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Support study for an impact assessment on: "the establishment of a European framework for granting PECs"

Final Report

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List of abbreviations

DWT	Deadweight Tonnage
EC	European Commission
ECSA	European Community Shipowners’ Association
EMPA	European Maritime Pilot Association
EMSA	European Maritime Safety Agency
EU	European Union
EUR	Euro (currency)
hh	Hours
GDP	Gross Domestic Product
GT	Gross Tonnage
GVA	Gross Value Added
IMO	International Maritime Organization
LOA	Length overall
mln	Million
MS	Member State
NM	Nautical Mile
O/D	Origin/Destination
PEC	Pilotage Exemption Certificate
PO	Policy Option
RoRo	Roll on Roll off
SMEs	Small and Medium Enterprises
SMCP	Standard Marine Communication Phrases
VTS	Vessel Traffic Service

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Executive summary

Problem

The Pilotage Exemption Certificate (PEC) is commonly defined as a certificate that provides for suitably qualified crew (usually the shipmaster) to navigate their vessel instead of being compelled to use a maritime pilot when navigating in compulsory pilotage areas. The use of a maritime pilot generally requires the payment of a fee which can be exempted or discounted when the shipmaster or other senior crew member holds a PEC. In some countries, regions or ports it is not possible or it is extremely difficult for a shipmaster to apply for and obtain a PEC – thus it can happen that a shipmaster with sufficient qualification and experience of a particular fairway, channel or port, must unnecessarily be advised by a pilot when navigating in that compulsory pilotage area. In such circumstances the absence of a framework for granting PEC or the presence of discriminatory and protectionist conditions / requirements can result in unjustified obligation to be assisted by a pilot. Under such circumstances, shipping companies bear unnecessary costs as they are paying for pilotage services that might not necessarily be needed. In addition, shipping companies face unnecessary operational cost resulting from lack of flexibility and waste of time in the event no pilot is needed.

The total port throughput will average 1.9% per annum growth in the period between 2010 and 2030. This implies that growth will be close to 5,803 million tonnes by 2030, compared with 3,973 million tonnes in 2010. In order to achieve the port traffic throughput forecast, the shipping industry must increase capacity by around 46% by 2030. Recent figures indicate that the target will be met, not by a greater number of port calls being made, but mainly by increases in ship size. In terms of demand for pilotage services, this implies that the number of arrivals and departures in port will not increase. However, there will be changes in the pattern of demand by ship size. The number of ships exempted from compulsory pilotage due to size will be static or diminishing, and consequently, the number of pilotage missions will slightly increase (from 1,269,163 in 2010 to 1,290,567 in 2030). Because demand increases are matched by increases in ship size, and not frequency of call, the ratio of PEC missions to pilotage missions will diminish or not change significantly.

The current PEC scenario is characterised by three macro-regions, each one representing a degree of development of the PEC grant and use. Scandinavian countries, UK and Ireland grant several PECs and these are frequently used in place of pilotage service provisions. A more limited share of PECs is present in Northern Europe (i.e. Belgium, The Netherlands, France, Germany, etc.) and this comes to be very limited or absent in the rest of the Union.

The category of stakeholders mostly affected by the PEC-related problem is that of shipping companies. Indeed, the presence of rules guaranteeing in some MSs the compulsoriness of pilotage operations for vessels entering/leaving ports (or, in any case, obstructing the granting of PECs) hinders the possibility for shipping companies to freely choose whom should provide the service: pilots or trained officers. As a result, shipping companies are eventually required to sustain cost that would be avoided in case PECs were granted, without any substantial benefit in return. In particular, costs concerning operational inefficiencies related with pilot-delays and those regarding the impossibility to avoid pilotage costs, even in those cases when qualified officers have the sufficient experience and competence to perform the operation by themselves.

In line with the outcome of the Fact Finding Study on PECs (PwC and Panteia 2012) it is possible to identify two drivers to the problem:

- PECs are not granted by all coastal countries.
- PECs can be difficult or impossible to obtain.

The two drivers are the results of three root causes:

- Lack of legislative framework for granting PECs in some MSs.

- Requirements for obtaining PECs are not sufficiently clear, are disproportionate or discriminatory.
- Process of applying or renewing PECs is not sufficiently transparent and is burdensome.

Objectives

The General objective of the policy initiative is the "**Promotion of Short Sea Shipping by reducing the administrative burden and unnecessary costs for shipping companies**". In particular the policy should promote a reduction in the cost of pilotage services which may be unnecessary in the event that the shipmaster has the required qualification and experience to safely navigate in specific compulsory pilotage areas without the assistance of a maritime pilot.

The General objective can be translated into a specific objective:

- To establish a transparent, clear and non-discriminatory framework for granting PECs.

The specific objective can be achieved by pursuing two different operational objectives:

- To establish clear, non-discriminatory and proportionate criteria for obtaining PECs.
- To establish a transparent and simplified process for applying for and renewing PECs.

Policy options

To address the problem, the underlying drivers and the root causes, four policy options in addition to the "do nothing" option are considered. Each policy option is composed of a series of policy measures addressing the two specific problems ("PECs are not granted by all coastal countries" and "PECs can be difficult or impossible to obtain"). Policy options differ on the delivery mechanism and on the opportunity for Member States to derogate from the requirements set by the Commission.

Policy Option 0 "do nothing" means no new EU policy and reliance on the existing recommendations. Although policy option 0 considers no new line of intervention from the EU, a slight increase in the number of PECs granted is expected, in line with trends over the last ten to fifteen years, as a result of natural progression, adjustments and improvements sought by a wide range of stakeholders (e.g. national administration that wish to improve access to PECs, continuous requests from shipping lines, etc.). Some countries are proactive in reviewing and improving the requirements for PECs with a view to making PECs easier to obtain, while other countries are less so, to the extent of preventing the granting of PECs in their ports. Thus it is possible that protectionist practices will continue to occur, such as setting excessive PEC application requirements and associated legislation. It is also likely that issues related to a lack of transparent rules will be present in the future as much as they currently are, without any new EU intervention. The development is framed by the previously issued recommendations on PECs in 1995, 2007 and most recently in 2009 (i.e. COM(2009)10 final, etc.) by the Commission, though there has not been any dedicated Communication on PECs so far.

Policy option 1 "EU Recommendations" differs from baseline in that a distinct and clear position of the European Commission (the "Commission") is present, by way of a dedicated communication on PEC recommendations. The goal of the Communication would be to invite all countries to create a regulatory framework which would permit easier pilotage exemptions. Although policy option 1 is a soft approach, the open position of the Commission is expected to have a more positive effect than baseline. The idea is that through the widespread dissemination of relevant information and benchmarking analyses, the Commission might encourage all countries to consider the positive impacts associated with easing the requirements for obtaining PECs - in particular those countries where requirements are excessive. In contrast with baseline, policy option 1 might also increase transparency in those countries where PECs are already granted. On the other hand, based on current experience, the Communication is not expected to fully contribute to achieving the objectives of the initiative and therefore this option is discarded and not analysed further.

Policy option 2 "directive setting a legal framework in each Member State" considers placing an obligation on all countries to issue PECs to experienced shipmasters through a clear and a non-discriminatory

framework, letting each Member State regulate the matter as they please. In practice, policy option 2 would be unlikely to lead to the outcome that the Commission desires. By giving countries the freedom to set requirements and criteria arbitrarily, it might be the case that no current issues would be solved. Countries that do not want PECs to be granted could easily produce regulations obstructing its actual implementation. Lastly, policy option 2 would be unlikely to solve issues relating to a lack of transparency or excessive requirements within the PEC application process. As a result, this option is not expected to contribute fully to achieve the objectives of the initiative. Considering the above, the transposition burden would likely outweigh any possible benefits. The objective of creating a legal framework in each Member State would be achieved, but the objective on transparency of the framework cannot be reached. Therefore, on the basis of this preliminary assessment policy option 2 is also discarded and not further analysed.

Policy option 3A "single EU framework – derogations possible" comprises the establishment of a Directive for the implementation of an EU framework specifying criteria and maximum requirements that Member States can set in national rules. This would limit arbitrariness and the potential for discriminatory conditions/requirements. The opportunity to request derogations from the EU framework for specific ports and fairways will be given to countries under this option. Nonetheless, in this eventuality, the Member State/Port would need to provide justification and report to a dedicated national/European body. Policy option 3A is expected to push towards an incremental increase in the use of PECs, moreover favouring the adoption of sound criteria throughout the EU. This option is likely to impact more on those countries which present a low ratio of PEC missions to pilotage missions. This option will be assessed in detail.

Policy option 3B "single EU framework – derogations not possible" very much limits the ability of countries to adapt requirements in order to suit specific circumstances. All countries will be required to set criteria and requirements that are cognisant of common thresholds defined by a single EU framework for PEC requirements without any possibility of derogation from the framework for specific ports and fairways. In practice, countries which do not yet grant PECs will be required to adopt a framework compliant with the single EU framework. Countries which already have adopted a PEC framework, but have set excessively strict criteria for PEC applicants, might be required to relax their system coherently with the single EU framework. This option is kept and assessed in detail.

Policy option 4 "full EU harmonization" considers the possibility to create by Regulation a single EU framework with fully specified requirements and criteria. In this case the EU would not define a threshold, but actual standard/harmonized requirements. In practice all 24 coastal countries will be required to adopt a framework where requirements are set as specified in the EU framework. Interestingly, countries which currently have relaxed requirements to grant PECs will be obliged to adopt stricter requirements which will result in a lower number of PECs being granted. This option does not consider local characteristics and geographical specificities of different contexts that are present across the EU and could be therefore seen as disproportionate. This option is assessed in detail.

For the preferred policy option, further analysis will be carried out to assess the impacts of possible requirements with regard to the **knowledge of English and/or the national language** for obtaining a PEC.

a. Knowledge of national language required: this sub-option requires all PEC applicants to know the national language of the country where the PEC will be granted.

b. English and basic knowledge of national language required: this sub-option includes the specific requirement that all countries accept English plus a sound understanding of basic maritime vocabulary in the local language.

c. English as an alternative language: under this sub-option all countries are obliged to accept English as an alternative to the local language as part of the PEC application.

Analysis of impacts

The use of PECs is generally regarded as a **cost saving opportunity for shipping companies**. The amount of savings seems very relevant, especially in those countries and ports where no fees are required from vessels holding PECs, and therefore, the only cost for PEC holders is represented by the issuing/renewing of PECs. Examples obtained during consultation show that the savings will not be distributed evenly.

Introduction of PEC schemes in all EU countries is estimated to drop costs of pilotage of an amount between €81.93m to €100.52m per annum, based on 2030 forecasts of vessel traffic. However, it should be noted that the savings are not distributed evenly. Most of the benefit will arise on frequent, short sea operations between countries with no existing PEC scheme, or on countries where the PEC requirements are difficult to meet. The main reason for the increase in savings for option PO4 arises from the assumption that under a common EU pilotage scheme, the number of required manoeuvres would be set at 10 ins/10 outs per annum. PO3 has been quantified under an assumption of a minimum of 20 ins / 20 outs, meaning that the majority of countries with existing PEC schemes would not have to change their requirements. These requirements in terms of manoeuvres can be considered quite strict if compared to the PEC Framework in use in Sweden that sets 2 ins / 2 outs as minimum requirement. Under this assumption the number of potential PEC exempted missions in Europe in 2030 will be in the region of 725 thousands. Accordingly, pilotage cost savings will be more than €130.00m.

The implementation of the identified measures implies additional costs imposed on both public administrations, and shipping companies. The **administrative burden to the public sector**, refers to the cost for personnel processing the requests for PEC issuing, renewals and modifications, as well as providing all required services to applicants (for example, feedbacks, etc.). Amongst policy options, the number of PEC applications (thus dependant on number of PECs) is the main cost driver, therefore, the higher the number of PEC applications, the higher the administrative cost. Nevertheless, the overall cost is predicted to slightly decrease as effect of longer duration of PECs and simplified procedures for renewal. The case of **administrative costs to shipping companies** is very similar. Indeed, the number of active PECs is expected to increase as a result of the EC intervention (on the contrary, without intervention, it is going to slightly decrease), nevertheless, as the average duration of PECs increases as well, the overall effect in administrative costa is negligible. The baseline scenario is expected to be characterised by a slight increase of the number of PECs issued per annum, although the number of missions slightly decreases, mainly due to increased vessel size. The overall administrative costs would slightly increase, as no relevant change is expected in the unit costs related to PEC issuing, renewal and modification. The EC intervention in the different versions of PO3B is expected to increase the number of PECs, which, therefore, would increase administrative costs. Nevertheless, measures aiming at simplifying procedures to facilitate and support PEC use are expected to have a strong effect on administrative costs. As a result, the overall administrative cost is expected to be substantially the same. No substantial difference is expected between the various variants of PO3B and the relative variants of PO3A. As derogations are possible, the number of PECs is likely to be slightly lower and so are administrative costs. Policy Option 4 is the one related with the highest expected number of PECs. Accordingly, costs are expected to be slightly higher compared to other considered Policy Option.

Shipping companies incur in several types of other **PECs related costs**. These are primarily fees for obtaining, renewing or modifying PECs. These fees are used to cover the administrative burden sustained by public authorities. Nevertheless, the two costs are not always matching; sometimes, shipping companies are required to pay more than the amount needed to cover the administrative costs, sometimes less. Together with these costs, there are costs related to the PEC examinee to study and take the exam. In particular, depending on the policy option considered, longer time might be required to meet language requirements in those countries that do not allow it to be taken in English. Finally, some countries require PEC exempted vessels to pay a share of pilotage fees. It is worth considering the difference in terms of language related costs between the different scenarios, as in the baseline scenario (as well as in PO3B(a) – and, thus, also in PO3A(a), though not directly considered), the effort required to learn proper terminologies and forms in the local language requires much longer time and, thus costs. At the same time, it partially refrains the attractiveness of PECs, raising a barrier to its obtaining. As a result, the cost is lower, if compared to PO3B(b) (where local language requirements are

much softer), or to PO3B(c) and PO4 (no local language requirements), but the number of PECs is much lower than the cost difference.

Operational cost savings represent another important aspect related to PECs. Examples of possible operational cost savings are related to avoid delays resulting from pilotage service availability. These delays might result in additional cost and penalties in ports for stevedoring, night supplement, etc. and additional fuel cost to speed up in order to catch up with the original schedule for the following ports. In addition other operational cost saving can be obtained by increasing schedule flexibility in the case the pilot service slot assigned to ship is not optimal or by avoiding penalties for missed pilot reservation in case the ship is delayed for other reasons. If PEC exempted missions increase, pilotage operations will decrease thus diminishing related delays. An increased number of PECs exempted missions against pilotage operations results in additional savings due to avoided delays. These have been estimated to be approximately €10.8 million in case of PO3(a) and to reach approximately €13.1 million in the PO4 scenario.

In summary **aggregate costs saving** to shipping companies should consider on one hand costs reductions due to savings on pilotage fees and lower operational costs, on the other hand additional administrative cost and additional other PEC related costs (i.e. issuing/granting PECs fees, training, exams, PEC usage, etc.). Even though high volume growth is expected in the port sector and in the shipping fleet worldwide, the baseline outlook for demand for pilotage services in Europe is essentially static. Pilotage missions will increase little, whereas PEC exempted missions will decrease due to increasing ship size. The aggregate cost for pilotage is estimated to rise from € 1,096M in 2010 to € 1,243M in 2030, mainly as effect of increased ship sizes. The overall aggregate cost for pilotage, PEC and pilot delays is expected to be € 1,406M in 2030. Under PO3B(a) the number of active PECs is expected to top 11,765. The PEC exempted missions will also increase producing cost savings to the shipping companies, which have been estimated in the region of € 82.8M in the year. PO3B(c) as well as PO3B(b) will facilitate not native speaker Officers in the process of obtaining a PEC. Hence the number of active PECs in 2030 is expected to be slightly higher if compared to PO3B(a). Cost savings to shipping companies are expected to be € 86.7M in the year 2030. PO3A envisaged the possibility for Member States to derogate from the single European framework. Hence, the number of PECs issued under this policy option is expected to be lower. Benefits in terms of cost savings to shipping companies will be in the region of these expected for PO3B, but somewhat lower. Policy Option 4 will allow for the highest number of PECs to be issued. We estimated that under this policy option the number of active PECs in the year could be close to 13 thousand. As a consequence, the expected savings to the shipping companies are higher when compared to other policy options. In 2030 we expect the shipping companies to save about € 100M.

Providers of pilotage services express concern regarding **potential losses** following the implementation of the policy options under consideration. However, even considering the option leading to the most significant reduction in pilotage missions (PO 4), results are reassuring. Policy option 4 is actually predicted to lead to an increase in revenues for pilotage service providers of 4.3% in the period 2010-2030. This is mainly due to a shift towards larger ships that counterbalances the decrease in pilotage missions, resulting in greater total revenues for pilotage service providers. As a result neither issues of lower remuneration of fixed assets nor under-utilisation of staff should represent matters of concern, being the sustainability of the service guaranteed in the long term by the increasing revenues.

According to consultation outcome, pilots are concerned that the increase in number of PECs might negatively impact on the need for their services, thus impacting the level of **employment**. According to our elaboration under the baseline scenario, a slight increase in pilotage missions in the period 2010-2030 will generate new pilot jobs which are quantified in approximately 80 units. In case the EU decides to implement policy option 3A, instead, potential reduction in jobs is expected although these will be lower than under policy option 3B. The implementation of policy option 3B(a) and 3B(c) present a significant reduction in pilotage missions (8.9% - 9.2%) in the period 2010-2030, resulting in potential reduction in jobs in the region of 350 and 370 units respectively. However policy option 4 seems to have the most pronounced effect on employment for the sector: about 450 potential units lost related to a decrease in pilotage missions of 10.0%. While, on one side, the increased number of pilotage exemption certificates would bring a reduction in the overall demand for pilotage services, it is still to be considered that, on the other side, the overall size of vessels has a distinct tendency to increase in the future. As a result, in the future, the share of port calls from vessels requiring two pilots will

increase, counterbalancing the decreased demand for pilotage due to the increase in the number of PEC holders.

The increased number of PECs granted and the resulting change in roles and responsibility of different categories of professionals is expected to produce a certain change in the **quality of work** for shipmasters, deck officers and pilots. Shipmasters see their role changed little, if any. Without PEC, they already held full responsibility for any accident, being the ship under their command, even with a pilot being on-board. However some shipmasters claim that the presence of pilots might be beneficial to safety, especially when fatigue begins to appear. Oppositely, others claim that the unnecessary presence of pilots (thus in case of experienced masters in specific ports where calls are frequent) may result in a factor of stress which does not produce any benefit at all. Furthermore, some shipmasters claim that any measure allowing for facilitation on PEC granting and renewal or for longer duration of PEC would be beneficial to them. Indeed, depending on the criteria set for the renewal of PEC, it might happen that a shipmaster is required to navigate always on the same route in order to collect the minimum required number of ins / outs for PEC renewal. Deck officers' profession is expected to become more attractive as a result of increased responsibility and opportunities for qualification, and moreover due to the coherently increased salary. Several shipping companies consider the obtaining of PECs a necessary qualifying requirement for deck officers to be promoted to shipmasters. Pilots seem to have concerns that the implementation of a PEC system may someway damage the position and status of EU pilots. Nevertheless, in line with all stakeholders' claims, the policy does not aim to reform the fundamental role of pilots as those whom to rely on in case of need to maintain safety at high standards. Nor their mansions are to change. Therefore, no effect is expected on pilots' quality of work as a result of this policy initiative.

The possibility to communicate in English in all MSs ports would surely facilitate the **work mobility** of deck officers, which would then be able to apply for PECs in countries in which they do not speak the local language. As English is already the international maritime language, the issue would be to formalise the possibility to have it accepted as the only language requirement in all MSs. It is expected that, without the EC intervention, English will probably become more and more important, due to globalisation and the need to communicate in one, single, common language. Nevertheless, the process of accepting it as the only language requirement may take several years, if ever occurring. In this case, all proposed policy options will have the same impact, but those explicitly including measures on language requirements (i.e. policy option 3A.b, 3A.c 3B.b and 3B.c). In this case, the "mild approach" (i.e. policy option 3A.b and 3B.b) would most likely be welcomed with favour by those MSs that want to keep to some extent the local language requirements for PEC granting. Nevertheless, the number of terms and commands to be learnt for deck officers in the local language is not expected to be a major burden, as only sound understanding of basic maritime vocabulary is required. Policy option 4, 3A.c and 3B.c would further increase work mobility, as English would be considered a full alternative to the local language for PECs granting.

Concerning **maritime safety**, the study outcome suggests that most if not all PEC schemes in Europe operate in a way that is as much safe as having a pilot on board. This finding is supported both by literature review and analysis of data on accidents directly collected by a relevant number of competent national authorities. For instance, the EfficienSea[1] report by HELCOM was structured with the aim to screen the role of pilots in guaranteeing maritime safety; within the analysis, comparisons with exempted missions were attempted. However, the report resulted in no statistical basis to determine any difference in terms of safety in case vessels were supported by pilots on board against vessels manoeuvred by PEC holders. Also, direct information gathered by PwC has been used as primary sources for analysis. According to PwC findings, there are no clear differences in safety when navigating with the assistance of a pilot and when a PEC holder is on board: in some countries (i.e. Belgium, Ireland, Lithuania, Poland and Sweden), the probability that accidents may occur when a PEC holder is on board is lower than with pilot on board. In some others (i.e. Finland and Norway), the opposite.

Although no severe impact in relation to the EC initiative is expected on safety, some measures can produce effects. Indeed, measures can potentially impact safety depending on the way these are able to guarantee minimum standards that comply with local specificities.

[1] EfficienSea, 2012 *How pilotage contributes to maritime safety*.

Baseline scenario: in case the European Commission decides not to intervene on PECs, no relevant impact on safety is expected at all. As for all cases, technological improvement will most likely represent the main source of increased safety, while the expected increase in ship size traffic might partially produce negative effects, as bigger vessels may have more difficulties manoeuvring in port areas. Impact on safety deriving from the implementation of policy option 3A strongly depends on the way requirements for obtaining PECs are set. In case of stringent thresholds, safety might be affected in those contexts where local specificities would require additional experience to prevent dangerous situations to occur. Under PO3A the risk of setting inadequate thresholds is prevented by allowing country to derogate from the single EU framework when appropriate. The difference between PO3A and PO3B relies on the exclusion of the possibility to derogate from single EU framework, which would foster the implementation of PECs. In case of PO3B, impacts on safety will most likely become an issue to cope with. On the contrary, the possibility to derogate from the framework should be enough to guarantee safety. Compared to PO3B, where thresholds are specified, PO4 is less flexible and less adaptable to local specificities. The EU level harmonisation would then most likely be counterweighted by inefficiencies and safety issues at local level, where more attention to specific and unique conditions should be considered.

In consideration of the general level of understanding of English, in some areas and ports, the adoption of the additional option (c) "English as alternative language" might result in communication issues between PEC holders and other vessels. For instance, fishing vessels might not have any commercial need for require English speaking crew, thus their understanding of the language might not be sufficient to communicate in case of distress or potentially dangerous situations. Under additional policy option (a) "Knowledge of national language required" risks deriving from communication issues would be minimised but also the opportunity for not native speakers to apply for a PEC would be significantly reduced. Finally the adoption of additional option (b) "English and basic knowledge of national language required" seems to guarantee the highest outcome both in terms of safety and potential number of exemptions from pilotage; this being particularly true in areas where there is significant local traffic and generally low language skills by crews. Requiring a sound understanding of basic maritime vocabulary and jargon in the local language would increase the possibility to communicate with those few vessels with crews not speaking any English. Thus safety would not be reduced.

Navigational **accidents involving workers** in compulsory pilotage areas are quite rare, compared to the number of vessel movements in EU waters. The baseline scenario is related with a certain increase in safety due to technological improvements. The main difference among the baseline scenario and the policy options 3A, 3B and 4 is represented by a small improvement of occupational safety concerning pilots embarking/ disembarking operations. However, the small positive impacts might be counterbalanced in those cases where derogations to the single EU framework are not considered (PO 3B and PO 4). It is worth considering that the impact entirely depends on how stringent the rules included in the single EU framework will be. Indeed, granting PECs too easily would most likely allow under experienced shipmasters/ officers to obtain PECs, thus increasing potential risks of accidents related to the human factor. Conversely, setting too stringent requirements would secure safety as all PEC holders will be qualified or overqualified. Nevertheless, in the latter case the number of PECs granted will be too low to produce any positive effects with regards to policy objectives.

Accidents involving passenger ships are generally very rare. Statistics from the UK Department of Transport report 0,0004% passenger injuries or losses per vessel movement within port areas (compared to 0,0019% for crewmembers). Even though the number of accidents causing harm to passengers is so limited to be comparable to null, such event cannot be excluded. The EU framework is not expected to negatively impact passengers safety (as it was already claimed for safety in general), although some policy options are related with higher risks of mismatching between safety requirements and legal requirements. Indeed, in case of stringent rules, safety might not always be guaranteed. In case policy options not contemplating derogations from the EU framework are implemented (policy option 3B and 4); the risk of mismatch between safety requirements and legal requirements is higher than for the other cases (policy option 3A). It does not mean that there is a direct negative impact, but that it is more complex to find the balance between safety and benefits from PECs.

Accidents causing **marine pollution** are often related with fuel spill. Quantity is usually limited, and generally, no other pollutant substances affect the environment. Nevertheless, cases of more substantial spill outs occurred, especially when tankers containing oil or chemicals were involved. The impact on marine pollution in pilotage areas is twofold. On one side, statistics present fewer cases of pollution-related accidents in

port areas compared to offshore cases. Moreover, the quantities of substances impacting the marine environment are, on average, much less relevant, when accidents occur in port areas. On the other side, it should be considered the effect of pollution, despite the quantity of oil and chemicals spilled out into sea. From this perspective, operations for containment are far more complicate when the disaster occurs close to the coastline (and the effect on the environment is generally more relevant) and are required to be carried out in shorter time, thus limiting the possibility to plan the intervention accurately.

The impact of measures on marine pollution is mostly related with marine safety, as it is related to the probability of accidents to occur. To this, some peculiarities should be addressed, in particular when considering to grant PECs to any type of vessel/ cargo.

Comparing the options

The alternative policy options are compared against the "do nothing option" with regards to their degree of effectiveness, efficiency and coherence. PO1 and PO2 are not considered since these have been abandoned after preliminary assessment of their effectiveness in addressing policy objectives.

The **effectiveness** of the policies under consideration is directly related to the possibility to increase the number of PECs granted, which would result in greater cost savings for shipping companies. According to the baseline scenario the number of PEC exempted missions is expected to slowly decrease over time as a result of the increase in vessels' size, which then increases the number of vessels not meeting the size requirements to be eligible for pilotage exemptions. As a result no improvement is expected without intervention. The development of a single EU framework that specifies maximum requirements for MSs, as in case of PO3A, is expected to effectively address the objective of reducing unnecessary cost to shipping companies; nevertheless, the possibility for derogation is expected to reduce the overall effectiveness of this policy option. Under PO3B, since derogation is not allowed, a higher level of effectiveness is expected compared to PO3A. The degree of effectiveness of this option is also related to the specific language requirement enclosed in it: PO3B(a), requiring the knowledge of national language, is predicted to be less effective than PO3B(b/c), where the use of English is favoured. The highest degree of effectiveness is reached under PO4. This policy, in fact, is expected to maximise cost savings for companies by setting stringent requirement for MSs without possibility of derogation, while introducing English as an alternative language.

Efficiency evaluates the effectiveness of each policy option compared to the cost related to its implementation. Generally speaking the efficiency of the policies under consideration mirrors the degree of their effectiveness. Under the baseline scenario, efficiency is relatively low, as the number of PECs is expected to decrease. In case of PO3A the degree of efficiency is expected to be slightly higher, despite being dependant on the possibility for MSs to apply derogation. Differently, in case of implementation of PO3B, the number of PECs is expected to increase and the aggregate cost for both pilotage and PECs would be lower than in the baseline case. In detail, PO3B(b/c) is more efficient in achieving the objective than PO3B(a), being related with a lower cost for pilotage and PECs and a higher number of PEC missions. PO4(c) shows the maximum degree in this sense for the same reasons explained in case of effectiveness.

Concerning the **coherence** of the analysed policy options with the general EU objectives, it is considered to focus the attention on the safety implications, which have been frequently indicated as being an issue by numerous stakeholders. Options with a greater risk in terms of safety are considered to have a lesser degree of coherence. The baseline presents a scenario in which no new policy is issued by the EU and the issue of safety is mainly dependant on the technological improvements in the sector. This is to be considered as a reference situation where the degree of safety is not positively or negatively affected by EU regulations. PO3A seems to be the most coherent option of the four under consideration. The reason relies on the fact that the possibility for derogation by MSs will allow for preventing any case where stringent EU requirements not fit to local needs, negatively affecting safety. PO3B(a) and PO3B(b/c) show similar degrees of coherence, but slightly lower than the previous option, being developed without the possibility of derogation. Nevertheless a certain degree of adaptability, within predefined threshold, is still possible in this case. Finally PO4 presents the lowest degree of coherence, related to the difficulty for MSs to adapt EU requirements to local needs. Therefore the adoption of this policy could lead to concerns in terms of safety.

1. Introduction

1.1. Purpose of the report

The aim of the European Commission is to examine a framework for the granting of PECs in European seaports in line with the objective of the Commission communication with a view to establishing a European maritime transport space without barriers [COM(2009) 11 final] and the Commission 2007 communication on a European Ports Policy [COM(2007)616]. This activity commenced with the drafting of the PECs Study 2012 by the same authors of the present study, which has provided a comprehensive baseline of information concerning PECs.

The main aim of this particular study is to support the Commission services in assessing the impacts of granting PECs on the attractiveness of the short sea shipping sector, the cost of maritime transport, the attractiveness of masters' profession, and the safety of maritime transport.

The tasks involved the consultation with stakeholders and the collation and analysis of appropriate facts and figures to support the execution of the impact assessment.

1.2. Structure of the report

The remainder of this report is structured as follows:

- Section 2 presents the different initiative undertaken to involve stakeholders during the preparation of the impact assessment;
- Section 3 provides a description of the problem definition, building on the findings of PEC Study 2012 as well as stakeholders' views collected during this study;
- Section 4 presents the objectives that the European Commission is willing to reach. The involvement of stakeholders has been crucial in the modification of these objectives in order to avoid focusing on marginal issues and thus improving the efficiency of the EC activity;
- Section 5 presents the policy options that have been produced by the Commission and that are assessed in the next sections;
- Section 6 focuses on the analysis of impacts, presenting the methodology followed for the assessment as well as describing the baseline scenario; within this section the assessment of impacts is presented, both in qualitative and quantitative terms;
- Section 7 cross compare the policy options with an oversight of their capability to reach the strategic objectives the European Commission considers essential;
- Section 8 presents the suggested monitoring and evaluation arrangements;

2. Consultation of interested parities

The following paragraphs present the different approaches employed to consult stakeholder and collect information.

2.1. Workshop

On 21 March 2013 a workshop has been held. The European Commission hosted it and most relevant stakeholders were present, as well as PwC and Panteia members. In particular, representatives of all the parties someway impacted by the policy initiative were present.

The workshop focused on the description of the on line survey, which at that time was recently opened, and aimed at guaranteeing that every single question was clear and appropriate.

During the workshop, the results of the previous PwC/ Panteia study was presented and discussed with stakeholders, together with the new, in progress study.

2.2. Stakeholder consultation

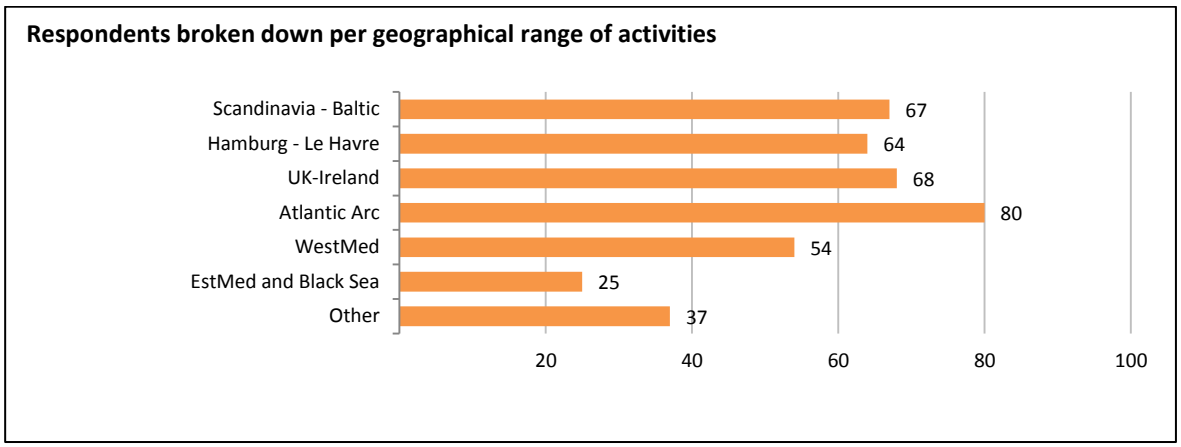
A stakeholder consultation has been opened on 14 February 2013 and lasted 12 weeks (until 9 May 2013), with the aim of supporting the assessment of the need for the European Union to take actions to improve the use and granting of PECs. The online questionnaire represented a substantial support to the assessment of policy options, providing stakeholders' opinions and suggestions on the proposed measures.

The questionnaire prepared by the EC, with the support of PwC and Panteia included different sections:

- respondent's identification section;
- identification of the problem/ of the main problems;
- opinions on the objectives and measures identified to cope with the problems;
- identification of impacts;
- additional issues.

