# EUROPEAN MARTITIME SPACE WITHOUT BARRIERS: A COST-BENEFIT ANALYSIS APPROACH IN THE IMPACT ASSESSMENT

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## ABSTRACT

All major policies issued by the European Commission (EC) undergo an "Impact Assessment" (IA) process, which is developed on behalf of the Commission, following a number of guidelines proposed in specific EC's documents.
IA is a key tool to ensure that Commission initiatives and EU legislation are prepared on the basis of transparent, comprehensive and balanced evidence, and it has to be considered as an aid to political decision-making, not a substitute for it. In the words of the EC, IA "helps to identify the main options for achieving the objectives and analyses their likely impacts in the economic, environmental and social fields. It outlines advantages and disadvantages of each option and examines possible synergies and trade-offs" . An integrated approach for IA was introduced by the EC in 2002. It consists of a balanced appraisal of all potential impacts of a new legislation (economic, social, environmental), and is "underpinned by the principle of proportionate analysis, whereby the depth and scope of an impact assessment, and hence the resources allocated to it, are proportionate to the expected nature of the proposal and its likely impacts" .
IA is an activity that may include a number of methodologies and tools; as such, it is not aimed at gathering a unique quantitative indicator of the impacts of policy measures, but at a set of different indications, not necessarily of a quantitative nature (which is the objective of e.g. Cost-Benefit Analysis), which define the various effects of the actions. In the case presented in this paper, which concerns the implementation of an internal free market in the maritime transport sector, the Cost-Benefit Analysis (CBA) is one of the tools included in the overall IA procedure. The proper "assessment of impacts" is one of the steps included in the IA. No restrain is given in the Guidelines concerning the use of CBA in order to assess the impacts of the policies. Still, CBA is a tool characterized by a widespread application, by a sound theoretical background and – above all – by the possibility to cover a wide range of effects of a project by monetizing even impacts which are naturally of a quantitative nature, and therefore by a high degree of flexibility of application.

In the "Preparatory study for the impact assessment relating to achieving the internal market for intra-European trade using maritime transport (IA-EMS)" (PriceWaterhouseCoopers, CERTeT-Bocconi, 2008), performed on behalf of the European Commission, a methodology based on CBA was developed. The peculiarities of this methodology reside in the approach

that is used to implement the CBA, given the wide geographical scope of the policy, and the peculiarities of the problems addressed by the new legislation proposal itself.

Since the implementation of such European policies occurs on a (at least) Community scope, the sole use of bottom-up methodologies (such as the ones that generally are used in the application of CBA's of transport projects on a local level) turns out to be troublesome, in particular for the estimation of the modal shift deriving from the implemented policies. The proposed methodology, therefore, envisages a mixed top-down and bottom-up approach, where "top-down" is referred to an estimation based on an aggregated result which is therefore distributed among specific measures, and "bottom-up" is referred to an estimation where unitary cost or benefit parameters are applied to directly measurable phenomena.

Moreover, the bottom-up approach allows to take into account – even in the case of wider scope assessments – geographical and logistic peculiarities of services supplied throughout Europe. Indeed, the present CBA approach (bottom-up side) aimed at assessing the economic impact of the new legislation both in terms of "time related costs" (all costs proportional to the duration of port operations) and of "time costs" (costs connected with the time spent by freight during the entire supply chain involving port operations). A further peculiar aspect is the attempt to measure such economic impacts with a strongly demand oriented approach, i.e. starting from the real measurement unit involved in administrative operations in ports, which is the "bill of lading".

*Keywords: Impact assessment, common maritime space, administrative procedures, measures, policy option, CBA, time costs*

# RATIONALE

The administrative procedures currently applicable to vessels performing Short Sea Shipping (SSS) in the European Union tend to be rather complex, redundant and not harmonised with each other. The reason is that administrative procedures are very diverse, ranging from customs and tax rules, to immigration rules, trade, statistics, environment and waste, phytosanitary, veterinary and health protection, security and safety regulations. Moreover, such regulations are not coordinated with each other, thus sometimes leading to redundancies and heavy time consumption. This means that operations for incoming and outgoing vessels to/from ports are slowed down, thus generating higher costs. Moreover, also loading and unloading operations for goods tend to be delayed, thus putting maritime transport on a disadvantaged position, compared to road transport.

On January 21st, 2009 the EC adopted a Communication and action plan for the creation of a European maritime transport area without barriers . This plan includes several legislative measures, comprised a proposal of Directive aimed at simplifying administrative formalities based on Community regulations and recommendations to Member States for reducing the administrative burdens imposed on shipping companies.

Hence, the rationalization process of administrative procedures applicable to SSS aims at overtaking an obstacle to intra-EU maritime transport. This includes both ship-related and cargo-related procedures.

Several measures included in the action plan have been assessed in the IA-EMS, whose objective was to assess the impact of planning and developing a set of measures aimed at simplifying/harmonising/abolishing the administrative procedures currently applicable to Short Sea Shipping. Apart from simplification and facilitation, the study has also assessed whether the abolition of controls on exclusively Community goods in intra-EU Short Sea Shipping could be practical and feasible and have economic effects on the market.

# THE IMPACT ASSESSMENT STUDY

On the EU-27 countries, 22 have been considered in the study. They account for total maritime intra-EU commercial traffic considering a total of 275 ports in the EU. The effects are considered in the time-frame 1th January 2009 – 31th December 2040; in order to better understand how the effects of the policies develop in time, also the results for a shorter (11-year) time horizon have been studied. Not all the costs and benefits are in fact quantifiable with confidence after 2020.

Three "Policy Options" were set, in accordance to the input provided by the Directorate General of Transport and Energy of the European Commission (DG TREN).

•        Policy Option A refers to the do-nothing scenario, also known as the "baseline scenario". This implies no active measure for the removal of administrative bottlenecks to SSS. Rather, the responsibility to comply with administrative procedures to the future needs of the maritime transport activity falls on Member States and operators.

•        Policy Option B1 tends to focus on the extension of existing provisions, on certain categories of vessels (vessels operating under a Licence of ARSS) and goods (EU goods only, EU dangerous goods). This Policy Option has a low innovative impact, and is mainly focused on legislative aspects.

•        Policy Option B2 contains more operational provisions, such as electronic data transmission, one-stop administrative shops in ports and single documents for vessels.  It focuses mainly on information flows and it implies an information re-organisation on the side of ports (i.e. one interface for the vessel, one place where all procedures can be carried out, possibility of using English language). In particular these measures are gathered in a single policy option in order to achieve a double advantage: the language uniformity, with the use of English in SSS procedures, and the speeding up of procedures, by using electronic data transmission. These two measures are also linked with the possibility to use a single stop administrative shop in ports, in order to allow vessels to communicate electronically in one language to one counterpart only .

•        Policy option C includes all the measures considered before in order to obtain an extremely smooth administrative path for SSS in the EU. This "framework" policy option will gather all the measures taken for the "Authorized Regular Shipping Service" regime, even for dangerous goods and pilot exemption (Policy Option B1), the electronic one stop shop, issued in English, and the single document simplification (Policy Option B2). It ought to be pointed out that Policy Option C implies the complete elimination of all customs and administrative procedures on EU goods (replaced by some conditions to be fulfilled ex ante). For non-EU goods, the regulations of the ARSS Licence remain valid.  With regards to the physical inspections that can take place in ports, Policy Option C entails the scrapping of all inspections on EU goods and EU vessels.  They will take place only on non-EU goods and non-EU vessels.  Safety and security inspections on vessels, obviously, would still be performed randomly on all vessels.

Furthermore, a large part of the remaining procedures (e.g. entry departure notification, waste management notification) should not be eliminated for several reasons, such as the need of communication and information among the parties involved in the transport chain and in the trade. Some of the procedures are also used for security and safety purposes and for port operations management. It is necessary to maintain a minimum electronic reporting system in order to guarantee a monitoring process that allows port authorities, maritime authorities and other actors to have the exact awareness on vessels arrivals and departures, information of crew composition and possible passengers, security level at which the ship is operating, list of goods, with B/L, shipper or consignor references, list of dangerous goods and their volumes.

As said before, a vast plethora of subjects is affected by the implementation of the policy options. The main actors likely to be affected by the implementation of the different policy options relating to the achievement the internal market for intra-European trade using maritime transport are listed in the table below.

Table I: list of main actors affected by the implementation of different policy options

| Abbr | Stakeholder | How affected |
|---|---|---|
| EU | European Union | - Costs: Administrative costs (mainly start-up costs, such as design action plans and legal framework's guidelines and monitoring |

| Abbr | Stakeholder | How affected |
|------|-------------|--------------|
| | | feedbacks);<br>- Benefits: increase of modal shift from road to maritime, achievement of a prior policy objective and relative reduction of external costs for collectivities. |
| MS | Member State | - Costs: Administrative costs (mainly development of different projects at national level, budgeting and funding);<br>- Benefits: increase of modal shift from road to maritime. |
| PA | Port Authority | - Costs: Administrative costs (mainly development of the project at port level and ongoing costs related to updating running and controlling of programmes activated); Increase of administrative costs resulting from the development of new structures dedicated to the management of the new programme;<br>- Benefits: increase in labour productivity and consequent reduction of time for each call (physical documents' inspections no longer performed). |
| CU | Customs | - Costs: Administrative costs (mainly for developing the project at port level and ongoing costs related to updating running and controlling of programmes activated);<br>- Benefits: increase in labour productivity and consequent reduction of time for each call (physical documents' inspections no longer performed). |
| SO | Ship – Owner (maritime line comp) | - Costs: increase of IT costs for the alignment of HW and SW tools. Increase in costs for informatisation of procedures required by the new IT solutions;<br>- Benefits: reduction of total transport costs due to the decrease of administrative costs; potential reduction of internal costs due to the decrease of delays on vessels resulting from the elimination/simplification of administrative procedures; increase of utilisation rates of vessels due to extension of licenses (cfr. ARSS). |
| SA | Ship Agent | - Benefits: increase in labour productivity, as a consequence of "administrative time" reduction per single call (reduction of time spent preparing different documents and carrying out administrative procedures). |
| MA | Maritime Authority | - Costs: increase of administrative costs due to the alignment of the new single document, integration of port authorities and of electronic procedures;<br>- Benefits: reduction of internal costs due to the reduction of the time for carrying out procedures and simplification of different processes. |
| FO | Forwarder | - Benefits: reduction of costs in relation to a proportional decrease of administrative procedures and customs formalities (free circulation of EU goods within EU ports); reduction of costs related to a decrease of probability of delays mainly of the goods (door-to-door transport); potential decrease in the price of transport services. Potential increase in the service level, due to the increase of punctuality rate on goods. |

| Abbr | Stakeholder | How affected |
|------|-------------|--------------|
| Cs | Customers | - Benefits: reduction of costs for the transport of goods and potential decrease in the price of transport services: reduction of emissions, noise, pollution, road congestions, accidents, caused by the modal shift from road to maritime. |
| Ot | Other | - Other: Immigration police, Maritime Health. |

Source: IA-EMS

A set of impacts has been identified as possible effects of the proposed measures related to different policy options. The list of possible impacts has been developed in order to identify economic, environmental and social effects of the proposed policy options. A screening of the identified impacts according to the guidelines suggested by the EU is presented in the following table.

