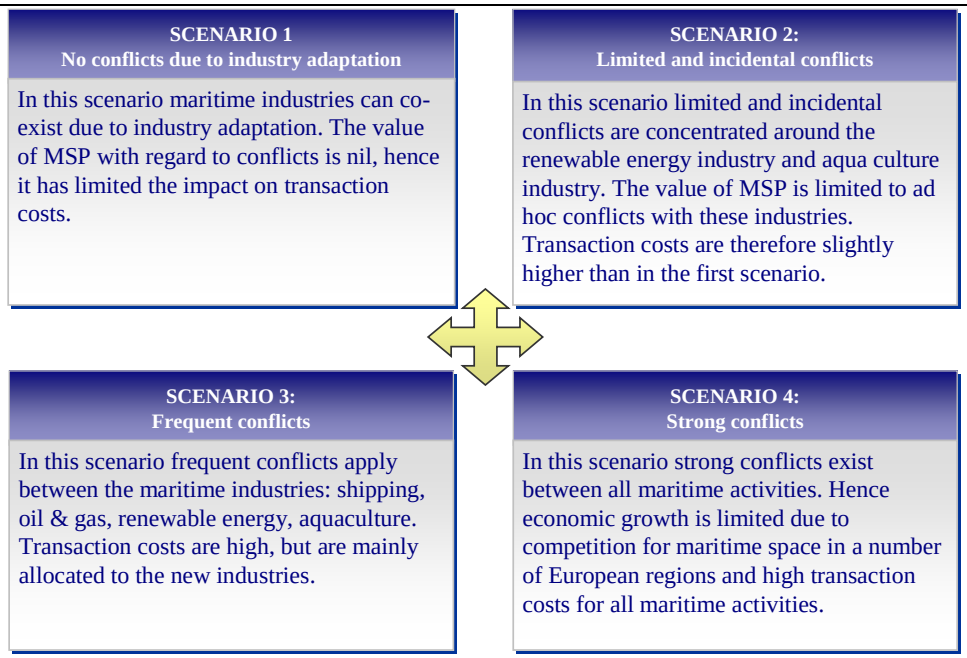
Now that the value of the maritime activities is known, the economic effects of MSP can be estimated. Although the potential economic effects of MSP have been assessed on a country and activity level, the following paragraphs provide an aggregated overview for the European Union as a whole. Detailed calculations per country can be found in the country reports.

IV.3.1. REDUCING TRANSACTION COSTS

Making a reliable estimate of the impact MSP has on transaction costs is impossible due the high variability caused by a number of factors. Therefore, four scenarios were described in *III.1.4. These* potential future situations indicate the value added MSP could generate by decreasing transaction costs. *Figure 8* gives an insight into these different scenarios.

55 *Policy Research Corporation* based on Eurostat.
56 *Policy Research Corporation* based on multiple resources. See previous footnotes.
57 The economic effects do not include benefits for Norway as it is not a member of the European Union.

Figure 8: Scenarios for the development of the maritime economy



Source: Policy Research Corporation

Based on the future value added, the value of MSP is different per scenario. *Table 8* shows a forecast of the value added for the autonomous evolution of the different maritime activities. These predictions are based on revenue figures from Eurostat, which have been converted to value added figures based on the OECD input-output tables. Real yearly growth rates where estimated for the different maritime activities based on a 20 year annual growth rate to calculate the future value added of the different maritime activities[58].

Table 7: Value added of maritime activities in the EU – future evolvement[59]

€ million	Shipping	Cruise tourism	Dredging	Oil and gas	CCS	Offshore wind energy	Wave and tidal energy	Fishing	Aqua-culture	Marine tourism	Total
2010	26 477	938	558	64 220	n.a.	238	4	6 992	1 246	2 868	103 541
2020	30 727	1 457	714	74 530	n.a	15 334	5	5 428	1 674	3 855	133 724
2030	36 195	2 138	936	87 793	n.a.	39 495	12	4 109	2 317	5 336	178 331

Source: Policy Research Corporation

In 2020, if MSP were to reduce only 1% of transaction costs for all scenarios, it could generate between € 170 million and € 1.3 billion, depending on the scenario, and in 2030, MSP could generate between € 418 million and € 1.8 billion.