Collected responses covered all the marine areas of the EU with the following distribution:

Figure 1 - Geographical coverage of the stakeholder consultation



Although the stakeholder consultation could be answered by anyone, it was specifically addressed to the following categories:

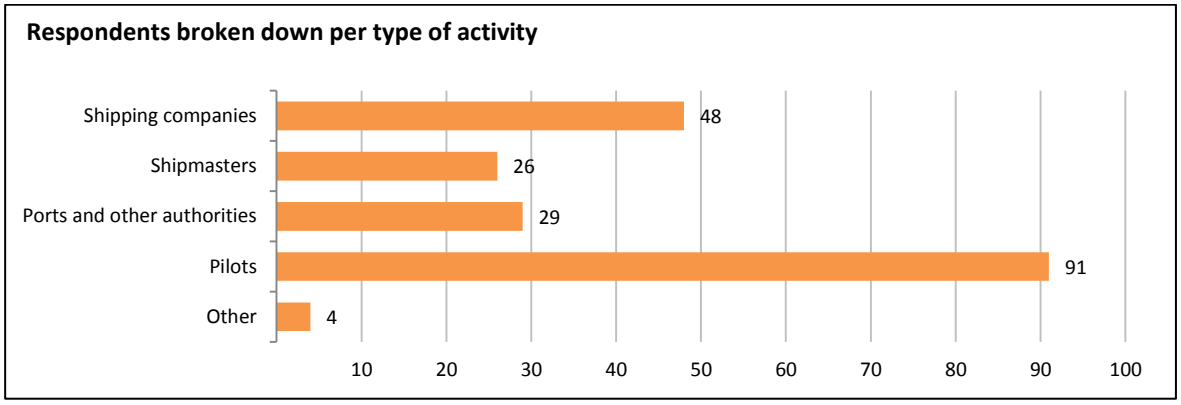
- Shipping company or shipping agency: tanker operator, ferry operator, cruise ship operator, container shipping company, barge operator, etc.;
- Shipmaster or other senior crew member;
- Public authority (Member State Representative, Ministry, Agency, other);
- Port authority, harbour master or port manager: entity or management body of the port, being both public and private;
- Pilot (national association of pilotage service providers, Pilotage station, Corporation of pilots, Private company providing pilotage service, other);
- Other port service provider (terminal operator, stevedoring company, warehouse operator, barge terminal operator, rail terminal operator, passenger service operator, marine service provider, towage provider, mooring operator, ice-breaking, dredging, bunkering, and environmental service provider, or other service provider);
- Others.

For a matter of simplicity and justified by common interests shown in the responses, it was then possible to reduce the number of categories of responses to five, which aggregated responses from the previous identified stakeholders:

- Shipping companies;
- Shipmasters;
- Ports and other authorities;
- Pilots;
- Others.

As the number of responses collected in the category "others" are small (circa 2% of the sample), these are not considered in the statistics, but their opinions are included when comments are analysed.

Figure 2 - Statistics on respondents to the stakeholder consultation



2.3. Direct survey

2.3.1. National authorities' survey

An initial survey was addressed to national authorities by PwC/Panteia for the PEC study in 2012. For the purpose of this Impact Assessment, it was decided to proceed with a follow-up survey, which involved only those countries most familiar with PECs. The consultation proceeded through the confirmation of specific answers already provided in the previous survey, which were of primary importance for the development of the Impact Assessment; at the same time, further details – including statistics – have been requested. The authorities to whom the questionnaire was addressed were those representing:

- Belgium;
- Denmark;
- Finland;
- The Netherlands;
- Norway;
- Poland; and
- Sweden.

The consultation of national authorities is presented in details in Annex I – Consultation of National Authorities.

2.3.2. Shipping companies' survey

An online survey, specifically addressed to shipping companies, has been designed and developed by PwC/Panteia, together with the EC. The aim of this survey was to confirm and provide additional quantitative data for the calculation of the economic impact of PECs. Shipping companies have been directly contacted and requested to fill in detailed information on costs related to pilotage operations and PEC in same ports with same vessels. This way, it has been possible to provide a direct comparison between the two sources of costs.

According to survey findings the use of PECs allow for economic savings compared to operations involving the support of pilots. However, the amount of savings is not homogeneous among ports, countries, etc.

The survey demonstrates that the use of PECs can result in a relevant saving for shipping companies, which, in extreme cases, can reduce costs for entering/leaving ports up to over 300 times (while, in worst cases, it still remains between 2-4 times lower than with pilots).

Detailed report of the survey is presented in Annex II – Survey on PEC/ pilotage costs.

3. Problem definition

3.1. Description of the main problem

The Pilotage Exemption Certificate (PEC) is commonly defined as a certificate that provides for suitably qualified crew (usually the shipmaster) to navigate their vessel instead of being compelled to use a maritime pilot when navigating in compulsory pilotage areas[2].

The use of a maritime pilot generally requires the payment of a fee which can be exempted or discounted when the shipmaster or other senior crew member holds a PEC. In some countries, regions or ports it is not possible or it is extremely difficult for a shipmaster to apply for and obtain a PEC – thus it can happen that a shipmaster with sufficient qualification and experience of a particular fairway, channel or port, must unnecessarily be advised by a pilot when navigating in that compulsory pilotage area.

In such circumstances the absence of a framework for granting PEC or the presence of discriminatory and protectionist conditions / requirements can result in unjustified obligation to be assisted by a pilot. Under such circumstances, shipping companies bear unnecessary costs as they are paying for pilotage services that might not necessarily be needed. In addition, shipping companies face unnecessary operational cost resulting from lack of flexibility and waste of time in the event no pilot is needed.

3.1.1. Scaling of the problem

In 2010, in the EU plus Croatia[3] and Norway there were total of 420,596 sails with PEC and 1,269,163 sails with a pilot. This gives the ratio of PEC missions to Pilotage missions at 0.33, meaning that for every one PEC mission, on average there are three missions under pilotage - this could include shore based pilotage[4].

This ratio is well below to the ones observed in UK, Sweden and Norway, which are the three countries with the highest ratio of PECs, and where in fact the number of PEC missions exceeds the number of pilotage missions (see table below).

Table 1 - 2010 Pilotage and PEC missions by country

Ranking	Country	PEC to Pilot missions Ratio	Pilotage Missions	PEC Exempt Missions
1	UK	1.30	80,503*	104,426*
2	SE	1.22	38,207	46,500
3	NO	1.07	44,708	47,985
4	FI	0.58	29,385	17,050
5	IE	0.56	22,547	12,566
6	FR	0.55	92,498	50,479
7	PL	0.28	16,086	4,474
8	DK	0.22	22,823	5,050
9	BE	0.19	59,374	11,512

[2] Compulsory pilotage areas are typically entrance and exit of ports and other areas where specialized local knowledge is required. The importance of employing qualified pilots was formally recognized by IMO in 1968, when the Organization adopted Assembly resolution A.159(ES.IV) Recommendation on Pilotage. The resolution recommends Governments to organize pilotage services where they would be likely to prove more effective than other measures and to define the ships and classes of ships for which employment of a pilot would be mandatory.
[3] Croatia has joined the European Union on 1 July 2013.
[4] According to EMPA Shore Based Pilotage is: "Shore Based Pilotage is an act of pilotage carried out in a designated area by a pilot licensed for that area from a position other than on board the vessel concerned to conduct the safe navigation of that vessel".

Ranking	Country	PEC to Pilot missions Ratio	Pilotage Missions	PEC Exempt Missions
10	NL	0.19	87,600	16,826
11	LT	0.19	8,160	1,551
12	DE	0.18	171,391	31,129**
13	EE	0.17	11,439	2,000
14	ES	0.13	200,000	26,143
15	MT	0.12	7,863	928
16	LV	0.12	11,656	1,370
17	BG	0.05	7,514	400
18	PT	0.01	16,445	208

*Note: * Estimation based on 4 ports*
*** Estimation based on number of port visits of frequently calling vessels*
Source: Study authors, based on PEC Study (2012) and survey

The maritime transport and traffic country profiles (types of vessels, density of traffic and frequency of port visits) are different from country to country; therefore more countries should be taken into account in order to define a reasonable target rate for the EU as whole.

As shown in Table 1, in 2010, there were 18 countries with active PECs; the average PEC to Pilotage missions ratio on the first 9 countries – UK, Sweden, Norway, Finland, Ireland, France, Poland, Denmark and Belgium - is 74%. Hence, it is reasonable to argue that the EU average ratio should be at least that.

If this target is met by the EU plus Croatia and Norway, yearly, additional 517,000 pilotage missions could be exempted with PECs.

3.1.2. Likely evolution of the problem

The total port throughput will average 1.9% per annum growth[5] in the period between 2010 and 2030 (see par. 6.1.2). This implies that growth will be close to 5,803 million tonnes by 2030, compared with 3,973 million tonnes in 2010.

In order to achieve the port traffic throughput forecast, the shipping industry must increase capacity by around 46% by 2030. Recent figures indicate that the target will be met, not by a greater number of port calls being made, but mainly by increases in ship size.

Table 2 – Baseline scenario for pilotage services market

	2010	2030
Demand - Tonnes	3,973 million tonnes	5,803 million tonnes
Vessel Arrivals	787,053	773,717
Pilotage missions	1,269,163	1,290,567
PEC missions	420,596	415,529
PEC missions to Pilotage missions ratio	0.33	0.32

Source: Study authors

In terms of demand for pilotage services, this implies that the number of arrivals and departures in port will not increase (from 787,053 in 2010 to 773,717 in 2030). However, there will be changes in the pattern of demand by ship size. The number of ships exempted from compulsory pilotage due to size will be static or diminishing, and consequently, the number of pilotage missions will slightly increase (from 1,269,163 in 2010 to 1,290,567 in 2030). Because demand increases are matched by increases in ship size, and not frequency of call, the ratio of PEC missions to pilotage missions will diminish or not change significantly (from 0.33 in 2010 to 0.32 in 2030).

[5] Forecast calculated using the TRANSTOOLS v2.6 model, based on economic assumptions (GDP and GVA) obtained from the PRIMES model (NTUA, Athens. Reference model for EC forecasting).

3.1.3. Who is affected by the problem?

The current PEC scenario is characterised by three macro-regions, each one representing a degree of development of the PEC grant and use. Scandinavian countries, UK and Ireland grant several PECs and these are frequently used in place of pilotage service provisions. A more limited share of PECs is present in Northern Europe (i.e. Belgium, The Netherlands, France, Germany, etc.) and this comes to be very limited or absent in the rest of the Union.

The category of stakeholders mostly affected by the PEC-related problem is that of **shipping companies**. Indeed, the presence of rules guaranteeing in some MSs the compulsoriness of pilotage operations for vessels entering/leaving ports (or, in any case, obstructing the granting of PECs) hinders the possibility for shipping companies to freely choose whom should provide the service: pilots or trained officers. As a result, shipping companies are eventually required to sustain cost that would be avoided in case PECs were granted, without any substantial benefit in return. In particular, costs concerning operational inefficiencies related with pilot-delays and those regarding the impossibility to avoid pilotage costs, even in those cases when qualified officers have the sufficient experience and competence to perform the operation by themselves.

Although this consideration can be considered as valid in general terms, it should be pointed out that those companies suffering more from the current situation are **small and medium enterprises** performing several times the same routes; while deep-sea transport companies would probably have no or little concern on PECs.

On a lesser extent, not being directly involved with economic effects, **shipmasters** (and senior deck officers) are affected by the problem as well. Holding PECs would indeed require them to pilot the ship without the support of a local pilot when entering/leaving ports. Nevertheless, it seems that many shipmasters (and officers) would gladly avoid the pilot compulsoriness, in return of increased operational flexibility. It is also worth considering that masters granted with PECs generally benefit from increased salaries and carrier opportunities, in comparison with others. In addition, the present situation hinders officers' mobility, due to different language and certification requirements.

3.2. Identification of the problem drivers and of the root causes

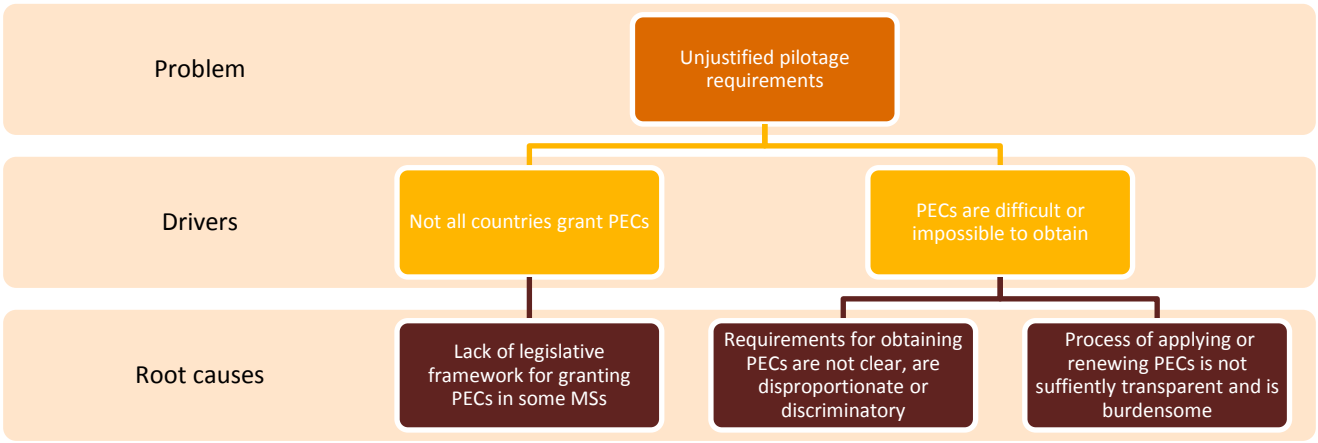
In line with the outcome of the Fact Finding Study on PECs (PwC and Panteia 2012) it is possible to identify two drivers to the problem:

- PECs are not granted by all coastal countries.
- PECs can be difficult or impossible to obtain.

The two drivers are the results of three root causes:

- Lack of legislative framework for granting PECs in some MSs.
- Requirements for obtaining PECs are not sufficiently clear, are disproportionate or discriminatory.
- Process of applying or renewing PECs is not sufficiently transparent and is burdensome.

Figure 3 - Problem tree



3.2.1. Not all countries grant PEC

Certain countries or ports do not issue PECs. Based on the information gathered in the Fact Finding Study four countries do not issue PECs: Cyprus, Greece, Italy and Romania (as of 2011). In 2011 there were no active PECs in Croatia or Slovenia.

The absence of PECs is commonly justified by a claim that PECs reduce safety. However, as a large number of countries provide PECs without any identified decrease in safety. This claim, particularly when applied to all ports, does not appear to be based on factual information and/or might constitute a form of protectionism.

Most stakeholders show shared agreement considering the fact that PECs are not recognised in all MSs as a problem. In particular, shipping companies and shipmasters fully agree that this lack of recognition is an issue that should be solved, while ports and other authorities do agree, but seem less concerned. Differently from the other categories, more than half the respondents from the pilot's category do not see the recognition issue to be a problem at all.

3.2.2. PECs can be difficult or impossible to obtain

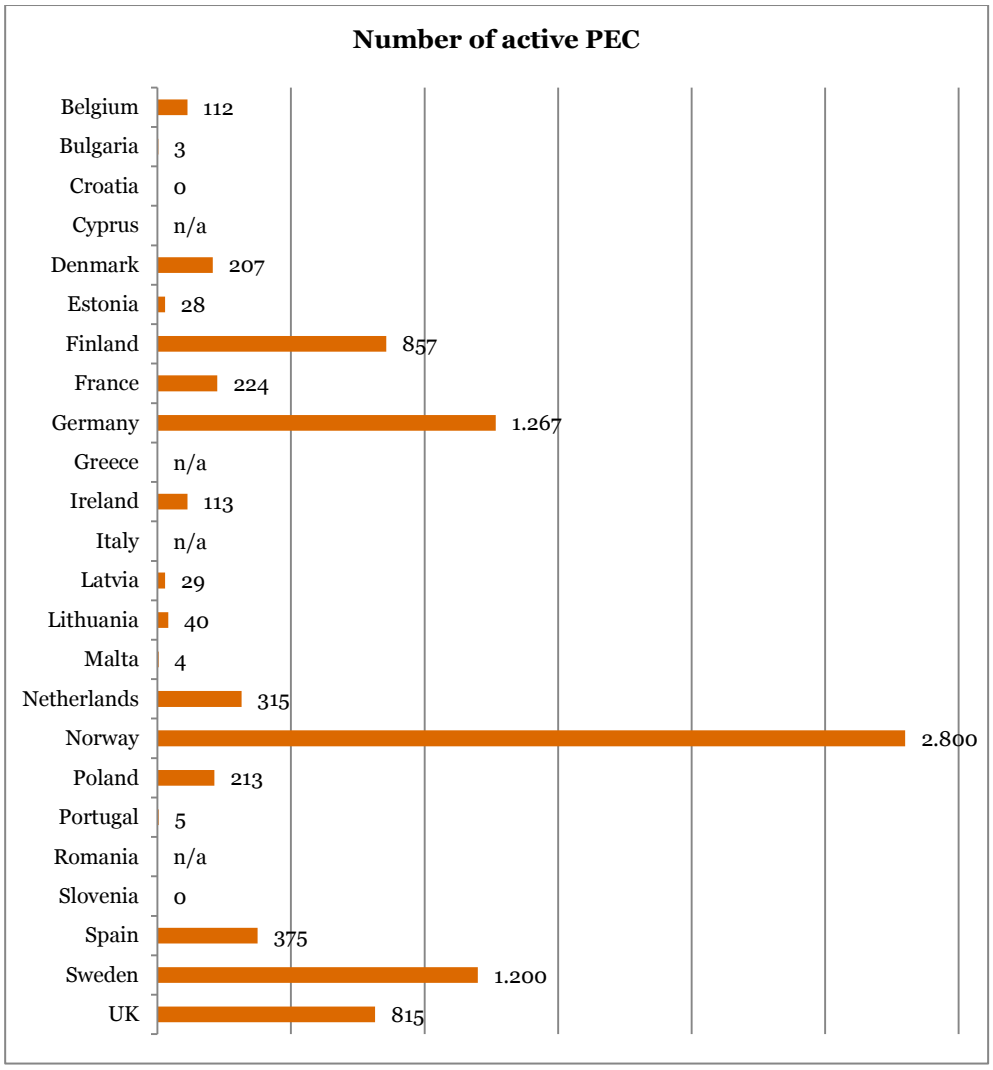
Overall, only in five countries out of 24 there are more than 500 active PECs. This might indicate the presence of difficulties in obtaining PECs.

Countries in the Nordic Region have the highest number of PECs in circulation: in 2011 there were reported to be 2,800 PECs in Norway, 1,267 in Germany and 1,200 in Sweden. There was also reported to be a high prevalence of PECs in Finland (857).

In contrast, there were less than 50 PECs in Lithuania, Latvia and Estonia, while there were between 100 and 500 PECs in Belgium, Denmark, France, Ireland, Netherlands, Poland and Spain. Finally, only a small number of PECs were issued in Portugal (five), Malta (four) and Bulgaria (three).

Figure 2 presents the number of active PECs in 2011 by country.

Figure 4 - Number of active PECs in 2011

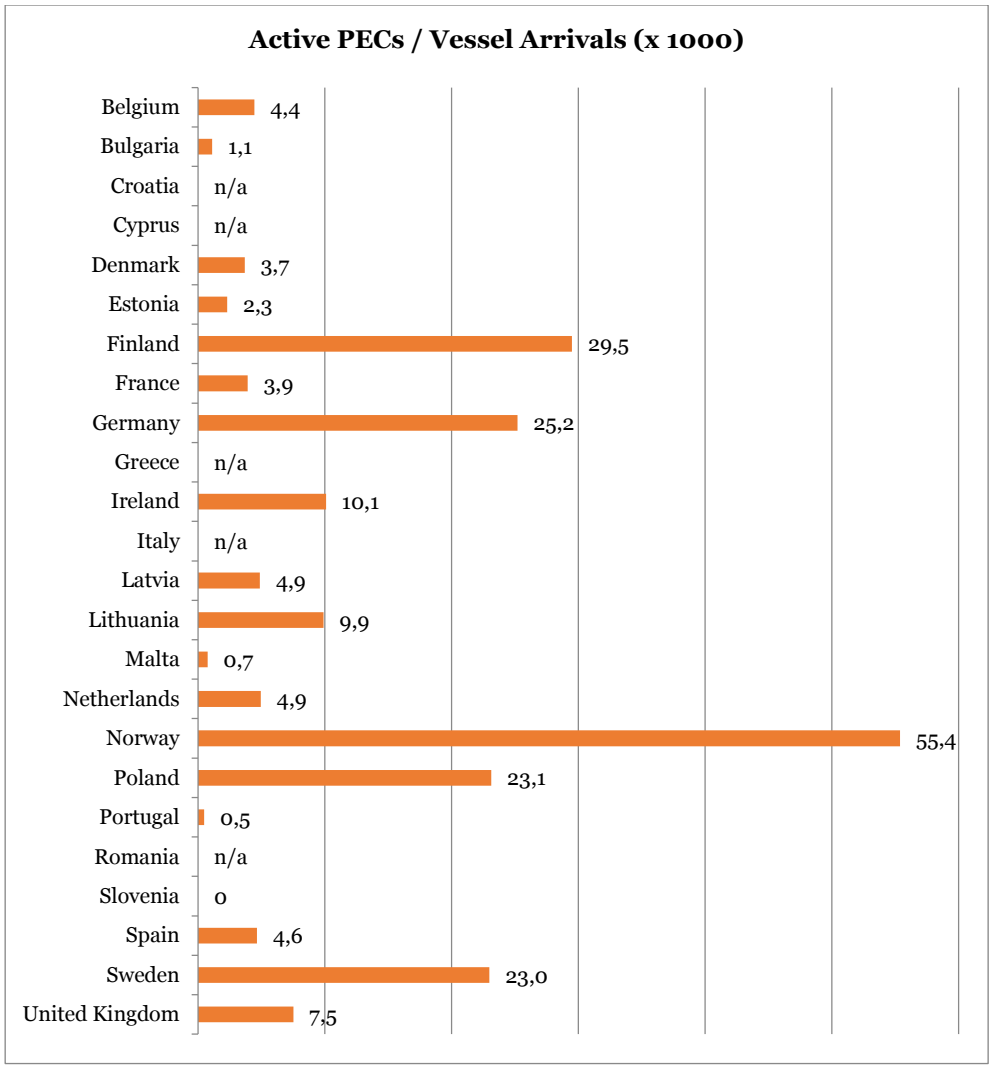


Source: PwC and Panteia Fact Finding Study on PECs (2012) and direct survey

The difference throughout countries is not only present in number of granted PECs, but also in the ratio of these to the overall number of arrivals (see figure below).

The situation presented is still similar, describing strong discrepancies between Northern countries and the Southern ones. Nevertheless, it is shown that the relevance of PECs is somewhat higher than expected (even if still limited) in Baltic countries.

Figure 5 - PEC development indicator levels per country



Source: PwC and Panteia Fact Finding Study on PECs (2012) and direct survey

There are several reasons – or 'drivers' – as to why PECs might be difficult to obtain. These can be grouped:

- The requirements set for obtaining a PEC are not sufficiently clear in all countries or ports.
- The process of granting PECs is not sufficiently transparent in all countries or ports.
- The requirements set for obtaining a PEC are too high in many countries or ports.
- The requirements set for obtaining a PEC are discriminatory in some countries or ports.
- The process of applying or renewing PEC can be burdensome in some countries or ports.

Table 3 presents a summary of requirements set by different countries at a high level, based on the Fact Finding Study.

Table 3 - Requirements set by different countries

Country	Certification		Language			Validity for sister ships
	Master	Chief Officer	National only	National/ English	English only	
Belgium[6]	✓	✓			✓	✓
Belgium[7]	✓	✓	✓			Unknown
Bulgaria	✓			✓		Unknown
Croatia	✓	✓	✓			Unknown
Denmark	✓	✓		✓		✓
Estonia	✓[8]	✓ and x[9]		✓		✓
Finland	✓	✓ and x[10]		✓		✓
France	✓	✓	✓			No
Germany	✓	✓	✓			Unknown
Ireland	✓	✓			✓	Unknown
Latvia	✓			✓		No
Lithuania	✓			✓		Unknown
Malta	✓				✓	Unknown
Netherlands[11]	✓	✓			✓	✓
Norway	✓	✓			✓	✓
Poland	✓	✓		✓		✓
Portugal[12]	✓		✓			No
Spain	✓	✓	✓			Unknown
Sweden	✓	✓ and x[13]		✓		✓
UK	✓	✓ and x[14]			✓	No

Source: PwC and Panteia Fact Finding Study on PECs (2012) and direct survey

3.2.2.1. The requirements for obtaining PECs can be not sufficiently clear, disproportionate or discriminatory

Requirements for PEC are not homogenous across Europe. As a result, there are different levels of expectation when it comes to passing or failing a candidate, coupled with differing perceptions of what is required of the candidate.

[6] Under Pilotage Decree.

[7] Under Revised Scheldt Rules.

[8] For cargo ships.

[9] Only for passenger ships.

[10] Chief officer can obtain a PEC but can actually make use of it only once he/she became a shipmaster.

[11] The Dutch Directorate of Maritime Affairs did not provide information on this topic. The information presented for the Netherlands refers to the Port of Rotterdam and has been sourced by "Harbour Master Port of Rotterdam, *Port Information Guide*, 1 March 2012." The information on the type of examination required concern general country provisions which have been extracted from "Decree PEC Shipping Traffic Act/Besluit verklaringhouders Scheepvaartverkeerswet (Stb, 1995, 396)."

[12] Based on discussion with Associação dos Pilotos de Barra e Portos.

[13] If applicant holds a certificate for Chief Officer/Second Officer during service on the vessel and obtaining a master certificate.

[14] Chief Officer Certificate is not accepted in Tees but it is accepted in the majority of the UK ports.

Respondents of the stakeholder consultation were asked whether they agree that the requirements for obtaining PECs are not sufficiently clear in all Member States or ports. The majority of shipping companies (80%) and shipmasters (52%) fully agree that requirements are not sufficiently clear across the EU, with most other respondents in these categories agreeing to some extent.

Overall, the majority of stakeholders fully agree or agree to some extent that the requirements are not sufficiently clear, apart from pilots (68% of which disagree) and a small proportion of ports and other authorities (20%) and some shipmasters (12%), who do not agree with the statement.

The requirements for obtaining a PEC can also be excessive to the extent that they could be regarded as a potential means of protectionism.

The issue of proportionality and of requirements and discriminatory practices for PEC granting, which thus entails the presence of protectionist practices, was regarded by stakeholders similarly to the previously analysed transparency issue. Almost all shipping companies fully agree that these are too high (84%), and the rest agree to some extent. Shipmasters generally fully agree, too (63%), while ports and other authorities agree, but those fully agreeing (21%) are exceeded by those agreeing to some extent (47%).

Pilots almost entirely disagree (90%), as do also one quarter of shipmasters and one third of ports and other authorities.

Finally, some countries set discriminatory criteria for PEC applicants: for example excessive language skills requirements or the exclusion of some type of vessels or cargo.

There is a clear variance in opinion with regard to discriminatory practices – the majority of shipping companies (79%) fully agree that in some Member States there are discriminatory practices, while 85% of pilots do not believe that there are any discriminatory practices.

The view of shipping companies is mirrored by those of shipmasters (65% fully agree), while the views of ports and other authorities is more akin to the opinion of pilots (24% disagree and 53% only agree to some extent).

PECs are not always granted to officers other than the shipmaster

In five countries (Bulgaria, Latvia, Lithuania, Malta and Portugal) a Chief Officer is not able to obtain a PEC.

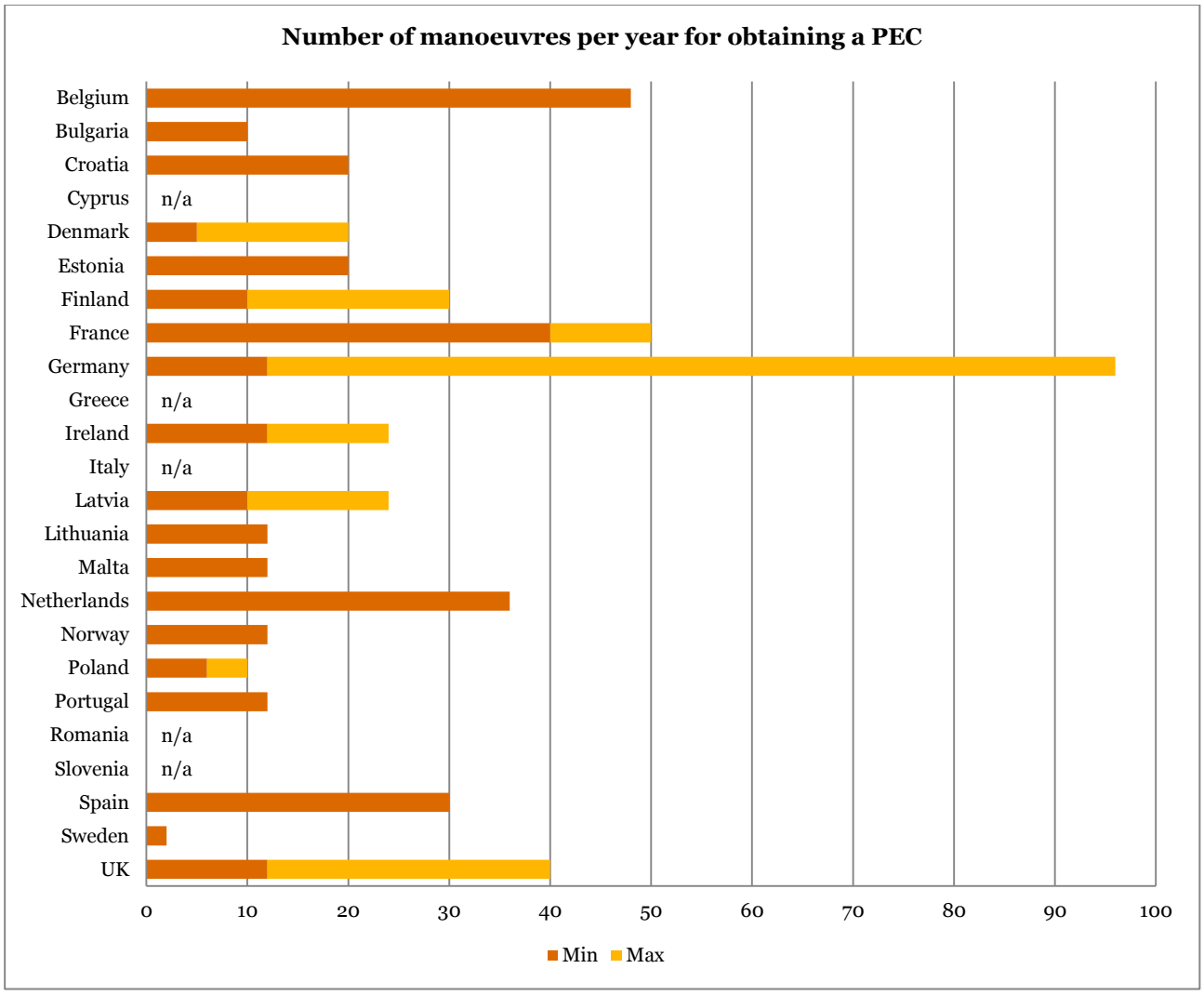
In these countries, other senior crew members who are suitably qualified and experienced in navigation are prevented from applying for a PEC. Allowing other senior crew members to apply for a PEC would assist shipping companies in ensuring that properly qualified personnel are available to pilot ships and that there is less likelihood of duty hours being stretched so as to ensure that a PEC holder remains on duty for an extended period instead of taking a rest period.

Number of manoeuvres/passages with pilot on board as part of requirement for obtaining PEC

With regard to frequency of manoeuvre the requirement is often a specified number of 'passages' or 'calls' or 'manoeuvres' incorporating movements into and out of a specific port, within a specified time frame.

Figure 3 shows the number of manoeuvres per year required for obtaining a PEC: for these countries where the requirement in terms number of manoeuvres varies for different type of PEC, the chart provides the minimum and maximum requirement.

Figure 6 - Number of manoeuvres per year for obtaining a PEC



Source: PwC and Panteia Fact Finding Study on PECs (2012) and direct survey

The number of passages required varies considerably –the highest minimum requirements are in Belgium, and France, whereas the highest maximum requirement is Germany.

In Belgium, for example, 25 in/25 out manoeuvres are required per year in the port of Antwerp (right bank). Even within Antwerp, the requirements vary as fewer manoeuvres are required on the left bank.

In Germany and Denmark there are different levels of frequency requirements: in Germany small ships are required to make 6 in/6 out, while large ships are required to make up to 48 in/48 out.

For some areas in Denmark there is a higher requirement, but not in all: in Denmark there are four categories of area, for which different levels of frequency are required, based on degree of navigation requirements – e.g. the most complex to navigate requires a higher frequency of manoeuvre as part of the application (Area A requires 20 pilotage manoeuvres, compared with Category C where only 5 or less manoeuvres are required).Generally the requirement is less than 10 manoeuvres, while the specified time periods vary from three months to two years. In some instances national administrations indicated that a pilot must be on board at the time of these manoeuvres.

In Sweden the requirement is for two informational passages only: however it is up to the applicant to decide how many passages he requires to make in order to have a chance of passing the exam.

In Latvia and Norway the manoeuvres must be carried out in three months, while the requirement in Croatia is for a two year period. Generally the frequency requirements are for the preceding year to the PEC application.