Table II– List of the main impacts

| Macro-category | Impact on: | Detailed description | Indicators | Effect |
|----------------|-----------|----------------------|-----------|--------|
| Economic | Higher efficiency and reduction of total transport costs | **Reduction of personnel costs:** reduction or standardisation of procedures could generate the savings in terms of FTE equivalent | FTE involved in carrying out administrative procedures | Benefit |
| Economic | Higher efficiency | **Cost decrease for reduction of delay on goods and improvement of punctuality rate:** reduction of time required for adm. procedures would produce a proportional reduction in the delays on goods | Average delay (hours) in door-to-door arrival of goods | Benefit |
| Economic/ Environmental | Competitiveness of shipping industry | **Cost decrease for time reduction of ship calls (minimal):** Reduction of potential delay in port because of the elimination/simplification of administrative procedures. Other impacts (negligible):<br>• Reduction of waiting times in port and possible extension of the origin/destination time: lower waiting time in port. Sailing times can therefore be extended, thus realising energy and economic savings;<br>• Decrease of overall sailing time: shipping frequencies can be increased (qualitative) | Benefit | Benefit |

| Macro-category | Impact on: | Detailed description | Indicators | Effect |
|---|---|---|---|---|
| Economic | Competitiveness of shipping industry and relative increase of total transport costs | **Administrative costs:** short-term increase of administrative costs, due to the harmonisation of procedures and to the management of the organisational stage of the standardisation programme; Long-run decrease of administrative costs. | All administrative costs (no personnel cost) | Cost |
| Environmental | Modal shift | **Reduction of external costs caused by modal shift:** Modal shift (Environmental effect) determines lower emissions of pollutants (shipping is environmentally friendlier than road/rail transport); Maritime transport cannot cover the overall transport of goods. The last part needs to be carried out with another mode of transport | Emissions, Global warming, Noise, Congestion, Accident costs, Infrastructure, Vehicle costs | Benefit |

Source: IA-EMS

# THE CBA: METHODOLOGY

In the framework of a wide set of measures bound to the implementation of a European Common Maritime Space, the CBA has both the theoretical consistency and the flexibility that enable to assess different kind of impacts, specific to single measures or actors, and include all of them into a unique economic value. The proposed methodological approach in order to quantify the costs and benefits of the CMS actions implies the use of elements of top-down and bottom-up approaches in order to assess different kinds of impacts. In particular:

- the environmental effects deriving from the overall modal shift achieved from the implementation of the CMS measures are assessed *top-down,* relying on expert opinions - expressed in the consultation process[1] - on the effectiveness of the measures ;

- a *bottom-up* approach has been used to quantify other kinds of costs and benefits, such as those related to the saving of time and costs in the port operations and in the transport chain.

The scheme of CBA approach can be summarised as in the following chart:
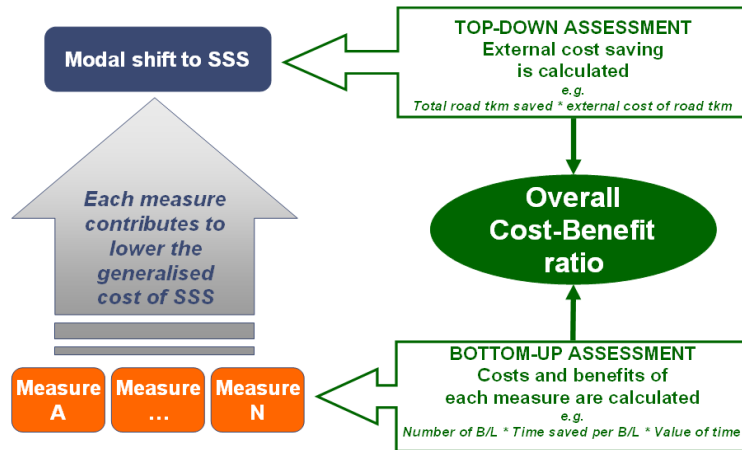
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[1] See note 6.

Figure I: Scheme of CBA approach

The left part of the chart shows the rationale of the adoption of the measures: each of them, in fact, contributes to make the use of SSS more attractive by lowering (via the different elements involved in each measure) the generalised cost of SSS, and this leads to the aim of achieving an additional modal shift from other modes to SSS at the European level.

Each measure has its own costs of implementation and its own benefits in terms of time and cost saving, and the bottom-up analysis is aimed at quantifying them. As a consequence of this mixed approach, three key methodological points have to be clarified:

1) How to assess the modal shift deriving from the policy measures.

2) How to monetise such modal shift.

3) How to assess costs and benefits connected to each measure.

As regards point (1), the assessment is done on the basis of the existing forecasts concerning the overall modal shift in Europe projected at the concerned time-horizon. This "baseline modal shift" is obtained via the elaboration of exogenous relevant information such as data from Eurostat or previous EC projects (namely, ISIC[2] and MCTP[3]) and singles out:

- the size of SSS in Europe in terms of ton*km in the years up to 2020;

- the amount of freight in tkm shifted to SSS from other modes in 2020;

- the amount of freight in tkm shifted from road to SSS in 2020[4];

- the amount of freight in tkm shifted from rail to SSS in 2020;

- the percentage size of modal shift to SSS out of the overall amount of SSS transport, in 2020

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[2] Zomer G. et al. (2006). ISIC is a study commissioned by the European Commission – DG TREN in 2005-6. A Cost-Benefit Analysis was developed, in which the baseline scenario of SSS in Europe at 2020 and the baseline forecast of modal shift was assessed following the assumption of TEN-STAC model (NEA et. al, (2003)) on Baseline socio-economic trends, basic policy actions, infrastructure assumptions, accompanying measures. In ISIC, the additional modal shift brought from measures such as standardisation of loading units, creation of intermodal development centres, education and training in intermodal, Quality Label and benchmarking system for teminals was assessed by a top down approach.

[3] Fiedler R. et al (2006). In MTCP, the total SSS traffic at 2020 was assessed using STAN model, and the modal shift to SSS brought by the implementation of new intra-EU "Motorway of the Sea" routes was assessed.

[4] This figure considers a detour factor that accounts for the fact that an SSS link generates two additional road hauls, one at each end of the door-to-door route.

Such data, especially the latter element, is considered as a basis for the assessment of the modal shift related to CMS measures. This modal shift would in fact be additional to the one assessed excluding the share related to ISIC actions[5], which are not to be considered as invariant and therefore are not part of the "baseline scenario". Furthermore, significant insights on modal shift forecasts have been taken as input from the consultation process which sided the IA-EMS[6] (hereafter, the "consultation").

As concerns point (2), the choice of external cost parameters has been made by taking into account several studies that have carried out analyses for the monetization of such phenomena, such as the Stern Review[7] as well as IMPACT[8] which also includes the review of the results of HEATCO, UNITE and INFRAS-IWW[9]. The final set of values has been taken from the ISIC study, since the subject of this study is closely related to the goals of the present analysis, and because such values have been explicitly validated by EC officials for the purpose of the CBA. Such parameters of unit external costs have been applied to the modal shift data in order to quantify the external benefits and costs deriving from the action. The ISIC – Task G figures are shown in the table below.

Table III –Key figures of external costs

| Key figures (in euro/tonkm) | Road | Rail | SSS |
|---|---|---|---|
| Air pollution | 0,0089 | 0,0046 | 0,0056 |
| Global warming | 0,0026 | 0,0046 | 0 |
| Noise | 0,0028 | 0,0009 | 0 |
| Accident costs | 0,0043 | 0,0014 | 0 |
| Congestion | 0,0113 | 0 | 0 |
| Infrastructure | 0,0043 | 0,0037 | 0,0034 |

Source: EC ISIC project (2006)

As regards point (3), each policy option will be analysed in order to:

a) define the costs and benefits related to its implementation

b) single out the actors, per port, which such costs and benefits can be referred to

c) assume a methodology to quantify them

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[5] See note 2.
[6] "Consultation on a European maritime space without barriers, reinforcing the internal market for intra-European maritime transport" launched by the European Commission at the end of 2007, with 52 stakeholders participating. http://ec.europa.eu/transport/maritime/consultations/2007_12_20_barriers_en.htm
[7] Stern (2006)
[8] INFRAS et al. (2008)
[9] INFRAS/IWW (2000) and (2004)

In the analysis carried out for the purpose of quantifying some of the impacts, several variables and data have been taken into account. It has been decided to base the calculation of the time related cost of full-time-equivalents (FTEs), on the number of B/Ls, rather than on the number of loading units or tonnes-km, since customs and other safety/security controls are performed on each "administrative" unit of cargo, regardless of its size. The assessment of the overall number of tonne/km was also accomplished, in order to make further considerations regarding the modal shift (from road to SSS) and the time saved in the carrying out of those procedures.

Different assumptions have been used for different types of cargoes. Whilst the approach described in the previous paragraph applies for short-sea container and Ro-Ro traffic, an assessment based on traffic performance (tonne-km) has been chosen for the dry bulk market, because of its nature (characterised by the overwhelming presence of tramp vessels, usually chartered by one or few customers). Also the "mixed traffic" routes have been examined, such as the Ro-Lo segment and the Ro-Pax one.

## MARITIME TRAFFIC AND SCOPE OF THE ANALYSIS

The following steps will explain the methodology used for the assessment of the average number of B/L per year in intra-EU SSS . A database  has been set up, containing all the data available on SSS connections, in which all the intra-EU liner maritime connections are shown, both for container traffic and for Ro-Ro traffic. Further elaborations on that database allowed the assessment of the number of intra-EU lines, their average frequency, the average number of ports called per line and the overall number of line loops per year. Matching the containers connections' data and the Ro-Ro ones it has been estimated the share of lines entirely dedicated and the share of mixed traffic lines. At a later stage, with further elaborations on the data on Ro-Ro lines, we analysed operators and fleets, as well as the number of lines used for the transport of passengers and private cars (Ro-Pax). In this way it has been possible to define the different typologies of intra-EU maritime cargo traffics, and to set the basis for further considerations on different cargo specificities (average load factors, average number of ports called per line and average liner frequency, conversion factors from loading units to bill of ladings). In the baseline scenario the assumptions concerning the variables are shown in the table:

Table IV – Intra EU maritime transport in EU-27, projections on the base-line scenario

| Variable | Base-line scenario (2009-2020) | | | |
|---|---|---|---|---|
| | *Container* | *Ro-Ro* | *Ro-Lo* | *Ro-Pax* |
| Vessel size | *Constant* | | | |
| Avg number of port calls per line | *Constant* | | | |
| Load Factor of vessels | *Constant* | | | |
| Avg number of B/L's per vessels | *Constant* | | | |
| Share of Regular lines | *Constant* | | | |
| Number of lines in the EU SSS market (2020) | 518 | 255 | 61 | 84 |
| Number of Bills of Lading in the EU SSS market (2020, per week) | 232,255 | 61,892 | 5,224 | 7,698 |

Source: capacity data from www.shortsea.info* (Finnish Customs)

*12<sup>th</sup> WCTR, July 11-15, 2010 – Lisbon, Portugal*

Moreover, it is assumed that the loading capacity of a line is split equally among each port-call. Therefore the number of Loading Units embarked/disembarked in each port of call considers the average number of ports called by each type of line, the capacity of the line and its overall Load Factor. It is assumed, finally, that – as observed in recent years – the container transport will grow at a faster rate (+1 pp yearly) than Ro-Ro transport. Since all other variables are assumed to be constant, the total number of lines and B/L's will grow proportionally with the traffic.