[58] Shipping: 1.5% (2020 – 2030); cruise tourism: 4.5% (2020) – 4% (2030); dredging: 2.5% (2020 – 2030); oil and gas: 1.5% (2020-2030); CCS: 1% 2020 – 5% 2030; wind energy: EWEA; wave and tidal energy: 1% (2020) – 5% (2030); fishing: -2.5% (2020 – 2030); aquaculture: 3% (2020 – 2030); marine tourism: 3% (2020 – 2030).

[59] *Policy Research Corporation* based on industry estimations.

Table 8: Contribution of MSP in terms of transaction costs

€ million – Δ 1% transaction costs	Scenario 1	Scenario 2	Scenario 3	Scenario 4
2020	0	170	1 237	1 337
2030		418	1 679	1 783

Source: Policy Research Corporation

A reduction of 1% in transaction costs should be considered as the minimum MSP can generate, specifically for upcoming industries, such as the renewable energy industry and offshore aqua farming. Hence, the scenario 2 results should be interpreted as a minimum.

IV.3.2. ENHANCING INVESTMENT CLIMATE

IV.3.2.1. Accelerating economic activity

Accelerating economic activity creates substantial economic value for the European Union Member States. Two types of activities were indicated as being positively affected by this benefit from MSP: aquaculture and wind farms. *Table 9* shows the benefits for aqua farms. The acceleration calculations are based on expected future investments in aqua farms around Europe[60] (see the country reports for specific figures).

Table 9: Economic effects of accelerating aquaculture investments with a real investment rate of 4% (in € millions)

Acceleration aquaculture	1 year	2 years	3 years
2020	€ 2	€ 8	€ 19
2030	€ 3	€ 12	€ 27

Source: Policy Research Corporation

Two dates have been incorporated in the overview, 2020 and 2030. These should be interpreted as follows. If planned investments in aquaculture in 2021 were accelerated to 2020, this would create a benefit of € 3 million. For wind farms, the benefits (see *Table 10*) are much higher due to the larger planned operational size of future offshore energy development[61].

[60] The expected future value added in aquaculture is € 1 674 million for 2020 and € 2 317 million for 2030.
[61] The expected future value added for offshore wind energy is € 15 334 million for 2020 and € 39 495 million for 2030.

Table 10: Economic effects of accelerating wind farm investments with a real investment rate of 4% (in € millions)

Acceleration wind farms	1 year	2 years	3 years
2020	€ 60	€ 255	€ 614
2030	€ 152	€ 651	€ 1 570

Source: Policy Research Corporation

Altogether, the benefits of accelerating economic activity range from € 155 million tot € 1.6 billion in 2030, depending on the number of years the activity is accelerated.

An example of the calculations is given below.

ACCELERATING ALL EUROPEAN AQUAFARMS ONE YEAR, FROM 2021 TO 2020

Due to MSP, certain maritime activities can be accelerated. Aquafarming is one example. It is estimated that the total value added of aquafarming in 2020 will be € 1.67 billion and in 2021 the value added will go up to € 1.72 billion (both figures are in current prices of 2010).

If MSP can accelerate this economic activity with one year, this means that the value added of 2021 can already be generated in 2020. So due this acceleration € 50.3 million extra value added will be generated in the aquafarming industry in Europe. This amount can be invested at an interest rate of 4%, which would mean that after one year € 2 million euro has been gained by investing this money. This € 2 million euro is the benefit of MSP by accelerating the European aquafarms for one year.

a/ Benefits of transnational cooperation

Paragraph II.1.b also discussed the fact that MSP also delivers benefits with regard to transnational cooperation. Due to the absence of concrete planned transnational projects, scaled macro quantification in this regard could not be conducted, with the exemption of one project: the transnational electricity grid between Belgium, Denmark, France, Germany, Ireland, Luxembourg, the Netherlands, Sweden and the United Kingdom.