Knowledge of local language

There are mixed requirements with regard to language across countries. 'English' is accepted in four countries plus Ireland and UK as an alternative to the local language as part of the PEC application process. In a further eight countries, 'English' is accepted as an alternative, but a sound understanding of basic maritime vocabulary in the local language is also required. Finally in six countries only the local language is required.

Several shipping companies but also other categories of stakeholders reported that in some countries or ports the requirements concerning the local language constitute a strong barrier against granting PECs.

Stakeholders called to express their opinion on the possibility to have English accepted as sole language requirement for PECs consider the issue quite relevant. Shipping companies strongly support it, while pilots are on the opposite side. In the middle, other stakeholders are clearly in favour, but less proactive than shipping companies.

Applicability and validity of PEC for more than one vessel

With regard to applicability and validity of PEC for more than one vessel, comprehensive information at European level is currently not available.

However, it was reported that in four out of 19 countries the PEC applies only to a specific vessel. By contrast, in four other countries the PEC is valid for more than one vessel, typically including sister vessels or vessels with similar characteristics.

In Sweden a supplementary PEC can be extended to include other vessels. An evaluation is undertaken to understand if the vessel applied for has the same dimensions: if it does not then an additional practical exam must be taken.

Type of vessel for which the PEC can be granted

One criterion, which varies considerably between countries, is whether a PEC can be issued for any type of vessel or not.

Six countries grant PEC for any type of vessel apart from vessels carrying dangerous goods. Four countries have defined requirements in terms of maximum length (LOA) or tonnage (GT) of the vessel for which a PEC should be issued. Finally in a few countries it was reported that PECs can be granted only to shipmasters of ferry or RoRo vessels.

However, unless there are proven safety reasons, any discrimination in terms of type of vessel or cargo should be avoided when granting a PEC.

3.2.2.2. The process of applying or renewing PECs can be not sufficiently transparent and burdensome

In some countries the process of applying for PECs can be not sufficiently transparent or burdensome.

The opinion of stakeholders is once again split between shipping companies / shipmasters and ports and other authorities / pilots. The majority of shipping companies (73%) and shipmasters (45%) fully agree that the process for applying / renewing PECs is burdensome in many Member States or ports. This compares with only 20% of ports and other authorities and 1% of pilots. Indeed 87% of pilots do not agree with this statement at all.

Application process can be not transparent

While many shipmasters are interested in obtaining PEC they are often not able to prepare adequately for the exam or obtain the required competences – due to the fact that the process of granting a PEC is not clear or transparent.

Furthermore, in some countries or ports the examination results are confidential and it is not possible for a PEC applicant to review the results or to receive feedback should they fail. Without this information it is difficult for a shipmaster to prepare and re-sit the exam successfully.

This situation can result in additional stress being placed upon the shipmaster, as he will be frustrated due to not having a clear understanding of what is required in terms of exam preparation.

Based on our research, information on detailed requirements and on the exam process is not generally available in internet or it is difficult to find.

The results of the stakeholder consultation present a serious concern from stakeholders on transparency of requirements for PEC granting. Shipping companies (84%) and shipmasters (57%) are aligned in full agreement that the process of granting PECs is not sufficiently transparent. At the same time, the majority of ports and other authorities fully agree or recognize that in some ports there might be issues with transparency in process for granting PECs. Most pilots, on the opposite, do not believe this being a problem.

It is important to note that many shipping companies suggested that *in case an exam on local conditions is required, there should be full transparency on the detailed information or data the applicant is supposed to know; [...] the port should publish some notes or text to allow the applicants to acquire the required knowledge.*

Duration of PECs

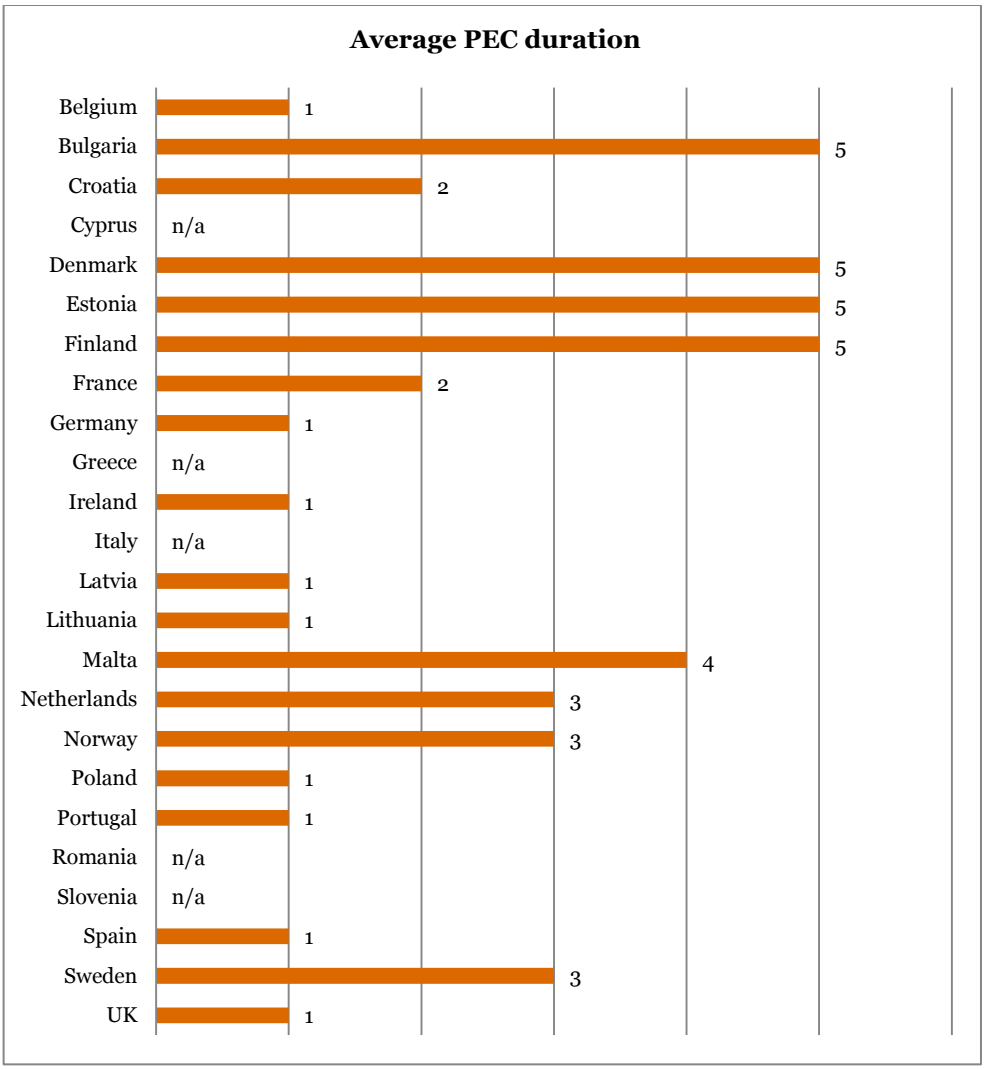
The duration of a PEC is mostly one year or five years, based on information gathered during the Fact Finding Study:

- One year (Belgium, Germany, Ireland, Latvia, Lithuania, Poland, Portugal, Spain, UK).
- Two years (Croatia, France).
- Three years (Netherlands, Norway, and Sweden): although in Norway there are two categories, one of which has no time limit.
- Five years (Bulgaria, Denmark, Estonia, Finland, Malta).

It is interesting to note that a number of countries where a high number of PECs are in circulation have longer renewal periods (e.g. Finland, Sweden and Norway, for example). It is the case however, that some countries with high numbers of PECs also have short duration periods (e.g. Germany and the UK, where the duration of a PEC is one year).

Figure 7 presents the duration of PECs for each country.

Figure 7 – Duration of PECs



Source: PwC and Panteia Fact Finding Study on PECs (2012) and direct survey

Indeed, renewing the PEC every year can result in unnecessary administrative burden to shipping companies and their shipmasters. However, the opportunity of extending the minimum duration of PEC should be further assessed.

Procedures and requirements for renewal of PEC

The renewal process varies with regard to requirements, being stricter in some countries compared with others. For example in Belgium the applicant must provide a list of dates and times at six month intervals as evidence of manoeuvres.

In many cases the same criteria for the original application must be met – particularly in terms of frequency of manoeuvres during the preceding year. In a number of cases the manoeuvre requirement is less than at the time of application – for example in Finland the PEC must present documentation of two voyages per year in the fairway.

In Bulgaria the PEC only becomes invalid with the holder has not made the required number of manoeuvres in a three month period.

In Sweden, the PEC holder must only have used the PEC in the preceding 12 months – there is no stipulation on frequency of passage other than at least two passages.

In some cases re-examination is required – for example in Finland a written test must be passed as well as a simulator test, and a theoretical text must be passed in Estonia.

In other countries, no exam is required – in Lithuania, all that is required is that there have been no accidents or remarks from VTS/pilots in the preceding year. In France there is no requirement for re-examination, provided that all other conditions are met (these are the same for renewal as for initial PEC issue).

Simplification of procedures and more relaxed requirements than at the time of application will reduce the administrative burden on shipping companies and their shipmasters. However, it is suggested to further investigate this topic in order to ascertain that there are not relevant drawbacks to such an approach.

3.3. Justification for EU action

Is EU action justified on grounds of subsidiarity? Why can countries not achieve the objectives of the proposed action sufficiently by themselves? Can the EU achieve the objectives better?

The action is justified on grounds of subsidiarity. Maritime transport is an international activity and the legislation should be adopted at international level as far as possible. Ports are unique and pilotage may require skills and actions that are specific to each port. But there is also an increasing degree of commonality, as qualification, safety rules and techniques tend towards greater harmonisation. Moreover the EU has a specific role for harmonising rules or eliminating discriminatory rules.

Not all countries achieved the objectives of the proposal sufficiently by themselves. The Commission issued recommendations to the Member States relating to pilotage services in 1995, 2007 and 2009. These did not result in a sufficient improvement of the situation. Give that the soft approach which has prevailed until now has not succeeded in achieving progress, a more pro-active approach must be considered.

The EU can act in an efficient manner to extend best practice across Europe.

4. Objectives

4.1. General, specific and operational objectives

The General objective of the policy initiative is the "**Promotion of Short Sea Shipping by reducing the administrative burden and unnecessary costs for shipping companies**". In particular the policy should promote a reduction in the cost of pilotage services which may be unnecessary in the event that the shipmaster has the required qualification and experience to safely navigate in specific compulsory pilotage areas without the assistance of a maritime pilot.

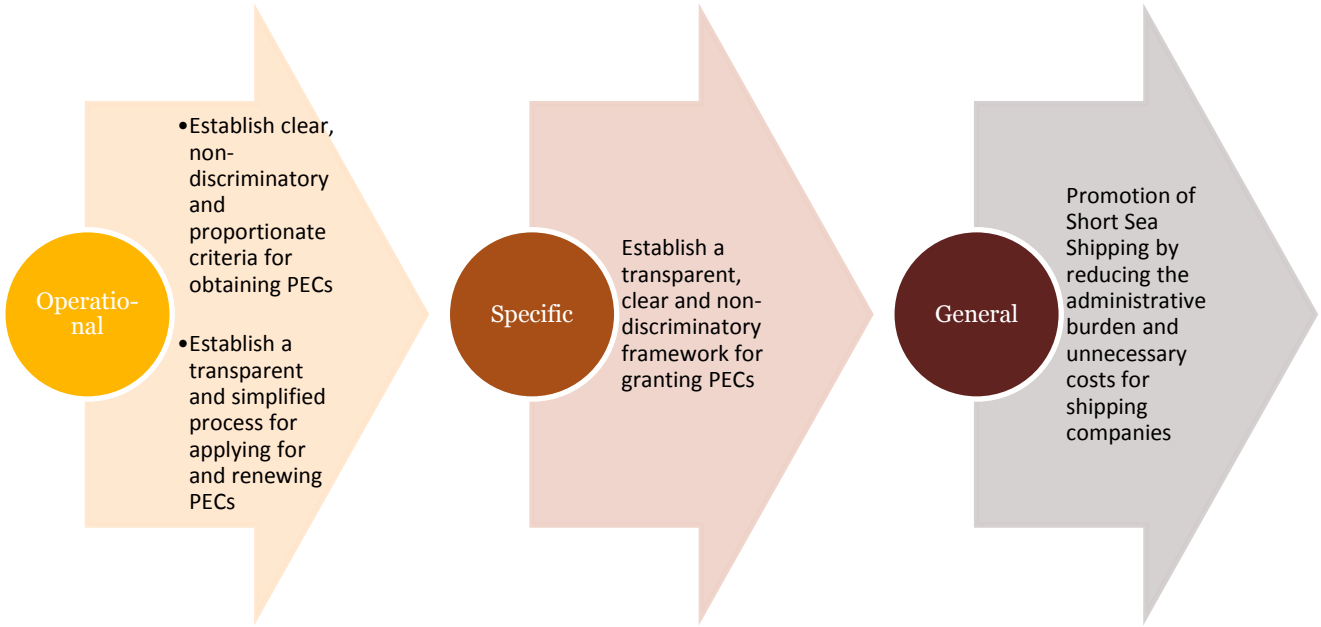
The General objective can be translated into a specific objective:

1. To establish a transparent, clear and non-discriminatory framework for granting PECs.

The specific objective can be achieved by pursuing two different operational objectives:

1. To establish clear, non-discriminatory and proportionate criteria for obtaining PECs.
2. To establish a transparent and simplified process for applying for and renewing PECs.

Figure 8 – Objectives framework



5. Policy options

5.1. Definition of measures and related objectives

The review of the problem and in particular the outcome of consultation of stakeholders conducted within the context of the PwC and Panteia Fact Finding Study on PECs (2012) have allowed for the identification of a set of measures which can be grouped in different policy options.

These measures are expected to address the issues and drivers, which have been identified and described under the problem definition activity.

The long list of measures and the related specific objectives are presented in Table 4 which depicts the main relationship between proposed measures and the operational objectives to be addressed.

In consideration of the outcome of the stakeholder consultation and of the views expressed by the stakeholders a few measures have been discarded.

Table 4 - Measures

Measure	Clear, non-discriminatory and proportionate criteria for obtaining PECs	Transparent and simplified process for applying for and renewing PECs
M3 Transparency of examination procedures: all countries should publish particular information on-line and provide written feedback to applicants in the event of exam failure	✓	✓
M4 Simplified renewal of PEC: all countries should define simplified procedures and requirements for the renewal of PECs	✓	✓
M6 Granting PEC to any qualified senior member of crew: all countries should allow any (senior) member of the crew who is suitably qualified and experienced in navigation to obtain PEC and to replace the need to pilot	✓	
M7 Threshold for number of manoeuvres needed to obtain PEC: setting the types of requirements and their maximum thresholds for obtaining a PEC (or number of manoeuvres/passages with a pilot, years of experience, etc.)	✓	
M8 Applicability and validity of PEC for more than one vessel: countries should extend the validity of PEC for more than one vessel, typically including sister vessels or vessels with similar characteristics	✓	✓
M9 Granting PEC for any type of vessel or cargo: countries should grant PECs for any type of vessel or cargo, as long as there are not proven safety concerns	✓	✓
M10 How long PEC is valid for: countries should define a minimum duration for PECs equal or above a common threshold defined by the EU - e.g. 3 years' duration	✓	✓
M11 English as a valid language for PEC holder: countries should accept 'English' as alternative to the local language as part of the PEC application	✓	

5.2. Definition of policy options

To address the problem, underlying drivers and root causes, four policy options in addition to the "Do nothing" option have been proposed. Each policy option is composed of a series of policy measures addressing the two

specific problems ("PECs are not granted by all coastal countries” and “PECs can be difficult or impossible to obtain”).

All the proposed policy options include measures 3, 4 and 6 to 10. Measure 11 on language requirement is treated separately as an additional option.

Policy options differ on the delivery mechanism and on the opportunity for Member States to derogate from the requirements set by the Commission.

Policy Option 0: “do nothing”

This baseline option means no new EU policy and reliance on the existing recommendations. Although policy option 0 considers no new line of intervention from the EU, an slight increase in the number of PECs granted is expected, in line with trends over the last ten to fifteen years, as a result of natural progression, adjustments and improvements sought by a wide range of stakeholders (e.g. national administration that wish to improve access to PECs, continuous requests from shipping lines, etc.).

However, since traffic demand increases are matched by increases in ship size, and not frequency of call, the ratio of PEC missions will not change significantly or will diminish.

Some countries are proactive in reviewing and improving the requirements for PECs with a view to making PECs easier to obtain, while other countries are less so, to the extent of preventing the granting of PECs in their ports. Thus it is possible that protectionist practices will continue to occur, such as setting excessive PEC application requirements and associated legislation. It is also likely that issues related to a lack of transparent rules will be present in the future as much as they currently are, without any new EU intervention.

The development is framed by the previously issued recommendations on PECs in 1995, 2007 and most recently in 2009 (i.e. COM(2009)10 final, etc.) by the Commission, though there has not been any dedicated Communication on PECs so far.

Policy Option 1: "EU Recommendations"

Policy option 1 differs from baseline in that a distinct and clear position of the European Commission (the “Commission”) is present, by way of a dedicated communication on PEC recommendations. The goal of the Communication would be to invite all countries to create a regulatory framework which would permit easier pilotage exemptions. Although policy option 1 is a soft approach, the open position of the Commission is expected to have a more positive effect than baseline. The idea is that through the widespread dissemination of relevant information and benchmarking analyses, the Commission might encourage all countries to consider the positive impacts associated with easing the requirements for obtaining PECs - in particular those countries where requirements are excessive. In contrast with baseline, policy option 1 might also increase transparency in those countries where PECs are already granted. On the other hand, based on the current experience, the Communication is not expected to fully contribute to achieving the objectives of the initiative and therefore this option is discarded and not analysed further.

Policy Option 2: "directive setting a legal framework in each Member State"

Policy option 2 considers placing an obligation on all countries to issue PECs to experienced shipmasters through a clear and a non-discriminatory framework, letting each Member State regulate the matter as they please. In practice, policy option 2 would be unlikely to lead to the outcome that the Commission desires. By giving countries the freedom to set requirements and criteria arbitrarily, it might be the case that no current issues would be solved. Countries that do not want PECs to be granted could easily produce regulations obstructing its actual implementation. Lastly, policy option 2 would be unlikely to solve issues relating to a lack of transparency or excessive requirements within the PEC application process. As a result, this option is not expected to contribute fully to achieve the objectives of the initiative.

Considering the above, the transposition burden would likely outweigh any possible benefits. The objective of creating a legal framework in each Member State would be achieved, but the objective on transparency of the framework cannot be reached. Therefore, on the basis of this preliminary assessment policy option 2 is also discarded and not further analysed.

Policy Option 3A: "single EU framework – derogations possible"

Policy option 3A comprises the establishment of a Directive for the implementation of an EU framework specifying criteria and maximum requirements that Member States can set in national rules. This would limit arbitrariness and the potential for discriminatory conditions/requirements.

The opportunity to request derogations from the EU framework for specific ports and fairways will be given to countries under this option. Nonetheless, in this eventuality, the Member State/Port would need to provide justification and report to a dedicated national/European body.

Policy option 3A is expected to push towards an incremental increase in the use of PECs, moreover favouring the adoption of sound criteria throughout the EU. The six countries which currently do not grant PECs are expected to adopt a framework compliant with the criteria and maximum requirements set at European level. Some of the remaining 18 countries which already have a framework in place for granting PECs might have to modify their framework in order to comply with all the provisions. This option is likely to impact more on those countries which present a low ratio of PEC missions to pilotage missions (see Table 1)

This option will be assessed in detail.

Policy Option 3B: "single EU framework – derogations not possible"

Policy option 3B very much limits the ability of countries to adapt requirements in order to suit specific circumstances. This policy will be delivered through a Regulation.

In practice all countries will be required to set criteria and requirements that are cognisant of common thresholds defined by a single EU framework for PEC requirements without any possibility of derogation from the framework for specific ports and fairways.

As for policy option 3A, under policy option 3B the six countries which do not yet grant PECs will adopt a framework compliant with the single EU framework. The remaining 18 coastal countries will be expected to modify their current framework where current criteria and requirements are not coherent with the single EU framework.

This option will be assessed in detail.

Policy Option 4: “full EU harmonization”

Policy option 4 considers the possibility to create by Regulation a single EU framework with fully specified requirements and criteria. In this case the EU would not define a threshold, but actual standard/harmonized requirements. In practice all 24 coastal countries will be required to adopt a framework where requirements are set as specified in the EU framework. Interestingly, countries which currently have relaxed requirements to grant PECs will be obliged to adopt stricter requirements which will result in a lower number of PECs being granted.

This option does not consider local characteristics and geographical specificities of different contexts that are present across the EU and could be therefore seen as disproportionate.

This option will be assessed in detail.

Additional Options regarding language requirements

For each of the afore-mentioned options, an additional question on specific language requirements could be raised.

For the preferred policy option, further analysis will be carried out to assess the impacts of possible requirements with regard to the knowledge of English and/or the national language for obtaining a PEC. Table 3 in chapter 3 helps to understand how different countries will be affected by these provisions.

a) Knowledge of national language required

This sub-option requires all PEC applicants to know the national language of the country where the PEC will be granted. This provision will not impact on the 14 countries which currently require the applicant to know the local language. In contrast, the six countries which have set the knowledge of English as sole language requirement will be obliged to modify their framework. Finally, the six coastal countries which currently do not grant PECs will need to consider this specific criterion when defining new frameworks.

b) English and basic knowledge of national language required

This sub-option includes the specific requirement that all countries accept English plus a sound understanding of basic maritime vocabulary in the local language. Eight countries currently require the applicant to know English and the local language; however some of these countries will be likely required to simplify the examination to assess the knowledge of the local language, since under this sub-option a full knowledge of the local language is not required. Similarly, the six countries which currently require only the knowledge of the local language may have to simplify the examination with this concern and to explicitly require English knowledge.

The six countries which currently require English knowledge as only language requirement will need to impose a new requirement concerning the sound understanding of basic maritime vocabulary in the local language. Finally, the six coastal countries which currently do not grant PECs will need to consider this specific criterion when defining new frameworks.

c) English as an alternative language

Under this sub-option all countries are obliged to accept English as an alternative to the local language as part of the PEC application.

The possibility to use the English language will reduce the burden and stress placed on shipmasters associated with learning a language and undergoing a language examination when applying for a PEC in a foreign country.

This sub-option will affect the six countries which accept only the local language and the six countries which do not currently grant PECs. The latter will be required to consider this provision when defining new frameworks.

6. Analysis of impacts

6.1. Development of market for pilotage services

6.1.1. Outline of methodology

6.1.1.1. Definitions

In general, the analysis is limited to pilotage applying to the arrival and departure of sea-going vessels on international journeys to and/or from European Union ports. It therefore includes EU short sea shipping, as well as inter-continental shipping, but excludes coastal and inland waterway traffic.

We distinguish between port-centric definitions and ship-related ones. From the perspective of the port, we analyse vessel arrivals and departures, indicating that a ship has either entered or left a port area. A vessel arrival in port may also be termed a port call. Often the shorthand terms 'ins' and 'outs' are used equivalently to arrivals and departures.

From the perspective of the ship, we analyse missions or manoeuvres or movements, indicating that a vessel has simply moved from one stationary position to another, without further qualification.

In a typical case of a ferry arriving in port in the morning, going straight to its berth, and then departing in the evening, we would count:

- One arrival (or one call) per day.
- One departure per day.
- One in, one out per day.
- Two missions (or two manoeuvres) per day.

If the ship changes berth during the port visit, the arrival and departure count remains at one each, but the number of missions increases to three.

As regards pilotage, it is necessary to distinguish four mutually exclusive circumstances:

A. Ship movements into, out of or within port where there is a pilot on board. These are termed *pilotage missions*.

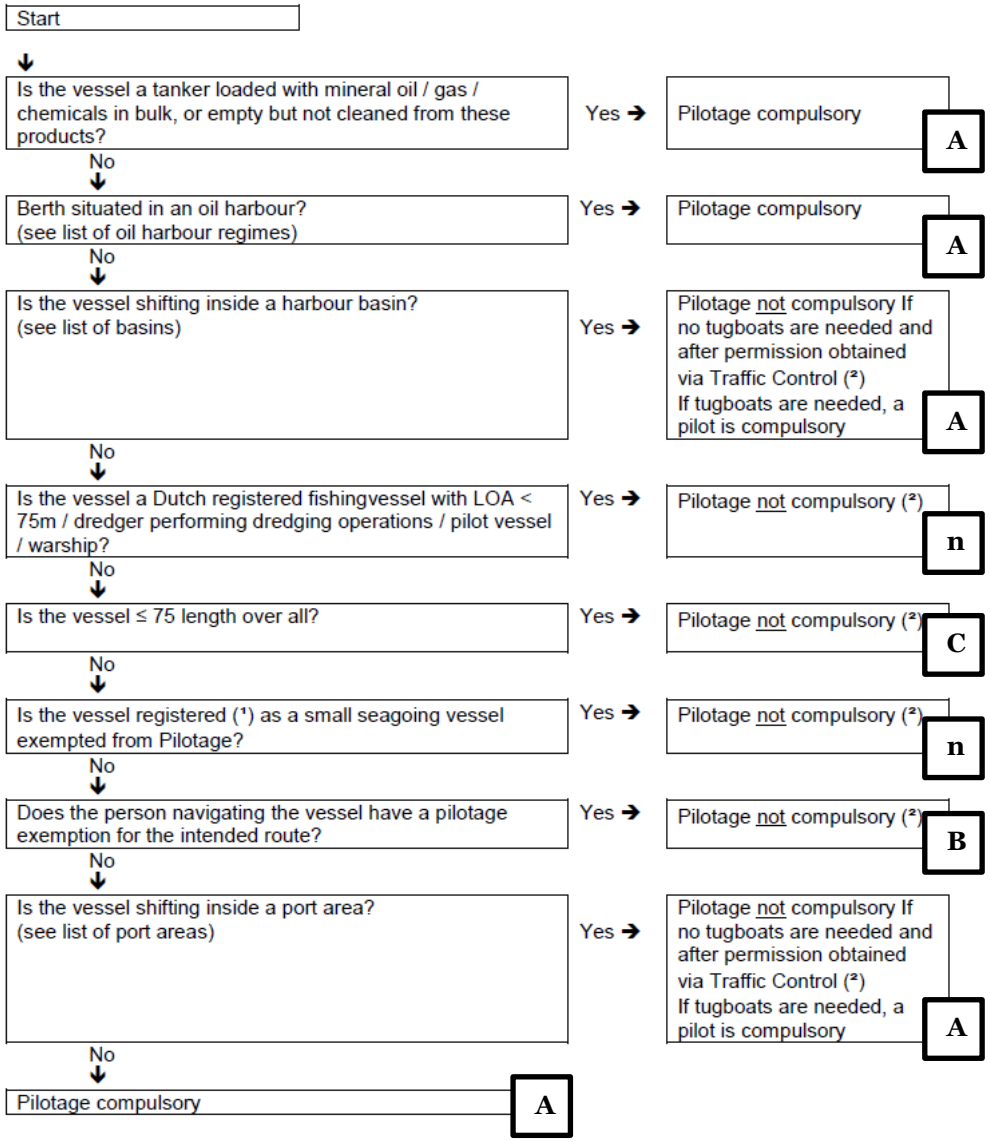
B. Ship movements into, out of or within port where the pilotage is in effect carried out by a member of the ship's crew, in the circumstances where a pilotage exemption certificate is held. These are henceforth termed *PEC missions*.

C. Ship movements into, out of or within port where pilotage is not required, typically because of the (small) size of the vessel in question. These are termed *other exempt missions*.

D. Ship movements into, out of or within port where shore-based guidance is applied as an alternative to on-board pilotage. These are termed *shore-based pilotage missions*.

Pilots may be used in circumstances where it is not necessarily compulsory to have a pilot on board, but if a mission is classified as 'pilotage not compulsory' then we assume that no pilot will be on board. This is exemplified below, using an extract from the Amsterdam port information guide, where the rules are presented in the form of a decision tree. Categories A, B, and C are added according to the definitions above; n.a. refers to vessel traffic out of scope for this study.

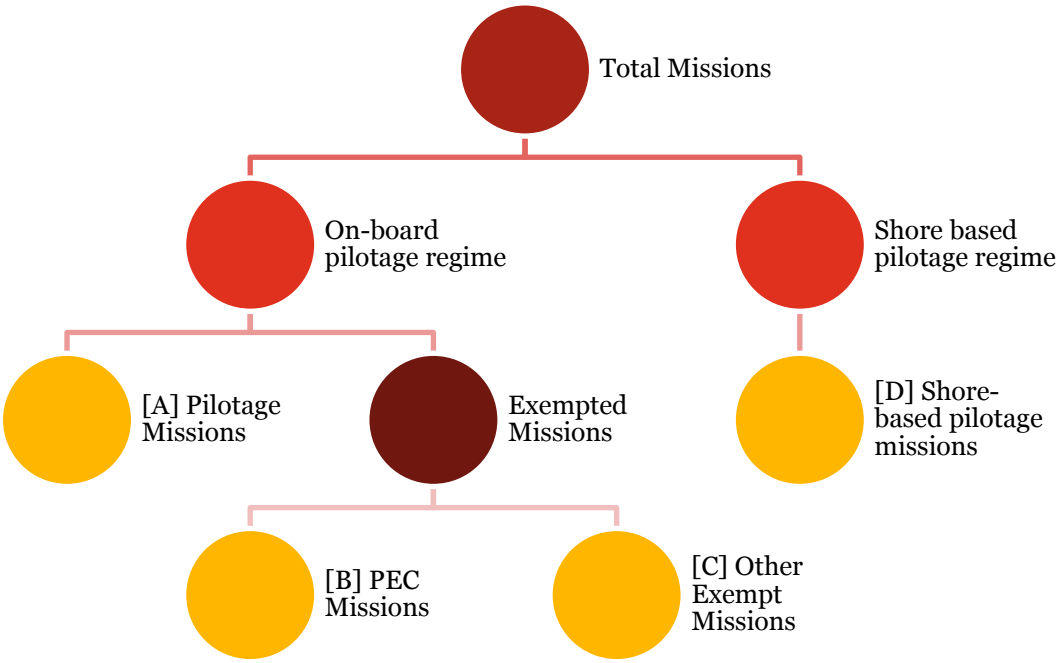
Figure 9 - Port of Amsterdam, Pilotage decision tree



Source: Port of Amsterdam, Port Information Guide, January 2011, http://www.portofamsterdam.nl/docs/uk/Shipping/PIG_DEF.pdf

This can be extended to allow for the additional category of shore-based pilotage, which may or may not be considered as 'pilotage' according to specific national legislation.

Figure 10 - Categories of missions



6.1.1.2. Analytical system structure

The proposed Analytical System Structure is based on the following principles:

1. Total missions are a function of traffic levels, i.e. the number of ships calling at a port in a year. This relates to the intensity of the demand, rather than any measure of gross cargo weight.

2. Numbers of pilotage missions and conversely, exempted missions, depend on the rules being applied at the port. Exemptions with PECs typically require that a ship is calling at a given port regularly. Other exemptions typically apply according to vessel size. Infrequently calling large vessels typically require a pilot on board. Frequently calling and smaller vessels may not require compulsory pilotage.

3. Pilotage tariffs typically vary per country and according to vessel size. By combining tariff information with usage information it is possible to estimate user costs.

Applying these basic principles, it is therefore possible to translate from estimates of port throughput, to vessel calls, to ship missions, to pilotage missions, to user costs.

In order to apply the rules for pilotage exemptions to patterns of port calls, it is necessary to segment the demand. We have applied two dimensions of segmentation; by ship size and by calling frequency, in order to address the rules for compulsory pilotage. Ship size and calling frequency also permit estimates of user costs for pilotage services to be made. Each country is analysed separately, given the broad range of practices.

Our approach and intermediate steps to quantification are described in the following paragraphs. The quantification results for the baseline are described in par. 6.1.2.2. Quantitative findings for the alternative policy options are presented in par. 6.4.4.

6.1.1.3. Trends in vessel arrivals

To produce the baseline a number of main sources have been used, including:

- Eurostat data covering vessel arrivals.

- Dutch Central Bureau of Statistics data covering vessel arrivals.
- 2012, Pilotage Study (PwC/Panteia)
- Questionnaire responses collected for current impact assessment support study.

While figures on port throughput (tonnes of cargo and numbers of passengers) are generally unambiguous, statistics on vessel arrivals do show a high degree of discrepancy between sources. This is partly because different scoping may be applied, e.g. inclusion of yachts, pleasure boats, service vessels, ships for offshore activities, and other non-commercial activities. It is also because there are ways of double counting ship movements, and because there are overlaps between inland waterway activity and movements of sea-going vessels.

Eurostat indicates that 2,019,653 vessels arrived in EU-27 (excluding France) ports[15] in 2011. Eurostat data is based on inward declarations by ports. They show a slow rate of annual increase in the five year period between 2006 and 2011. In 2006, vessel arrivals were 2,010,720.

By contrast, the cargo carrying capacity represented by these port calls increased by over 16%, mainly accounted for by increases in average vessel size, and not by increased arrivals. The average ship size increased from 6,339 GT[16] in 2006 to 7,337 GT in 2006. Over the same period, passenger volumes increased until 2007, and then fell every year subsequently. Cargo volumes also reached a high point in 2007, then fell sharply in 2009, and then recovered gradually up to the level shown for 2011.