By considering a 62% share of Authorised Regular Shipping Services (hereafter ARSS) on the overall SSS lines, the evaluation has been divided into "non-ARSS" and "ARSS". The following table shows the data resulting from these elaborations.

Table V – Number of intra EU lines, divided by ARSS and non ARSS, and number of B/L

| Vessel type | Avg vessel's load | N. of intra-UE lines[10] | % ARSS | # ARSS lines | # Non ARSS lines | % embarks-disembarks/call | B/L per line | B/L per call | n. line loops/ year |
|---|---|---|---|---|---|---|---|---|---|
| Ro-Ro | 280 LU | 136 | 0,62 | 84,32 | 51,68 | 0,35 | 400,0 | 140,6 | 195,1 |
| Ro-Lo | 220 (80 LU, 140 TEU) | 39 | 0,62 | 24,18 | 14,82 | 0,24 | 170.3 | 41 | 153,0 |
| Container | 560 TEU | 308 | 0,62 | 190,96 | 117,04 | 0,24 | 448,0 | 105,8 | 67,2 |
| Ro-Pax | 64 LU | 74 | 0,62 | 45,88 | 28,12 | 0,49 | 91,4 | 45,1 | 415,5 |
| Tot. | | 557 | | 345,34 | 211,66 | | | | |

Source: IA-EMS

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[10] Cabotage excluded.

The two market shares have been considered separately in order to assess, within each status (ARSS and non-ARSS), the number of B/L used by EU goods and the number used by non-EU goods. In order to do this, it has been assessed the share of EU goods for each status. The percentages resulting from our inquiry are respectively 90% within ARSS and 50% within non-ARSS. The percentages of non-EU goods are consequently 10% in ARSS and 50% in non-ARSS.

Finally, by adding the overall number of B/L used for EU goods and the ones used for non-EU goods, without considering the service status, the overall number of B/L used for EU goods and the ones used for non-EU goods was found.

By employing the same methodology of the B/L assessment, considering the assumptions on vessels sizes and load factors , and the output resulting from the database on the number of intra-EU lines and their frequency, it is possible to extrapolate the number of tonnes carried by Authorised Regular Shipping Services on the total and overall volume of EU goods and non-EU goods carried each year by intra-EU maritime transport.

The variable level of delays in port (for administrative procedures) for vessels and goods has been processed on the basis of the evidences of some qualitative information gathered in the course of several interviews performed and on EC consultation's results. As it can be inferred from different sources, procedures related to controls in most cases do not generate a consistent delay on arrival/departure of vessels when the task is performed by a ship agent. The exception is that of customs procedures and procedures associated with dangerous goods. In any case, delays generated on arrival or departure of vessels are often of less than an hour for standard goods.

Goods suffer delays to a greater extent than vessels. The average time spent by a trailer waiting its load to be located, handled, and cleared, could be known only through occasional surveys.

# CBA: RESULTS

The application of CBA methodology led to the quantitative assessment of impacts for significant impact categories, per policy option, with the calculation and results described in the following paragraphs. A brief insight only will be sketched on the analysis made on administrative costs, which represent the "cost" side of the CBA.

**Quantification of the main costs of Policy Options**

*(A)    Investment + training cost*

*(B)    Operational costs*

The implementation of the different Policy Options will provide the different stakeholders with different added costs due to the design, organisation, planning, development and management of the specific programmes and structures needed. Moreover, the various Policy Options will generate the need (mainly for the EU, MSs) to create specific monitoring programmes or structures with the aim of understanding the real effectiveness of the maritime sector's performance.

For the purpose of this study all the costs related to administrative procedures have been split into:

☐ Cost of design/development (start-up);

☐ Training cost (start-up);

☐ On-going costs (update and running cost).

As considered in chapter 4, the main impacts of these costs are on MSs, customs (in relation to Policy Option B1) and Port Authorities (in relation to Policy Options B2 and C), that have to expect an increase of labour costs (measured as FTEs, Full Time Equivalent), due to specific programmes focused on the development of different measures.

A detailed description of all the administrative costs considered in relation to the measures within each policy option is presented below.

*Policy B1 (Authorised Regular Shipping Service + Dangerous Goods)*

Policy Option B1, as already mentioned in the previous chapters, deals with legislative issues and does not entail substantial impacts on the management and organisation of activities inside ports. Both measures act on the simplification or on the relaxation of current legislative solutions already in place. They do not involve a radical change of procedures of interface between the various entities in port. Also the harmonisation of dangerous goods procedures with other modes of transport (road and rail), while requiring a strong commitment in the design stage, leads to a substantial simplification of activities in port, without changing current organisational methods.

**Measure: Authorised Regular Shipping Service to be linked to the operator**

Extending the ARSS Licence to operators (instead of vessels) does not lead to changes in organisation and/or control systems of customs in port. On the contrary, it requires efforts due to changes and/or simplifications in the way authorisations are issued ex ante. Hence, administrative costs connected with this measure are assumed to refer to the legislative aspects, with a direct impact on the EU and MSs, rather than to individual customs agencies in port. It is hence assumed that:

☐ The change in the issuing of ARSS does not require a high financial effort for MSs. It can be managed with standard resources. For the purposes of this Study, such financial effort translates into the launch of a Working Group with the aim of designing and developing the legislative framework. It will require on average 1 FTE from each MS and 5 FTEs from the EU. The average cost per FTE amounts to €60,000 a year)

☐ The process of updating the new issuing characteristics of the ARSS Licence can be completed in a time range not longer than 1 year.

☐ In the phase of design and development, the effect on individual customs within ports is negligible. Indeed, customs offices in port will have to be in charge of the same activities with the same operational features. The difference with the BAU is due only to the mix between ARSS traffic (on the rise) and non-ARSS traffic.

On the basis of the assumptions made above, a financial effort of about €1.35 million at EU level has been considered, split among MSs (€1.1 million and the European Union (€0.25 million).

Moreover, it needs to be taken into account the cost of a training scheme for central customs and for local port operators. For the purposes of this Study, a cost item directly linked to MSs is quantified. The effect on single customs offices in port is considered negligible, under the assumption that training courses fall within ordinary training for agents. The total number of FTEs involved per port is 20 and the cost per course is €300 (unavailability FTE cost included for 1 day course and direct cost of the course). The financial effort in this training phase (totally on MSs) is assumed to amount to € 1.65 million, that is on average €0.08 million per MS.

Finally, it is necessary to set up structures for the monitoring of the Licences issued, of the use of vessels benefiting of ARSS and of the Community goods' traffic, as well as a database of the ARSS issued. Since the Licence is not associated to the vessel (but to the operator), it is necessary to be able to manage and control the issuing (which varies along time) of Licences to vessels performing Community traffic. Moreover, free circulation of Community goods within the EU in the case of the ARSS, can lead to a loss of information concerning trade between countries. For the purposes of this Study, a financial commitment of €1.1 million per year is assumed at MS level (on average €0.05 million per MS), for setting up this monitoring, control and reporting structure (on average, about 1 FTE per MS). In this case too, the cost item is to be totally attributed to MSs.

**Measure: simplification of regulations on carriage of dangerous goods in the case of "Authorised Regular Shipping Service"**

With regards to the measure on dangerous goods, it needs to be pointed out that the main aim is that national authorities, in cooperation with the industry, should agree on regulations regarding dangerous cargo that are harmonised between transport modes. The aim is the simplification of the regulations on dangerous goods, in the case of Authorised Regular Shipping Services ( rationale: certain parts of the RID/ADR Codes would be accepted for ARSS operators).

The European Commission, in cooperation with all Member States, should define a strategy for the implementation of the measure, with voluntary commitments in order to set projects for specific areas and corridors (for instance as in the MoUs Baltic Case). 4 Working Groups will be created, one for each MoU, with the aim of defining new rules concerning transport, loading, unloading, packaging, stowage and segregation of dangerous goods (some relaxations). They will be in charge of preparing the new legislation and updating the existing legislation. Each MoU will include a group of 3 to 5 MSs, requiring 3 FTEs per each MS involved, with an average cost of €60,000 a year per FTE.

Because of the nature of the activities, with issues linked to security and because of the need to activate transversal agreements between different modes of transport, it is assumed that the effort in terms of administrative costs has a fairly high impact on many stakeholders both in the maritime and in the road/rail sectors. For example, police, customs, border guards, maritime administration, rail administration, road administration, health authorities for workers' safety. The total cost for the Member States is estimated to be €34.3 million in 4 years.

Moreover, the establishment of an EU-wide Working Group will also be necessary, with the aim of supporting and coordinating the activities of specific regional MoUs, guaranteeing communication between various MoUs. This Working Group will require on average 5 FTEs (average cost of each FTE is €60,000 a year), working for 4 years and a total cost for the EU of €1.20 million in 4 years. The consequent overall financial effort amounts to about €35.5 million, for the design and development phase.

In this case too, a cost due to a training programme for the different local structures in ports will have to be considered. For the purposes of this Study, a cost item directly attributed to MSs is calculated, because MSs will have to be in charge of the training programme in single ports. In order to calculate training and administrative costs, the following assumptions have been made:

☐ Financial efforts have been evaluated as a function of the number of ports and of their size;

☐ It is assumed an average number of 20 FTEs per port to be trained (with reference to all stakeholders).

☐ The cost for each individual training amounts to €2,000 (unavailability FTE cost included for 10 days course and direct cost of course)

The total, one-shot, financial effort for this training phase is assumed to amount to about €11 million (on average, €0.5 million per MS).

Finally, it is necessary to consider the creation or the strengthening of structures linked to the control and monitoring of dangerous goods' traffic in ports, mainly for safety and environmental reasons. For the purposes of this Study, it is assumed that in each port, on

average, 1 FTE is dedicated to this, with a financial effort of about €13.4 million at the EU level. Such cost has to be entirely attributed mainly to port authorities.

The following table briefly summarises the administrative costs associated to Policy Option B1, on the basis of the assumptions described above.