Due to the level of MSP implemented in these countries, there is already certainty regarding locations of future offshore wind farms. Hence, information on locations and capacity (i.e. search costs) is available, which is a first important step in the implementation of a transnational grid. This implies that such a grid can be implemented faster than if these countries would not have taken these steps. Consequently, costs can be prevented due to the acceleration of:

- reduction of emissions;
- reduction of electricity generating costs.

Since the case for a transnational grid encompasses many aspects of MSP, it was incorporated into a separate case study published with this report. Depending on the acceleration time (1.5, 4 or 6.5 years), the results show that MSP is likely to generate benefits between € 1 billion and € 13 billion in terms of net present value.

IV.4. CHAPTER SUMMARY

This chapter showed that the economic effects of MSP can be substantial. Since various future scenarios are possible, it is impossible to attach a single number to the benefits of MSP. Therefore, the outcome of this study provides ranges of benefits to expect from MSP. This overview includes the benefits that were quantified in this study i.e. cost of conflict, acceleration of investments and coordination costs. It does not include the benefits that were not quantified i.e. search, legal and administrative costs and extra investments.

Table 11: Overview of economic effects (in € million)

Additional value added creation of:		Scenario 2	Scenario 3	Scenario 4
Cost of conflict	**2020**	170	1 237	1 337
	2030	418	1 679	1 783
Acceleration of:		**1 year**	**2 years**	**3 years**
Acceleration of aquaculture	**2020**	2	8	19
	2030	3	12	27
Acceleration of wind farms	**2020**	60	255	614
	2030	152	651	1 570

Source: Policy Research Corporation

V. CONCLUSIONS AND RECOMMENDATIONS

This study focused on the economic effects of environmentally sustainable MSP. Multiple benefits can result from MSP if its key principles are implemented adequately. These benefits can be divided into three categories:

- Lower coordination costs;
- Lower transaction costs;
- Enhanced investment climate.

a/ Coordination costs

If governmental policies are aligned by looking at policy issues with a holistic view, governmental coordination mechanisms can be more efficient and more effective. Application of the MSP key principles will facilitate the way policies can be aligned, hence creating the prerequisites for a more efficient coordination system.

b/ Reducing transaction costs for maritime activities

Transaction costs for maritime activities were found on four dimensions. The first dimension concerns *lowering search costs*. Search costs are the costs incurred by a business in searching for the right inputs for its business processes (i.e. resources, location, human capital, etc). The second dimension concerns *lowering legal costs*. Legal costs are the costs with regard to ascertaining that the actions of a business are legitimate as well as setting up and enforcing compliance with regard to agreements (e.g. contracts). Since MSP helps establish legal clarity and certainty, it is expected that legal costs will come down as well. The third dimension concerns *lowering administrative costs*. Administrative costs are the costs for permits, licenses and certification. Because of more efficient and integrated procedures, it can be expected that application and awarding processes will be better aligned, resulting in lower administrative costs. The fourth dimension concerns *fewer conflicts* (also known as opportunity costs). One of the key objectives of MSP is to facilitate sustainable economic growth. Planning enables a government to *a priori* incorporate the interests of different stakeholders to prevent costs for these stakeholders if a conflict of interest should arise. A conflict is defined as a situation in which two or more maritime activities are incompatible or compete in terms of space

and/or or time for the same area. The impact of transaction costs on the maritime economy was incorporated into this study via scenario-based analysis.

c/ Enhanced investment climate

The positive relationship between certainty and the investment climate of a country was a basic assumption in this study for the assessment of the MSP effects in this regard. Two dimensions were identified: *economic growth* and *acceleration of economic activity*. For *economic growth,* a valid and reliable estimate proved to be unfeasible and purely speculative. For the acceleration of economic activity, various scenarios were incorporated (i.e. 'WHAT – IF' planned activity would be accelerated by either 1, 2 or 3 years).