Table 5 - Aggregate Port Statistics, EU27

		2006	2009	2011	Change % (11/06)
Vessel Arrivals	EU27-FR	2,010,720	1,928,806	2,019,653	+0.44%
GT ('000T)	EU27-FR	12,746,355	13,837,498	14,818,674	+16.26%
Avg. GT/Vessel	EU27-FR	6,339	7,174	7,337	+15.74%
Total Tonnage (mln)	EU27	3,836.0	3,445.5	3,706.4	-3.4%
Total Passengers (mln)	EU27	406.6	399.5	385.4	-5.2%

Source: Eurostat

These figures can be broken down by vessel size (GT) and by port of arrival.

In terms of ship arrivals, it can be seen that 807,084 ship arrivals were less than 1000 gross tonnes, and that many of these were found in two regions, namely Greece/Cyprus and Denmark/Sweden. If these are converted into aggregate cargo carrying capacity, the picture is quite different. More than 70% of capacity is accounted for by the ships in the range 10,000-100,000 GT, and the distribution by geographical range is more even.

[15] Statistics in Focus, 7/2013, Vidar Lund, "Continued recovery in volume of goods handled in EU ports", Table 9. NOTE: Figures exclude arrivals for France.
[16] Gross tonnage: The gross tonnage (GT) of a ship shall be determined by the following formula: GT = K1V, where: V = Total volume of all enclosed spaces of the ship in cubic meters, K1 = 0.2 + 0.02log10V (or as tabulated in Appendix 2). International Convention on Tonnage Measurement of Ships, 1969

Table 6 - Number of Ship Arrivals by GT Class and Coastal Range, 2010

	BE,NL, DE	BG,RO	CY,GR	DK,SE,FI	EE,LV,LT ,PL	ES,PT	IE,UK	IT,MT,SI	EU27-FR
< 1,000	35,246	354	377,983	243,242	6,310	4,686	2,349	136,914	807,084
< 10,000	69,336	3,276	94,428	102,591	31,862	77,393	48,461	330,795	758,142
< 00,000	64,439	1,311	24,155	123,791	14,810	45,783	72,558	60,596	407,443
> 100,000	1,252	-	98	72	40	1,512	330	1,597	4,901
TOTAL	170,273	4,941	496,664	469,696	53,022	129,374	123,698	529,902	1,977,570

Source: Eurostat

Table 7 - Total GT ('000 Tonnes) of Ship Arrivals by GT Class and Coastal Range, 2010

	BE,NL,D E	BG,RO	CY,GR	DK,SE,FI	EE,LV,LT ,PL	ES,PT	IE,UK	IT,MT,SI	EU27-FR
< 1,000	17,003	247	177,325	79,652	3,238	1,479	1,448	51,402	331,794
< 10,000	255,182	12,370	339,696	377,858	148,563	403,089	209,320	1,107,516	2,853,592
< 100,000	1,912,770	39,890	650,170	2,631,620	401,405	1,313,265	2,083,485	1,777,295	10,809,900
> 100,000	175,700		12,450	9,000	5,150	207,700	46,150	202,875	659,025
TOTAL	2,360,655	52,507	1,179,641	3,098,129	558,356	1,925,532	2,340,402	3,139,087	14,654,311
Avg GT	13,864	10,627	2,375	6,596	10,531	14,883	18,920	5,924	7,410

Source: Eurostat

Average GT per geographic range therefore depends heavily upon the presence of smaller vessels. Even though the average GT per vessel is 7,410, a more representative figure would be in the range 10-15,000 GT.

In the context of pilotage, we can estimate that out of 1.9 million ship arrivals, around 1.1 million would be below the threshold to require compulsory pilotage. The remaining 0.8 million would generate around 1.6 million pilotage or PEC missions. Based on PwC/Panteia 2012 stakeholder survey results, and taking into account some non-reporting countries, we would estimate the number of pilotage missions to be 1.1 million and the number of PEC missions to be 0.5 million.

The conclusions from Eurostat statistics are therefore that:

- Vessel arrivals react to the level of port throughput, but the longer term trend is static.
- Average vessel size increases consistently year on year.
- A representative average vessel arriving in a European port in 2010 has a gross tonnage of 10-15,000 GT.
- Total demand for pilotage plus PEC missions in 2010, for sea-going vessels arriving/departing EU ports, is estimated to be 1.6 million ship missions.

6.1.1.4. Trends in vessel sizes

The following tables show the trends in ship size by ship type and by year of build, based on the Clarkson World Fleet Register. These are ships which are still classified as belonging to the current world fleet, although the degree of usage or the region of deployment is not known.

For example, an average container vessel (fully cellular containership) built between 1974 had a deadweight of 8,162 tonnes. For the period 2010-2011 new vessels had an average deadweight of 68,539 tonnes. Over the whole period the increase in new vessel size average 6.4% per annum in terms of deadweight and 6.1% in terms of tonnage.

Table 8 - Average Deadweight per vessel by Year of Build and Ship Type

	1970-74	1975-79	1980-84	1985-89	1990-94	1995-99	2000-04	2005-09	2010-11	CAGR 1970-2011
Bulk Carrier	12,308	24,220	12,308	41,448	59,566	58,885	67,891	70,629	77,282	4.7%
Bulk Ore Carrier	21,033	28,042	84,412	196,248	248,578	273,194	162,311	270,661	277,682	6.7%
Bulk/Oil Carrier		74,945	92,328	80,284	115,896	109,861	120,584			1.6%
Other Dry Cargo	3,137	3,646	3,955	3,308	3,290	4,685	5,860	6,389	9,686	2.9%
Ore/Oil Carrier	3,345	3,205	3,291	33,492	3,076	3,710			319,869	12.1%
Tanker	2,475	2,912	6,333	10,870	24,278	51,177	72,373	54,268	69,455	8.7%
Gas Carrier	6,041	14,784	11,870	8,787	18,484	15,999	34,584	47,428	31,798	4.2%
Fully Cell. Contnr	8,162	8,713	18,527	27,228	26,536	26,944	41,923	44,883	68,539	5.5%
Pure Car Carrier	1,438	6,452	13,574	13,560	10,801	16,064	15,210	17,374	15,620	6.1%
Reefer	2,168	2,107	4,199	3,901	5,877	5,509	6,267	7,419	9,015	3.6%
Ro-Ro	2,509	5,135	8,035	6,160	5,501	7,225	9,969	4,332	7,947	2.9%
Cruise/Passenger	857	628	762	807	876	1,130	2,127	2,166	3,882	3.8%
Offshore Service	1,206	1,127	1,743	2,521	3,120	2,167	2,375	2,178	2,409	1.7%
Miscellaneous	8,428	11,890	4,247	6,448	6,448	3,837	6,393	3,635	3,988	-1.9%
Miscell. Cargo	5,867	9,358	7,534	5,129	4,605	4,012	9,116	8,718	14,629	2.3%
Grand Total	**3,960**	**5,896**	**9,036**	**11,728**	**17,911**	**24,915**	**35,880**	**33,713**	**47,950**	**6.4%**

Source: Clarkson World Fleet Register

Table 9 - Average Gross Tonnage per vessel by Year of Build and Ship Type

	1970-74	1975-79	1980-84	1985-89	1990-94	1995-99	2000-04	2005-09	2010-11	CAGR 1970-2011
Bulk Carrier	7,488	14,568	22,769	24,143	32,908	32,776	37,088	38,608	42,263	4.4%
Bulk Ore Carrier	10,282	14,808	48,913	102,147	135,608	142,230	82,487	136,312	140,394	6.8%
Bulk/Oil Carrier		43,440	50,900	47,115	63,175	63,515	70,933			1.6%
Other Dry Cargo	2,147	2,550	2,819	2,511	2,378	3,274	4,214	4,447	6,968	3.0%
Ore/Oil Carrier	2,613	2,630	2,615	19,546	2,648	3,704			172,146	11.0%
Tanker	1,510	1,760	3,880	6,434	13,687	28,612	39,985	30,367	38,211	8.4%
Gas Carrier	6,432	17,431	12,753	9,000	19,130	18,752	39,971	54,084	35,167	4.3%
Fully Cell. Contnr	6,786	6,745	15,908	23,451	21,906	22,784	36,349	38,788	61,307	5.7%
Pure Car Carrier	4,540	16,708	30,453	37,555	31,050	44,457	43,812	52,645	47,914	6.1%
Reefer	1,964	1,905	4,014	3,749	5,541	5,203	5,808	7,701	8,585	3.8%
Ro-Ro	3,754	7,416	10,701	9,638	9,055	13,716	19,235	8,889	17,129	3.9%
Cruise/Passenger	3,191	2,515	3,479	3,891	4,774	7,411	15,163	17,194	28,266	5.6%
Offshore Service	1,117	1,093	1,598	2,456	2,846	2,199	2,348	2,287	2,626	2.2%
Miscellaneous	4,446	6,465	2,811	3,935	3,863	2,705	4,133	2,518	3,061	-0.9%
Miscel. Cargo	3,946	5,641	4,935	3,325	2,759	2,743	6,025	5,249	8,288	1.9%
Grand Total	**2,812**	**4,130**	**6,297**	**8,249**	**11,759**	**16,756**	**24,093**	**23,082**	**30,185**	**6.1%**

Source: Clarkson World Fleet Register

6.1.1.5. Shipping industry fleet forecasts

In the Optimar[17] study, forecasts were estimated for the development of the world fleet, based on total ship numbers by type of vessel, and by GT and DWT. These show that the average GT in 2010 was 11,615 tonnes, and that this figure is expected to grow by 25% by 2018. Overall, the worldwide fleet expressed in number of vessels is expect to grow by 21%, but the aggregate gross tonnage is expected to grow by 52% in only eight years.

[17] Benchmarking Strategic Options for European Shipping and for the European Maritime Transport System in the Horizon 2008-2018. IHS Fairplay, 2010 Update.

According to the deadweight definition the growth in ship size is expected to be 23%.

Table 10 - 2010-2018 Forecast of Global Fleet (DWT basis)

	Number		DWT (mln Tonnes)		Avg DWT/vessel		Avg DWT/Vsl
Ship Type	**2010**	**2018**	**2010**	**2018**	**2010**	**2018**	**Chg. 2018/2010**
Oil Tanker	8,029	8,973	415	518	51,651	57,768	*112%*
Chemical Tanker	5,195	8,029	83	145	15,965	18,078	*113%*
LPG/LNG	1,889	2,361	52	73	27,440	30,733	*112%*
Bulker	7,556	12,279	498	798	65,855	65,011	*99%*
General Cargo	17,946	18,419	83	104	4,621	5,629	*122%*
Other Dry	1,889	1,417	10	10	5,488	7,317	*133%*
Container	5,667	8,501	207	384	36,586	45,123	*123%*
Vehicle/roro	2,361	3,306	10	10	4,390	3,136	*71%*
Ferry/Cruise/Yacht	8,501	9,445	21	21	2,439	2,195	*90%*
Offshore	7,084	8,973	41	83	5,854	9,243	*158%*
Service	17,946	20,780	21	10	1,155	499	*43%*
Total	**85,009**	**102,955**	**1,451**	**2,167**	**17,074**	**21,046**	**123%**

Source: Optimar Study

Table 11 - 2010-2018 Forecast of Global Fleet (GT basis)

	Number		GT (mln Tonnes)		Avg GT/vessel		Avg DWT/Vsl
Ship Type	**2010**	**2018**	**2010**	**2018**	**2010**	**2018**	**Chg. 2018/2010**
Oil Tanker	8,029	8,973	223	282	27,741	31,440	*113%*
Chemical Tanker	5,195	8,029	52	89	10,004	11,097	*111%*
LPG/LNG	1,889	2,361	67	82	35,370	34,584	*98%*
Bulker	7,556	12,279	264	438	34,977	35,673	*102%*
General Cargo	17,946	18,419	59	67	3,310	3,628	*110%*
Other Dry	1,889	1,417	7	7	3,930	5,240	*133%*
Container	5,667	8,501	178	342	31,440	40,174	*128%*
Vehicle/roro	2,361	3,306	45	67	18,864	20,212	*107%*
Ferry/Cruise/Yacht	8,501	9,445	37	52	4,367	5,502	*126%*
Offshore	7,084	8,973	45	52	6,288	5,792	*92%*
Service	17,946	20,780	7	15	414	715	*173%*
Total	**85,009**	**102,955**	**987**	**1,500**	**11,615**	**14,566**	**125%**
Growth		**121%**		**152%**		**125%**	

Source: Optimar Study

Conclusions from Clarkson Data and Optimar Study:

- The average size of new ships has increased by 6.1% to 6.4% per annum since 1970.
- A significant part of this increase has taken place since 2010.
- It is expected that average vessel size will increase by 25% overall between 2010 and 2018 or 2.8% per annum, as new larger ships gradually replace older ones.

6.1.1.6. European port throughput forecasts

The following forecasts are calculated using the TRANSTOOLS v2.6[18] model, based on economic assumptions (GDP and GVA) obtained from the PRIMES[19] model. Average growth in GDP for the EU27 as a whole is expected to be 1.4% per annum up to 2030. Different growth rates are assumed for each EU member State and for each trading partner.

[18] DG-MOVE reference transport model.
[19] NTUA, Athens. Reference model for EC forecasting.

It implies that port traffic growth will be close to 50% by 2030, with an average annual growth rate of 1.9% per annum.

Table 12 - 2010 port traffic by region of loading/unloading (mln Tonnes)

Region	Container	Dry Bulk	Liquid Bulk	RoRo	Other Cargo	Total
UK/Ireland	65.46	137.58	265.57	123.12	18.70	616.60
Nordic	32.71	134.00	204.03	89.08	46.57	517.08
South Baltic	14.61	68.86	83.81	13.74	13.86	194.90
Hamburg-France	323.35	329.79	529.26	92.36	80.63	1,357.59
Iberia	124.48	90.50	175.37	15.45	25.32	431.12
Italy/Malta	83.22	67.76	207.01	85.72	33.45	482.92
Balkan/Aegean	54.48	74.47	80.81	24.69	56.12	313.36
Black Sea	6.26	27.42	20.03	0.30	6.18	60.19
Total	704.56	930.40	1,565.88	444.46	280.83	3,973.76

Source: Eurostat/ETISplus.

Table 13 - 2030 port traffic by region of loading/unloading (mln Tonnes)

Region	Container	Dry Bulk	Liquid Bulk	RoRo	Other Cargo	Total
UK/Ireland	125.74	155.43	297.49	137.46	35.26	751.39
Nordic	50.53	187.66	240.30	122.01	81.87	682.37
South Baltic	19.91	158.09	88.92	17.68	39.39	323.98
Hamburg-France	595.58	434.53	571.20	186.83	138.26	1,926.40
Iberia	217.28	176.38	213.45	38.34	50.98	696.44
Italy/Malta	179.00	112.67	261.87	80.05	64.24	697.83
Balkan/Aegean	120.80	156.28	122.21	50.50	128.72	578.51
Black Sea	8.22	69.73	28.90	1.53	37.81	146.19
Total	1,317.06	1,450.77	1,824.34	634.40	576.53	5,803.11

Source: Study authors

Growth rates are summarized below.

Table 14 - Port Traffic Growth Rates (mln Tonnes, %)

Region	Container	Dry Bulk	Liquid Bulk	RoRo	Other Cargo	Total
Total Growth (T)	612.50	520.37	258.46	189.94	295.70	1,829.35
Change 2030/2010	187%	156%	117%	143%	205%	146%
CAGR. 2010-2030	3.2%	2.2%	0.8%	1.8%	3.7%	1.9%

Source: Study authors

Port Traffic in the container sector will be higher than in the bulk sectors. By 2030, total container traffic growth will exceed 85% i.e. 3.2% year on year growth. However, due to lower growth in bulk sectors, total throughput will average 1.9% per annum.

6.1.1.7. Ship calls by ship types

We define four ship types, based on natural clusters within the world fleet database (Clarkson World Fleet Register):

Category	Max Beam	Description
Type 1	< 20m beam	Up to Handysize
Type 2	< 33m beam	Up to Panamax Size
Type 3	< 50m beam	Up to Suezmax
Type 4	50m +	Including e.g. VLOCs.

Typically, modern Ro-Ro ships which are important in the context of short sea shipping and which are frequent callers in ports will be in the second category, having beam dimensions greater than 20m. The same is true for the smaller container ships used as European short-sea and feeder vessels.

The characteristics of each type are summarised below. Ships from the world fleet are assigned to categories based on their beam (breadth). However, since pilotage exemption rules may be applied to other vessel attributes such as length, draught or gross tonnage, measurements for each type according to other dimensions are shown below. In the case of beam, the key figure is the maximum boundary. However, in the other dimensions it is the mid-point which gives the most realistic description of the category, and the upper bound is the size of the largest ship in the set, which may be an outlier.

Table 15: Ship types, Dimensions

	Gross Tonnage (GT)	
	Mid pt	Upper Bound
Type 1	1,575	67,997
Type 2	24,000	149,945
Type 3	75,000	225,282
Type 4	149,000	236,638

	Deadweight (T)	
	Mid pt	Upper Bound
Type 1	1,917	52,733
Type 2	33,000	284,497
Type 3	115,000	232,922
Type 4	272,000	443,783

	Length Overall (m)	
	Mid pt	Upper Bound
Type 1	63	243
Type 2	181	322
Type 3	270	367
Type 4	323	398

Beam (m)		
	Mid pt	Upper Bound
Type 1	12	20
Type 2	28	33
Type 3	43	50
Type 4	58	98

Draught (m)		
	Mid pt	Upper Bound
Type 1	4	13
Type 2	10	22
Type 3	15	24
Type 4	20	25

PECs are normally granted on the basis of certain requirements, as shown in Table 50 of PwC/Panteia (2012)[20]:

- Master or Chief Officer certification and or medical certificate
- Examinations, written, oral and/or practical.
- Language proficiency, and
- Frequency of manoeuvres.

All 19 countries in the survey apply a frequency threshold, for example:

- Belgium 24 in/24 out per year
- Bulgaria 5 in/ 5 out per year
- Estonia 10 in/10 out per year
- Lithuania 6 in/6 out per year
- Malta 6 in/6 out per year
- Netherlands 18 in/18 out per year
- Norway 6 in/6 out per year
- Poland-Gdansk 3 in/3 out per year
- UK-Tees, 12 in/12 out per year
- UK-Dover, 20 in/20 out per year

To put this in context, short-sea ferry operators will operate services with more than a weekly or daily frequency per ship, meaning over 52 to 365 or more calls per port per ship per year. Shipmasters operating these services would qualify for PECs in most of the above cases provided that they meet the proficiency criteria.

In contrast, a container ship on a 70 day round-trip voyage between Europe and Asia for example, is unlikely to call more than five times per annum at any given port.

We therefore expect that high frequency services such as ferries account for a high proportion of vessel calls, but a relatively low proportion of ships. The majority of individual ships are likely to be calling infrequently, so the distribution according to frequency will be clustered at either extreme, with relatively few ship arrivals close to the PEC frequency threshold.

Frequencies have been estimated and collated by the study team, based on a range of sources.

[20] PwC/Panteia, (2012), "Final Report, Pilotage Exemption Certificates."

In Table 16 and Table 17, we show the estimate of ship arrivals according to the vessel size segments. They are also split by their calling frequency. The first cell therefore indicates that 164,320 ship arrivals were accounted for by small ships (Type 1 as defined above) that only call once per year at any given location. In the same row, the figure of 23,010 ship arrivals in the ">100 per year" column indicates that 23,010 Type 1 ship arrivals were accounted for by vessels calling more than 100 times at any given port per year. It implies that fewer than 230[21] individual vessels belong to this category. As expected, there is a high proportion of Type 2 ships with high frequency calling patterns; these are short sea ferry services.

The figures show clearly that 42.6% of ship arrivals are made by ships calling only once per port per year, that a further 16.3% of arrivals are made by ships calling between 2 and five times per year, and that a further 26.3% are made by ships making more than 50 calls per year.

[21] 23010 divided by 100

Table 16: Estimate of EU ship arrivals by size class and frequency class

	1 per year	2-5 per year	5-10 per year	10-15 per year	15-20 per year	20-25 per year	25-30 per year	30-40 per year	40-50 per year	50-100 per year	>100 per year	Total
Type 1	164,320	43,750	12,267	5,979	3,563	2,769	1,917	3,744	2,760	6,563	23,010	270,641
Type 2	90,830	47,198	21,109	9,012	5,996	4,694	3,869	6,797	4,578	18,373	131,652	344,107
Type 3	20,323	11,579	1,874	317	218	196	847	183	73	514	2,684	38,808
Type 4	1,890	875	108	0	26	192	368	0	0	0	0	3,459
Unknown Type	36,520	16,354	5,700	2,769	1,613	1,478	1,094	2,588	1,030	3,793	6,530	79,469
TOTAL	313,884	119,756	41,057	18,077	11,416	9,328	8,095	13,312	8,441	29,243	163,876	736,485

Figure 11: Ship arrivals by frequency class

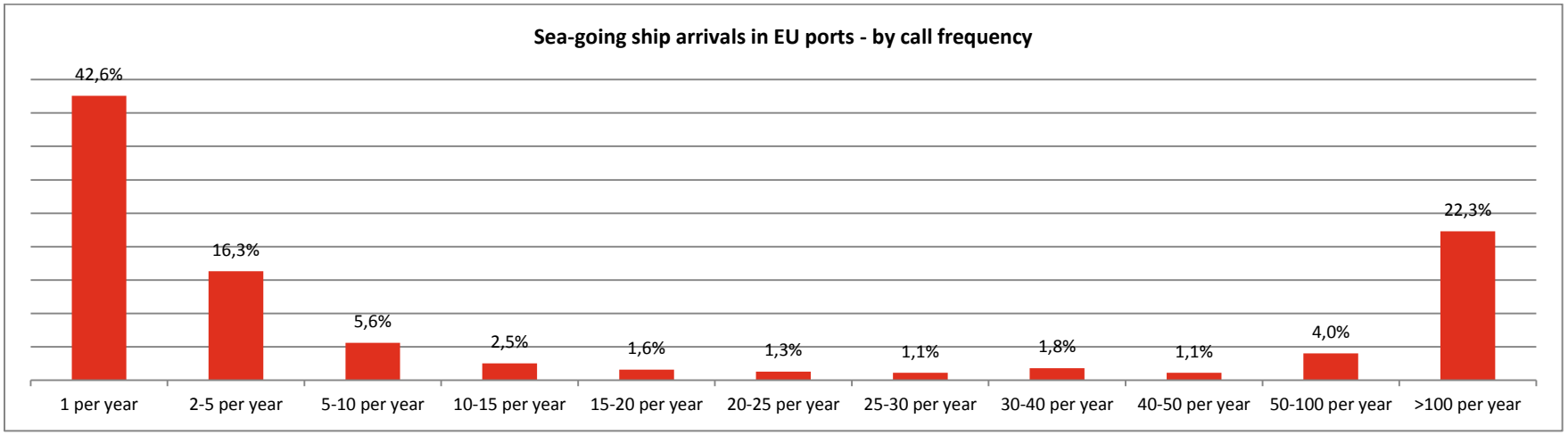
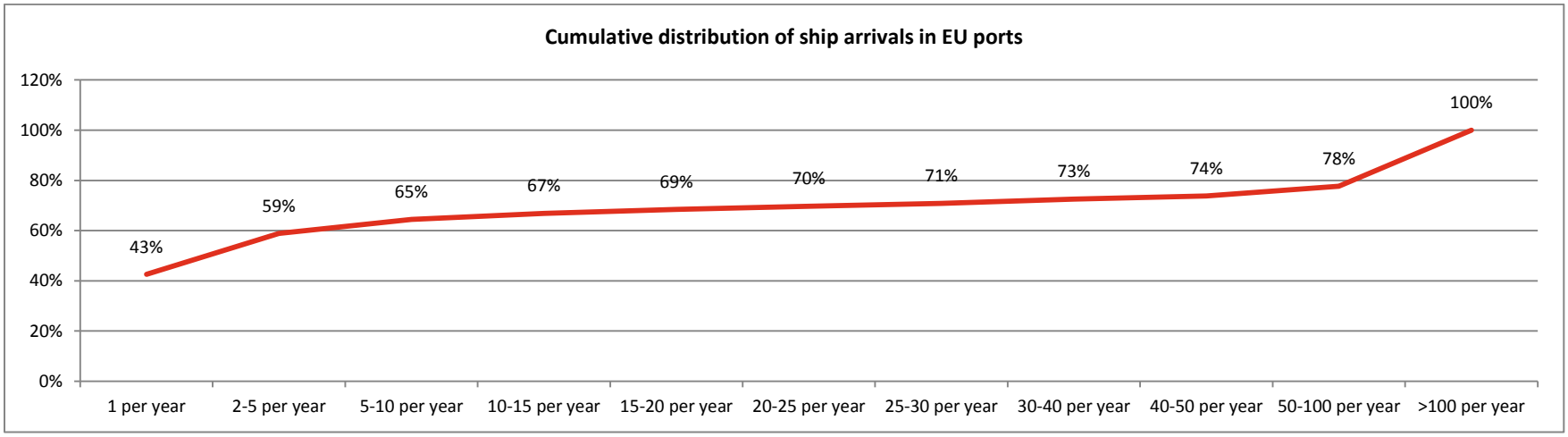


Table 17: Shares of EU ship arrivals by size class and frequency class

	1 per year	2-5 per year	5-10 per year	10-15 per year	15-20 per year	20-25 per year	25-30 per year	30-40 per year	40-50 per year	50-100 per year	>100 per year	Total
Type 1	22.3%	5.9%	1.7%	0.8%	0.5%	0.4%	0.3%	0.5%	0.4%	0.9%	3.1%	36.7%
Type 2	12.3%	6.4%	2.9%	1.2%	0.8%	0.6%	0.5%	0.9%	0.6%	2.5%	17.9%	46.7%
Type 3	2.8%	1.6%	0.3%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.1%	0.4%	5.3%
Type 4	0.3%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.5%
Unknown Type	5.0%	2.2%	0.8%	0.4%	0.2%	0.2%	0.1%	0.4%	0.1%	0.5%	0.9%	10.8%
TOTAL	42.6%	16.3%	5.6%	2.5%	1.6%	1.3%	1.1%	1.8%	1.1%	4.0%	22.3%	100.0%
Cumulative	**42.6%**	**58.9%**	**64.5%**	**66.9%**	**68.5%**	**69.7%**	**70.8%**	**72.6%**	**73.8%**	**77.7%**	**100.0%**	

Figure 12: Cumulative ship arrivals by frequency class



6.1.1.8. Quantification methodology

Number of PECs, number of pilotage exempted missions and therefore the Pilotage costs to be incurred by shipping companies depend upon patterns of ship deployment. Ships deployed on longer routes call fewer times in any given port.

Ships calling in frequently in any given port are:

a) Less likely to obtain a PEC, and

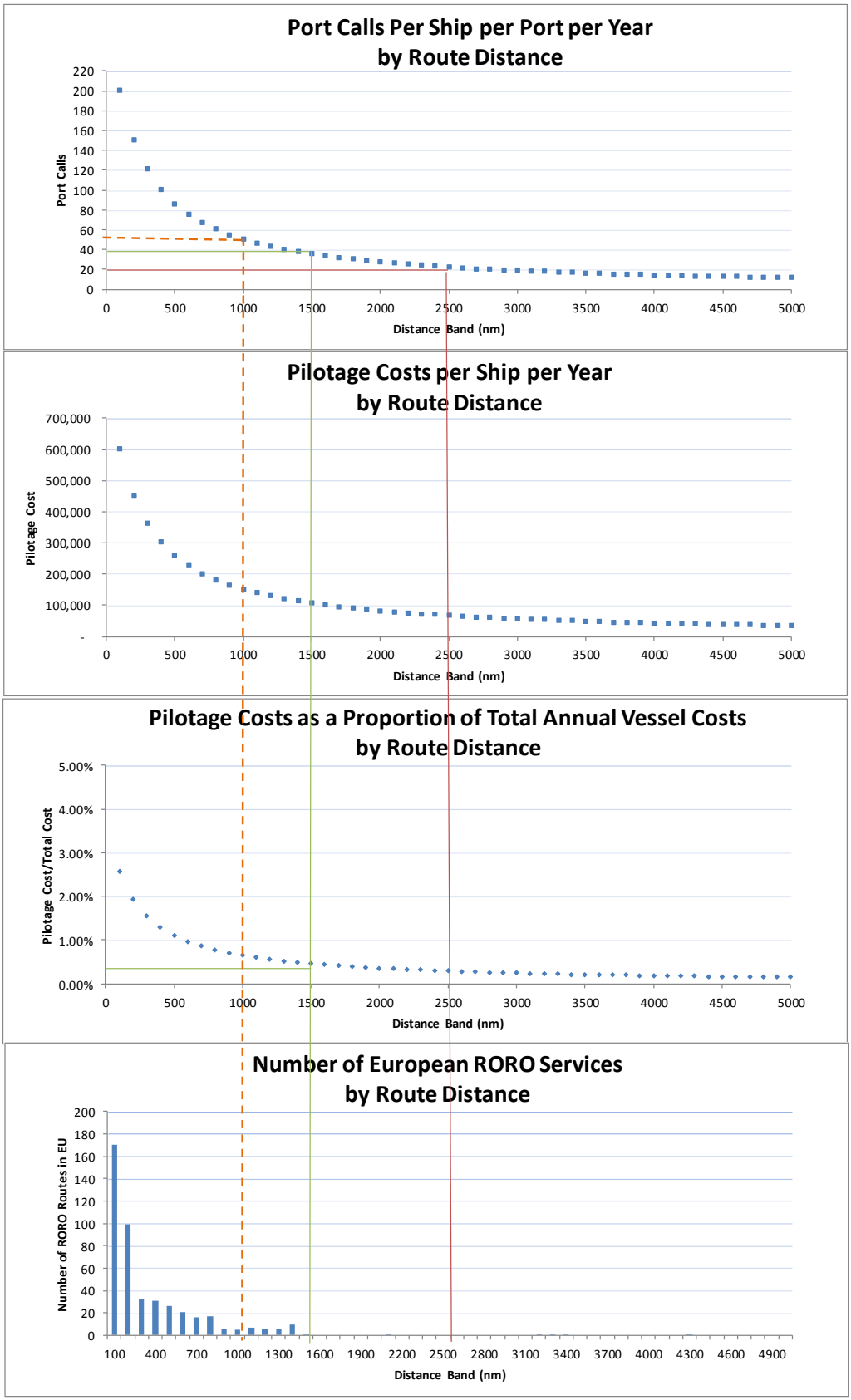
b) Less likely to face heavy costs for pilotage, relative to other costs incurred.

Taking a given ship type as an example (e.g. a freight only RoRo ship of 11,500 GT), it is possible to analyse the relationships between ship deployment, number of port calls, and pilotage costs. It is also possible to match this information against the range of RoRo services operating in Europe.

A range of up to 5000 NM has been taken as the maximum for port to port distances in Europe e.g. Finland to Bulgaria. Beyond this range, shipmasters (or other deck officers) navigating a specific ship are not calling frequently enough to qualify for PECs, so any impacts of the proposed measures on inter-continental services will be insignificant.

Calculation results are shown overleaf.

Figure 13: Relationship between Ship deployment and Pilotage Costs



From top to bottom, the four sections of the figure above show:

1. Port calls per ship per port per year, distributed by route distance. For a given ship speed, the number of calls that can be made in any specific port depends upon the route distance.

2. Pilotage costs per ship are estimated as a multiple of port calls. The costs are calculated per ship, so they include port calls at both ends of the voyage.

3. Pilotage costs are expressed as a proportion of total annual vessel costs, including fixed or time-based costs such as capital costs, and variable or distance based costs such as fuel consumption. For longer routes, the ship spends more time at sea, so pilotage costs occupy a relatively low share of total costs. For short routes with high frequency calls, pilotage costs start to become much more significant.

4. The number of actual RORO services operated in Europe, distributed by distance band. This shows that a high proportion of actual services are on routes of up to 1000 nautical miles.

Starting from the right hand side of the distribution:

1. To the right of the red line, ships are travelling over 2500 NM between ports, and therefore unlikely to make more than 20 calls per port per year. Furthermore, it is observed that a shipmaster unlikely navigates on the same ship and route longer than 6 months per year. These services are probably not eligible for PECS based on frequency.

2. Between the red line and the green line, shipping lines are calling between 20 and 40 times per port per year. A shipmaster operating in these routes is likely to collect in between 10 and 20 port calls per year. These services would be affected by the thresholds for the number of manoeuvres, but their pilotage costs would be less than 0.5% of their annual operating costs (ship and port costs).

3. In between the green line and the orange line pilotage costs would start becoming a more significant proportion of annual operating costs for the route. However, to the right of the orange line, there are relatively few RORO services actually operating. For example, 1000NM is approximately the distance from Zeebrugge to Stockholm.

4. Pilotage costs are therefore only really significant for the shorter routes to the left of the orange dotted line because (a) most active routes are found in this band below 1000 NM, (b) they make enough calls to require a high number of pilotage missions, and (c) port-related costs including pilotage are a greater proportion of their total costs. However, in this group, each ship should be arriving at least once a week per port (52 per annum). This would result in approximately 25 port calls per shipmaster. Most ports with PEC schemes will offer PECs for shipmasters calling this frequently.

As far as the impact upon shipping costs is concerned, the key issue is that all countries should offer a PEC scheme which is clear, transparent and non-discriminatory. The measures with the highest impact will be those which remove barriers towards obtaining PECs. Provided that the frequency requirement for the number of vessel/shipmaster arrivals is less than 25 per year in large part of ports, lowering the threshold would not have a great impact.

This implies that economic impacts are most likely to be gained from measures:

- M2: PECs should be granted in all MS
- M3: Transparency of the examination procedure
- M11: English as valid language.