Table VI – Total Administrative costs policy option B1(MEuro)

|  | *ARSS* | *DG* | *TOTAL B1* |
|---|---|---|---|
| Design/develop cost | 1.35 | 35.50 | 36.85 |
| Training cost | 1.65 | 11.00 | 12.65 |
| Ongoing cost  (per year) Monitoring, update, running etc. | 1.01 | 13.40 | 14.41 |

Source: IA-EMS, Consultation results and Interviews

*Policy Option B2: electronic data transmission + single window + English language + single document*

The development of the activities linked to Policy Option B2 appears to be rather complex, since it has an impact not only on the partial/total simplification of "operational aspects", but also on the overall organisation of information flows and consequently on the organisation of activities among the various actors in port. The development of this Policy Option involves in its operational stage nearly all public and private port offices. Its substantial action of improvement is aimed at defining a dynamic and flexible front-office organisation in port, which allows speeding up administrative operations on vessels and goods, which require the physical interface of different actors. At the same time, it is envisaged the planning of a process of back-office information interface among the various entities in port, in order to share information in an efficient and timely way. It is clear how the effort in terms of FTEs (time and costs) results to be substantially higher than for Policy Option B1.

As considered in the Cause-Benefit Analysis, there are three different phases that can be identified:

☐  Setting up of organisations and necessary structures to plan the implementation of the new reorganisation of processes and information flows (physical and IT)

☐  Development of the projects designed and training of the different actors that will manage the activities related the projects;

☐  Control of all the structures organised in order to manage the new processes and activities already set up.

On the basis of the analysis performed, evidences about each single measure contained in Policy Options B2 are described in detail below.

**Measures: one stop shop-and electronic data transmission (single windows concept)**

In order to calculate the cost of designing and implementing an electronic information system in the EU for the quick processing of information and procedures, different projects currently ongoing within the EU have been considered and analysed.

In particular, the following assumptions have been considered within the analysis in order to assess the total potential administrative costs:

☐  The average start-up cost (design and development cost) has been set at €2 million per port for the IT project; total development time has been assumed to be 6 years. the average cost and time for the development of such an electronic data interchange system has been obtained via the elaboration of relevant information gathered from various similar projects, such as PortNet (in Finland), Portinfolink (Rotterdam), Short Sea XML etc. It is important to underline that this figure could be considered as an upper bound in order to

assess the worst case within the cost-benefit analysis. PortNet Finland and Short Sea XML registered a total cost respectively of €1.2 million and €1.8 million, and they are used by different entities and counterparts (for instance PortNet is used nationwide for vessels traffic in Finland – 20 ports). It is quite possible that MSs could obtain scale economies with the application of a unique framework at national level or by adopting a European best practice solution.

☐ Design and development costs have been differentiated in relation to a detailed cost structure depending on specific cost drivers differentiated between MSs (for instance, number of licences, average size of ports and level of IT friendliness). In particular, the total investment depends on:

- Adaptation costs depending on documents' format complexity, partners' skills, complexity of the processes, IT infrastructure;

- Licence cost, depending on complexity of messaging software and number of installations (assumed proportionate to the number of ports). The cost of Licence is assumed to be € 150,000 per port maximum (one-off cost) and the total amount of the cost of licences depends on the complexity of the IT network.

- Other costs, such as document type conversion cost, connection set-up costs.

☐ It has been considered, for each MS, a qualitative level of IT friendliness of countries depending on the existence of e-information projects (planned or operational), current operating systems that allow paperless administrative procedures. It has been assumed that countries with low degrees of IT friendliness would face higher costs than countries with medium or high degrees of IT friendliness. In particular the following clusters were identified:

- High level of IT friendliness (low impact on total start up cost): Belgium, Finland, Germany, The Netherlands, Finland and the UK;

- Medium Level of IT friendliness (medium impact on total start up cost): Denmark, Ireland, Greece, France, Italy, Cyprus, Malta, Poland, Portugal;

- Low Level of IT friendliness (medium impact on total start up cost): Bulgaria, Estonia, Latvia, Lithuania, Romania, Slovenia.

In terms of FTEs, each Member State would establish a Working Group, to develop operations and IT systems at Member States' level. It would require 2 FTEs: a Project Manager and a Programme Manager. The final result is that such system would present a total start-up cost at MS level of €56.1 million (average cost per MS of €2.55 million).

At EU level, it would be necessary to establish a Working Group with the aim of designing and developing operations in relation to electronic systems and strategies, coordination of the legal aspects, operational activities (pilot projects) and training of new IT solutions. It

would require on average 2 FTEs (average costs per FTE: €60,000/year), for 4 years. Moreover, by taking the LRIT Project (EMSA) as a benchmark, the cost of IT would amount to €1.8 million. Hence, the total startup cost at EU level would be of €2.28 million. Therefore, overall start-up costs (MSs and EU) would amount to €58.38 million.

Concerning the training phase, a first-level training programme for local structures (local coaches/tutors) in the ports of each MS would be necessary. It would involve 2 FTEs per port and each course would cost €1,500 (including the cost of the unavailability of the FTE for 1 day course + direct cost of the course). The second-level training would be on-the-job with the local coach/tutor. The total cost of the training phase (at MSs' level) would be €0,83 million (on average €0,04 million per MS).

Finally, the ongoing phase would be at the EU's and at MSs' level. At EU level, it involves monitoring and running costs for the IT system (human resources, operations maintenance and hosting, message costs). It amounts to €5.5 million. At Member States' level, the running costs for the IT systems include: the annual update of the actual release (soft training courses); systems' maintenance and Help desk; data monitoring. They amount to €22.5 million (on average, €1.25 million per MS and €0.07 million per port). Hence, the overall ongoing costs at EU and MS's level amount to €28 million.

**Measure: single document**

As already illustrated in the previous chapters, the programme of harmonisation and simplification of all documents used in port requires a strong effort on the side of the MSs, in order to define agreements and common guidelines for increasing efficiency and standardisation at EU level. It needs to be pointed out that projects of such size may require consistent time ranges for their application and full transposition by the MSs (as it is shown by the harmonisation project of IMO-FAL forms, launched in the year 2000 and not yet completely implemented by the MSs – 95% implementation). In order to calculate the total cost of implementing a Single Document, it has been assumed an implementation period of 3 phases.

The European Commission aims at defining the guidelines that allow the start-up of the planning of the new process describing the main targets, in particular:

☐ Documental simplicity, ensuring the minimum number of documents involved (single document concept);

☐ Harmonisation of the procedures between different actors and different countries to allow the use of a single information flow;

☐ Extensive use of the contributions from previous "document simplification projects" (for instance, IMO-FAL forms etc);

☐ Availability of a documental framework that allows procedures and documents related to be processed electronically. It needs to be underlined that the Policy's ultimate objective is the complete computerisation of procedures. The use of a single document is not necessarily related to the paper format.

The Working Group must necessarily involve all MSs, with the supervision of the European Commission. It will have to ensure the participation of representatives from the various players in charge of procedural and organisational aspects in port, such as: port authorities, customs, maritime authorities, maritime health, veterinary directorate, etc.

In the first phase (planning and development), it is assumed an average effort of about 2 FTEs per MS (depending on the number of ports of each MS and on the type of their traffic, with an average cost of €40,000 per FTE), 5 FTEs from the European Commission (average cost: €60,000 a year per FTE) and 2 external experts (350 working days a year). This phase is meant to last for 2 years. The total cost for the Member States would amount to €3.76 million in 2 years (€0.23 million per MS). The total cost for the EU would amount to €1.20 million in 2 years. The overall cost associated with the design and development phase would then amount to €4.96 million.

In the second phase (pilot projects and monitoring), a number of pilot projects will be launched in some ports, and they will be closely monitored. It will be necessary to set up an EU-wide Working Group with the aim of monitoring all the pilot projects, the effects and the feedbacks of the measure. 3 FTEs will be necessary on the side of the EU, for an average duration of 3 years and an average cost per FTE of €60,000 a year. Therefore the total cost for the EU would be of €0.45 million in 3 years. At MSs' level, on average 2 FTEs will be necessary per each MS, for an average duration of 3 years and an average cost per FTS of €40,000 a year. The total cost for the Member States would be of € 5.64 million a year (on average €0.29 million per MS). Hence, the overall ongoing cost (only 3 years) would amount to €6.09 million.

Ongoing costs have been assumed to be negligible, and already quantified in relation to electronic data transmission. All the costs described are mainly to be attributed to MSs: the funds for implementing these projects will be made available by the Member States.

**Measure: use of English as second official language**

The development of a wider use of the English language in port, as already pointed out, cannot be imposed with legal actions. Yet, the European Commission can stimulate actions aimed at promoting the use of the English language in ports, by means of a policy of incentives, aimed at organising language courses.

Implementation of this measure can, as a result, be associated mainly to the organisation and financing of such courses inside European ports. The only costs which emerge (assumed to be entirely at the Commission's expense) are the costs for the training of the staff in ports in English language skills. For the purposes of our study, it has been assumed a heterogeneous financial effort, depending on the current level of English friendliness of ports: three clusters of countries have therefore been identified.

☐ High level of English friendliness (low impact on total start-up cost): Belgium, Denmark, Finland, Germany, Ireland, Malta, Netherlands, Finland and UK;


☐ Medium level of English friendliness (medium impact on total start-up cost): Greece, France, Italy, Cyprus, Poland, Portugal;


☐ Low level of English friendliness (high impact on total start-up cost): Bulgaria, Estonia, Latvia, Lithuania, Romania, Slovenia.


Moreover, costs for English language training depend on the total number of ports in countries and on the average number of staff (only front-office) per port that need to take these English classes. For this reason, it has been assumed an average number of staff of 75 (customs, port authority, etc) and a single course programme cost of 1000 €.


On the basis of what has been assumed, it can be inferred that this measure requires a financial effort of about €5.0 million, at the Member States' expense (about €0.23 million per MS). The following table briefly summarises the administrative costs associated to Policy Option B2, on the basis of the assumptions described above.


Table VII – Total administrative costs Policy Option B2(million Euros)

|  | *1. One stop and Elect data transm.* | *2. Single document* | *3. Use of English* | *TOTAL B2* |
|---|---|---|---|---|
| Design/develop cost | 58.38 | 4.96 | ≈ 0 | 63.34 |
| Training cost | 0.83 | ≈ 0 | 5.03 | 5.86 |
| Ongoing cost  (per year) Monitoring, update, running etc. | 28.0 | 6.09 | ≈ 0 | 34.09 |

Source: IA-EMS on Consultation results and Interviews


From the Table above, it emerges that the start-up cost for Policy Option B1 amounts to €63.34 million, of which €58.38 million are needed for one-stop-shops and electronic data transmission. In terms of ongoing costs they amount to €28 million per year, and they are attributable to one-stopshops and electronic data transmission. The total costs for Policy Option B2 are therefore: design/development cost: €63.34 million; training cost: €5.86 million; ongoing costs: €34.09 million.


*Policy Option C:Maximum Elimination of administrative procedures*

In order to quantify the administrative costs connected with Policy C, it is important to underline that such solution represents the sum of the measures contained in the previous two Policy Options (B1 and B2), in terms of development and implementation of the various legislative and operational activities.

Hence, for the purposes of our study, total design and development costs are assumed to be the sum of the ones associated to Options B1 and B2.