V.2. RECOMMENDATIONS

Several recommendations can be made with regard to MSP.

a/ Traditional versus new industries

Europe's sea areas are becoming increasingly crowded with a growing number of maritime activities. Traditional industries perceive this development as competition for the space in which they have been operating for decades (or maybe even centuries). A typical example of such an industry is the fishery industry. Due to substantial overcapacity and catching restrictions, this industry has faced a decline in the past decades. With newcomers entering the maritime arena, the fishing industry foresees a further decline of their interests for the future. It is therefore of the utmost importance that fishermen cooperate closely with national governments to have their interests (e.g. designating important fishing grounds as areas in which restrictions for other activities apply) incorporated in every Member State's maritime spatial plan.

b/ MSP implementation and societal interests

The degree to which conflicts of interest are prevented will be largely determined by the sequence and priorities built into the maritime spatial plan (i.e. the first two key principles). By structuring a maritime spatial plan according to the most valuable activities (those activities with the highest value added or highest societal priority) per Member State, the highest value of MSP can be realised, as the cost of conflict of interest will be higher for this type of activity.

c/ Cross-border cooperation

An important key principle of MSP is cross-border cooperation. In the internationally oriented Europe of today, the principle of operating cross-border-wise becomes increasingly important. Borders can lead to significant barriers for economic activity. A good example of this is a wind farm being

planned in an area with excellent conditions but located in three different EEZ's (the Dogger bank). While this area may prove to be optimal, significant legal and technical restrictions will apply in each Member State, therefore restricting the gains from such a wind farm. International alignment of both environmental and economic regulations and relevant technical aspects will create substantial benefits for the continent of Europe.

d/ Exchanging best practices

For MSP to be successful, it is critical to exchange best practices between European Member States or countries. A clear example of a best practice is the Norwegian "AkvaVis" model that was developed for the designation of aqua farms. This model was proactively developed by order of the government to determine if an application for an aquaculture permit would lead to obstacles. In this way, significant search and administrative costs can be prevented. Another example of a best practice is the Danish one-stop-shop model for wind farms. In this model, all relevant authorities have been integrated into one virtual desk which enables significant time and cost savings for applicants. The exchange of best practices should be centralised (for example on an internet site hosted by the European Commission) and easily accessible for all relevant stakeholders.

e/ Data and knowledge base

A final but important recommendation is the availability of data and knowledge on MSP. Data is abundantly available on many maritime activities in Europe, but there is a lack of aggregated data, consistent definitions and consistent knowledge bases in the European continent to make fair and valid comparisons or analyses. For MSP to be successful, the transparency of the governmental institutions involved in the maritime arena needs to be enhanced significantly.

ANNEXES

Annex I: Values for discounting

Throughout the report, a nominal investment rate of 6% has been used. This means that € 100 in year 1 will be equal to € 106 in year 2. However, due to the fact that the added values of the different maritime activities in 2020 and 2030 are displayed in constant prices of 2010[62], this investment rate has been corrected for an inflation rate of 1.9[63]%. This means that in this report, 4% is correct as a real interest rate.

Annex II: Overview of stakeholders

Table 1 gives an overview of all the stakeholders that were actively involved in this study. Additionally, another 260 stakeholders were requested to fill in an online survey. Finally, all stakeholders were asked to comment on the report.