Assumptions used to Quantify Demand Impacts

The first set of modelling assumptions relates to the total activity levels. The absence or presence of PEC schemes, the arrival frequencies required in order to earn a PEC, and the cost of pilotage fees. Scenario 3A was not modelled directly because it allows derogations. There is no basis to predict which countries or which ports would choose to derogate, so it is argued instead that the results for 3A lie in between the baseline and scenario 3B. The key difference between scenario 3B and 4 is that in scenario 4, all countries operate the same PEC regime. In scenario 3, they are only required to operate within a pre-determined threshold. It is important to note therefore that the assumptions for the number of manoeuvres are 10 in 10 out in scenario 4, compared to 20 in 20 out in scenario 3. It would not make sense to keep a high level, such as 20 in 20 out in scenario 4 because the majority of countries would have to increase their requirements in order to comply.

Table 18: Demand Assumptions

Variable	Base Year	Baseline 2030	Scenario 3B 2030	Scenario 4 2030
Demand	3,973 million tonnes of port throughput in EC	5,803 million tonnes	5,803 million tonnes	5,803 million tonnes
Ship Size		Increase at 2.6% per annum in average ship size.	Increase at 2.6% per annum in average ship size.	Increase at 2.6% per annum in average ship size.
Availability of PEC Scheme	Current situation	Current situation	PEC scheme available in all countries.	Identical PEC scheme available in all countries.
Number of manoeuvres required for PEC	As obtained during consultation.	No change	Rate of 20 in/20 out per annum sufficient to obtain PEC.	Rate of 10 in/10 out per annum sufficient to obtain PEC.
Cost of pilotage	As obtained during consultation.	As 2010, except for pro-rata increase based on increased ship size.	As 2010, except for pro-rata increase based on increased ship size.	As 2010, except for pro-rata increase based on increased ship size.

Language Options and Assumptions

Three language options are considered:

a) National language only

b) English plus basic national language (or the national language)

c) English as an alternative to the national language

Of these, option 'c' is the most flexible.

According to the 2012 Fact Finding Study, the majority of EU countries do accept either English or the national language.

The main exceptions are France, Germany, Portugal and Spain, where the national language is required. Amongst these countries there is little evidence to suggest that there are major barriers related to these language requirements. Germany has 1,267 active PECs, Spain has 375, France 224 and Portugal has 5. In Portugal it is believed that there are relatively few international vessels calling frequently enough to qualify for PECs, as there are relatively few short-sea ferry routes to international destinations.

In addition French and German are the second and third most widely spoken languages in Europe, and both Portuguese and Spanish are widely spoken globally.

For this part of the quantified analysis, dealing with demand rather than administrative burden, the main consideration is whether the inclusion of language option 'c' would increase the number of ships obtaining PECs in the four countries, where currently English cannot be used.

We assume therefore that for the four countries in question, the number of PECs issued is 5% lower than would otherwise be the case. Therefore, taking into consideration the ship arrival patterns in each country, and the frequency requirements, the estimate of PECs issued per frequency band is reduced by 5%. This assumption is applied in the baseline and the 'a' variants of scenario 3, and then relaxed in the 'c' variants, and in scenario 4. Language option 'b' which allows international companies to use English but requires them to have basic skills in the national language is not modelled. It is assumed that the additional requirement to have basic knowledge of the national language would not be a major barrier towards application for a PEC. That is not to say that it would make no difference, only that it would not have a marked effect on the number of PEC applications. Impacts on safety and administrative burden are considered separately.

6.1.2. Baseline scenario

Under the baseline scenario, we estimate the development of the market for pilotage services under circumstances of no policy change in relation to pilotage exemption certificates. Under such circumstances, each coastal Member State maintains its own existing set of criteria for granting PECs.

The objective is then to calculate the demand for pilotage services, and to apply the rules per country in order to arrive at an internally consistent estimate of pilotage missions, exempt missions, and numbers of PECs. From this it is possible to estimate potential cost savings.

The quantitative assessment of alternative policy options in terms of number of exempted missions and pilotage cost saving to the shipping companies is provided in par. 6.4.4.

6.1.2.1. Baseline analysis

In order to achieve the port traffic throughput forecast, the shipping industry must increase capacity by around 46% by 2030, or 1.9% growth per year. Based on the Optimar[22] forecast, it is very likely that this target will be reached, even by 2020. Recent figures indicate that the target will be met, not by a greater number of port calls being made, but mainly by increases in ship size. Current rates of increase of fleet capacity at around 2.8% per annum are sufficient to allow future demand to be handled without increasing ship arrivals.

In terms of demand for pilotage services, this implies that under present regulations, the number of arrivals and departures in port will not increase substantially. However, there will be changes in the pattern of demand by ship size. The number of ships exempted from compulsory pilotage due to size will be static or diminishing, and consequently, the number of PEC missions will be static or decreasing. Because demand increases are matched by increases in ship size, and not frequency of call, the ratio of PEC missions to pilotage missions will not change significantly. However, since average tonnages per vessel will increase, average pilotage tariffs will increase per call, assuming fixed tariffs. This might become a greater incentive to use PECs, but if PEC usage is close to saturation, it will mean higher pilotage costs per ship arrival. Depending on the tariff structure and the rate of increase of ship size, this may yet mean lower pilotage costs per tonne of cargo shipped.

6.1.2.2. Baseline results

The modelled baseline results are shown below. They use the baseline traffic projection for port traffic, and the Optimar projection of the shipping fleet. They relate to pilotage services for the arrival and departure of sea-going vessels in EU ports. The increase in demand is assumed to be met by an increase in average ship size rather than an increase in the number of ships or the frequency of services.

[22] Benchmarking Strategic Options for European Shipping and for the European Maritime Transport System in the Horizon 2008-2018. IHS Fairplay, 2010 Update.

Pilotage costs are calculated at country level in consideration of average pilotage fees per ship category as detailed in PEC Study 2012. To calculate the 2030 costs, we assume that pilotage costs increase by 10% per ship category in order to reflect the increased average deadweight within these bands.

Table 19 – Baseline scenario for pilotage services market

	2010	2030	CAGR 2010-2030
Demand - Tonnes	3,973 million tonnes	5,803 million tonnes	1.90%
Aggregate GT	13,700 million GT	22,000 million GT	2.40%
Aggregate DWT	19,662 million DWT	31,662 million DWT	2.41%
Vessel Arrivals	787,053	773,717	-0.09%
Pilotage Missions [A]	1,269,163	1,290,567	0.08%
PEC Missions [B]	420,596	415,529	-0.06%
Aggregate Pilotage Cost	€ 1,096 million	€ 1,243 million	0.63%
Pilotage Cost per Pilotage Mission	€ 863	€ 963	0.55%
Pilotage Cost per Ship Arrival	€ 1,027	€ 1,607	0.72%
Pilotage Cost per Cargo Tonne	€ 0.20	€ 0.21	-1.26%
Total active PECs	8,681	8,832	0.09%

Source: Study authors

In the baseline projection to 2030, the following results are expected:

- Cargo throughputs increase at 1.9% per annum.
- Aggregate vessel capacity grows faster, at 2.4% per annum.
- The number of vessel arrivals is declining slightly.
- Total pilotage missions increase slightly.
- PEC missions slightly decrease, as a result of fewer vessel arrivals of vessels of small or medium size.
- Aggregate pilotage costs (user costs) increase by 0.63% per annum, affected by a shift towards larger ships.
- Pilotage costs averaged per ship arrival also increase, by 2.26%. This is higher because there is a smaller percentage of PEC usage and an increasing average ship size.
- Pilotage costs per cargo tonne, however, are only little changing. This is due to economies of scale related to larger vessel size.

Even though high volume growth is expected in the port sector and in the shipping fleet worldwide, the baseline outlook for demand for pilotage services in Europe is essentially static.

6.2. Identification of impacts

Annex III – Identification of impacts provides full description of identification of impacts. The main identified impacts are fully assessed in the following paragraphs:

- Maritime safety impacts
- Economic impacts
    - Pilotage costs to shipping companies
    - Administrative costs
    - PEC related costs
    - Operational cost savings
    - Costs to pilotage service providers
    - Economic damages resulting from maritime accidents
    - Impact on SMEs
    - International competitiveness
- Social impacts
    - Worker safety
    - Passenger safety
    - Employment
    - Quality of work for deck officers
    - Work mobility
- Environmental impacts
    - Marine pollution

6.3. Maritime safety impacts

In this section we present a comparative analysis of the accident risk connected with vessels navigating with a pilot on board and vessels exempted from pilotage because of the presence on board of a PEC holder. Furthermore, the relevance of the proposed measures with regards to maritime safety is evaluated. Finally, impacts on maritime safety of the alternative policy options are assessed against the baseline.

Analysis of maritime accident risk

Helcom

HELsinki COMmission (from here on, "HELCOM") statistics database[23] reports maritime accidents occurred in the Baltic Sea: it represents the most detailed source of data on the matter, although geographically limited. HELCOM statistics have been extensively used to produce a series of annual reports[24], directly published by HELCOM, as well as by EfficienSea, on its study on pilotage and safety[25]. The EfficienSea report was structured with the aim to screen the role of pilots in guaranteeing maritime safety; within the analysis, comparisons with exempted missions were attempted. However, the report resulted in no statistical basis to determine any difference in terms of safety in case vessels were supported by pilots on board against vessels manoeuvred by PEC holders.

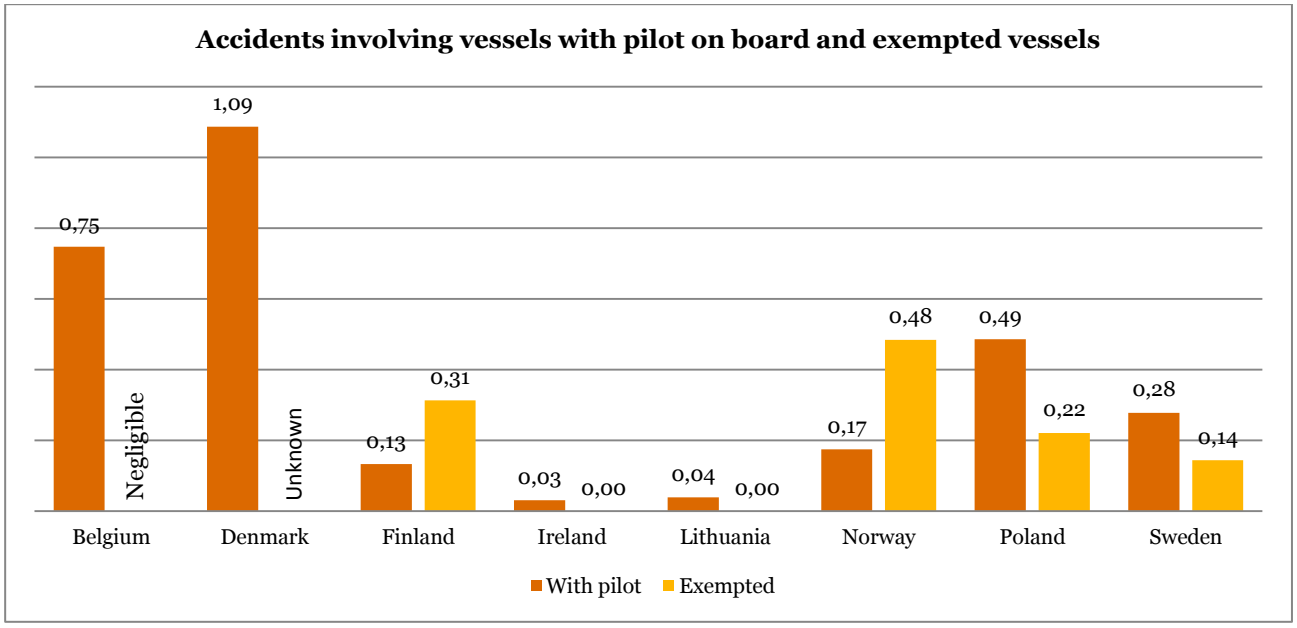
Direct survey

Direct information gathered by PwC is used as primary sources of data, too. In particular, between 2011 and 2012 PwC produced a study on PECs, for which it collected direct information from national authorities on various core issues concerning pilotage and PECs; amongst these, accident rates. In a second time, in 2013, a new consultation was developed, this time concentrated on those countries where PECs are granted in highest number (i.e. Belgium, Finland, Norway, Sweden, Denmark, The Netherlands, Poland). This latter survey was focused on navigational accidents only, and it was designed to gather more accurate information, as well as to acquire new data that would help clarifying the role of PEC and pilots on a series of issues, from safety, to costs, etc.

Figure 14 compares the number of accidents per 1000 missions with a pilot on board or exempted.

[23] HELCOM Group of Experts on Safety of Navigation – last revision 2013
[24] Helsinki Commission, 2011; 2010; 2009; 2008, *Report on shipping accidents in the Baltic Sea area*.
[25] EfficienSea, 2012 *How pilotage contributes to maritime safety*.

Figure 14 - Accident ratios with pilot missions and PEC exempted missions (number of accidents per 1,000 missions) [26]



Source: PwC study 2012 and survey 2013 for the present study. Data are based on the average value calculated on a three-year period (2009-2011).

What appears from data is that there are no clear patterns, with significant variation across the countries in the three years examined. Indeed, in some countries (i.e. Belgium, Ireland, Lithuania, Poland and Sweden), the probability that accidents occur when a PEC holder is on board is lower than with a pilot on board. In some others (i.e. Finland and Norway), the opposite.

It is worth noting that in some cases PECs and pilots perform operations in different conditions, therefore, data is not directly comparable. In Norway, for example, vessels using PECs are generally those carrying out coastal navigation (coast ranges are almost entirely compulsory pilotage areas in Norway). As it might be expected, this increases the sailing time with PECs, compared to standard port manoeuvres carried out in ports with pilots on board. Therefore, the two figures are not directly comparable.

In conclusion, most if not all PEC schemes in Europe operate in a way that is as much safe as conventional pilotage from a statistical point of view. This finding is supported both by literature review and analysis of data on accidents directly collected by a relevant number of competent national authorities (see Figure 14).

Indeed, it is widely agreed that, if PECs are granted according to properly defined requirements, no safety impact is expected. Different local conditions seem to require different levels of experience and capabilities, in order to maintain (and further improve) safety standards.

Analysis of the measures with regards to maritime accident risk

Although no severe impact in relation to the EC initiative is expected on safety, some measures can produce effects. Indeed, measures can potentially impact safety depending on the way these are able to guarantee minimum standards that comply with local specificities. In particular, measures that might produce a negative impact on safety, if not appropriately implemented, have been identified in Table 20.

[26] Accidents reported for Belgium might also include not navigational accidents. France and Latvia are not included as no data on accidents was reported.
Calculations for Sweden are made on the basis of the number of exempted missions in 2010 only, as no data was provided for 2009 and 2011.

Table 20 - Impact of measures on maritime safety

Measures	Impact on safety	Notes
M3 Transparency of the examination	Not relevant	Transparency of procedures can only improve safety, guaranteeing that PECs are granted when requirements are met
M4 Simplified renewal of PEC	Moderate/ low	Measure 4 is strongly correlated with measure 7 and therefore its impact depends on the number of manoeuvres required for PEC issuing the 1st time.
M6 Granting PEC to any deck officer	Low	Depends on the possibility to have vessels exempted without masters holding PECs or not.
M7 Maximum number of manoeuvres	High	Especially in case derogations are not considered. Setting a specific threshold to be valid in all EU ports might result in gaps between proper requirement and legal requirement
M8 PEC valid for sister vessels	Moderate/ Low	Depending on what is considered as "sister vessel", in particular referring to size, which, in ports where manoeuvrability is limited, may moderately impact safety.
M9 PEC for any type of vessel or cargo	Ambiguous	In theory, there seem to be no issue, as no different accident ratio was found between PEC holders and pilots. On the other side, in case of dangerous cargos and tanks in general, it would be in everyone's interest to maintain compulsory pilotage.
M10 Duration	Not relevant	
M11 English	Ambiguous	On one side, stakeholders – and, in particular, shipping companies – claim that English has the ability to prevent miscommunication and misunderstandings, as it is already a shared language for navigation and pilotage operations. On the other, pilots insist on the necessity to keep communications also in local languages, as crew from other vessels (mainly small boats as fishing boats, etc.) might not be fluent with English and might therefore not understand what is happening in the port area.

Measure 4. Simplified renewal of PEC

The decision to set a fixed ratio between manoeuvres/ passages required for PEC renewal and PEC granting might increase the risk that the actual requirements are inappropriate to guarantee safety. This might not be the general case, as it is expected that the number of manoeuvres for PEC granting is proportional to the presence of risk factors. Nevertheless, this might not always be the case. In particular, if the number of passages for granting PEC is defined at EU level and does not contemplate the possibility to derogate from the general requirement (see Measure 7 below).

Measure 6. Granting PEC to any qualified senior member of the crew

Different MSs allow any qualified deck officers to be granted with PECs. As these do not hold the position of *master*, it is expected that their support would be similar to that provided by pilots (which role is to advice masters; not to hold the command of the vessel). The impact is not expected to be relevant in terms of safety.

Measure 7. Threshold for maximum number of manoeuvres needed with pilot on-board for obtaining PEC

In case a common threshold is set for all MSs, without possibility to derogate from the general rule, a discrepancy might be created between the legislative requirements and requirements that would be appropriate in order to guarantee that PEC holders are sufficiently competent and experienced. Different ports and coastal areas may be characterised by specificities that must be considered when defining the experience PEC holders require. Moreover, it should be considered that the threshold set in this measure would affect also that set in measure 4, therefore increasing its impact.

All these considerations fall in case derogations can be implemented.

Measure 9. Granting PEC for any type of vessel or cargo

The impact on safety of measure 9 is, in theory, not relevant. Indeed, as there is no recognised correlation between number of PECs and accident occurrence, no increase in the number of accidents is expected from an

increased number of PECs, regardless the type of vessel or cargo. However, the impact of highly pollutant/ hazardous goods, in case of accidents involving spill outs, might easily become disastrous. Therefore, the possibility to have one additional expert on deck is welcomed by all stakeholders.

Assessment of policy options

Baseline scenario

In case the European Commission decides not to intervene on PECs, no relevant impact on safety is expected at all. As for all cases, technological improvement will most likely represent the main source of increased safety, while the expected increase in ship size traffic might partially produce negative effects, as bigger vessels may have more difficulties manoeuvring in port areas.

Policy Option 3A

Impact on safety deriving from the implementation of PO3A strongly depends on the way requirements for obtaining PECs are set. In case of stringent thresholds, safety might be affected in those contexts where local specificities would require additional experience to prevent dangerous situations to occur. Under PO3A the risk of setting inadequate thresholds is prevented by allowing country to derogate from the single EU framework when appropriate.

The Swedish case

The Swedish case presents another solution to the PEC vs. safety debate. Indeed, rules for granting PECs are generally tolerant (there is no *set* requirement in terms of number of passages for obtaining/renewing PEC). However, PEC applicants are required to pass a *blind chart* test, which entails filling in all the detail of a fairway/port as part of the exam, which requires a full knowledge of that area and its navigational requirements. As a result, applicants passing the test are generally well prepared to carry out entry/exit operations in the areas they apply for as their knowledge of the local geography is similar to that of pilots.

Sweden is among the countries where PECs are more numerous and the number of accidents is nonetheless very limited. It is even lower in case PEC holders are on board than when pilots are.

Policy Option 3B

The difference between PO3A and PO3B relies on the exclusion of the possibility to derogate from single EU framework, which would foster the implementation of PECs. In case of PO3B, impacts on safety as presented in Table 20 will most likely become an issue to cope with. On the contrary, the possibility to derogate from the framework should be enough to guarantee safety.

Policy Option 4

Fully specified requirements might affect safety. Compared to PO3B, where thresholds are specified, PO4 is less flexible and less adaptable to local specificities. The EU level harmonisation would then most likely be counterweighted by inefficiencies and safety issues at local level, where more attention to specific and unique conditions should be considered.

Additional options regarding English

Respondents to the stakeholder consultation were asked to provide a view on the appropriateness of using English as an alternative language for PEC. Most shipping companies (94%) have a strong or moderate appreciation towards the possibility to use English as an alternative to the local language; on the contrary most of the Pilots (75%) believe that English should not be used as an alternative to the local language.

In one hand ECSA underlines that the bridge language (including communication a shore) is according to the IMO English Standard Marine Communication Phrases (SMCP). Hence, the use of English is regarded as a key requirement for safe navigation globally. The examination for obtaining a PEC should therefore be either in the local language or in English at the Master's choice. Furthermore, it is recognised that some specific maritime "jargon" in the local language may be required.

In the other hands EMPA points out that English is not the working language in many EU ports. IMO has fully recognized the language issue for ships under pilotage / manoeuvring in IMO Resolution A.960.

In consideration of the level of understanding of English in some areas and ports, the adoption of the additional option (c) “English as alternative language” might result in communication issues between PEC holders and other vessels. For instance, fishing vessels might not have any commercial need for require English speaking crew, thus their understanding of the language might not be sufficient to communicate in case of distress or potentially dangerous situations.

Under additional policy option (a) “Knowledge of national language required” risks deriving from communication issues would be minimised but also the opportunity for not native speakers to apply for a PEC would be significantly reduced.

Finally the adoption of additional option (b) “English and basic knowledge of national language required” seems to guarantee the highest outcome both in terms of safety and potential number of exemptions from pilotage. Requiring a sound understanding of basic maritime vocabulary and jargon in the local language would increase the possibility to communicate with those few vessels with crews not speaking English. Thus safety would not be reduced.

6.4. Economic impacts

EC policy interventions impact both public administrations and businesses (i.e. shipping companies). These are differently impact depending on the policy option considered. Indeed, some costs are related with the variation in the number of PECs granted; others are related with specific measures aiming at reducing costs or increasing services that thus require additional costs.

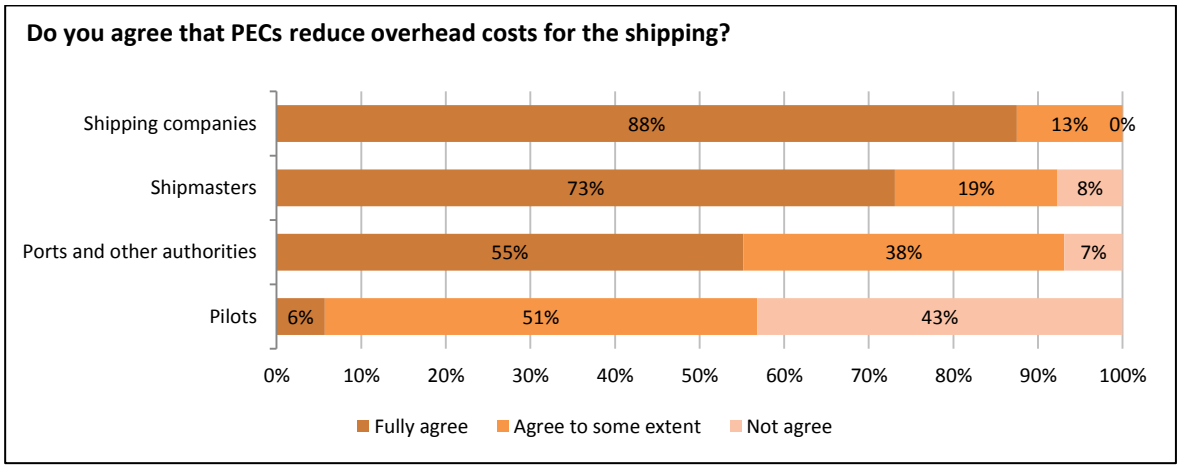
The following paragraphs present economic impacts divided per category and entities burdened:

- Costs related to pilotage fees to be paid by shipping companies
- Fees and costs related to PECs:
    - Administrative costs to be met both by shipping companies and public authorities
    - Costs related to issuing and use to be met by shipping companies
- Operational costs related to pilotage
- Costs to pilotage service providers
- Economic damages resulting from maritime accidents
- Impact on SMEs
- International competitiveness

6.4.1. Costs related to pilotage fees

Stakeholders generally agree on the possibility for shipping companies to save costs through the use of PECs. Pilots tend to be less certain that a relation between PECs and cost reduction is present; on the contrary, shipping companies are certain.

Figure 15 - Stakeholders' opinion on PECs ability to reduce costs for shipping companies



Source: Study authors

More into details, cost saving related to PECs was investigated considering the possibility to reduce costs from pilotage fees, as well as increased flexibility and timesaving (see par. 6.4.3). Again, shipping companies are strongly positive, while pilots mostly consider the impact of PECs to be null or negative on costs in all cases. In

particular, when timesaving is considered, pilots oppose to the opinion that PECs would produce positive impacts, rather than negative ones. The rest of stakeholders is generally in line with shipping companies' opinion, but support this cause less firmly.

The use of PECs is generally regarded as a cost saving opportunity for shipping companies. Both the results of the survey on PEC/pilotage costs (see Annex II – Survey on PEC/ pilotage costs) and of the national authorities survey (see Annex I – Consultation of National Authorities) confirm the thesis that vessels using PECs can sensibly reduce costs related to entering/leaving ports. The amount of savings seems very relevant, especially in those countries and ports where no fees are required from vessels holding PECs, and therefore, the only cost for PEC holders is represented by the issuing/renewing of PECs. In some countries, PEC renewal cost is comparable – or even sensibly lower – than the average cost of one single operation (i.e. Denmark, Norway, Sweden, see Annex I – Consultation of National Authorities par. A.8 and A.9).

Examples obtained during consultation show that the savings will not be distributed evenly. Most of the benefit will accrue to companies operating frequent services between countries where currently no PEC scheme is available, or cases where the requirements are difficult to meet.

Table 21 – Pilotage costs to shipping companies in the EU, Norway and Croatia

	Baseline 2010	Baseline 2030	PO3B(a)	PO3B(c)	PO4
Demand – Million Tonnes	3,973	5,803	5,803	5,803	5,803
Aggregate GT	13,700	22,000	22,000	22,000	22,000
Aggregate DWT	19,662	31,662	31,662	31,662	31,662
Vessel Arrivals	787,053	773,717	773,717	773,717	773,717
Pilotage Missions	1,269,163	1,290,567	1,176,114	1,171,847	1,151,730
PEC Missions	420,596	415,529	529,982	534,249	554,366
Pilotage Cost per Pilotage Mission, EUR	863.31	963.25	992.17	992.70	996.97
Pilotage Cost per Ship Arrival, EUR	1,027	1,607	1,561	1,557	1,537
Pilotage Cost per Cargo Tonne, EUR	0.20	0.21	0.21	0.21	0.20
Aggregate Pilotage Cost, mln EUR	1,095.68	1,243.13	1,161.20	1,157.61	1,142.61
Pilotage Cost Savings against the Baseline 2030, mln EUR			81.93	85.52	100.52

Source: Study authors

Table 42 shows the costs estimated for European maritime traffic associated with the payment of pilotage fees or charges. Introduction of PEC schemes in all EU countries is estimated to drop costs of pilotage of an amount between €81.93m to €100.52m per annum, based on 2030 forecasts of vessel traffic. The main reason for the increase in savings for option PO4 arises from the assumption that under a common EU pilotage scheme, the number of required manoeuvres would be set at 10 ins/10 outs per annum. PO3 has been quantified under an assumption of a minimum of 20 ins / 20 outs, meaning that the majority of countries with existing PEC schemes would not have to change their requirements.

As mentioned above, PO4 assumes that 10 ins/10 outs per annum are required to PEC applicants. However, this assumption can be considered conservative if compared to the 2 ins/ 2 outs required by the PEC Framework in use in Sweden. In case the latter would be applied to whole Europe, the number of potential PEC exempted missions in 2030 will be in the region of 725 thousands. Accordingly, pilotage cost savings will be more than €130.00m.

6.4.2. Fees and costs related to PECs

The implementation of the identified measures implies additional costs imposed on both public administrations, and shipping companies. The following have been identified and analysed:

Administrative costs:

- related to administrative personnel from public administration processing PEC first time applications, renewals and/ or modifications;
- related to administrative personnel from public administration providing feedback on the outcome of the PEC request procedure;
- related to administrative personnel from shipping companies producing the required documentation and following the procedures for PEC first time applications, renewals and/ or modifications;
- related to shipmasters/ senior deck officers requiring the necessary time to follow the procedures (i.e. examination) to obtain, renew and modify PECs.

Other PEC related costs:

- related to shipmasters/ senior deck officers requiring time to prepare for the theoretical exam to obtain/ renew PECs.
- related to shipmasters/ senior deck officers requiring time to study to meet the language requirements to obtain PECs;
- related to shipping companies being requested to pay a fee for PEC issuing, renewing and/or modification;
- related to shipping companies being requested to pay a portion of the pilotage fee when entering/ leaving the port, even if holding a PEC.

Steps for the calculation of costs

For the purpose of this study, a specific evaluation process was adopted to calculate the incidence of PEC related costs in Europe. The activity has involved seven steps, presented below:

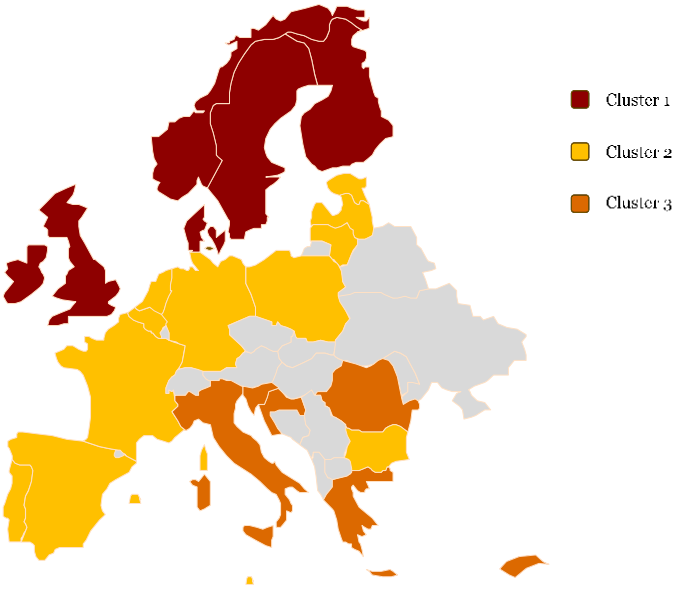
- Preliminary identification of the actions required to implement each specific measure;
- Identification of relevant cost parameters: for the purpose of this study, it has been assumed that the main costs are represented by labour costs;
- Identification of target groups (public, business), responsible to develop the actions;
- Identification of the frequency of recurring actions (starting from a case-by-case approach, considering an average value at EU level);
- Assessment of the number of entities/applications concerned;
- Assessment of the full cost of a normally efficient entity (identification of the Full Time Equivalent - person-day - related to each action related to each measure);
- Quantification of full Cost according to the Impact Assessment Guidelines, which are mainly assessed on the basis of the average cost per action ("P") of total number of actions performed per year, defined multiplying frequency ("F") and number of entities concerned ("NE").

Whenever possible, the cost calculation model refers to country-level data and information. Nevertheless, not all parameters have been calculated with such detail. In case of lack of complete data, it has been necessary to decrease the level of detail and to proceed by applying cluster-level parameters (i.e. for the allocation of cost for language training, PEC for sister vessels, etc.). Thus, together with an EU[27]-wide figure, the EU was divided into clusters, formed by homogeneous countries. These have been grouped under the clusters, which differ in terms of presence of PECs, PEC exempted missions, and use of English.