On the contrary, it is possible to assume that training, project, monitoring and ongoing costs (where evaluated) can be relatively reduced, compared to the sum of their respective costs of Policy Options B1 and B2. Indeed, there are synergies that can be exploited in order to obtain consistent economic savings. In particular, a substantial part of the costs linked to Policy Option B1 from the training ad ongoing phases have been halved, since they were already taken into account by Policy Option B2.

In relation to ongoing costs, the structure (1 FTE per port) dedicated to the control and monitoring of dangerous goods' trade/traffic has been halved in relation to the new IT system that could automatically provide the monitoring of the information (roughly: 7 M€)

The following table summarises total start-up and ongoing costs for each Policy Options.

Table VIII – Total Administrative costs (MEuro)

|  | TOTAL B1 | TOTAL B2 | TOTAL C |
|---|---|---|---|
| Design/development cost | 36.85 | 63.34 | 100.19 |
| Training cost | 12.66 | 5.86 | 18.52 |
| Ongoing cost  (per year) Monitoring, update, running etc. | 14.41 | 34.09 | 34.93 |

Source: IA-EMS, Consultation results and Interviews

From the Table above, it emerges that Policy Option C results to be the Option with the highest startup costs (€100.19 million) and ongoing costs per year (€34.93 million). The second most expensive Policy Option is B2, with total start-up costs of €63.34 million, and ongoing costs per year of €27.50 million. The least costly Policy Option is B1, start-up costs of €36.85 million and ongoing costs of € 14.41 million.

**Internal benefits of Policy Options**

*(D)    Personnel costs savings*

*Policy B1 (Authorised Regular Shipping Service + Dangerous Goods)*

By linking the Licence of "Authorised Regular Shipping Service" (ARSS) with shipping operators and routes and not with single vessels (as required by the existing regulations), many operative benefits to operators would be produced. In particular, the Licence would apply to all the vessels belonging to an operator, guaranteeing a higher flexibility in the management of its fleet and the possibility to use the simplification of customs formalities allowed by the ARSS in a higher number of lines/port calls. The reduction in vessels' turnaround times and the reduction of time spent carrying out all customs formalities would translate into a direct reduction of person-hours per call saved and FTE employed in ports.

In particular, it is important to underline that the differences in terms of time spent carrying out the different procedures are restricted to the proof of the Community status of goods, to the Presentation,  the Summary Declaration and Transit Procedures. All the figures considered are based on a bottom-up analysis based on input received during the consultation process .

Considering the market shares for EU and non-EU goods described in the previous sections, for both kinds of vessels (ARSS and non-ARSS vessels), it is possible to figure out the average time reduction in relation to the baseline scenario and Policy Opion B.1 scenario.

The following table shows the times required for carrying out all the procedures, in the case of ARSS vessels and non-ARSS vessels, with EU and non-EU goods.

Table IX – Time required for carrying out all procedures (ARSS and no ARSS vessels – man-hours/call)

| | Share (EU Goods) | | Time for Custom Formalities (h/call) | | |
|---|---|---|---|---|---|
| | EU Goods | Non EU Goods | EU Goods | Non EU Goods | Ave Weighed |
| **ARSS** | 90% | 10% | 0 | 1.4 | **0.27** |
| **Non ARSS** | 50% | 50% | 1.96 | 0 | **0.59** |

| | |
|---|---|
| ***TOTAL Weighted TIME - % Reduction*** | **- 54%** |

Source: IA-EMS, Consultation results and Interviews

Table X – Time required for carrying out all procedures (PO B1 scenario –man- hours/ call)

| | BAU | PO B1 (ARSS -effect) | Delta (B1-BAU) |
|---|---|---|---|
| **ARSS** | 62% | 75% | +13% |
| **Non ARSS** | 38% | 25% | -13% |

| | | | |
|---|---|---|---|
| *TOTAL Weighted TIME (h/call)* | 0.39 | 0.35 | -0.04 |
| ***TOTAL Weighted TIME - % Reduction*** | | | **-11%** |

Source: IA-EMS, Consultation results and Interviews

It can be inferred from the table above that there is a weighted average of a 11% time reduction  considering the Base line scenario and the Policy Option B.1 scenario. This effect will be assessed only for the intra-EU market and in relation to customs formalities.  It is clear

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that the entire benefit, associated with the time reduction, is not here perceived. Only the marginal benefit is assessed (the marginal increase of authorised lines on the current ones). Moreover, the vessels are assumed to carry both EU goods and non-EU goods.

Another measure/action considered within this Policy Option consists in facilitating the maritime transport of dangerous goods. The EU and/or national authorities in co-operation with the industry should agree on regulations regarding dangerous cargo that are harmonised between transport modes.

The rationale of this action would be that certain parts of the RID/ADR Codes would be accepted for ARSS operators. The rules concerning transport, stowage and segregation of dangerous goods (DG) would continue to apply, in accordance with the IMDG Code, but with some relaxations in case of goods transferred within EU.

The total time involved in carrying out different procedures in port in relation to Dangerous Goods would be reduced and a direct saving in terms of Full Time Equivalents would be generated.

It important to underline that the net effect of this action has to be considered only on Packaged DGs (PDGs) because the IMDG code does not apply to other DGs, for instance carried in bulk (where goods are loaded directly into the cargo hold in the ship without any further containment). For this reason, the impacts in terms of benefits and costs have been considered only on PDGs that could be estimated as 5% of total intra-EU market.

In order to assess the total time reduction in relation to the simplification of the DGs procedure, it has been considered an average weighted reduction time of 50% in relation to the baseline scenario.

The following table shows the reduction of time spent in port carrying out administrative procedures for DGs, in the case of Policy Option B.1, compared to the baseline scenario.

Table XI – Time involved to carry out DG procedures (man-hours per call - policy B1 scenario)

|  | **Base Line Scenario** | **PO B1 (DG Effects)** | **Total reduction** |
|---|---|---|---|
| PDG Share (on total goods) | *5%* | *5%* |  |
| Time for Document Preparation (h/call) | 1.45 | 0.73 | **-50%** |
| Time for carrying out procedures in port (h/call) | 1.31 | 0.76 |  |
| **TOTAL Weighed TIME (h/call)** | **2.76** | **1.49** |  |

Source: IA-EMS on Consultation results and Interviews

From the table above, it is clear that there would be a total time reduction of 50% per port call. Since PDGs are assumed to be 5% of the total goods carried by the ship, then the net

benefit would greatly be reduced. In terms of personnel cost saved, the advantages of the implementation of Policy Option B1 (ARSS + DGs) amount to an average of 0.7 million Euros per year.

*Policy Option B2 (electronic data transmission + single window + English language + single document)*

The use of information and communication services offers different stakeholders direct advantages in terms of time and money. Optimisation of the administrative processes in the transport chains (one-stop-shops), and the development of on-line information and communication services to boost the efficiency levels of customers (and of information systems) generate cost reductions, and quality improvements in information flows. The total percentage reduction of average time and costs related to the administrative procedures in ports for Policy Option B2 has been calculated considering the following evidences:

☐ The establishment of one-stop administrative shops inside port areas (a single desk, where all paperwork would be dealt with or where e-information would be sent to/from) could produce at least a 50% reduction in the time spent by different agents in port communicating with the various counterparts (Port Authority, Customs, etc..) . As general rule, two counterparts in port are the major points for data reporting in port: the customs declaration and other formalities on goods are handled directly between ship agents and customs (only dangerous goods are handled between ship agents and port authorities).

☐ An analysis on different administrative procedures and documents requested by EU ports highlights that the introduction of a uniform standard form (single document) produces an important percentage reduction in the documents' preparation time. Because of the elimination of redundancies, such time reduction could range between 60% and 80% of the total time needed to produce all the different documents (roughly 10-15 pieces of paper per vessel's arrival/departure).

☐ The introduction of an electronic information system generates a faster, more efficient and reliable notification process that could allow the reduction of the administrative burden and of the time spent for communications in port. For instance, a direct benefit could be that different stakeholders in port would not store paper documents anymore (as opposed to minimum one fax + 8 copies per ship call before), or would drastically reduce the total number of faxes to be sent (by 50-70%). Such figure on the potential reduction time is confirmed by a deeper interview carried out in port of Antwerp, after then consultation.

☐ Moreover the use of English as the second official language could produce a direct benefit in relation to the reduction of time spent in port in preparing document (all documents written in English have to be legally valid across the EU) and carrying out different procedures. However, because of the difficulties to force Member States to use English as an official first language, this effect has been considered negligible in relation to the other effects of the measures within Policy Option B2.

The following table summarise all the potential time reductions in port for carrying out administrative procedures in the case of Policy Option B2.

Table XII – Impacts on potential time reductions due to different Measures (PO B2)

| Measure | T-doc | T-port | Tot Time |
|---|---|---|---|
| One-stop shop | Low | High ≥50% | -50% |
| Single document | High ≈ -70% | Medium | -70% |
| Elect. Data transm. | Low | High (→0 FTE) | -50% |
| Use of English | Negligible | Negligible | Negligible |
| TOTAL | -70.8% | -50.0% | **-59.3%** |

Source: IA-EMS

In the statements made above, it has been assumed that the average time reduction in relation to the total time spent in ports to carry out the different administrative procedures ranges from 65 to 75%. From the table above, it can be inferred that for the purpose of the Impact assessment, the total time reduction has been set at 59.3%.

In terms of personnel costs saved, the advantages of the implementation of Policy Option B2 amount to an average of 11.8 million Euros per year.

*Policy C1 (Policy Option B.1 + Policy Option B.2)*

It important to underline that, in relation to personnel cost reduction, Policy Option C contains all the benefits considered within Policy Options B1 and B2. Hence, for the purpose of the Impact Assessment, the cost reduction time as been considered as the weighted sum of the total time reduction (T Red) of Policy Options B1 and B2, in particular:

T Red (C )= T Red (B1) Custom Formalities and DG procedures + T Red (B2)other procedures

The table below shows the percentage time reduction (documents' preparation time and reporting time) in Policy Options B1 and B2, as compared to the baseline scenario.

Table XIII – Percentage of time reduction in respect to the baseline scenario

| | **B1** | | **B2** | **C** |
|---|---|---|---|---|
| | ARSS Effects on customs formalities | DG Effects only on PDG (5% of total) | | |
| % reduction in Documents' preparation Time | -9% | -50% | 70.8% | 69.5% |
| % reduction in Reporting obligation Time in port | -28% | -50% | -50.0% | 49.5% |

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| Average TOTAL time for carrying out procedures (h) | -11% | -50% | 59.3% | 59.1% |
|---|---|---|---|---|

Source: IA-EMS on Consultation results and Interviews

From the table above, it can be inferred that Policy Option B.1 would generate an average time reduction of 50% in the case of PDGs (assumed to be 5% of total cargo), while of 11% in  the case of vessels operating under an ARSS.  In the case of Policy Option B.2, the time saving would be even higher: 59.3%.

In relation to the reduction of personnel cost, the following table shows the reductions, expressed in Euros, associated with the three Policy Options B1, B2 and C.