Table 1: Overview of stakeholders

Country	***Organisation***	***Name***	***Function***
International	European Dredging Association	Mr. Sansoglou	Sceretary general
International	European Wind Energy Association	Ms. Gloria Rodrigues	Policy and Project Officer
International	European Wind Energy Association	Mr. Nicolas Fichaux	
International	International Council for the Exploration of the Sea	Mr. Hubold	General Secretary
International	International Council for the Exploration of the Sea	Mr. Lassen	Head of advisory Programme
International	International Council for the Exploration of the Sea	Mr. Kellerman	Head of Science Programme
International	International Association of Dredging Companies	Mr. Kolman	Sceretary general
International	International Association of Oil & Gas Producers	MS. Annabel Holroyd	EU Affairs Officer
International	OSPAR	Mr. Johnson	Executive Secretary
International	OSPAR	Mr. Unger	Deputy Secretary
International	United Nations Environment Programme	Ms. Hema	
International	WWF	Mr. Aaron McLoughlin	Head of European Marine Programme
International		Mr. John Richardson	Former Head of European Maritime Task Force
Belgium	Enfinity Wind - Knowledge Centre	Mr. Emmanuel Timmermans	Project engineer
Belgium	Marine Instite	Dr. Maes	Professor
Denmark	BIMCO	Mr. Lund	Chief International Affairs Officer
Denmark	Danish Energy Agency	Ms. Mette Cramer Buch	Energy Supply and Renewable energy
Denmark	Danish Fishermen's Association	Mr Michael Andersen	Senior Consultant
Denmark	Den Danske Maritime Fond	Mr. Pontoppidan	President
Denmark	The Association for Promotion of Shipping	Mr. Sabinsky	Chief Executive
France	Comité des Pêches	Ms. Perrine Ducloy	Chargée de mission
France	Comité des Pêches	Ms. Stéphanie Tachoires	Chargée de mission
France	Direction des Affaires Maritimes	Mr. Jean-Loup Petit	Deputy Director of Maritime Activities
France	Direction des Affaires Maritimes	Mr. Jean-Luc Hall	Head of Unit - Control of Maritime Activities

62 *Policy Research Corporation* has worked with constant prices to make it easier to compare numbers.
63 The target inflation rate of the ECB.