Table 22 - Cluster approach

Clusters	PEC are granted	PEC are granted (also) in English & more than 30% of missions are performed with PECs
Cluster 1	YES	YES
Cluster 2	YES	NO
Cluster 3	NO	NO

Figure 16 - Cluster regions



PEC related costs in relation to policy options

The following measures have been evaluated for the analysis of the PEC related costs:

Measure	Baseline	Intervention	Type of cost
M3 Transparency of examination procedures: all countries should publish particular information on-line and provide written feedback to applicants in the event of exam failure	Authorities: Cost of feedback for some countries (mostly in cluster 1)	Authorities: Cost of feedback for all countries – increase in relation to the number of exams which depends from the forecasted number of PEC exemptions and no. of active PECs. Low impact in cluster 1; relevant impact in cluster 2 and cluster 3	Administrative: Unit cost per feedback Non Administrative: None

[27] EU + NO

Measure	Baseline	Intervention	Type of cost
	Shipping companies: No cost	Shipping companies: No cost	
M4 Simplified renewal of PEC: all countries should define simplified procedures and requirements for the renewal of PECs And M10 How long PEC is valid for: countries should define a minimum duration for PECs equal or above a common threshold defined by the EU - e.g. 3 years' duration	Authorities: Issuing procedure cost as for 1st time application Examination procedure cost only for few countries (assumed 50% of 1st time examination)	Authorities: Issuing procedure cost as for 1st time application – depends from number of PEC and duration Examination procedure cost = 0	Administrative: Unit cost per procedure and re-exam if applicable Non Administrative: None
	Shipping companies: Fees for 1st time issuing Fees for re-examination in few countries (assumed 50% of 1st time examination) Cost for administrative preparation activities (2 days) Cost for examination attendance in few countries (1 day) Cost for training in few countries (50% of 1st time training excluding language)	Shipping companies: Fees for 1st time issuing depending by n. of PEC and duration Fees for re-examination = 0 Cost for administrative preparation activities (2 days) depending by n. of PEC and duration Cost for re-examination attendance = 0 Cost for training = 0	Administrative: Unit cost for administrative preparation activities Non Administrative: Unit price per procedure and re-exam if applicable. Unit cost for re-training and re-exam attendance if applicable
M7 Threshold for number of manoeuvres needed to obtain PEC: setting the types of requirements and their maximum thresholds for obtaining a PEC (or number of manoeuvres/passages with a pilot, years of experience, etc.) And M6 Granting PEC to any qualified senior member of crew: all countries should allow any (senior) member of the crew who is suitably And M9 Granting PEC for any type of vessel or cargo: countries should grant PECs for any type of vessel or cargo, as long as there are not proven safety concerns	Authorities: Cost as for baseline	Authorities: Increase of cost because of increase of PEC	Administrative: Unit cost per procedure and exam Non Administrative: None
	Shipping companies: Cost as for baseline	Shipping companies: Increase of cost because of increase of PEC	Administrative: Unit cost for administrative preparation activities Non Administrative: Unit price per procedure and exam. Unit cost for training and exam attendance.
M8 Applicability and validity of PEC for more than one vessel, typically including sister vessels or vessels with similar characteristics	Authorities: Cost for PEC modification when applicable (cluster 1 and part of cluster 2) Cost for PEC issuing and examination in countries where modification is not applicable (part of cluster 2).	Authorities: Cost for PEC modification in all countries (cost for PEC modification = cost for PEC issuing)	Administrative: Unit cost per PEC issuing and or modification Unit cost for examination (only baseline) Non Administrative: None
	Shipping companies: Fees for modification (cluster 1 and part of cluster 2) Fees for 1st time issuing (part of cluster 2). Fees for examination in few countries (part of cluster 2). Cost for administrative preparation activities in all countries (2 days)	Shipping companies: Fees for modification depending by n. of PEC Fees for re-examination = 0 Cost for administrative preparation activities (2 days) depending by n. of PEC Cost for re-examination attendance = 0 Cost for training = 0	Administrative: Unit cost for administrative preparation activities Non Administrative: Unit price per modification/issue. Unit cost for re-training and re-exam attendance if applicable

Measure	Baseline	Intervention	Type of cost
	Cost for examination attendance in few countries (1 day) (part of cluster 2). Cost for training in few countries (50% of 1st time training excluding language) (part of cluster 2).		
M11 English as a valid language for PEC holder: countries should accept 'English' as alternative to the local language as part of the PEC application	Authorities: none	Authorities: none	
	Shipping companies: Cost for language training in few countries (it is assumed that in cluster 2 countries 5% of applicant need to undergo full language training).	Shipping companies: Under PO3B(b) there are costs for language training in few countries (it is assumed that in cluster 2 and 3 countries 5% of applicant need to undergo basic language training). Under PO3B(c) Cost for language training = 0	Administrative: none Non Administrative: Unit cost for full language training Unit cost for basic language training

Most measures produce an indirect effect in terms of PEC related costs. It is the case of those measures that are not directly related to any specific action involving cost increase, but rather increase/decrease in the number of applications to PECs, thus requiring a greater amount of the same administrative tasks to be performed.

A few exceptions should be considered in higher detail. Some measures do have a direct impact, as the implementation of transparency and clearness of examination procedures. Indeed, for any given number of PECs, the administrative burden is higher in case authorities are required to publish information, as specified. The analysis of the single measures is provided in higher detail in the following paragraphs.

Inputs and assumptions

The calculation of costs has been carried out through the development of a model. First, costs related to PECs have been differentiated into different cost elements, namely:

1. for public administrations:
    a. administrative costs related to the issuing of PECs;
    b. administrative costs related to the renewing of PECs;
    c. administrative costs related to the modification of PECs;
    d. administrative costs related to examination procedures required to grant PECs;
    e. administrative costs related to examination procedures required for renewing PECs;
    f. administrative costs related to the provision of feedbacks to PEC applicants.
2. for shipping companies:
    a. administrative costs related to personnel preparing documentation and procedures to require the issuing/ renewal/ modification of PECs;
    b. training costs related to Masters/ Senior Officers preparing the exam for the first time;
    c. training costs related to Masters/ Senior Officers preparing the exam to renew the PEC;
    d. training costs related to Masters/ Senior Officers acquiring the language skills required to obtain the PEC;

e. cost related to the time spent by the Master/ Senior Officer performing the exam;

f. cost related to the usage of PECs;

g. fees to be paid to be granted with PECs for the first time;

h. fees to be paid to have PECs renewed;

i. fees related to the exam required to be granted with the PEC;

j. fees related to the exam required to renew the PEC.

It is worth highlighting that, although it was considered to evaluate them, elements 2.g, 2.h, 2.i, and 2.j represent the same costs (with little differences) already considered in point 1. Indeed, overall, the fees for PEC issuing are required to cover the administrative costs for their granting. As a result, these are going to be presented in the following paragraphs as part of the costs sustained by both sides; however, to account both of them to the overall burden related to the EC initiative would be misleading, as the same cost would be counted twice.

The modelling of the administrative and PEC related costs are primarily based on the following drivers:

- the person-day cost[28] for an administrative employee, which has been used both for public administration and the administrative personnel from private companies[29];
- the person-day cost for a master/ senior officer[30];
- the number of PEC missions, which considers costs variable depending on the number of manoeuvres;
- the number of active PECs, which is used to calculate fixed costs that occur whenever a PEC is issued/ renewed, etc.

As for some countries figures on number of PEC missions have not been disclosed, but only those on number of active PECs, a factor was calculated per each cluster, thus defining a ratio between the two values. Similarly, the ratio between number of active PECs and PECs yearly issued for the first time, renewed and modified has been calculated through a sample of countries providing all requested information on the matter.

These input data provided the basis for the calculation of the major differences amongst the alternative scenarios and the baseline in terms of variation in quantities of PECs circulating in Europe. In particular, each administrative procedure for **PEC granting, renewing, modification** is assumed to require one person-day from public administration personnel. Concerning exams, two person-days from administrative employees are required to carry out all procedures for the first time issuing exam, while the renewal exam is expected to require only one person-day, as it is generally simpler (as provided by national authorities).

Similarly, each first PEC issuing requires, on average, one person-day from shipping companies administrative personnel.

Together with information on administrative procedures, data on PEC issuing, renewing, modification fees are reported as provided by public authorities answering to the questionnaire. In those few cases where data were lacking, as well as for those countries not yet granting PECs, fees are estimated based on the cluster approach.

Concerning **examination procedures**, shipmasters are assumed to require five days of training for a first time PEC issuing and 2.5 for renewals (only in baseline scenario, as explained in the following paragraphs).

[28] The person-day effort for administrative personnel of public administrations has been calculated based on data provided by the Flemish Government, Department of Mobility and Public Works, Ports and Water Policy Division.
[29] The man-day cost was calculated on the basis of data provided in PwC, London Economics and Ecorys, Public procurement in Europe, Cost and effectiveness, Prepared for the European Commission, March 2011.
[30] Calculation based on information retrieved from *The National Archives*, UK [accessed June 2013].

Finally, **PEC usage** is sometimes linked to fees and tariffs. These have been calculated as percentage of pilotage tariffs on the basis of national authorities' indications.

Additional differences, amongst the different policy options and, in particular, between policy options and the baseline scenario, required further calculations.

Depending on the possibility to have **PECs valid for sister vessels** or not, a difference of approximately 10% in the number of PEC applications and PEC modification is assumed. In particular, in those countries where it is currently not possible to have PECs for sister vessels, a 20% decrease in first time PEC applications and a coherent increase in PEC modifications are applied in case a policy option is implemented.

Concerning the **transparency of examination procedures**, it is assumed – coherently with responses received by National Authorities – that all countries included in cluster 1 already publish information on examination procedures as well as provide exam feedbacks coherently with measure 3 requirements. Accordingly, administrative costs for public authorities already include costs related to transparency procedures. Oppositely, countries from the other two clusters are assumed not to have implemented any transparency procedure. In these cases, it is assumed an additional half an hour of administrative work required per each PEC issuing, renewing or modification procedure.

The **duration of PECs** has been included in the model as well. In all policy options, countries related with a PEC duration below three years have seen it increased to reach the three year limit (including countries not currently granting PECs); PEC duration is kept as in baseline in those cases where it already was equal or exceeded three years.

As the implementation of measure 4 considers a **simplification of PEC renewal procedures**, it is assumed that all renewal costs related to re-examination procedures are cancelled for all policy options. As responding to the survey, public authorities rarely provided separate information on exam costs and administrative costs for renewal, the overall renewal cost is simply assumed to be halved in case the measure is implemented. Administrative unit costs for public administration procedures renewing PECs are kept equal to the baseline, while the cost related to exam preparation becomes null.

Different **language requirements** are related to different assumptions. In case English is accepted as a valid language, interchangeable to the local language, no increased costs are considered. On the contrary, in case local language requirements are set, PEC applicants are supposed to require additional training time, compared to the standard training to obtain a PEC qualification. Thus, in case simple marine terms are sufficient, 5 additional person-days are assumed to be sufficient, while in case a deeper understanding of the language is required, additional 20 person-days are calculated as a cost for shipping companies.
It is worth considering that increased cost for language requirements are only applied to countries from clusters 2 and 3, as countries from cluster 1 already accept English as substitute to the local language and are not likely to modify their regulations on the matter. Moreover, the increased costs apply only to 5% of new PEC applications in case of stringent requirements and only to 10% in case of loose requirements. Indeed, it is assumed that language requirements might discourage potential applicants (thus the difference between the two percentages). Nevertheless most PECs are granted to masters and officers operating on domestic routes, for which there is no need to train on language.

PEC related costs quantification

The policy options assessed in this document are very similar one another. The differences between policy options are indeed poorly characterised by a different level of administrative burden. On the contrary, they differ in fostering the implementation of PECs, and, therefore, in their number.

As the size of vessels increases, PECs are reduced, due to existing limitation on sizes of vessels for PEC applicants. On the other side, depending on the considered policy option, the number of countries granting PECs can sensibly increase, as it might increase the number of granted PECs as well, due to abandoning of discriminatory practices for PEC issuing. As a result, those countries where PECs are already very widely

granted and used would most likely meet a certain reduction in number of PECs; oppositely, those countries where PECs are less commonly granted would increase their number.

The following paragraphs show the administrative costs and other costs related to PEC from the public administration and business side. PO3A (with its variants) was not directly considered in the calculation. Nevertheless, it is expected to be not very different from the respective PO3B variants, with a slightly lower number of PECs due to the higher possibility to derogate from the EU framework (thus preventing the granting and/or use of PEC in case of local specificities).

6.4.2.1. Administrative costs

The different policy options assessed against the baseline impact the market on opposite ways. Indeed, if the increased number of PECs leads to an increase of overall administrative costs, these are counterbalanced – and even exceeded – by the reduction of unit costs related to single activities performed by administrative personnel, both from the public administrations side and the business side, as well as from the increased duration of PECs.

The administrative burden to the public sector, refers to the cost for personnel processing the requests for PEC issuing, renewals and modifications, as well as providing all required services to applicants (for example, feedbacks, etc.). Amongst policy options, the number of PEC applications (thus dependant on number of PECs and PEC duration) is the only cost driver, therefore, the higher the number of PEC applications, the higher the administrative cost.

The case of administrative costs to shipping companies is very similar. Indeed, the number of PECs is expected to increase as a result of the EC intervention (on the contrary, without intervention, it is going to slightly decrease), nevertheless, as the average duration of PECs increases as well, the overall result is a slight reduction in administrative costs in this case as well.

Administrative costs for public administrations have been calculated on the basis of the yearly number of first time PEC applications, renewals and modifications. As a result, cost variations depend on the average duration of PECs and on the increase/ decrease of number of PECs. It is also worth considering that the examination cost for renewal is brought to zero as a result of simplification procedures, further decreasing administrative costs in the intervention scenario.

Table 23 - Administrative cost calculation drivers

	Average PEC duration	No. of first time appl. (year)	No. of renewals (year)	No. of modifications (year)
BL 2010	2.04	1,044	2,739	1,377
BL 2030	2.04	1,062	2,755	1,400
PO3B(a)	3.50	1,355	2,335	1,944
PO3B(b)	3.50	1,362	2,349	1,954
PO3B(c)	3.50	1,362	2,349	1,954
PO4	3.50	1,452	2,522	2,136

Source: Study authors

Administrative costs for public administration do not vary much between 2010 and 2030 without any EC intervention. Nevertheless, simplification of procedures sensibly reduces costs related to renewals/ modifications, which is the main trigger causing an overall reduction of administrative costs for public administrations.

Table 24 - Administrative costs to public administrations by cluster (€)

	BL 2010	BL 2030	PO3B(a)	PO3B(b)	PO3B(c)	PO4
Cluster1	1,836,238	1,894,728	1,779,866	1,779,866	1,779,866	1,657,617
Cluster2	1,017,083	1,002,356	468,765	479,923	479,923	585,667
Cluster3	-	-	203,036	203,036	203,036	345,485
Total	**2,853,321**	**2,897,084**	**2,451,667**	**2,462,825**	**2,462,825**	**2,588,770**

Source: Study authors

The increase in PEC duration from the baseline scenario to intervention scenario related to measure 10, sensibly changes the cost structures, reducing the overall number of applications, renewals and modifications, especially in cluster 2, where the incidence of PEC duration is higher.

Table 25 - Administrative costs to public administrations by type of cost (€)

	PEC issuing admin. cost	PEC renewal admin. cost	PEC modif. admin. cost	PEC exam admin. cost (1st only)	PEC exam admin. cost (renewal)	Feedback admin. cost	TOTAL admin. cost
BL 2010	309,982	741,489	408,880	619,964	741,489	31,516	**2,853,321**
BL 2030	316,572	749,366	417,573	633,145	749,366	31,063	**2,897,084**
PO3B(a)	383,268	660,631	542,105	766,537	-	99,125	**2,451,667**
PO3B(b)	384,940	663,918	544,502	769,880	-	99,585	**2,462,825**
PO3B(c)	384,940	663,918	544,502	769,880	-	99,585	**2,462,825**
PO4	402,482	695,185	581,210	804,963	-	104,930	**2,588,770**

Source: Study authors

Administrative costs are sustained also by shipping companies with regards to documentation to be prepared and administrative procedures to be implemented. Administrative costs are calculated only on the basis of the cost of administrative personnel (person-day based) and on the number of activities these are required to perform for the different PEC applications.

Table 26 - Administrative costs for shipping companies (€)

	BL 2010	BL 2030	PO3B(a)	PO3B(b)	PO3B(c)	PO4
Cluster1	1,912,188	1,973,011	2,277,698	2,277,698	2,277,698	2,112,001
Cluster2	1,008,514	994,011	612,037	626,747	626,747	765,437
Cluster3	-	-	282,274	282,274	282,274	480,316
Total	**2,920,702**	**2,967,021**	**3,172,009**	**3,186,719**	**3,186,719**	**3,357,753**

Source: Study authors

Table 27 summarises the expected administrative cost be incurred by the public sector and the private sector under the different policy scenarios.

Table 27 – Administrative costs for public administrations and businesses

	BL 2010	BL 2030	PO3B(a)	PO3B(b)	PO3B(c)	PO4
PEC issued per annum[31]	4,373	4,449	5,927	5,957	5,957	6,435
Costs to Public authorities, mln EUR	2.9	2.9	2.5	2.5	2.5	2.6
Costs to Businesses, mln EUR	7.1	7.3	8.0	8.0	8.0	8.3
Total administrative Costs, mln EUR	10.0	10.2	10.4	10.4	10.4	10.9

Source: Study authors

Baseline Scenario

The baseline scenario is expected to be characterised by a slight increase of the number of PECs issued per annum, although the number of missions slightly decreases, mainly due to increased vessel size. The overall administrative costs would slightly increase, as no relevant change is expected in the unit costs related to PEC issuing, renewal and modification.

Policy Option 3B

The EC intervention in the different versions of PO3B is expected to increase the number of PECs, which, therefore, would increase administrative costs. Nevertheless, measures aiming at simplifying procedures to facilitate and support PEC use are expected to have a stronger effect on administrative costs. As a result, the overall administrative cost is expected to decrease approximately 20%.

If PO3B(a) – which includes strong language requirements – is implemented, the number of PECs is expected to be slightly lower, if compared to the other variants. Coherently, costs would be slightly more contained.

No differences in terms of administrative costs are expected between PO3B(b) and PO3B(c) variants, as the limited language requirements that characterise the first of these two are not sufficient to increase/ decrease PEC use.

Policy Option 3A

No substantial difference is expected between the various variants of PO3B and the relative variants of PO3A. As derogations are possible, the number of PECs is likely to be slightly lower and so are administrative costs.

Policy Option 4

PO4 is the one related with the highest expected number of PECs. Accordingly, costs are expected to be overall higher than any other considered Policy Option.

6.4.2.2. Other PEC related costs to shipping companies

Shipping companies incur in several types of PECs related costs. These are primarily fees for obtaining, renewing or modifying PECs. These fees are used to cover the administrative burden sustained by public authorities (see par. 6.4.2.1). Nevertheless, the two costs are not always matching; sometimes, shipping companies are required to pay more than the amount needed to cover the administrative costs, sometimes less.

The actual fees amounts were partially disclosed through questionnaires and interviews. Since information was not available for all countries a cluster approach has been adopted.

[31] Including renewals and modifications. The number of PECs issued per annum was calculated on the basis of the information provided by Norwegian and Swedish National Authorities.

Table 28 - Fees for PEC by cluster and policy options (€)

	BL 2010	BL 2030	PO3B(a)	PO3B(b)	PO3B(c)	PO4
Cluster 1	3,956,683	4,065,290	4,296,136	4,296,136	4,296,136	4,171,837
Cluster 2	252,357	261,414	244,269	245,470	245,470	392,253
Cluster 3	-	-	238,902	238,902	238,902	410,102
Total	**4,209,040**	**4,326,704**	**4,779,308**	**4,780,509**	**4,780,509**	**4,974,192**

Source: Study authors

Table 29 - Fees for PEC by type and policy options (€)

	PEC issuing fee	PEC renewal fee	PEC modif. fee	PEC exam fee (1st only)	PEC exam fee (renewal)	TOTAL fees
BL 2010	2,793,402	706,988	685,146	19,494	4,010	**4,209,040**
BL 2030	2,886,764	720,770	694,915	20,170	4,085	**4,326,704**
PO3B(a)	3,588,686	575,627	590,295	23,337	1,362	**4,779,308**
PO3B(b)	3,589,687	575,748	590,375	23,337	1,362	**4,780,509**
PO3B(c)	3,589,687	575,748	590,375	23,337	1,362	**4,780,509**
PO4	3,699,700	589,260	635,387	49,367	478	**4,974,192**

Source: Study authors

Together with these costs, there are costs related to the PEC examinee to study and take the exam. In particular, depending on the policy option considered, longer time might be required to meet language requirements in those countries that do not allow it to be taken in English. It is supposed that anyway at least part of the time required for the examinee to study can be carried out during off duty hours when on board (e.g. downtimes, etc.).

Finally, some countries require PEC exempted vessels to pay a share of pilotage fees. These costs are generally justified by the necessity to maintain the pilotage service for any case of necessity. On average, in Europe, the cost for using PEC is equal to around 10%-15% of the pilotage service cost.

It is worth considering the difference in terms of language related costs between the different scenarios, as in the baseline scenario (as well as in PO3B(a) – and, thus, also in PO3A(a), though not directly considered), the effort required to learn proper terminologies and forms in the local language results in much longer time and, thus costs. At the same time, it partially refrains the attractiveness of PECs, raising a barrier to its obtaining. As a result, the cost is lower, if compared to PO3B(b) (where local language requirements are much softer), or to PO3B(c) and PO4 (no local language requirements), but the number of PECs is much lower than the cost difference.

Table 30 - Additional costs by cluster and policy scenario (€)

	BL 2010	BL 2030	PO3B(a)	PO3B(b)	PO3B(c)	PO4
Cluster 1	22,285,231	22,503,873	22,920,424	22,920,424	22,920,424	22,764,566
Cluster 2	8,117,640	7,933,015	8,139,472	8,283,100	8,232,467	9,097,253
Cluster 3	-	-	8,324,829	8,299,380	8,273,932	10,398,816
Total	**30,402,872**	**30,436,887**	**39,384,726**	**39,502,905**	**39,426,823**	**42,260,636**

Source: Study authors

Table 31 - Additional costs by cost type (€)

	PEC usage cost	Training (1st only)	Training (renewal)	Language-related cost	Exam attendance cost	TOTAL fees
BL 2010	25,782,147	2,972,432	407,997	103,768	1,136,528	**30,402,872**
BL 2030	25,732,753	3,035,625	410,730	100,654	1,157,125	**30,436,887**
PO3B(a)	34,113,647	3,675,175	-	148,903	1,447,001	**39,384,726**
PO3B(b)	34,283,808	3,691,205	-	76,082	1,451,810	**39,502,905**
PO3B(c)	34,283,808	3,691,205	-	-	1,451,810	**39,426,823**
PO4	36,861,920	3,859,413	-	-	1,539,303	**42,260,636**

Source: Study authors

Considerations made in par. 6.4.2.1 on the relation between the different policy options and number of PECs are valid for the assessment of these other costs as well. Nevertheless, it is worth considering that costs are not only related to the number of PECs, but also to unit costs. Indeed, fees for PEC issuing, renewing and modifications are expected to decrease as simplifications are implemented (see par. 6.4.2.1), as PEC duration is increased, etc.. As a result, the increase in costs due to increased number of PECs is partially counterbalanced by the reduction of unit costs.

Table 32 – Summary of other PEC related costs to shipping companies

	BL 2010	BL 2030	PO3B(a)	PO3B(b)	PO3B(c)	PO4
PEC Missions	420,596	415,529	529,982	534,249	534,249	554,366
PEC issued per annum[32]	4,373	4,449	5,927	5,957	5,957	6,435
Fees related to PECs issuing, mln EUR	4.2	4.3	4.8	4.8	4.8	5.0
Training and exam preparation costs , mln EUR	3.5	3.5	3.8	3.8	3.7	3.9
PECs' usage fees (when applicable), mln EUR	25.8	25.7	34.1	34.3	34.3	36.9
Total	33.5	33.5	42.7	42.9	42.8	45.8

Source: Study authors

These costs to shipping companies concur along with administrative costs to shipping companies (see par. 6.4.2.1) and to operational costs (see following paragraph) to the definition of net cost savings to shipping companies. Par. 6.4.4 describes the expected effects of each policy options in terms of cost savings to shipping lines.

6.4.3. Operational costs related to pilotage

As already mentioned before, cost savings is not only related to the possibility for shipping companies to completely or partially avoid pilotage costs. Operational cost savings represent another important aspect related to PECs; examples of possible operational cost savings are related to:

- Avoiding delays resulting from pilotage service availability which might result in:
    - Additional cost and penalties in ports for stevedoring, night supplement, etc.

[32] Including renewals and modifications. The number of PECs issued per annum was calculated on the basis of the information provided by Norwegian and Swedish National Authorities.

- Additional fuel cost to speed up in order to catch up with the original schedule for the following ports.

- Avoiding penalties for missed pilot reservation in case the ship is delayed for other reasons;
- Increasing schedule flexibility in the case the pilot service slot assigned to ship is not optimal. In this case the ship would have to slow down. Oppositely, if the available pilot service slot is too early, the ship is forced to navigate faster than needed.

Although ECSA comment on the fact that the issue of waiting times and extra fuel consumption requires further examination, the position of shipping companies, shipmasters, ports and other authorities seems to be very clear, as shown in the charts below. EMPA, on the contrary, are of the view that there is no evidence that PEC usage can lead to time savings. According to them, for instance, taking a pilot on board can sometimes result in a faster transit and a more efficient manoeuvring due to the pilot's excellent experience and well established interaction with the port services.

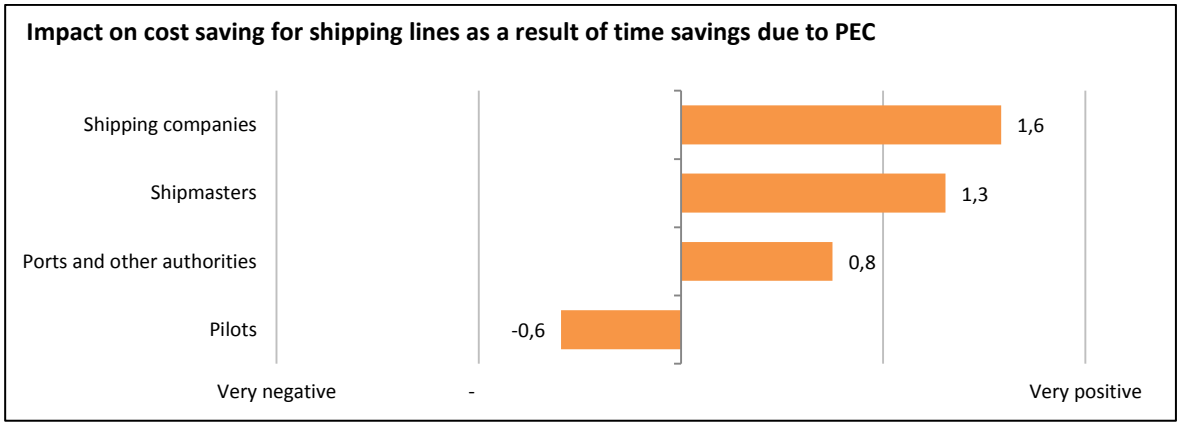
Compensation in case of delays by pilots[33]

Some countries grant compensations in case of failure by pilots to respect a reservation. For instance, in Finland, a wait of more than three hours from the vessel's arrival/departure, as notified by the client, shall entitle the client to a fee reduction of 8 per cent of the standard pilotage fee.

However, in our opinion, in case of frequent line services such as ferry or RoRo such reduction is not believed to pay back for the inconvenience. Indeed, minimum turnaround times may be not respected and following departure may need to be delayed.

Figure 12 and Figure 13 present the impact on cost saving as a result of time saving and flexibility, respectively, in the event that no pilot is required. Shipping companies seem to consider these costs highly dependent on the possibility to be granted with PECs. On a scale from very negative to very positive, they claim that PECs would have an impact between positive and very positive on cost savings as a result of time saving as well as from increased flexibility. Oppositely, pilots claim negative impacts would be related on time saving from PEC granting and no impact at all is expected on flexibility.

Figure 17 - Impact of PEC on cost saving as a result of time savings in the event that no pilot is required

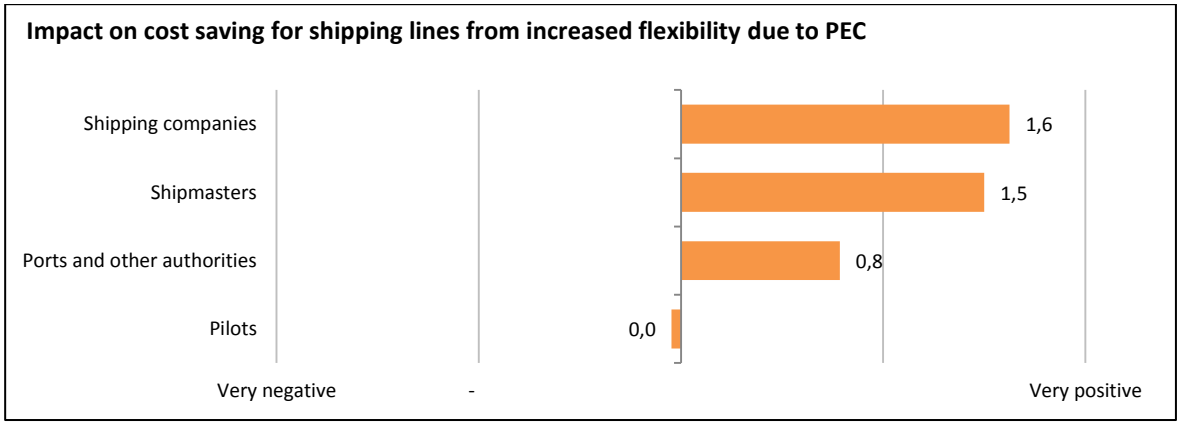


Source: PEC stakeholder consultation 2013

The other stakeholders are generally in favour of the thesis that PECs would reduce costs due to these two factors. Shipmasters being very close to shipping companies, when supporting these claims; ports and other authorities being more cautious.

[33] http://www.finnpilot.fi/www/ajankohtaista/tiedotteet_2013/en_UK/fees_2014/ accessed on 25 July 2013. Accessed on 25 July 2013.

Figure 18 - Impact of PEC on cost saving as a result of increased flexibility in the event that no pilot is required



Source: PEC Stakeholder consultation 2013

Approach to calculation of costs of pilot-related delays

In case of pilot delays, the shipping company will incur in one or more of the following expenses in order to get back into schedule.

- expenses due to increased fuel consumption as speed adjustments are set to overcome the time lost as a consequence of pilot delaying;
- expenses due to stevedores' gang performing unloading activities outside the scheduled plan;
- expenses due to additional stevedores required to perform unloading activities within schedule;
- expenses due to night supplement in case stevedores are required to carry out unloading activities during night shifts;
- expenses relative to keep the gang idle while the vessel is not docked, yet.

The calculation of costs is carried out under the following assumptions.

- very short delays are not included, as these are generally not recorded by competent authorities.
- short delays may require only increased port service costs due to the possibility to get back on schedule leveraging the use of additional stevedores; in this case no additional fuel cost is considered.
- when additional stevedores are not available, short delays may lead to increase in cruise speed (from optimal efficient speed in terms of consumption) to full speed to bring the vessel back on schedule. In this case, additional costs due to port operations will also occur (i.e. overtime cost), to which fuel cost is to be added;
- longer delays (up to 4 hours) involve both additional port operation costs and fuel costs;
- very long delays have not been considered, due to rareness of their occurrence.

Pilot-related delays in Europe

Consistent information on delays is not recorded homogeneously throughout the countries considered in this assessment. Therefore a *variable similarity approach* is used to calculate the impact in the EU starting from data reported only in specific countries.

In particular, data on delays has been collected during the PEC Fact Finding Study 2012 for Malta, Norway and Belgium. Although data were presented differently, it was possible to produce a homogeneous variable in terms of hours of delay per call. It is worth considering that it represents a conservative indicator as it is not common practice for competent authorities to report single delays shorter than one hour.

Table 33 - Statistics on delays from Belgium

Year	Delays (h)	Missions (n)	Average delay per mission (h)
2009	867	54,990	
2010	1,523	59,374	
2011	2,368	59,735	
Total	4,758	174,099	0.027

Table 34 - Statistics on delays from Malta

Year	Delays (h)	Missions (n)	Average delay per mission (h)
2009	2,336	7,917	
2010	2,516	7,863	
2011	2,657	8,855	
Total	7,508	24,635	0.305

Table 35 - Statistics on delays from Norway

Year	Delays (h)	Missions (n)	Average delay per mission (h)
2009			
2010			
2011	1,125	44,708	
Total	1,125	44,708	0.025

Table 36 - Average delay

Delays (h)	Missions (n)	Average delay per mission (hh)
13,391	243,442	0.055

It is moreover considered that no statistically valid information is reported on the average duration of delays, nor any statistic is differentiated between short ones (1 h – 2 h) and long ones (3 h – or more). Therefore, although longer delays produce more than proportionally increasing operating costs (please, refer to the following paragraphs), every pilot-related delay is treated as if it was of the duration of one hour. Accordingly, the operational cost increase calculated in this model is to be considered as a conservative measure of the overall cost, which is expected to be somewhat higher than that presented as result of the analysis.

Expenses related to increased fuel consumption

The calculation of cost for shipping liners due to increased fuel consumption is based on the analysis of data provided by stakeholders. In particular, one shipping company operating on scheduled short sea shipping routes provided detailed fuel cost calculations with regard to three different size vessels, which match with the typical sizes of vessels for which PEC are granted.

Table 37 - Sample on vessels consumption and speed

	Eco speed (kn)	Full speed (kn)	∂ speed (kn)	Eco consumption ton/h	Full speed consumption ton/h	∂ consumption ton/h
Vessel type 1	13	18	5	0.689	1.264	1.188
Vessel type 2	13	18	5	0.942	1.238	0.296
Vessel type 3	12	19	7	0.800	1.988	0.575

The sample has been analysed considering the fuel consumption in relation to speed for each type of vessels. Both the economically most efficient speed and top speed were considered in the formula.

On average, consumption at economically efficient speed is approximately 0.81 ton/h, while it rises up to 1.5 ton/h in case of full speed.

In economic terms, these quantities are translated into €358 per hour in case of efficient speed and €662 per hour in case of top speed.

To cover one hour delay it is required – according to empirical information – to sail at full speed for approximately 2.67 hours (€735 increased costs). As the delay increases, the amount of time required increases, but not following a precise linear correlation. Indeed, in case of four hours delay, approximately 9 hours of full speed cruise are required, totalling €2,508 increased costs.

Expenses related to port costs increase

A list of costs sustained by shipping companies at port level was previously presented, costs which are related to pilotage delays. No complete statistic is available for an EU-wide calculation of these costs as well, therefore case studies provided by the same stakeholders are considered. In particular, data has been provided for short delays with the possibility to benefit from additional support by stevedores, without this possibility and in case of longer delays (4 hours). Two ports have been taken as example for the calculation, one in northern Europe and the other in the southern side of the Union. The calculation includes the cost at port-level due to pilot delays as well as the eventual increased cost related to fuel consumption in case it is not possible to get back on schedule speeding up port operations.

Cost amounts considered in the calculation depend on the type of port and on specific cost structure of required fees for stevedores. In particular:

- Overtime cost refers to the required fee to be provided to stevedores in compensation for their work beyond the schedule.
- Extra labour still refers to extra-payment due to stevedores, but in this case it reflects a cost increase related to an increased amount of workforce used to compensate the hourly labour lost due to delays;
- Gang idle or cancelled is a cost due to the fact that the gang is to be paid even if not active, as the vessel is not docked, or in case the gang is to be cancelled due to heavy delay.
- New shift is a cost related to a new gang scheduled.
- Night supplement costs arise when stevedoring operations are required to be carried out beyond regular working hours.