Table XIV – Reduction of total personnel costs per call (Euro)

|  | BAU | B1 | B2 | C |
|---|---|---|---|---|
| TOTAL COST per call (base case) | 287.8 | 286.1 | 119.4 | 116.4 |
| DELTA Cost per call on Base Line scenario | - | 1.77 | 168.42 | 171.34 |
| **Percentage of cost reduction per Call** | **-** | **0.6%** | **58.5%** | **59.5%** |

Source: IA-EMS on Consultation results and Interview

From the table above, it can be inferred that Policy Option B1 would generate an average personnel cost reduction per call of 0.6%, while Policy Option B.2 would generate a cost reduction of 58.5% and Policy Option C would generate a saving of 59.5% on the personnel cost per call.

### (E)    Ship cost savings

As considered before, the time spent by vessels in port is connected to operative activities and is not due to the carrying out of administrative procedures (both customs and administrative). It is therefore assumed that time savings in port, resulting from the Policy Options, do not produce a time saving in terms of ship calls. Moreover, as it has already been argued, it is very unlikely that a vessel is subject to delays because of activities connected with administrative procedures. If and when such delays do occur, they are not higher than 1 hour, as it turned out from our evaluation and from the consultation. Similarly to what has been done for delays on goods, in order to calculate such potential delays, it has been evaluated the probability of reduction of delays. In this case too, it has been assessed the impact relative to the reduction of time for port operations. Unlike the case of goods, a discount ratio has not been considered, because the delay for carrying out procedures leads directly to a delay on vessels.

The following table shows the general delays on arrival and departure of ships, expressed both in percentage and hours per call, for each Policy Option.

Table XV – General delays on arrival and departure (percentage, hours per call)

| | Delay On vessels | Percentage reduction of delay on vessels | | | Delay on vessels | | |
|---|---|---|---|---|---|---|---|
| | BAU | PO B1 | PO B2 | PO C | PO B1 | PO B2 | PO C |
| Formalities on vessels | 0.56 | 1% | 44% | 59% | 0.55 | 0.31 | 0.23 |
| Formalities on Goods | 0.52 | 4% | 43% | 62% | 0.50 | 0.28 | 0.20 |
| Dangerous Goods | 0.55 | 50% | 30% | 50% | 0.27 | 0.38 | 0.27 |
| Phytosanitary | 0.32 | 0% | 30% | 30% | 0.32 | 0.22 | 0.22 |
| Animal origin | 0.18 | 0% | 30% | 30% | 0.18 | 0.13 | 0.13 |

Source: IA-EMS (2008)

As considered before, in order to calculate the time-related costs of ships, an average hourly cost of rent of a ship has been considered (see the following table).

Table XVI – General cost reduction related to the decrease of delays on vessels. (Euro/call)

| | Ship cost per hour | BAU | Policy Option B1 | | Policy Option B2 | | Policy Option C | |
|---|---|---|---|---|---|---|---|---|
| | | Cost/call | Cost/call | Δ BAU | Cost/call | Δ BAU | Cost/call | Δ BAU |
| Container | 476 | 266,56 | 261,80 | 4,76 | 147,56 | 119,00 | 109,48 | 157,08 |
| Ro-Ro | 625 | 325,00 | 312,50 | 12,50 | 175,00 | 150,00 | 125,00 | 200,00 |
| Ro-Lo | 625 | 343,75 | 168,75 | 175,00 | 237,50 | 106,25 | 168,75 | 175,00 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Bulk | 1250 | 400,00 | 400,00 | 0,00 | 275,00 | 125,00 | 275,00 | 125,00 |
| Ro-Pax | 625 | 112,50 | 112,50 | 0,00 | 81,25 | 31,25 | 81,25 | 31,25 |
| Weighted Average | | 277,79 | 258,83 | 18,97 | 169,31 | 108,48 | 139,98 | 137,82 |
| **Percentage of cost reduction on the Base line scenario** | | | | **-6,8%** | | **-39,1%** | | **-49,6%** |

Source: IA-EMS (2008)

The Table above shows that Policy Option B2 and C would produce a total cost reduction on the baseline scenario between of 39% and 49%, while Policy Option B1 would produce a reduction of 6.8%.

In terms of cost saved in relation to the reduction of delays on vessels, the advantages (quite minimal) of the implementation of the different Policy Options correspond to an average ranging between 0.5 million Euros (Policy Option B1) to 3.2 million Euros per year (Policy Option B2 and C).

*(F)      Time cost savings (improvement of punctuality rate for goods in door-to-door transport)*

The total costs for administrative formalities depend not only on the total time required to carry out the procedures (in terms of FTE equivalent), but also on the potential delays that would be generated in relation to the expected and scheduled times for goods in the door-to-door transport chain. The reduction of the time required for carrying out the different administrative procedures would produce a proportional reduction in the delays on goods caused by these administrative formalities.

The cost decrease is then calculated taking into account the time costs arising from the application of intrinsic values of time to specific goods. Differently from "time related costs" (i.e. costs proportional to a time unit, e.g. labour costs per hour, etc.), time costs are an implicit factor of the generalised transport cost function, although not directly perceived as a monetary expense by the stakeholder demanding a transport service (e.g., the shipper), or affected by a delay in the door-to-door transport chain (e.g., the consignee)[11].

The assessment of "time costs" is necessary because delays have to be associated only to the increase of time spent by the cargo in ports for carrying out the different procedures, and not only with the time spent by the operators preparing different documents (usually this phase starts before vessels' arrival);

Hence, for the purpose of calculating the decrease of the delay probability due to the implementation of the policies, a "discount rate ratio" has been considered, thus evaluating the effect of the "reduction of benefits", according to the different procedures.

A higher index has been considered for Policy Option B1, since such policy directly affects free circulation of EU goods and is aimed at decreasing controls and inspections on vessels operating under an ARSS.  Similarly, simplifications on DGs produce a high impact on the potential delays of goods. Therefore, the effects of time reductions in port directly affect the probability of reduction of delays.  The reduction factor has been set at 50% of the total effects of the time reductions for carrying out procedures in port (not for documents' preparation time).

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[11] For a complete definition of "time costs" and its components, vs. "time related costs", see ZEW et al. (2000).

On the contrary, for Policy Option B2, it has been chosen a low level of impact reduction, since such measures mainly affect the management and the speeding up of information flows.  They do not affect free circulation of goods or the reduction/elimination of specific controls or inspections in port on particular types of goods. According to inputs coming from the consultation, the reduction factor has been set at 20% of the total effects of the time reduction for carrying out procedures in port.

In the case of Policy Option C, for precautionary reasons, a low impact in the potential reduction of delays has been considered.  This result is explained by the fact that the solutions envisaged by Policy Option B1 affect only partially the total effect of Policy Option C (B1 and B2), since such option produces effects only on a small percentage of procedures in port (customs procedures and procedures relating to dangerous goods) and only on a small percentage of goods (EU goods and DG goods).  The reduction factor has been assumed to be 20% and it has been calculated on the effects on time in port for carrying out port procedures for Policy Options B1 and B2.

The final delay probability has been assumed to be equal to the delay percentage, weighted on the basis of the answers provided by stakeholders to the questionnaires and to the consultation.

The following table summarises the degrees of reduction factors for each Policy Option, the delays considered for base line scenario and the delays assumed in the different Policy Options scenarios.

Table XVII – General delays on arrival and departure (percentage, hours per call)

| | Delay On goods | Percentage reduction of Delay on Goods | | | Delay on goods | | |
|---|---|---|---|---|---|---|---|
| | BAU | PO B1 | PO B2 | PO C | PO B1 | PO B2 | PO C |
| *Discount rate ratio* | | *50%* | *20%* | *20%* | | | |
| Formalities on vessels | **0.80** | 1% | 21% | 21% | **1.24** | **1.06** | **0.36** |
| Formalities on Goods | **0.77** | 7% | 25% | 31% | **0.78** | **0.62** | **0.44** |
| Dangerous Goods | **0.95** | 40% | 25% | 40% | **0.57** | **0.72** | **0.57** |
| Phytosanitary | **3.45** | 0% | 25% | 25% | **3.45** | **2.59** | **2.59** |
| Animal origin | **2.50** | 0% | 25% | 25% | **2.50** | **1.88** | **1.88** |
| Other standard goods | **1.42** | 7% | 25% | 31% | **0.99** | **0.75** | **0.84** |
| **Weighted average delay on goods** | **1.48** | **8%** | **25%** | **30%** | **1.07** | **0.83** | **0.82** |

Source: IA-EMS on Consultation data (2008)

The total costs related to the delays on goods have been considered depending on several factors, such as specific types of ships (container, Ro-Ro, Bulk, etc..), specific types of cargoes (Standard, Animal, DG, etc…), probability of delays of specific groups of port

procedures in relation to the standard expected times. For this purpose, the value of time per ton of goods per hour has been considered.

As concerns unit values of time, reference figures have been taken from HEATCO  and applied to all traffic typologies , except bulk. For the latter traffic, an average of values of time for specific commodities, usually carried in bulk, has been applied taking SCENES reference values .

It is worth recalling that freight transport's value of time is usually composed by three factors :

☐       Inventory costs (IC): corresponding to the traditional notion of immobilization of an asset, as typically used in any company's accounting procedures when estimating the costs of storage and warehousing. While the goods are being transported, they do not generate any added value, and therefore generate a financial cost to its owner, which is usually estimated on the basis of standard rates.

☐       Loss of value related to the delay with which the consignment reaches its destination, as a deviation factor for the user in planning its activity;

☐       Spoilage costs, defined as the loss of value resulting from a deterioration of the quality and usability of the goods as a consequence of the delay.

HEATCO model appears to incorporate those factors when deriving standard EU-27 reference figures. Thus those figures can be applied as "safer" reference values of time for measuring the benefits related to the decrease of delay probability.

Table XVIII – General cost reduction related to the decrease of delays on door-to-door transport. (Euros/tonne; Euro/call)

| | Value of Time applied | BAU | Policy Option B1 | | Policy Option B2 | | Policy Option C | |
|---|---|---|---|---|---|---|---|---|
| | | Cost/call | Cost/call | Δ BAU | Cost/call | Δ BAU | Cost/call | Δ BAU |
| Container | 1.22 €/t*h | 8055.9 | 7873.0 | 182.9 | 7300.0 | 755.9 | 7300.2 | 755.7 |
| Ro-Ro | 2.98 €/t*h | 16871.7 | 16488.6 | 383.1 | 15288.5 | 1583.2 | 15289.0 | 1582.8 |
| Ro-Lo | 2.98 €/t*h | 5807.7 | 5675.8 | 131.9 | 5262.7 | 545.0 | 5262.8 | 544.8 |
| Bulk | 1.02 €/t*h | 18050.9 | 17641.1 | 409.9 | 16357.1 | 1693.8 | 16357.5 | 1693.4 |
| Ro-Pax | 2.98 €/t*h | 5412.1 | 5289.2 | 122.9 | 4904.3 | 507.9 | 4904.4 | 507.7 |
| Average | | 10839.7 | 10593.5 | 246.1 | 9822.5 | 1017.1 | 9822.8 | 1016.9 |
| **Percentage of cost reduction on the Base** | | | **-2%** | | **-9%** | | **-9%** | |

| | Value of Time | BAU | Policy Option B1 | Policy Option B2 | Policy Option C |
|---|---|---|---|---|---|
| **line scenario** | | | | | |

Source: IA-EMS (2008)

The Table above shows that Policy Option B2 and C would produce a total cost reduction on the baseline scenario of 9%, while Policy Option B1 would produce a reduction of 2%. In terms of costs saved in relation to the reduction of delays on goods, the advantages of the implementation of the different Policy Options correspond to an average ranging between 16.2 million Euros (Policy Option B1) to 102.4 million Euros per year (Policy Option B2 and C).