France	Institut Français de la mer (Cluster Maritime)	Mr. Philippe Perrennez	Directeur Général Cluster Maritime
France	Institut Français de la mer (Cluster Maritime)	Mr. Eudes Riblier	
France	Secrétariat Générale de la Mer	Mr. Christophe Le Visage	Chargé de mission
France	Secrétariat Générale de la Mer	Ms. Elie Jarmache	Senior officer Law of the Sea
Germany	Aida Cruises	Mr. Kay-Uwe Marob	Senior Manager Port Operations
Germany	BARD	Mr. Guido Kumbartzky	Project development
Germany	BARD	Dr. Susanne Schorcht	Project development
Germany	BARD	Mr. Christian Simonis	Attorney
Germany	Federal Maritime and Hydrographic Agency	Mr. Nolte	Responsible MSP
Germany	German Shipowners' Association	Mr. Wolfgang Hintzsche	Safety Management, Navigation an Engineering
Germany	German Shipowners' Association	Mr. Daniel Hosseus	International Shipping Policy and Liner Shipping
Greece	Greek National Tourism Organisation	Ms. Papadopoulou	
Greece	Hellenic Centre for Marine Research	Mr. Kostas Papakonstantinou	Vice president
Greece	Hellenic Centre for Marine Research	Mr. Evangelos Papathanasiou	Deputy Director of the Institute of Oceanografy
Greece	Hellenic Wind Energy Association	Mr. Ioannis Tsipouridis	President
Greece	Ministry of the Environment, Energy and Climate Change	Ms. Athina Mourmouris	Environmental Engineer - Planner
Greece	University of Thessaly	Mr. Coccossis	Professor
Ireland	Department of Transport	Mr. Curran	Maritime Transport Division
Ireland	Department of Transport	Capt. Black	Nautical Surveyor
Ireland	Marine Institute Ireland	Mr. Dave Jackson	Inspector of Fisheries/Section Manager
Ireland	Marine Institute Ireland	Mr. Eugene Nixon	
Ireland	Sustainable energy Ireland	Mr. Sweeney	Head Ocean Energy Development Unit
Norway	Business Region Bergen	Mr. Tone Hartvedt	Communication Manager
Norway	Department of Coastal Affairs	Ms. Inge Doskeland	Head of Coastal Affairs
Norway	Fisheries Directorate	Ms. Anne B. Osland	Senior Advisor Aquaculture and Coastal Management Department
Norway	HOG Energi	Mr. Leder	
Norway	Institute of Marine Research	Mr. Arne Arvik	
Norway	Maritime Forum	Mr. Hogne Haugsdal	Managing Director
Norway		Mr. Knut Stevenik	
Poland	AOS/Polish Wind Energy Association	Mr. Bogdan Gutkowski	Director/President
Poland	Maritime Institute in Gdansk	Mr. Juliusz Gajewski	Department of Operational Oceanogrophy
Poland	Maritime Institute in Gdansk	Ms. Joanna Predrzymirska	Department of Operational Oceanogrophy
Poland	Maritime Institute in Gdansk	Dr. Andrzej Osowiecki	Department of Operational Oceanogrophy
Poland	Maritime Office Gdynia	Mr. Andrzej Cieslak	Chief Specialist
Poland	Maritime Office Gdynia	Mr. Wojciech Wasowski	Senior Specialist
Poland	Maritime Office Gdynia	Mr. Pawel Gomulka	VTS Supervisor
Poland	Sea Fisheries Institute	Mr. Eugeniusz Andrulewicz	Head of the Marine Environment Quality Laboratory
Poland	Sea Fisheries Institute	Dr. Piotr Margonski	Head of Department
Poland	Sea Fisheries Institute	Dr. Wojciech Pelczarski	Deuty Director Science
Portugal	General Directorate of Fisheries and Aquaculture	Ms. Ana Rita Berenguer	
Portugal	General Directorate of Fisheries and Aquaculture	Mr. Edgar Alfonso	
Portugal	General Directorate of Fisheries and Aquaculture	Ms. Christina Borges	
Portugal	Institute for Nature Conservation ad Biodiversity	Ms. Maria José Pitta	Deputy Director of the Department of Management of Wetlands
Portugal	Institute for Ports and Shipping	Mr. José Manuel Cruz	Head of Planning and Management Control Department
Portugal	Institute for Ports and Shipping	Mr. Victor Fernandes	Head of Maritime Transport Department
Portugal	Institute for Ports and Shipping	Ms. Heloisa Cid	Head of Port Affairs Department
Portugal	Maritime Policy Task Force	Ms. Teresa Maria gamito	Coordinator Portuguese MSP
Portugal	Nature Protection League	Ms. Constanca Belchior	
Spain	Cepesca	Mr. Juan Manuel Liria Franch	Vice-president
Spain	Directorate-General of Fisheries Resources and Aquaculture	Ms. Martinez Castaneda	Technical Advisor
Spain	Ministry of the Environment, and Rural and Marine Affairs	Ms. Ainhoa Pérez Puyol	Head of Service – Division or the protection of the sea and prevention of marine pollution
Spain	Ministry of Transport	Mr. David Alonso-Mencia Alvarez	Technical Advisor
Spain	Spanish Wind Energy Association	Mr. Ramon Fiestas Hummler	General Secretary
Spain	Spanish Wind Energy Association	Mr. Alberto Ceña	Technical Director
The Netherlands	LEI - Wageningen UR	dr. Hans van Oostenbrugge	Head Fisheries department
The Netherlands	LEI - Wageningen UR	Mr. Arie van Duijn	Aquaculture and fisheries economics
The Netherlands	Ministry of Transport, Public Works and Watermanagement	Mr. Jurjen Keuning	Senior consultant
The Netherlands	Van Oord Dredging and Marine Contractors	Mr. Groothuizen	
The Netherlands	Visafslag Hollands Noorden	Mr. W. Visser	Director
The Netherlands	Visafslag Lauwersoog	Mr. Harry Smit	Director
UK	British wind enery association	Mr. Ayling	Head of Offshore
UK	Crown Estate	Mr. Moore	MaRS Data Management
UK	Crown Estate	Mr. Tudor	Policy Manager
UK	Department for Environment, Food and Agriculture	Ms. Wort	Marine Planning and Coastal Integration
UK	Department for Transport	Ms. Crossley	Head of Shipping Policy Division
UK	Department of Energy and Climate Change	Ms. O'Carroll	Head of Environmental Policy
UK	Oil and Gas UK	Mr. Bassett	European Issues Manager and Analyst
UK	Oil and Gas UK	Mr. Dymon	Operations and Sypply Chain Director
UK	The Chamber of Shipping	Mr. Brownrigg	Director-General
UK	The Chamber of Shipping	Mr. Simmonds	
UK	The Chamber of Shipping	Mr. Sachdeva	Nautical Consultant

Source : Policy Research Corporation

Annex III. Definitions and abbreviations

In this study the following definitions are repeatedly used or referred to.