Another element, which is worth considering, is the opening hours of ports. Indeed, in case the port is not open 24/7, the amount of time to be gained back may increase of the span between the arrival and the next operating

shift, with consequently increase in costs. In the considered examples, the port from northern Europe is open 24/7, while the one in southern Europe is not, and is operative from 08:00 to 02:00.

Table 38 - Port in Northern EU: cost increase structure

	Overtime	Extra stevedores labour	Gang idle or cancelled	New shift and/or night supplement	Fuel cost increase	TOTAL
1h delay - extra labour	-	€ 1,050	-	-	-	€ 1,050
1h delay - no extra labour	€ 1,100	-	-	-	€ 735	€ 1,835
4h delay	-	-	€ 4,400	€ 2,550	€ 2,508	€ 9,458

Table 39 - Port in South EU: cost increase structure

	Overtime	Extra stevedores labour	Gang idle or cancelled	New shift and/or night supplement	Fuel cost increase	TOTAL
1h delay - extra labour	-	€ 1,890	-	-	-	€ 1,890
1h delay - no extra labour	€ 1,350	-	-	-	€ 735	€ 2,085
4h delay	-	-	€ 7,290	€ 2,843	€ 2,843	€ 12,641

No fuel cost increase is expected in case of extra stevedores available; as it is supposed that the delay is overcome with extra labour.

Table 40 - Average cost increase structure

	Overtime	Extra stevedores labour	Gang idle or cancelled	New shift and/or night supplement	Fuel cost increase	TOTAL
1h delay - extra labour	-	€ 1,470	-	-	-	€ 1,470
1h delay - no extra labour	€ 1,225	-	-	-	€ 735	€ 1,960
4h delay	-	-	€ 5,845	€ 2,679	€ 2,508	€ 11,050

If the total cost related to 4 hours delay is divided by the number of hours (4), the result is evidently much higher than the total cost related to 1 hour delay (almost 50% higher). This is due to several cost items that do not occur in case of short delays (i.e. night supplements, cancellation of the gang and request for a new shift, keeping the stevedoring gang idle, etc.). Nevertheless, as it was mentioned before, information on the distribution of delays broken down per length of the delay is not available. Hence, it is cautiously assumed that all delay events are of one hour. As a result, on average, the additional operational cost incurred by shipping companies suffering one hour delay is assumed to be €1,715.

Total operational cost due to pilot delays saved with PECs

If PEC exempted missions increase, pilotage operations will decrease thus diminishing related delays. Table 41 estimates the expected number of hours of delays under different policy scenarios. Hours of delays are multiplied by €1,715 in order to estimate the operational cost. An increased number of PECs exempted missions against pilotage operations results in additional savings due to avoided delays. These have been estimated to be approximately €10.8 million in case of PO3(a) and to reach approximately €13.1 million in the PO4 scenario.

Detailed description of operational cost calculation is provided in Table 41.

Table 41 - Operational costs resulting from pilot delays

	Baseline 2010	Baseline 2030	PO3B(c)	PO3B(c)	PO4
Pilotage missions	1,269,163	1,290,567	1,176,114	1,171,847	1,151,730
Delays per pilotage mission			0.055		
Hours of delays *(hh)*	69,823	70,991	64,695	64,461	63,354
Cost of pilotage operations delays					
Cost related to 1h of delay *(Eur)*			1,715		
Average operational cost due to pilot delays *(mln Eur)*	119.7	121.8	111.0	110.6	108,7
Average operational saving *(mln Eur)*			10.8	11.2	13.1

Source: Study authors

These operational cost savings concur along with administrative costs (see par. 6.4.2.1) and other PEC related costs (see par. 6.4.2.2) to the definition of net cost savings to shipping companies. Par. 6.4.4 describes the expected effects of each policy options in terms of cost savings to shipping lines.

6.4.4. Summary of cost savings to shipping companies

Table 42 presents the outcome of our analysis in terms of:

- Costs related to pilotage fees to be paid by shipping companies
- Administrative costs met by shipping companies
- Other PEC related costs (i.e. issuing/granting PEC fees, training, exams, PEC usage, etc.)
- Operational costs related to pilot delays

Administrative costs incurred by public administrations are not considered since those are covered by the costs borne by shipping companies when paying for PEC issuing fees.

Table 42 – Cost savings to shipping companies in the EU, Norway and Croatia

	Baseline 2010	Baseline 2030	PO3B(a)	PO3B(c)	PO4
Demand, Mln Tonnes	3,973	5,803	5,803	5,803	5,803
Aggregate GT	13,700	22,000	22,000	22,000	22,000
Aggregate DWT	19,662	31,662	31,662	31,662	31,662
Vessel Arrivals	787,053	773,717	773,717	773,717	773,717
Pilotage Missions	1,269,163	1,290,567	1,176,114	1,171,847	1,151,730
PEC Missions	420,596	415,529	529,982	534,249	554,366
Active PECs	8,681	8,832	11,765	11,823	12,774
Aggregate Pilotage Cost mln EUR [i]	1,095.68	1,243.13	1,161.20	1,157.61	1,142.61
Administrative costs incurred by shipping companies, mln EUR [ii]	7.1	7.3	8.0	8.0	8.3
Other PEC related costs, mln EUR [iii]	33.5	33.5	42.7	42.8	45.8
Operational costs due to pilot delays, mln EUR [iv]	119.7	121.8	111.0	110.6	108.7
Aggregate cost for pilotage and PEC [i]+[ii]+[iii]+[iv]	1,255.98	1,405.73	1,322.90	1,319.01	1,305.41
Savings against the baseline 2030, mln EUR			**82.83**	**86.72**	**100.32**

Source: Study authors

Table 42 shows the costs estimated for European maritime traffic, including pilotage costs and the costs associated with using PECs. Introduction of PEC schemes in all EU countries is estimated to save between € 82.8M and approximately € 100M per annum, based on 2030 forecasts of vessel traffic.

However it should be noted that the savings are not distributed evenly. Most of the benefit will arise on frequent, short sea operations between countries with no existing PEC scheme.

The cost shipping companies should sustain when choosing to use PECs instead of pilotage services is mainly of two types:

- The administrative [ii] to be incurred by shipping companies to apply for being granted with PECs (including first issuing and renewal/ modification) (see par. 6.4.2.1);
- Other PEC related costs [iii] to be incurred by shipping companies: fees for PEC issuing; costs of training of shipmasters/ senior deck officers; cost of calling at ports with a PEC (when applicable) (see par. 6.4.2.2).

However the use of PEC instead of common pilotage services allow for two type of cost savings:

- Avoiding the payment of fees or charges for the pilotage services [i] (see par. 6.4.1)
- Avoiding operational costs deriving from eventual delays by pilots [iii] (see par.6.4.3)

6.4.4.1. Assessment of net cost savings for each policy option

Baseline Scenario

Even though high volume growth is expected in the port sector and in the shipping fleet worldwide, the baseline outlook for demand for pilotage services in Europe is essentially static. Pilotage missions will increase little, whereas PEC exempted missions will decrease due to increasing ship size.

The aggregate cost for pilotage is estimated to rise from € 1,096M in 2010 to € 1,243M in 2030, mainly as effect of increased ship sizes. The overall aggregate cost for pilotage, PEC and pilot delays is expected to be € 1,406M in 2030.

Policy Option 3B

Under **PO3B(a)** the number of active PECs is expected to top 11,765. The PEC exempted missions will also increase producing cost savings to the shipping companies, which have been estimated in the region of € 82.8M in the year.

PO3B(c) as well as **PO3B(b)** will facilitate not native speaker Officers in the process of obtaining a PEC. Hence the number of active PECs in 2030 is expected to be slightly higher if compared to PO3B(a). Cost savings to shipping companies are expected to be € 86.7M in the year 2030.

Policy Option 3A

PO3A envisaged the possibility for Member States to derogate from the single European framework. Hence, the number of PECs issued under this policy option is expected to be lower. Benefits in terms of cost savings to shipping companies will be in the region of these expected for PO3B, but somewhat lower.

Policy Option 4

PO4 will allow for the highest number of PECs to be issued. We estimated that under this policy option the number of active PECs in the year could be close to 13 thousand. As a consequence, the expected savings to the shipping companies are higher when compared to other policy options. In 2030 we expect the shipping companies to save about € 100M.

6.4.5. Costs to pilotage service providers

Providers of pilotage services express concern regarding potential losses following the implementation of the policy options under consideration. However, even considering the option leading to the most significant reduction in pilotage missions (PO 4), results are reassuring. Policy option 4 is actually predicted to lead to an increase in revenues for pilotage service providers of 4.3% in the period 2010-2030. This is mainly due to a shift towards larger ships that counterbalances the decrease in pilotage missions, resulting in greater total revenues for pilotage service providers. As a result neither issues of lower remuneration of fixed assets nor under-utilisation of staff should represent matters of concern, being the sustainability of the service guaranteed in the long term by the increasing revenues.

6.4.6. Economic damages resulting from maritime accidents

Under this section we provide an analysis of cost of damages resulting from maritime accidents. Furthermore, the section provides for an assessment of the likely impacts of the alternative policy options.

Literature review on economic consequences of maritime accidents

The review on costs related to maritime accidents encompassed different studies and statistics published on sectorial articles. In particular, the following sources provide for accurate and quite comprehensive statistics:

- Finnish Maritime Authority (FMA) - HELCOM[34]; and
- the UK Department of Transport[35], which gathers data on marine accidents in the Baltic Sea and in UK waters.

Finnish Maritime Authority (FMA) - HELCOM

Economic consequences of maritime accidents are generally differentiated by categories on which the accident impacts. Most relevant are:

- people (i.e. losses and injuries);
- property (i.e. damages to cargo, infrastructures, vessels, etc.);
- environment (i.e. water pollution, impact on ichthyic ecosystem, etc.).

Other costs might arise as well, as legal costs, image damage, etc. These later are not considered within this analysis.

Data reported by the Finnish Maritime Authority (FMA), gathered from the international insurance company "Swedish Club" on a ten-year base, from 1998 to 2007, present costs related to ship reparation and salvage operations broken down by type of accident. The statistics only include cases that have been reported to the Swedish Club, and, therefore, that required the intervention of an insurance company. It is worth noting that statistics include accidents no matter the location (open waters, ports, etc.).

Table 43 - Average accident cost per type of accident

	Number	Total cost (€ m)	Average cost per accident (€ m)
Grounding	231	262	1,10
Vessel collision	250	201	0,80
Collision with structures	273	66	0,25
Fire, explosion	40	55	1,40
Machine failure	985	296	0,30
Weather	116	21	0,20
Other	196	85	0,45

Source: FMA 2008, EfficienSea 2012

Grounding, vessel collisions and fire/ explosions are by far the most costly accidents.

The first three rows are those more relevant for the purpose of the study, as the others are non-*navigation* accidents and hardly involve pilotage operations (either conducted by pilots or by PEC holders). These are further analysed below.

[34] HELCOM Group of Experts on Safety of Navigation – last revision 2013
[35] Department of Transport – Ports division. Marine Accidents in Harbour Waters: Results from the Marine Safety Pilot Study

As tankers are generally considered per se when considering pilotage and PECs (at present time, only few countries allow exemptions for these vessels), statistics are broken down between tankers and other vessels.

Table 44 - Economic cost of marine accidents involving tankers (€m per accident)

Type of accident	Reparation / salvage	Bunker leakage	Cargo leakage overboard	Other authority services	Bodily injuries	TOTAL
Grounding	1,10	0,05	0,50	0,05	-	**1,70**
Vessel collision	0,80	0,05	0,50	0,05	-	**1,40**
Collision with structures	0,25	-	-	0,05	-	**0,30**

Source: FMA 2008, EfficienSea 2012

Table 45 - Economic cost of marine accidents involving other vessels then tankers (€ m per accident)

Type of accident	Reparation / salvage	Bunker leakage	Cargo leakage overboard	Other authority services	Bodily injuries	TOTAL
Grounding	1,10	0,05	-	0,50	-	**1,20**
Vessel collision	0,80	0,05	-	0,50	-	**0,90**
Collision with structures	0,25	-	-	-	-	**0,30**

Source: FMA 2008, EfficienSea 2012

It is worth considering that the cost related to bodily injuries is reported to be too low to be considered, due to the rareness of the event.

Tables above present an overall average cost for those cases – reported by FMA on the basis of Swedish Club statistics – for which reimbursement was requested to the insurance company. Therefore, only accidents of a certain severity are included. Nevertheless, it should be considered that serious accidents are far less probable to occur than minor accidents.

UK Department of Transport

Table 46 presents the outcome of a research conducted by the UK Department of Transport, which considers accidents between 2005 and 2009 occurred in major UK ports.

Table 46 - Seriousness of incidents by type[36]

	Serious	Moderate	Minor	Total
Collision	0	10	65	75
Contact with infrastructure	4	59	442	505
Grounding	1	6	87	94
Near miss	1	11	312	324
Fire/ explosion/ flood	1	6	40	47
Pollution	1	2	122	125
Person overboard	5	2	12	19
Other on-board incident	5	7	591	603

[36] An accident is considered serious in case one vessel is lost and/or serious injuries/losses occur. Similarly, it is serious an accident that involves 10 or more tons of oil or chemical substances to impact the marine environment. Moderate accidents involve cargo loss and/or injuries, or eventually discharge of oil or chemicals between 0,5 and 10 tons. Finally, minor accidents involve no injuries, no substantial damage to objects and less than 0,5 tons of hazardous substances spilled into water.

	Serious	Moderate	Minor	Total
Machinery failure	0	38	430	468
Capsize, listing	3	4	13	20
Total	**21**	**145**	**2114**	**2280**

Source: UK Department of Transport

Table 46 suggests that serious accidents are far less likely to occur than moderate and minor accidents. Roughly, the share of serious accidents on the overall figure is around 1%, moderate accidents account for 6% and around 93% of cases are represented by minor accidents. Minor accidents are hardly reported to insurance companies, therefore, the average economic cost per marine accident is expected to be, overall, much lower than presented in Table 44 and Table 45.

Assessment of policy options

It can be assumed that if PECs are granted to officers with competence and experience, no increased safety risk is expected. Coherently, the economic damages are not likely to be affected by the number of PECs granted. The only concern is to keep the requirements for granting them coherent with the standards that are necessary to guarantee that PEC holders are experienced and competent.

In the **baseline scenario**, economic damages are expected to be constant in the short term. In the long term, on the other side, these will be reduced as a consequence of two effects:

- reduction in the number of accidents due to improved equipment, radars, etc. that allow better manoeuvrability, quicker response to dangerous situations, reduced accidents caused by human factor, etc.;
- reduction in the severity of accidents due to improved engineering (i.e. more resistant structures, materials, alloys, etc.).

These two factors are not related with number of PECs and are therefore valid for all scenarios.

The discrimination among policy option is then made according to the risk that unbalanced requirements affect safety. In particular, the distinction arises between **PO3A** that considers the possibility to derogate from the single EU framework and the policy options that do not consider this eventuality (i.e. **PO3B** and **PO4**) (see par. 6.3).

6.4.7. Impact on SMEs

The impact of the proposed policies specifically on SMEs is not expected to be relevant. In particular, no substantial difference is expected between benefits to large enterprises or SMEs. Of course, due to the different cost structure typical of smaller firms, the benefit due to the reduction of pilotage costs in smaller shipping companies may produce higher advantages compared to huge enterprises. The benefit of using PECs is particularly relevant in case of small companies performing several times a year the very same route, thus the fixed cost of renewing PECs will be distributed to several calls.

On the other side, it is worth considering that the decreased transportation costs, due to the abatement of part of the fixed costs shipping companies have to sustain, would be reflected in a slight reduction in cost of transported goods, which would impact the whole European market. Theoretically, this can be expected to produce higher benefits to smaller companies than large ones, representing a discount on variable costs, which SMEs cannot abate through economies of scale. Nevertheless, the effect is expected to be irrelevant, being a very small reduction to be distributed along the whole supply chain.

6.4.8. International competitiveness

The economic benefit resulting from the possibility to avoid some or all pilotage-related costs (hereby all costs are considered: economic cost from tolls and tariffs, reduced flexibility, inefficiency, etc.) is likely to produce a certain effect on the competitive balance between PEC granting countries and other countries. This can be valid internally, at EU level, in case PEC granting is not enforced in all MSs, as well as at international level. Naturally, competitiveness, in this sense, concerns countries with ports that are close enough to each other to be substitutes. The case of ports connected to the same hinterland thus includes nearby countries, where the cost of transporting freight from the coast to the hinterland is equivalent or similar. It is mainly the case of the Baltic Sea and the Eastern Mediterranean.

A quantification of the increased international competitiveness is too complex to be forecasted, as numerous variables should be considered; not last, the eventuality that, loosing competitiveness, the non-EU countries impacted might implement similar measures on PECs than those proposed by the Commission.

In the **baseline scenario** no substantial change is expected on the current trend. The European Union is most likely to maintain its political cooperation with neighbouring countries in transport policy, which, in the long term, would sensibly increase the flow of traffic between EU MSs and bordering countries. MSs granting PECs, would offer shipping companies more attractive economic conditions, and the flow of goods towards the hinterland of a non-EU country where PECs are not granted would be guaranteed by increased rail/road connectivity; therefore ports where PECs can be used will gain competitiveness over ports in countries where PEC is not granted.

In **all other cases**, PECs are granted in all MSs, no matter the differences among measures implemented and not implemented. The number of PECs granted becomes the main source of competitive advantage for MSs and border countries. Indeed, the more PEC are easily granted, the more the possibility for shipping companies to benefit from reduced costs, increased flexibility, etc.

6.5. Social impacts

6.5.1. Worker safety

Navigational accidents involving workers in compulsory pilotage areas are quite rare, compared to the number of vessel movements in EU waters.

The figures recorded by EMSA show that 29 lives have been lost on commercial vessels in and around EU waters in 2010. The number of reported lives lost in 2010 has increased from 2009, but is still substantially lower than the 2007/2008 figures. Over the observed period, the majority of losses were on general cargo ships and "other vessel types" also being significant.

Table 47 – Lives lost by ship type in and around EU waters (2007-2010)

	2006	2007	2008	2009	2010
Cargo ships	14	20	24	19	17
Tankers	n.a.	3	9	2	5
Container ships	n.a.	0	2	1	0
Passenger ships	n.a.	10	6	4	7
Total	14	33	41	26	29

Source: EMSA, Maritime Accident Review 2010

Considering the 2,489 vessels involved in major accidents in EU waters in the period between 2006 and 2010 reported by EMSA, it can be calculated that there are 7 fatalities every 100 vessels involved in maritime accidents.

Based on EMSA statistics and on the PEC 2012 Study, fatal accidents in compulsory pilotage areas seems to be rare. Nevertheless, few cases are reported, where accidents resulted in losses. In 2011, the collision between the container vessel OOCL FINLAND and the general cargo vessel TYUMEN-2 in the Kiel Canal caused the death of the pilot and of a canal helmsman[37]. In 2013, the container vessel JOLLY NERO, during the manoeuvres for leaving the port, crashed on the port control tower, causing 9 fatalities and 4 injuries, as well as severe damages to port structures. In this latter case, the pilot was on board; however, the cause of the accident is probably to be ascribed mainly to technical failure[38].

Statistics presented in Table 47 include different types of accidents:

- sinkings;
- collisions/contacts;
- groundings;
- fires/explosions; and
- other.

Occupational accidents typically fall under the category "other". EMSA database[39] on occupational accidents consolidates information from various sources which recorded occupational accidents resulting in harm to human beings. From 2000, among the 127 cases reported by EMSA, 41 were related to merchant traffic[40] and resulted in either injuries or losses; 8 involved vessels on which pilotage operations were performed, totalling 2 losses and 11 injuries.

[37] Federal Bureau of Maritime Casualty Investigation, 2011 Annual Report - Germany.
[38] ANSA 8 May 2013, Nave contro torre molo a Genova, 7 morti
[39] http://emsa.europa.eu/marine-casualties-a-incidents/occupational.html
[40] Statistics exclude fishing vessels, private yachts, warships and other service vessels.

Table 48 presents figures on the number of accidents resulting in life losses and/or injuries per type of accident.

Table 48 – Serious accidents occurred in port areas involving persons

	Number of accidents considered	Life losses	Percentage life losses	Injuries	Percentage injuries
Berthing or Mooring operations	6	4	15%	3	10%
Cargo handling	9	5	19%	5	17%
Crew member overboard	1	1	4%	0	0%
Pilot embarking / disembarking	6	2	7%	4	13%
Waves above the bow	3	4	15%	3	10%
Work on board	16	11	41%	15	50%
Total	**41**	**36**	**100%**	**34**	**100%**

Source: various sources

Although it is a rare event, strictly pilotage-related accidents concern the embarking/disembarking of pilots on vessels, which represent the 7% of losses and 13% of injuries in the considered statistics.

Pilot embarking/disembarking might become a dangerous operation, in particular in adverse weather conditions. A survey conducted by PwC, in the context of PEC 2012 study, reported 3 cases on 436 analysed, in which accidents occurred due to pilot embarking/disembarking operations, involving injuries or losses. Similarly, in 5 of the EMSA reported accidents in which pilots were involved, injuries or losses were due to embarking/disembarking operations. Although the number is very limited, accidents related to pilots embarking/disembarking represent the most frequent case of injuries/losses involving navigational accidents. Other cases of severe accidents are present; none of these involves vessels where PEC holders were on board.

A different statistic, produced by the UK Department of Transport[41], focuses only on accidents occurred in major UK port areas. As the geographical range, the type of accidents and the timeframe are different, it is not comparable to the one presented above by EMSA. Nevertheless, it is useful to provide an insight on accidents occurred in port areas, excluding non-navigational accidents.

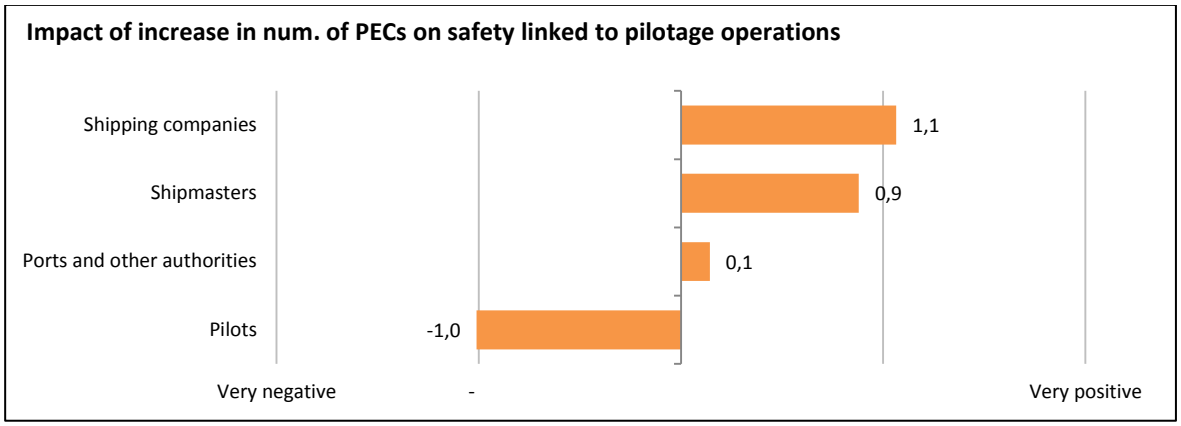
On average, in UK ports, the rate of occurrence of accidents is 1 /3000 vessel movements for passenger ships and 1 every 241 movements for commercial vessels. It is worth noting that more than 90% of these cases were reported as "minor accidents" and only around 1% as "serious". Injuries occurred with a rate of 0.0019% on the number of movements for freight and 0.0003% for passengers. The proportion of fatalities over other injuries is around 30%. The EU data is unknown, but is expected to be fairly lower, as EMSA statistics[42] specify UK waters to be related with a higher number of accidents than the rest of Europe.

Although there is no information on the presence of pilots or PEC holders on board of vessels involved in accidents, UK statistics confirm the low rate of accidents resulting in fatalities and injuries in ports. Therefore, regardless the presence of pilots, it can be assumed that the severity of accidents occurred in ports is generally fairly low.

Respondents to the stakeholder consultation provided their views on the correlation between PECs and occupational safety. Shipping companies and shipmaster tend to consider safer the use of PECs, while pilots claim the opposite. Ports and other authorities generally agree that there is no correlation between PECs and safety.

[41] Department of Transport – Ports division. Marine Accidents in Harbour Waters: Results from the Marine Safety Pilot Study
[42] EMSA, 2009, Maritime Accident Review.

Figure 19 - Stakeholders' opinion on impact of PECs on operational safety



Source: PEC Stakeholder consultation 2013

Impacts of policy options related to worker safety are not expected to be substantially different from those already considered in par. 6.3. In this sense, the **baseline scenario** is related with a certain increase in safety due to technological improvements.

The main difference among the baseline scenario and the **policy options 3A, 3B and 4** is represented by a small improvement of occupational safety concerning pilots embarking/ disembarking operations.

However, the small positive impacts might be counterbalanced in those cases where derogations to the single EU framework are not considered (**PO 3B** and **PO 4**). It is worth considering that the impact entirely depends on how stringent the rules included in the single EU framework will be. Indeed, granting PECs too easily would most likely allow under experienced shipmasters/ officers to obtain PECs, thus increasing potential risks of accidents related to the human factor. Conversely, setting too stringent requirements would secure safety as all PEC holders will be qualified or overqualified. Nevertheless, in the latter case the number of PECs granted will be too low to produce any positive effects with regards to policy objectives.

6.5.2. Passenger safety

Accidents involving passenger ships are generally very rare. As shown in par. 6.5.1, statistics from the UK Department of Transport report 0,0004% passenger injuries or losses per vessel movement within port areas (compared to 0,0019% for crewmembers). While the gap might be related to higher concern for passengers' safety than crewmembers in case of accidents, statistics from EMSA confirm that the number of injuries and lives lost in passenger ships are overall lower compared to freight vessels (see Table 47). Either these lives belong to passengers or crewmembers.

Even though the number of accidents causing harm to passengers is so limited to be comparable to null, such event cannot be excluded.

The EU framework is not expected to negatively impact passengers safety (as it was already claimed for safety in general), although some policy options are related with higher risks of mismatching between safety requirements and legal requirements. Indeed, in case of stringent rules, safety might not always be guaranteed. In case policy options not contemplating derogations from the EU framework are implemented (**PO3B and 4**), the risk of mismatch between safety requirements and legal requirements is higher than for the other cases (**PO3A**). It does not mean that there is a direct negative impact, but that it is more complex to find the balance between safety and benefits from PECs.

6.5.3. Employment

As the stakeholder consultation shows, pilots are concerned that the increase in number of PECs might negatively impact on the need for their services. This concern is mild in case of 10% vessels with PECs, but rises immediately if the number of PECs goes up to 20% vessels. On the other side, shipping companies foresee almost no impact in case of 10% vessels granted with PECs, and only a mild impact in case the percentage rises to 20% or even 30%. Shipmasters generally do not seem to expect a very relevant impact on pilot profession in case the percentage of vessels granted with PECs is below 30%. Ports and other authorities, instead, appear to be more concerned when the percentage rises from 20% to 30%.

According to our elaboration under the **baseline scenario**, as shown in Table 49, a slight increase in pilotage missions in the period 2010-2030 will generate new pilot jobs which are quantified in approximately 80 units. In case the EU decides to implement **PO3A**, instead, potential job losses are expected although these are difficult to be estimated. The reason relies in the possibility of derogation that, despite being a mitigating factor in this sense, characterises the discretionary nature of the policy in consideration. However, the estimated number of demand for pilotage services will be lower than in case of **PO3B**.

The implementation of **PO3B(a)** and **3B(c)** present a significant reduction in pilotage missions (8.9% - 9.2%) in the period 2010-2030, resulting in potential losses in the region of 350 and 370 units respectively. However **PO4** seems to have the most pronounced effect on employment for the sector: about 450 potential decreased demand for pilotage services related to a decrease in pilotage missions of 10.0%.

Table 49 – Impacts on employment in the EU, Norway and Croatia

	Baseline 2010	Baseline 2030	PO3B(a)	PO3B(c)	PO4
Pilotage Missions	1.269.163	1,290,567	1,176,114	1,171,847	1,151,730
Change on Baseline 2010(%)		1,7%	-7,2%	-8,3%	-10,0%
Change on Baseline 2030(%)			-8,9%	-9,2%	-10,8%
Number of pilots	4845	4927	4490	4473	4397
Potential decrease on baseline 2010	0	82	-355	-372	-448
Potential decrease on baseline 2030			-437	-453	-530

Source: Study authors

While the analysis made conducted to calculate reasonable approximations of the future demand for the pilotage service in all considered scenarios, the effect on the number of job gains (losses) is harder to predict. Provided figures have been calculated simply applying a proportion (i.e. if the percentage of reduced in demand for pilotage service is calculated, then the number of pilots is reduced by the same percentage) (see Table 49). Nevertheless, it mainly serves the purpose to illustrate the size of the demand reduction, rather than provide estimates for actual changes in number of pilots employed in Europe.

Indeed, the calculation does not consider the need for pilots to be at least in sufficient number to guarantee an efficient 24h pilotage service (as it is and would be in the future). Furthermore, the calculation method does not take into account that the number of pilots required is not linear with the demand for pilotage services, but increases when the size of vessels exceeds specific dimensions.

Table 30 provides some examples of requirements in terms of having two pilots on board in some countries and ports.

Table 50 - Examples of countries and regulations on conditions where more pilots are required

Country	Considered port(s)	Details on vessel limit over which two pilots are required
Finland	All	The pilot is entitled to bring along a second pilot on a piloting assignment when necessary for compelling reasons associated with weather or ice conditions or the navigation or handling of the vessel.[43]
Italy	Port of Venice	Cruise vessels which exceed 50.000 GT require two pilots
Malta	All	All ships of 240 meters LOA and over, entering, leaving or shifting in Grand Harbour, are to employ two pilots with the exception of cruise liners. All ships of 300 meters LOA and over are to employ two pilots[44]
Sweden	Port of Stockholm	Vessels which exceed 200 m LOA. require two pilots[45]
UK	Port of Milford Haven	Certain vessels over 65,000 GT and all vessels over 80,000 GT are provided with two pilots.[46]

Source: Country and port regulations

While, on one side, the increased number of pilotage exemption certificates would bring a reduction in the overall demand for pilotage services, it is still to be considered that, on the other side, the overall size of vessels has a distinct tendency to increase in the future (see par. 6.1.2). As a result, in the future, the share of port calls from vessels requiring two pilots will increase, counterbalancing the decreased demand for pilotage due to the increase in the number of PEC holders.

6.5.4. Quality of work

The increased number of PECs granted and the resulting change in roles and responsibility of different categories of professionals is expected to produce a certain change in the quality of work for shipmasters, deck officers and pilots.

Shipmasters see their role changed little, if any. Without PEC, they already held full responsibility for any accident, being the ship under their command, even with a pilot being on-board. However some shipmasters claim that the presence of pilots might be beneficial to safety, especially when fatigue begin to appear. Oppositely, others claim that the unnecessary presence of pilots (in case of experienced masters in specific ports where calls are frequent) may result in a factor of stress which does not produce any benefit at all. According to IMO resolution A.889(21)[47], the embarkation or disembarkation of a pilot should be supervised by a responsible officer, who is therefore required to leave the bridge. This has been reported to be another factor of stress for the shipmaster that cannot rely on the responsible officer during embarking and disembarking of the pilot.

Furthermore, some shipmasters claim that any measure allowing for facilitation on PEC granting and renewal or for longer duration of PEC would be beneficial to them. Indeed, depending on the criteria set for the renewal of PEC, it might happen that a shipmaster is required to navigate always on the same route in order to collect the minimum required number of ins / outs for PEC renewal.

[43] Pilotage Act (940/2003; amendments up to 592/2011 included)
http://www.finlex.fi/en/laki/kaannokset/2003/en20030940.pdf
[44] Maritime Pilotage Regulations http://www.justiceservices.gov.mt/DownloadDocument.aspx?app=lom&itemid=11348
[45] http://www.stockholmshamnar.se/documents/en/trycksaker/090512-mariners-guide.pdf
[46] http://www.mhpa.co.uk/pilotage/
[47] Adopted on 25 November 1999

Deck officers' profession is expected to become more attractive as a result of increased responsibility and opportunities for qualification, and moreover due to the coherently increased salary.

Several shipping companies consider the obtaining of PECs a necessary qualifying requirement for deck officers to be promoted to shipmasters.

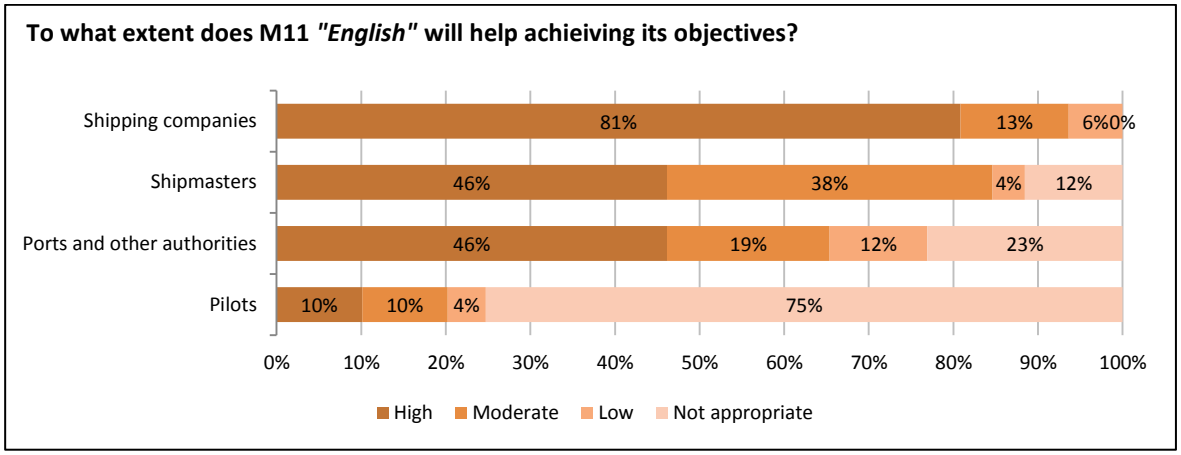
Pilots seem to have concerns that the implementation of a PEC system may someway damage the position and status of EU pilots. Nevertheless, in line with all stakeholders' claims, the policy does not aim to reform the fundamental role of pilots as those whom to rely on in case of need to maintain safety at high standards. Nor their mansions are to change. Therefore, no effect is expected on pilots' quality of work as a result of this policy initiative.