## External benefits of Policy Options

### (H)    External costs saved by modal shift

By improving the internal efficiency of SSS, the policies determine a modal shift from road and rail to maritime transport. Thus, there is a positive impact in terms of reduction of external costs.

Following the top-down approach and the reference sources described above, a total SSS transport performance of EU goods has been assessed in to 1,115,906 ton-km at 2020 .

The modal shift in favour of SSS in the base-line scenario in 2020 is estimated according to the STAN model running performed in the EC "ISIC" project. From its results it can be derived that the SSS modal shift in 2020 in absence of the ISIC actions themselves amounts to 17,591 million t-km out of overall 2,270,907 million t-km of SSS (both amounts include both EU and non-EU goods). Therefore, a percentage of 0.77% is the modal-shift for SSS forecast for the base-line scenario.

The reduction of generalised maritime transport costs brings to the SSS sector more competitiveness with other modes of transport. An assessment of the average elasticity of the demand of transport to the generalised cost of SSS in Europe is not available and is not the purpose of this study. For this reason, an alternative approach is adopted which envisages:

☐    The assumption of a percentage of modal shift based on indications from the most recent studies on the subject (as mentioned, ISIC and MTCP[12]).

☐    The definition of two scenarios (Low and High), ensuring the robustness of the analysis. In fact, the comparison between the overall results of CBA in the "Low" and "High" scenarios will allow considering the sensitivity of such results to the extent of the gap between the two percentages used.

Therefore, the modal shift to SSS assumed in the Low scenario is calculated on the basis of the indications taken from ISIC which point out a percentage of modal shift to SSS in presence of specific policies dedicated to such mode. Such percentage, considering that the ISIC actions are said to contribute for a 12.5% of the SSS modal shift potential (which as

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[12] See notes 2 and 3.

seen, is 0.77% in the base-line scenario according to the same study) is equal to 0.097%. This (0.097%) is assumed as the overall modal shift to SSS deriving from the EMS implementation in the Low Scenario.

The possibility to consider the MTCP study is limited by the fact that it analyses the effects on the modal split of the operation of new lines of SSS (in four European areas) rather than the effects of policies dedicated to existing maritime transport, and therefore there would be the risk to overestimate the modal shift for the purposes of the present studies. For this reason, the 0.4% average modal shift deriving from the elaboration of MTCP results over some 90 new lines in Europe is chosen as an upper threshold for the definition of the modal shift in the High scenario. It is therefore assumed that – consistently with the latter remark – the modal shift to SSS deriving from the EMS implementation in the High Scenario is double than the one of the Low Scenario, that is 0.194%.

Since, as previously mentioned, in the base-line scenario, in 2020 the SSS of EU goods will account for 1,115,906 million tkm, considering the additional ES modal shift it results that:

☐      in the EMS Low Scenario the SSS of EU goods in 2020 is equal to 1,116,986 mio tkm (+1,081 mio tkm shifted to SSS compared to the baseline);

☐      in the EMS High Scenario the SSS of EU goods in 2020 is equal to 1,118,067 mio tkm (+2,161 mio tkm shifted to SSS compared to the baseline).

The detour factor is the ratio that represents the share of additional transport (though it might be negative in certain cases) that is generated by the shift from a mode to another mode of the same door-to-door delivery. In other words, when shifting from road (or from rail) to SSS, a good has to travel through a higher number of kilometres in order to reach its final destination; the detour factor quantifies how higher such new route is.

Together with the ISIC study, also the EC "MTCP" study is taken into account in order to take indications on such element. As for the former, an average detour factor of 10,2% can be calculated for the shift to SSS from road and rail; for the same modes, an elaboration of MTCP results yields a detour factor of 29%. Therefore, the detour factor assumed in this project is the deriving average of 19%. Moreover, from the same studies an average share of road vs rail modal shift respectively of 68% and 32% is derived out of total t-km shifted from these two modes to SSS.

As a consequence of such figures:

☐      in the Low Scenario, the amount of transport shifted from road and rail in 2020 is 905 mio tkm (618 mio tkm from road, 287 mio tkm from rail) ;

☐      in the High Scenario, the amount of transport shifted from road to rail in 2020 is 1,810 mio tkm (1.236 mio tkm from road, 574 mio tkm from rail).
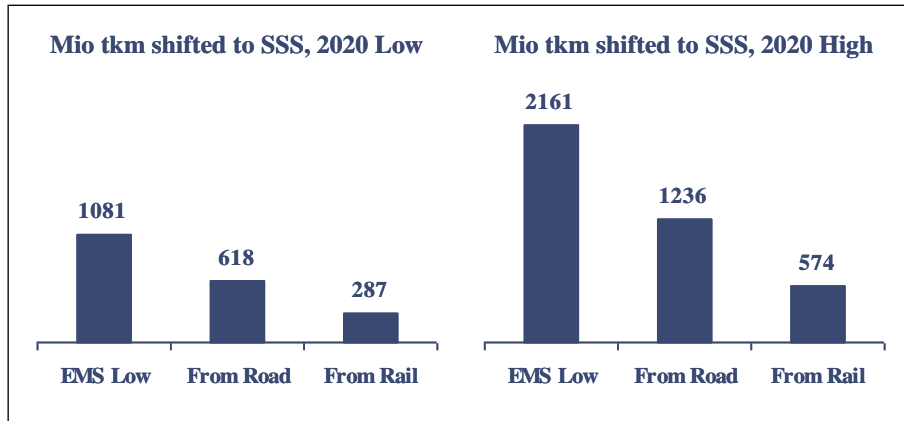
Figure II – Modal shift to SSS from road and rail in 2020 in the Low and High EMS Scenarios

Also in this case the review of existing studies (including the EC Handbook on external costs) show that the ISIC analyses prove to be the most fitting ones to the present external cost assessment problem:

☐ figures are expressed in terms of Euro/tkm

☐ figures are given also for SSS (recovering a usual lack of the most part of external cost reviews, including the EC Handbook, in which reference marginal or average external costs for seaborne transport are not given).

The sharing of the modal shift (and consequently of the environmental benefits) between Policy Options B1 and B2 could only be made according to the reciprocal ratio between Benefit/Cost Ratio (B/C R) expressed by the two Policy Options, which comes as an intermediate result of the CBA. Hence, some of the final results of the CBA are to be anticipated here by stating that Policy Option B2 has a higher internal benefits / costs ratio than Policy B1, by approximately 4:1 (a more detailed explanation of this will be given in the following chapters). On the basis of such indications the shares of the modal shift (and consequently of the environmental benefits) are assumed to be 20% for Policy Option B1 and 80% for Policy Option B2.

According to the 20%-80% shares attributed to Policy Options B1 and B2 (which are not exclusive), the environmental benefits in the reference year (2020) sum up to:

☐ Policy Option B1: 3,2 million Euros in the Low Scenario

☐ Policy Option B1: 6,4 million Euros in the High Scenario

☐ Policy Option B2: 12,6 million Euros in the Low Scenario

☐ Policy Option B2: 25,2 million Euros in the High Scenario

The cumulated reduction of external costs along the time horizon (up to the reference year of 2020), calculated in terms of present value in year 2008, is equal  to 44-89 million Euro (Low-High scenario) for the entire EMS (policy option C1). As concerns policy options B1 and B2, the cumulated environmental benefits are equal respectively to 10-20 million Euro (Low-High scenario) and 35-69 million Euro (Low-High).

# FINAL RESULTS AND CONCLUSIONS

Quantitative impacts have been estimated as the difference between specific policy options' solutions and the baseline scenario in terms of added costs and benefits, both following a top-down (modal shift effects) and bottom-up approach, as described before. As concerns the definition of the basic elements of the CBA:

☐       The discount rate has been fixed at 4%

☐       The time horizon 2009-2040, taking 2020 as the reference year for baseline scenario; also an 11-year time-horizon (up to 2020) is considered, in order to have a more immediate view on the effects of the measures

☐       Two scenarios per Policy Option have been assumed: "low" and "high". They differ from each other only for the application of different (i.e. lower or higher) assumptions on modal shift

☐       The results are expressed by the basic indicators of CBA, such as Net Present Value (NPV), Internal Rate of Return (IRR), and Benefit/Cost Ratio (B/C R), all with the socio-economic meaning that they incarnate when used in CBAs (i.e. not having any financial meaning), compared with the "baseline scenario".

In the following table costs and benefits associated to the different scenarios and for the different Policy Options are summarised. All values are expressed in their NPV (Net Present Value) and are referred to the period 2009-2040.

Table XIX –Cost Benefit Analysis: Monetised costs and benefits vs. baseline scenario ( M € - Net Present Value - time horizon 2009-2040)

| | | POLICY OPTION B1 | | POLICY OPTION B2 | | POLICY OPTION c | |
|---|---|---|---|---|---|---|---|
| **Rif** | **Impact** | LOW | HIGH | LOW | HIGH | LOW | HIGH |
| A | Investment + training costs | 45.7 | 45.7 | 68.0 | 68.0 | 107.3 | 107.3 |
| B | Operational costs | 224.2 | 224.2 | 391.7 | 391.7 | 510.2 | 510.2 |
| **C = A+B** | **TOTAL COSTS** | **269.9** | **269.9** | **459.7** | **459.7** | **617.5** | **617.5** |
| D | Personnel cost savings | 11,7 | 11,7 | 232,7 | 234,7 | 244,4 | 244,4 |
| E | Ship cost savings | 7.9 | 7.9 | 49.0 | 49.0 | 56.9 | 56.9 |
| F | Time cost savings (improvement of punctuality rate for goods in door-to-door transport) | 261,6 | 261,6 | 1917,9 | 1919,0 | 2171,6 | 2173,1 |
| **G = D+E+F** | **TOTAL INTERNAL BENEFITS** | **281.2** | **281.2** | **2199.6** | **2199.6** | **2472.9** | **2474.4** |
| H | EXTERNAL BENEFITS (external costs saved by modal shift) | 34.7 | 74.8 | 145.3 | 290.5 | 182.7 | 365.3 |
| | | | | | | | |
| **I = C-G-H** | **TOTAL NET PRESENT VALUE (NPV)** | **46.0** | **86.1** | **1885.2** | **2030.4** | **2039.6** | **2222.2** |
| | | | | | | | |
| | **IRR** | **8.9%** | **12.0%** | **61.3%** | **62.5%** | **60.7%** | **61.9%** |
| **(H+G) / C** | **B/C RATIO** | **1.17** | **1.32** | **5.10** | **5.42** | **4.30** | **4.60** |
| **G / C** | **INTERNAL BENEFIT / COST RATIO** | **1.04** | **1.04** | **4.78** | **4.78** | **4.00** | **4.00** |