Eco-system approach

- The eco-system approach is a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way. Application of the ecosystem approach will help to reach a balance of the three objectives (conservation of biological diversity, sustainable use of its components and fair and equitable sharing of the benefits arising out of the utilisation of genetic resources) of the Convention on Biological Diversity. It is based on the application of appropriate scientific methodologies focused on levels of biological organisation which encompass the essential processes, functions and interactions among organisms and their environment. It recognises that humans, with their cultural diversity, are an integral component of ecosystems[64].

Integrated Coastal Zone Management:

- Integrated Coastal Zone Management (ICZM) is designed to link all the different policies which have an effect on the coastal regions. It is about both planning and management of coastal resources and coastal space. It is not a "one off" solution but an ongoing dynamic process that will evolve over time. ICZM is not just an environmental policy, it also seeks to improve the economic and social well-being of coastal zones and help them develop their full potential as modern, vibrant communities[65].

Marine Protected Area:

- Any area of the intertidal or sub tidal terrain, together with its overlying water and associated flora, fauna, historical and cultural features, which has been reserved by law or other effective means to protect part or all of the enclosed environment[66].

Maritime activity:

- Activity within the maritime areas, such as fishing, shipping, cruise tourism, marine conservation, offshore oil and gas exploration, offshore renewable energy, etc.

Maritime Spatial Planning:

- Maritime Spatial Planning is a process of analysing and allocating parts of three-dimensional marine space (ecosystems) to specific uses, to achieve ecological, economic and social objectives that are usually specified through a political process[67]. It[68] is a tool for improved

[64] United Nations (1992), *Convention on biological diversity*.
[65] http://ec.europa.eu/environment/iczm/home.htm.
[66] International Union for the Conservation of Nature, http://www.iucn.org/.
[67] UNESCO.
[68] European Commission, (2008), *Roadmap for Maritime Spatial Planning*: *Achieving Common Principles in the EU,* COM (2008) 791 final.

decision-making and provides a framework for arbitrating between competing human activities and managing their impact on the marine environment. Its objective is to balance sectoral interests and achieve sustainable use of marine resources in line with the EU Sustainable Development Strategy.

Sustainable development:

- Sustainable Development stands for meeting the needs of present generations without jeopardising the ability of futures generations to meet their own needs[69].

Conflict:

- A conflict is a situation in which two or more maritime activities are based on methods or objectives that are incompatible if implemented simultaneously, either in space or time.

Spill over effect:

- The effect caused by the presence (either physically or in time) of one activity on another activity or activities. A spill over effect can either be negative or positive.

[69] Website European Commission: http://ec.europa.eu/environment/eussd/.

Table 12: List with abbreviations

Abbreviation	
Bcf	Billion cubic feet
Boe	Barrels of oil equivalent
C.L.A.M.S.	Co-ordinated Local Aquaculture Management System
CCS	Carbon capture and storage
EEZ	Exclusive Economic Zone
EIA	Environmental Impact Assessment
EPZ	Environmental Protection Zone
EWEA	European Wind Energy Association
GDP	Gross Domestic Product
GIS	Geographic Information System
Gt	Gross tonnage
GW	Giga watt
HECLOM	Helsinki Commission
ICZM	Integrated Coastal Zone Management
IMO	International Maritime Organisation
MEPA	Malta Environment and Planning Authority
MPA	Marine protected area
MSP	Maritime Spatial Planning
Mt	Million tonnes
MW	Mega watt
NM	Nautical miles
Nm^3	Normal cubic metre
OSPAR	Oslo – Paris convention for the Protection of the Marine Environment of the North-East Atlantic
SHAPE	Shaping a Holistic Approach to Protect the Adriatic Environment
TEU	Twenty feet equivalent unit
TWh	Terra watt hours
UNCLOS	United Nations Convention on the Law of the Sea
UNEP	United Nationals Environment Programme
WWF	World Wide Fund for Nature

Source: Policy Research Corporation

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