Source: CERTeT  elaboration (2008)

The following comments arise from the analysis of the tables:

All policy options show positive a NPV and IRR in each scenario. The IRR ranges from 9% (B1 LOW) to 62% (B2 HIGH). The adoption of policies towards the implementation of a Maritime Space without Barriers appears to generate a higher amount of benefits than the burden of costs implied;

Investment costs are always lower in NPV than operational costs. It means that all policy options do not entail the necessity of large scale investments (bearing in mind the EU-wide scope of the policies), but they imply a significant amount of direct effort from the stakeholders concerned. In particular, the development and maintenance of ICT features created for the policy implementation is higher compared to the initial investment cost for the hardware/software development;

The relevance of time cost savings, i.e. of the improvement of punctuality rate in door-to-door transport, is outstanding compared to the remaining categories of benefits, and including "external" ones (as shown in the following figures). This result is expected, especially when comparing it with several examples of CBAs for infrastructures and large scale policies. It demonstrates that the largest share of benefits is widespread over a large panel of stakeholders (forwarders, logistics operators, shippers/consignees, industries, etc.) that have their primary interest in receiving goods in a shorter time, and with a lower probability of delay;
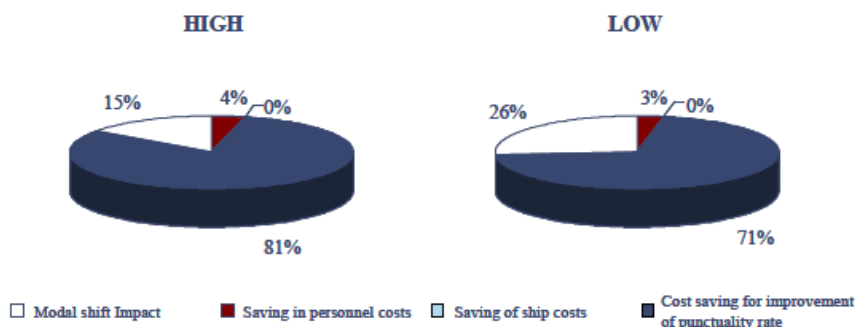


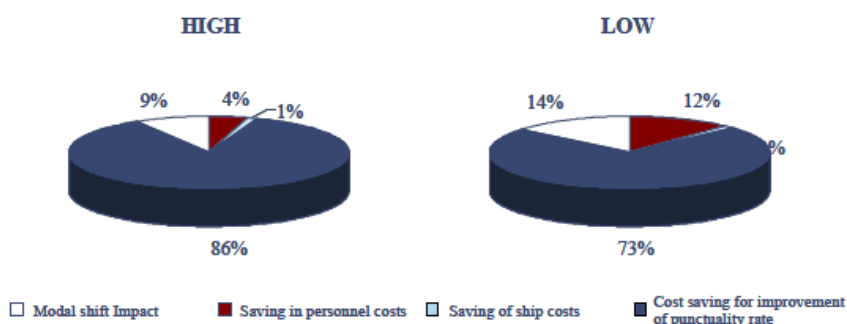Figure III: share of benefits by category: Option B1



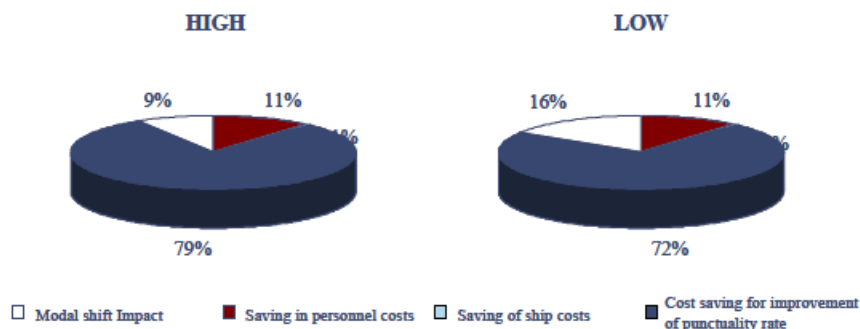Figure IV: share of benefits by category: Option B2

Figure V: share of benefits by category: Option C

The monetary outcome of the modal shift is encouraging, in particular if we bear in mind that:
- A top-down, precautionary approach has been assumed;
- The modal shift from road/rail to SSS is the driver for the composition of "high" and "low" scenarios.

However, the ratio of benefits from modal shift leads to a lower sensitivity of the analysis to the choice of top-down modal shift rates: the difference of IRR from "high" to "low" scenarios is never higher than 3,1%;

Although significant in Option B2, benefits from savings in personnel costs (FTE) are by far less relevant than time costs savings, and they are higher than externalities reduction only in Policy B2 LOW. This means that the largest part of benefits spread by the adoption of policies arises with a much lower necessity of FTEs repositioning, thus implying a reasonable amount of social costs in the (not verified) case of job losses.

In Policy Option B2, though costs are almost twice as much than in Policy Option B1, the overall impact is more positive: this is caused by the fact that these measures have an influence on all the lines operating intra-EU, and not only the ones that become ARSS (as in PO B1);

Similarly as in B1, in the first years (up to 2012 in this case) only costs are foreseen, while benefits start to be perceived only after the implementation phase.

Costs have a peak in the years when the ICT running costs of the ARSS measure are already ongoing and when the design, training, development and monitoring of the measures of Policy B2 are borne;

Benefits start to be perceived after the ARSS measure is implemented and increase significantly when the measures concerning one-stop shops,  the single document and the electronic data transmission are effective.

There is a cost-saving in implementing Policy C rather than the other two separately (training and monitoring can be done only once).

# LIST OF REFERENCES

BMT Transport Solutions (2006). MTCP, Desk Study on good flows in Europe for a pre-definition of Motorways of the Sea. Hamburg.

ESPO (2004). Analysis of the existing EU legal framework applying to seaports. Bruxelles.

European Commission (1989). Directive 89/662/EEC of 11 December 1989 concerning veterinary checks in intra-Community trade with a view to the completion of the internal market. Bruxelles.

European Commission (1990). Directive 90/425/EEC of 26 June 1990 concerning veterinary and zootechnical checks applicable in intra- Community trade in certain live animals and products with a view to the completion of the internal market. Bruxelles.

European Commission (1995). Communication on "The development of Short Sea Shipping in Europe: Prospects and Challenges", COM(95) 317. Bruxelles.

European Commission (1998). Comparison of documentation in Short Sea Shipping and road transport (CODISSARD) . Bruxelles.

European Commission (2001a). Directive 2001/96/EC establishing harmonised requirements and procedures for the safe loading and unloading of bulk carriers. Bruxelles.

European Commission (2001b), Study regarding the documentation flow and administrative procedures in Short Sea Shipping. Bruxelles.

European Commission (2002a). Directive 2002/6/EC on reporting formalities for ships arriving in and/or departing from ports of the Member States of the Community. Bruxelles.

European Commission (2002b). Directive 2002/59/EC establishing a Community vessel traffic monitoring and information system. Bruxelles.

European Commission (2003). Programme for the Promotion of SSS. Bruxelles.

European Commission (2004a). Guide to Customs Procedures for SSS. Bruxelles.

European Commission (2004b). Simplified Customs Procedures in SSS: Authorised Regular Shipping Services. Bruxelles.

European Commission (2004c). Communication from the Commission on SSS. Bruxelles.

European Commission (2005). Evaluation of EU Policy on the Transport of Dangerous Goods since 1994. Bruxelles.European Commission (2006a). IMAGE of Short Sea Shipping - bottlenecks in Door to Door Short Sea Shipping. Bruxelles.

European Commission (2006b). Regulation 1875/2006 amending Community Customs Code. Bruxelles.

European Commission (2006c). Keep Europe moving – Sustainable mobility for our continent. Mid-term review of the White paper on Transport Policy. Bruxelles.

European Commission (2006d). Commission Green paper "Towards a future Maritime Policy for the Union: A European vision for the oceans and seas". Bruxelles.

European Commission (2007a). Consultation on European Maritime Transport Space without Barriers – Summary of Contributions received. Bruxelles.

European Commission (2007b). Minutes of the Workshop – Administrative barriers to Short Sea Shipping, 26th March 2007. Bruxelles.

European Commission (2008), Communication on the creation of an European Border Surveillance System (EUROSUR). Bruxelles.

European Commission (2009a). Impact Assessment Guidelines (SEC (2009) 92). Bruxelles.

European Commission (2009b). Communication and action plan with a view to establishing a European maritime transport space without barriers (COM(2009) 10/2). Bruxelles.

International Maritime Organization (1974). SOLAS Convention. London.


Shortsea Promotion Centre – Finland (2006). Workshop on the bottlenecks of SSS. Turku.

Swedish Maritime Authority (2005). Memorandum of Understanding Ro-Ro Baltic. Szczecin.

### Studies and working papers

Bickel et. Al (2004). HEATCO Deliverable 5 - Proposal for Harmonised Guidelines. Project of the 6th Framework Programme, European Commission DG TREN. Bruxelles.

Fiedler R. et al (2006). MTCP - Desk study on good flows in Europe for a pre-definition of Motorways of the sea. BMT TS Gmbh.  Hamburg.

INFRAS/IWW (2000). External Costs of Transport. Accidents, Environmental and Congestion Costs in WesternEurope. Final report. Zurich/Karlsruhe.

INFRAS/IWW (2004). External Costs of Transport - Update study. Final report. Zurich/Karlsruhe.

INFRAS et al. (2008). Handbook on estimation of external cost in the transport sector (IMPACT). Delft.

ME&P et al. (2000). SCENES Deliverable D4 - SCENES European Transport Forecasting and Appended Module: Technical Description. European Commission DG TREN. Bruxelles.

NEA et al. (2003). TEN-STAC - Scenarios, Traffic forecasts and Analysis of Corridors on the Trans-European network – Deliverable 1 - description of the base year 2000 and interim forecasts 2020. European Commission DG TREN. Bruxelles.

PriceWaterhouseCoopers, CERTeT-Bocconi (2008). Preparatory study for the impact assessment relating to achieving the internal market for intra-european trade using maritime transport.  European Commission DG TREN. Bruxelles.

Stern, N. (2006). Stern Review on The Economics of Climate Change (pre-publication edition). Executive Summary". HM Treasury. London.

TRT et al. (2005). TRANSTOOLS Deliverable 2: Description of the datasets needed for model estimation and calibration, supported by databases. European Commission DG TREN. Bruxelles.

ZEW et al. (2000). RECORDIT Deliverable 1: Accounting Framework. European Commission DG TREN. Bruxelles.

Zomer G. et al. (2006). ISIC – Integrated Services in the Intermodal Chain – Task G - A Socio-economic CBA for the ISIC actions. European Commission DG TREN. Bruxelles.