6.5.5. Work mobility

The possibility to communicate in English in all MSs ports would surely facilitate the work mobility of deck officers, which would then be able to apply for PECs in countries in which they do not speak the local language.

Apart from pilots, all stakeholders agree on the possibility for a measure implementing English as a universal language for PEC to guarantee fair requirements: shipping companies being strongly in favour, shipmasters and ports and other authorities being less supportive. Moreover, apart from ports and other authorities, in general no stakeholder category considers local derogations to produce beneficial effects.

Figure 20 - Stakeholders' opinion on the possibility for English to ensure fair requirements for PEC



Source: PEC Stakeholder consultation 2013

As English is already the international maritime language, the issue would be to formalise the possibility to have it accepted as the only language requirement in all MSs. It is expected that, **without the EC intervention**, English will probably become more and more important, due to globalisation and the need to communicate in one, single, common language. Nevertheless, the process of accepting it as the only language requirement may take several years, if ever occurring. In this case, all proposed policy options will have the same impact, but those explicitly including measures on language requirements (i.e. **PO3A.b, 3A.c 3B.b and 3B.c**). In this case, the "mild approach" (i.e. **PO3A.b and 3B.b**) would most likely be welcomed with favour by those MSs that want to keep to some extent the local language requirements for PEC granting. Nevertheless, the number of terms and commands to be learnt for deck officers in the local language is not expected to be a major burden, as only sound understanding of basic maritime vocabulary is required. **PO4, 3A.c and 3B.c** would further increase work mobility, as English would be considered a full alternative to the local language for PECs granting.

6.6. Environmental impacts

6.6.1. Marine pollution

Accidents causing marine pollutions are often related with fuel spill. Quantity is usually limited, and generally, no other pollutant substances affect the environment. Nevertheless, cases of more substantial spill outs occurred, especially when tankers containing oil or chemicals were involved.

This section presents findings and statistics on accidents which resulted in environmental pollutions. Furthermore, an assessment of the likely environmental impacts deriving from the alternative policy options is provided at the end of the section.

Analysis of accidents which resulted on environmental pollutions

Based on 2000-2009 statistics on maritime accidents from HELCOM[48] (limited to the Baltic Sea), the environmental impact of accidents not involving pilotage areas is sensibly more relevant than those occurring within pilotage areas. Both in terms of number of accidents and in terms of impact for the environment: on 70 reported cases in which accidents had environmental consequences, 12 occurred in pilotage areas[49]. In particular, pollution due to oil spilled into water is around ten times higher outside pilotage areas than within these areas. Other pollutant substances and chemicals are also spilled almost exclusively outside pilotage areas.

Nonetheless, interviews with experts pointed out the different impact on the environment related to hardness of containment operations. When accidents occur far from the coastline, it is easier to cope with the problem and intervene, even if the disaster is more likely to spread due to marine currents. Indeed oil spilled onshore is more difficult to clean away and, due to higher possible impact on persons, responses are required to be undertaken in shorter time, therefore with less time for proper planning.

EMSA publications provide for accurate overview of main accidents resulting in oil spills in and around EU waters (the term EU includes Norway and Iceland for the purpose of this review) during the period from 2007 and 2010.

Table 51 focuses on significant accidents involving merchant vessels.

Table 51 – Accidents resulting in oil spills in and around EU waters (2007-2010)

Year	Involved vessel(s)	Place	Country	Pollution	Presence of pilot on board
2010	Mindoro and Jork Ranger	Scheveningen	Netherlands	Estimated spill of around 7,000 tonnes	no
2010	North Spirit	Bay of Biscay	Spain	Spill of up to 400 tonnes of fuel oil	no
2010	Antonis	Port of Liverpool	UK	330 tonnes of heavy fuel oil	yes[50]
2010	Francia and CMA CGM Strauss	Port of Genoa	Italy	180 tonnes of fuel oil	yes[51]
2009	Full City	Langesund	Norway	2-300 tonnes was spilled	no
2009	MSC Shenzhen	Port of Algeciras	Spain	80 tonnes of fuel oil leaked into the dock	yes[52]

[48] HELCOM Group of Experts on Safety of Navigation – last revision 2013
[49] HELCOM Group of Experts on Safety of Navigation – last revision 2013
[50] MV ANTONIS, Contact with Langton-Alexandra swing bridge In the Port of Liverpool, 11 December 2010. Available at: www.maib.gov.uk
[51] CMA CGM STRAUSS Container Vessel struck by a Tug in Genoa, 24 Feb 2010. Available at: www.cma-cgm.com
[52] Arizon Abogados SLP, The Prestige's 7th Anniversary. Available at: www.arizon.es

Year	Involved vessel(s)	Place	Country	Pollution	Presence of pilot on board
2009	Admiral Kuznetsov	Cork	Ireland	Estimated 400-500 tonnes of heavy fuel oil	no
2009	Petrozavodsk	Bear Island	Norway	60 tonnes of the fuel and other pollutants	no
2009	Triple	Europoort, Rotterdam	Netherlands	2,195 tonnes of petroleum	no
2009	Framnes	Yaksi	Estonia	Undisclosed quantity of oil	no
2009	Merit	Bremerhaven	Germany	6 tonnes of heavy fuel leaked out	no
2008	Fedra	Gibraltar	Spain	Spill estimates were around 300 tonnes	no
2008	Tawe	Algeciras Bay	Spain	Much less than 300 tonnes	no
2008	Ice Prince	Portland Bill	UK	400 tonnes of fuel oil	no
2007	Server	Fedje	Norway	Spilled almost 400 tonnes of fuel	yes[53]
2007	Claudel	Rotterdam	Netherlands	800 tonnes of crude oil spilled into the harbour	no
2007	Golden Sky	Port of Ventspils	Lithuania	40 km oil slick soon formed and an unspecified amount of its 490 tonnes of fuel oil	no
2007	Sierra Nava	Algeciras	Spain	270 of is 350 tonnes of bunker fuel spilled into the sea	no
2007	Torm Gertrud and New Flame	Gibraltar	Spain	Substantial amount of oil reached the coastline, while others say that almost all the spilled oil has been contained	no
2007	Don Pedro	Ibiza	Spain	Estimated at up to a maximum of 150 tonnes	no
2007	Sea Diamond	Santorini	Greece	300 of the total of around 400 tonnes of the fuel being recovered. However, it is uncertain how much is left on board,	no
2007	Wilson Muuga		Iceland	50 tonnes of heavy fuel oil spilled into the sea	no

Source: EMSA, Maritime Accident Review, various years

Over the mentioned four year period, 22[54] maritime accidents resulted in oil spills and consequently on marine pollution. According to EMSA, in the period between 2007 and 2010, 2,489 vessels have been involved in accidents in EU waters. Hence about only 1% of the maritime accidents have been reported having relevant environmental consequences.

On average about 700 tons of oil or heavy fuel are spilled per each major accident. In only 4 of these accidents a pilot was reported being on board. There are not accidents resulting in major spills for which a master holding a PEC was reported being on board. The four accidents for which a pilot was on board resulted in oil spills of small entity.

[53] http://www.tradewindsnews.com/daily/article479627.ece , accessed on 9 May 2013.
[54] In 3 out of 22 reported accidents two vessels were involved.

Assessment of policy options

According to the findings presented above the impact on marine pollution in pilotage areas is twofold. On one side, statistics present fewer cases of pollution-related accidents in port areas compared to offshore cases. Moreover, the quantities of substances impacting the marine environment are, on average, much less relevant, when accidents occur in port areas. On the other side, it should be considered the effect of pollution, despite the quantity of oil and chemicals spilled out into sea. From this perspective, operations for containment are far more complicate when the disaster occurs close to the coastline (and the effect on the environment is generally more relevant) and are required to be carried out in shorter time, thus limiting the possibility to plan the intervention accurately[55].

The impact of measures on marine pollution is mostly related with marine safety, as it is related to the probability of accidents to occur. To this, some peculiarities should be addressed, in particular when considering to grant PECs to any type of vessel/ cargo.

Without any intervention from the EC on PECs, the situation is not likely to substantially change. Technological improvements are expected to be the main source of increased marine safety in the long-run. Overall, only very few cases of accidents resulting in oil or chemicals spill outs are related with relevant environmental consequences (around 1%)[56]. Statistically, there seems to be no correlation between the presence of pilots or PEC holders and the probability of occurrence of accidents impacting the environment. In both cases, the impact is too limited to have any relevance. Therefore, the environmental impact is very limited for the purpose of this assessment.

Considering no correlation between presence of PECs and accidents affecting the environment, no policy option is expected to produce substantial modifications to the current status. Nevertheless, two cases might impact:

- In case of no derogation from the EU framework (**PO3B** and **PO4**), requirements for PEC granting might be unbalanced, thus increasing risks of accidents; this is both the case of loose requirements for PEC granting in general, as well as loose requirements for obtaining PECs for sister vessels (in particular referring to vessel size);
- In **all policy options,** environmental impact might be related to the interpretation of measure 9 "PECs granted for any type of vessel or cargo, as long as there is no proven safety concern". Indeed, as there is no proven statistics that these vessels, in case of exemptions, are more likely to occur in accidents, the topic might need specific attention. It is likely that "as long as there is no proven safety concern" would actually consider no PEC for vessels carrying hazardous substances. In this case, no effect on the environment is expected in any case (exception made for what stated in the previous bullet point).

It is worth considering that preventing PECs to be granted in case vessels transport hazardous substances is different from preventing PECs to be granted for those types of vessels destined to carry hazardous substances. In Sweden, for examples, PECs are granted for oil or gas tankers, but can be used only when these are empty. Otherwise, the presence of pilots is mandatory.

[55] FMA 2008
[56] HELCOM Group of Experts on Safety of Navigation – last revision 2013

7. Comparing the options

The present section provides an overview of the policy options according to their degree of effectiveness, efficiency and coherence. The parameter of effectiveness evaluates the capability of the policy to reduce unnecessary costs for shipping lines deriving from the impossibility to avoid the pilotage service when entering/ leaving ports. The degree of efficiency, instead, evaluates the amount of resources for each policy option to reach the objective it aims to. Finally coherence is related to the ability to provide a sustainable solution without contrasting to any EU principles.

Table 52 has been developed with the aim of providing a clear understanding of the policy options and their impacts, indicating a rate of gap between each of them and the baseline scenario, identified with asterisks (* equals small or negative changes, **** equals very relevant and positive changes) and a description of the sources of this gap. The quantitative analysis is omitted, as it has been already presented in chapter 6. The choice not to include figures has been made in order to provide the Commission with a simpler and easier overview, which would have not been possible in case calculations had to be provided and explained.

7.1. Effectiveness

The effectiveness of the policies under consideration is directly related to the possibility to increase the number of PECs granted, which would result in greater cost savings for shipping companies. According to the **baseline scenario** the number of PEC exempted missions is expected to slowly decrease over time as a result of the increase in vessels’ size, which then increases the number of vessels not meeting the size requirements to be eligible for pilotage exemptions. As a result no improvement is expected without intervention.

The development of a single EU framework that specifies maximum requirements for MSs, as in case of **PO3A**, is expected to effectively address the objective of reducing unnecessary cost to shipping companies; nevertheless, the possibility for derogation is expected to reduce the overall effectiveness of this policy option.

Under **PO3B**, since derogation is not allowed, a higher level of effectiveness is expected compared to PO3A. The degree of effectiveness of this option is also related to the specific language requirement enclosed in it: **PO3B(a)**, requiring the knowledge of national language, is predicted to be less effective than **PO3B(b/c)**, where the use of English is favoured.

The highest degree of effectiveness is reached under **PO4**. This policy, in fact, is expected to maximise cost savings for companies by setting stringent requirement for MSs without possibility of derogation, while introducing English as an alternative language.

7.2. Efficiency

Efficiency evaluates the effectiveness of each policy option compared to the cost related to its implementation. Generally speaking the efficiency of the policies under consideration mirrors the degree of their effectiveness. Under the **baseline scenario,** efficiency is relatively low, as the number of PECs is expected to decrease. In case of **PO3A** the degree of efficiency is expected to be slightly higher, despite being dependant on the possibility for MSs to apply derogation.

Differently, in case of implementation of PO3B, the number of PECs is expected to increase and the aggregate cost for both pilotage and PECs would be lower than in the baseline case. More into details, **PO3B(b/c)** is more efficient in achieving the objective than **PO3B(a)**, being related with a lower cost for pilotage and PEC and a higher number of PEC missions. **PO4(c)** shows the maximum degree in this sense for the same reasons explained in case of effectiveness.

7.3. Coherence

Concerning the coherence of the analysed policy options with the general EU objectives, it is considered to focus the attention on the safety implications, which have been frequently indicated as being an issue by numerous stakeholders. Options with a greater risk in terms of safety are considered to have a lesser degree of coherence.

The **baseline** presents a scenario in which no new policy is issued by the EU and the issue of safety is mainly dependant on the technological improvements in the sector. This is to be considered as a reference situation where the degree of safety is not positively or negatively affected by EU regulations. **PO3A** seems to be the most coherent option of the four under consideration. The reason relies on the fact that the possibility for derogation by MSs will allow for preventing any case where stringent EU requirements not fit to local needs, negatively affecting safety. **PO3B(a)** and **PO3B(b/c)** shows similar degrees of coherence, but minor than the previous option, being developed without the possibility of derogation. Nevertheless a certain degree of adaptability, within predefined threshold, is still possible in this case. Finally **PO4** presents the lowest degree of coherence, related to the difficulty for MSs to adapt EU requirements to local needs. Therefore the adoption of this policy could lead to concern in terms of safety.

7.4. Summary on the comparison of policy packages

Table 52 - Policy option comparison

Impact	Baseline	Policy Option 3A(b/c)	Policy Option 3B(a)	Policy Option 3B(b/c)	Policy Option 4(c)
Effectiveness of the option in relation to the objective					
SO : To reduce any unnecessary cost for shipping lines	- In case of no intervention, the number of PECs will most likely decrease over time, due to a general tendency to increase vessels' sizes (thus a higher share of the European fleet would not be allowed to be granted with PECs due to size limitations). Moreover, countries hindering the spread of PECs would still be able to raise legal and/or administrative barriers. Cost reduction for shipping lines is thus expected to be steady.	** PO3A(b/c) is expected to greatly improve the transparency of PEC granting procedures, limiting the arbitrariness of Member States in this sense. Easing the use of language is also expected to favour the release of PECs. Under these circumstances the number of PECs is predicted to increase in comparison with the baseline scenario. However the PO3A(b/c) will not be effective in the cases where MSs request for derogation from the EU framework.	** PO3B(a), despite being formulated without the possibility of derogation, will be less effective than PO3B(b/c) due to stringent language requirements. Indeed. requiring the knowledge of the national language is expected to discourage PEC applications and consequently decrease the number of PECs granted.	*** PO3B(b/c) would contribute to foster the diffusion of PECs, reducing costs for shipping lines. This would happen through the implementation of common thresholds for Member States, as regards PEC criteria, without possibility of derogation. Easing the use of English is expected to greatly enhance the effectiveness of the policy.	**** PO4(c) is predicted to maximise the increase of PECs, minimising the amount of unnecessary costs for shipping lines. Member States are required to adhere to requirements set by the EU framework, without possibility of derogation and obliged to accept English as an alternative language.

Impact	Baseline	Policy Option 3A(b/c)	Policy Option 3B(a)	Policy Option 3B(b/c)	Policy Option 4(c)
Efficiency of the option in achieving the objectives					
SO: To reduce any unnecessary cost for shipping lines	- The efficiency related to the Baseline scenario mainly reflects its degree of effectiveness. The increase in marine traffic forecasted for the coming years should favour the diffusion of PECs throughout the EU. However such trend is expected to be counterbalanced by the increasing size of vessels, resulting in a slight decrease in the number of PECs under these circumstances.	** The efficiency of PO3A(b/c) mirrors its degree of effectiveness, being lower than in case of PO3B(b/c), where derogation is not possible.	** Compared with PO3A, PO3B(a) is expected to increase the number of PECs as MSs would not be able to increase requirements derogating from the EU framework. This increased number of PECs would then lead to increased overall savings for shipping companies. Nevertheless the increased burden required to learn the local language might overturn the additional positive impact.	*** PO 3B(b/c) is likely to be the most efficient one after PO4(c). The lack of the possibility for derogations in addition to the specific language requirements should prevent the possibility to implement discriminatory practices or any other barriers for PEC issuing.	**** PO4(c) is likely to be the most efficient option under consideration. Through such option, in fact, shipping companies are able to maximise cost savings considered against baseline 2030. The definition of homogeneous and not discriminatory requirements throughout Europe would tear eventual barriers for obtaining PEC down.

Impact	Baseline	Policy Option 3A(b/c)	Policy Option 3B(a)	Policy Option 3B(b/c)	Policy Option 4(c)
Coherence of the option with overarching EU objectives, strategies and priorities					
The ability to provide a sustainable solution without contrasting to any of the EU principles	*** In case no new policy is developed by the EU, levels of safety remain untouched. However, also the costs to the shipping companies will remain substantially unchanged.	**** The implementation of PO3A(b/c) is expected to keep the levels of safety as high as in the baseline scenario. The possibility to derogate from the EU framework enables Member States to evaluate whether or not the EU requirements fit to local needs in terms of safety standards.	** The issue of safety related to PO3B(a) entirely depends on how stringent will the requirements set by the EU framework be. In case these present excessively strict criteria concern should rise in this sense, being Member States unable to adapt them to local needs.	** PO3B(b/c) presents a situation similar to PO3B(a) in terms of safety, being developed both without the possibility of derogation.	* The adoption of PO4(c) should be avoided because of safety issues. The reason is mainly based on the impossibility for countries to adapt the requirements to local needs.
Impacts					
Economic	- No substantial impacts are expected to occur under the baseline scenario. Despite an expected growth in the shipping sector worldwide, the demand for pilotage services in Europe is predicted to be static or even decreasing. Vessel arrivals will diminish due to increasing ship size, as well as pilotage missions and PEC exempted missions.	** The adoption of PO3A(b/c) is predicted to positively impact on the situation in terms of cost savings for shipping companies.	** In case of PO3B(a) cost savings for shipping companies are expected to be significant. However the degree of impact will be lower than in case of PO3B(b/c).	*** PO3B(b/c) will probably have a remarkable effect on cost savings for shipping companies. The degree of impact is expected to be greater than in case of PO3A(b/c) and 3B(a).	**** PO4(c) is predicted to maximise the positive effects of PECs on cost savings for companies. However such positive effects will vary according to the specific markets and geographical areas where the certificates will be introduced.

Impact	Baseline	Policy Option 3A(b/c)	Policy Option 3B(a)	Policy Option 3B(b/c)	Policy Option 4(c)
Social[57]	**** Under the current situation, the number of pilots is expected to decrease slightly between 2010 and 2030. This is related to a decrease in pilotage missions for the same period.	*** In case PO3A(b/c) is adopted potential job losses for pilots are expected, but less than in case of PO3B(a) and 3B(b/c). Easing the use of English is expected to increase work mobility for deck officers.	** PO3B(a), if implemented, is predicted to lead to some job losses for pilots between 2010 and 2030.	*** The present option presents potential job losses slightly higher than in case of PO3B(a). As for PO3A(b/c), enhancing the use of English is expected to increase work mobility and quality for deck officers.	* Under option 4(c) potential job losses for pilots are expected to reach the greatest amount compared to the previous policy options assessed. Work mobility for deck officers as well as job quality will be enhanced.
Environmental	**** The environmental issue is closely related with the safety issue due to the fact that accidents are one of the causes of marine pollution. In case the EU opts for not intervening the situation is predicted to not substantially change.	**** PO3A(b/c) is not expected to produce an increase in the risk of damages to the marine environment. The reason relies in the fact that MSs have the possibility to derogate the EU framework, minimising the risk of granting PECs to unprepared deck officers which might cause accidents.	** Being PO3B(a) without the possibility of derogation, the requirements for PEC granting could be insufficient to assure that candidate are properly qualified and experienced for specific pilotage areas. This could potentially negatively affect safety.	** The situation, in this case, is very similar to PO3B(b/c), being the increased risk of accidents related to potential damages to the marine environment.	* Under PO4(c) the risk for environmental damages is increased due to the fact that unbalanced requirements for PEC granting are more likely to happen.

[57] A deep analysis on employment increase was presented in par. 15.2.1

8. Monitoring and evaluation

As provided by the Impact Assessment guidelines of the Commission, monitoring systems have the main function of enabling policymakers to verify to what extent the policy is achieving its set objectives.

For this purpose a set of core indicators need to be identified for the key objectives of the intervention. Such indicators must be checked against the purpose they are supposed to serve.

A proposed list of the above-mentioned set of indicators is given in the following paragraphs.

8.1. Proposed set of core indicators

The definition of a monitoring and evaluating system starts with the identification of the key indicators. An indicator can be defined as the measurement of an objective to be met, a resource mobilized, an effect obtained, a level of quality or a context variable. Within the framework of the present impact assessment analysis, an attempt has been made to define some core indicators for the main policy objectives and to outline the monitoring system envisaged.

At this stage, it seems there is no point in laying down detailed indicators and the monitoring systems detailed features for all the options identified as part of the impact assessment. This will be done, more correctly, after the political choice of the most appropriate policy option has been made, as this is the last step in the policy design process.

That being said, some core indicators for the key policy objectives have been identified, as it is fair to assume that these general objectives are reasonably stable across the various alternative policy options envisaged in the impact assessment.

The evaluation of the implementation of the new policy initiative should be carried out within five years after its adoption, with the following set of core indicators (for all coastal MSs):

Table 53 - Impact of measures on maritime safety

Operational objective	Indicators	Source of data
Operational objective 1: To establish clear, non-discriminatory and proportionate criteria for obtaining PECs.	Number of: • pilotage missions • PEC missions • exempted missions	Survey addressing Member States or other relevant authorities;
	Revenues from: • pilotage missions • PEC missions	Survey addressing Member States or other relevant authorities;
	Number of (by type of vessel and level of qualification: Master, Chief Officer, etc.): • Active PEC • PEC issued • PEC renewed • PEC modified (e.g. inclusion of an additional vessel, etc.) • Exam fails • Application rejections on other ground	Survey addressing Member States or other relevant authorities;
	Requirement for obtaining PEC: • Number of manoeuvres • Languages	Survey addressing Member States or other relevant authorities;
	Pilotage/PEC users satisfaction on criteria for obtaining PECs	Survey addressing shipping companies

Operational objective	Indicators	Source of data
Operational objective 2: To establish a transparent and simplified process for applying for and renewing PECs	Type of examination: • Written/oral • Simulation/practice	Survey addressing Member States or other relevant authorities;
	Validity and renewal: • Years of duration of PEC • Requirements for simplified renewals	Survey addressing Member States or other relevant authorities;
	Availability of online information on PEC application process	Authorities websites
	Pilotage/PEC users satisfaction on process for applying for and renewing PECs	Survey addressing shipping companies

Annex I – Consultation of National Authorities

A.1. Introduction

A small number of national authorities were asked to complete a further questionnaire, which focussed on gathering data to enable a robust analysis for the impact assessment. National authorities were selected based on the prevalence of PECs in circulation and willingness of officials to provide additional information. Seven national authorities were approached – Belgium, Denmark, Finland, the Netherlands, Norway, Poland and Sweden.

The questionnaire covered the following topics.

- PEC applications.
- Medical certificate requirements.
- Eligibility for PECs both in terms of personnel and vessel / cargo type.
- Dues and costs.
- Statistics regarding pilotage missions and accidents.

A.2. PEC applications

National authorities were asked to provide information on the number of active PECs, as well as how many are issued and the number of exams passed or failed.

Table 54 – PEC applications (2011)

Country	Active PECs	PEC applications	Exam passes	Exam fails	PECs issued
Belgium	112	N/A	N/A	N/A	N/A
Denmark	158	N/A	N/A	N/A	N/A
Finland	857	N/A	N/A	N/A	N/A
Netherlands	315				
Norway	2 800	2 150	259	20	2 033
Poland	213				
Sweden	1 233	286	121	30	260

Table 55 – PEC applications (2010)

Country	Active PECs	PEC applications	Exam passes	Exam fails	PECs issued
Belgium	107	N/A	N/A	N/A	N/A
Denmark	167	N/A	N/A	N/A	N/A
Finland	1185	N/A	N/A	N/A	N/A
Netherlands	317				
Norway	2 800	3 027	117		
Poland	198				
Sweden	1,118	457	133	59	400

Table 56 – First time or renewal PEC applications

Country	PEC applications	First time PEC	PEC renewal	PEC applications	First time PEC	PEC renewal
		2011			2010	
Belgium	Information not available					
Denmark	Information not available					
Finland	Information not available					
Netherlands	Information not available					
Norway	Information not available					
Poland	Information not available					
Sweden	286	152	134	457	179	278

Table 57 – Further information provided on PEC applications

Country	Information provided
Belgium	No further information provided.
Denmark	No further information provided.
Finland	No further information provided.
Netherlands	No further information provided.
Norway	PEC rules were changed as of 1. January 2011 introducing the requirement that all applicants for new and extended (new ports/seaways) shall be subject to practical exam on board. Before 2011 exams were either practical exam on board (relatively few), or theoretical exam not on board the vessel. The 259 candidates took and passed a practical exam on board. The remaining PECs issued (1 774) are a mix of renewals and changes (e.g. new vessel / change of vessel). New pilotage areas most often require a new exam, but some of the 1 774 also refer to added pilotage areas.
Poland	No further information provided.
Sweden	Number of PEC exams that is failed also includes applications which have been stopped due to lack of supplemented requested information in approved time frame. The number of supplemented PECs – e.g. with another vessel – are not included in this information.

A.3. Feedback and information on PEC requirements

National authorities were asked to provide information on the nature and extent of feedback that is provided to applicants and to indicate where information on PEC requirements can be accessed.

Table 58 – Type of feedback provided to applicants

Type of feedback	No feedback	Only if applicant requests	Provided to all applicants whether pass or fail	Only to applicants that fail
Belgium	No information provided.			
Denmark			✓	
Finland			✓	
Netherlands			✓	
Norway			✓	
Poland		✓		
Sweden				✓

Table 59 –Further information provided on feedback

Aspect	
Belgium	No further information provided.
Denmark	The feedback covers the whole test
Finland	Yes, Applicants always receive oral feedback. There is also written feedback provided if the applicant fails an exam or practical assessment.
Norway	If exam is passed a letter of information confirms this and in addition includes the new/renewed/extended PEC. If exam is failed the applicant is informed in writing about the result, reasons for failure, possibility of complaint and requirements to be met before a new application can be submitted (e.g. number of sailings).
Poland	Published in yearly port information guides.
Sweden	If applicant has failed detailed information regarding what caused the failure is presented. The applicant is also given a chance to appeal against the decision.

Table 60 – How feedback is provided

Country	Written	Oral	Not applicable
Belgium			✓
Denmark		✓	
Finland			✓
Netherlands	✓	?	
Norway	✓		
Poland		✓	

Sweden	✓

Table 61 – Information on PEC requirements

Aspect	Internet – local language	Internet – English	Hard copy - local language	Hard copy – English
Belgium	No information provided.			
Denmark	✓	✓		
Finland	✓	✓		
Netherlands	✓	✓		
Norway	✓	✓		
Poland	✓			
Sweden	✓	✓		

Table 62 –Further information on PEC requirements

Aspect	Other
Belgium	n/a
Denmark	n/a
Finland	n/a
Netherlands	
Norway	If exam is passed a letter of information confirms this and in addition includes the new/renewed/extended PEC. If exam is failed the applicant is informed in writing about the result, reasons for failure, possibility of complaint and requirements to be met before a new application can be submitted (e.g. number of sailings). Applications can be made electronically in the NCA Single Window solution (Safe Sea Net).
Poland	Published in yearly port information guides.
Sweden	Information is given to the applicant orally when he or she does a mandatory information passage with an appointed pilot prior to examination.

A.4. Medical certificate requirement

Table 63 – Medical certificate requirements

Country	Description of requirements
Belgium	Medical certificate is not requested
Denmark	Medical certificate is indirectly requested through presentation of STCW certificate for Master / Chief Officer / Deck Officer (or equivalent) prerequisite
Finland	Medical certificate is indirectly requested through presentation of STCW certificate for Master / Chief Officer / Deck Officer (or equivalent) prerequisite
Netherlands	What is requested are existing certificates issued by recognized authorities who are already required by law. Thus the request for medical certificates as part of the PEC application process is not an added administrative burden
Norway	Valid medical certificate is not directly requested, but it is a prerequisite for the navigational certificate
Poland	Valid medical certificate means International Health Certificate issued by national authorities as per STCW requirements
Sweden	Medical certificate is indirectly requested through presentation of STCW certificate for Master / Chief Officer / Deck Officer (or equivalent) prerequisite

A.5. Who can apply/ obtain a PEC?

Table 64 – Eligibility

Aspect	Master	Chief mate	Deck officer	Rating	Other
Belgium	Yes	Yes			
Denmark	Yes	Yes	Yes		
Finland	Yes	Yes	Yes		
Netherlands	Yes	Yes			Anyone who can prove he or she is qualified as a captain
Norway	Yes	Yes	Yes	No	
Poland	Yes	Yes	No	No	
Sweden	Yes	Yes	Yes	No	n/a

Table 65 – Can a desk officer other than the master use his or her fairway related PEC if the master does not hold a fairway related or general PEC?

Country	Use of PEC
Belgium	n/a
Denmark	Yes.
Finland	No.
Netherlands	Yes – if the desk officer is qualified as captain (which he must be in order to obtain a PEC) and is authorized by the awarded PEC for the ship and fairway in question.
Norway	No.
Poland	No.
Sweden	Sweden – a ship's officer other than the master may not use his or her fairway related or general PEC unless the master holds a fairway related or general PEC for the ship and fairway in question.

A.6. Type of vessel/ cargo

Table 66 – Vessels for which PECs can be obtained

Vessel	Belgium	Denmark	Finland	Netherlands	Norway	Poland	Sweden
Passenger only ferry	n/a	Yes	Yes	Yes	Yes	Yes	Yes
RoRo passenger / freight ferry	n/a	Yes	Yes	Yes	Yes	Yes	Yes
RoRo freight only ferry	n/a	Yes	Yes	Yes	Yes	Yes	Yes
General cargo	n/a	Yes	Yes	Yes	Yes	Yes	Yes
Dry bulk cargo	n/a	Yes	Yes	Yes	Yes	Yes	Yes
Container	n/a	Yes	Yes	Yes	Yes	Yes	Yes
Oil / chemical tanker	n/a	Yes	Yes[58]	No	Yes /No[59]	Yes	Yes / No[60]
Gas tanker	n/a	Yes	Yes[61]	No	No[62]	Yes	No
Shipyard specific	n/a	Yes		Yes	No	No	Yes
Other service vessels	n/a	Yes[63]		Yes	Yes[64]	Yes	Yes
Other – Nuclear	n/a				No		No
INF substances	n/a				No		

[58] Can be used only when the vessel is in ballast.
[59] PEC may not be used when carrying carriage in bulk of the following liquid cargoes: 1. Liquefied gases, see chapter 19 of the IGC Code. 2. Substances falling into pollution category X that are regulated by MARPOL Annex II, see chapter 17 of the IBC Code. 3. Substances falling into pollution category Y that are regulated by MARPOL Annex II, see chapter 17 of the IBC Code, all substances regulated by MARPOL Annex I and substances with a flashpoint lower than 23□C, if the vessel has a single hull and a length of 70 metres or more.
4. Substances falling into pollution category Y that are regulated by MARPOL Annex II, see chapter 17 of the IBC Code, all substances regulated by MARPOL Annex I and substances with a flashpoint l.
[60] Not granted for some specific chemical tankers carrying hazardous cargo class X, Y, Z and single hull tankers.
[61] Can be used only when the vessel is in ballast.
[62] May in theory acquire PEC, but may only be used when free of gas. In practice no gas tankers use PEC. See regulations referred above.
[63] It is possible to obtain PEC for all types of vessel
[64] No special regulation. May use PEC.

A.7. Validity for multiple vessels

Table 67 – Are PECs valid for more than one vessel?

Country	Yes / No	Information provided
Belgium	n/a	
Denmark	Yes	A PEC is granted to a navigator for a specific geographical area and can include more than one ship, for example sister ships or similar ships.
Finland	Yes	Upon application, a Pilotage Exemption Certificate may also be granted for a vessel which does not substantially differ in size, technical arrangements or safety management systems from the vessel for which the Pilotage Exemption Certificate is granted or has been granted earlier. Approximately 40 -50 % of the applications are for more than one vessel.
Netherlands	Yes	Depends on ship type, measurements, bridge equipment / lay out and manoeuvrability
Norway	Yes	Regulations stipulate that: "one or more other specified vessels of a similar type and size as the vessel or vessels to which the pilot exemption certificate relates, without a new examination". Rule of thumb is that max number of vessels on one PEC is 5, and that similar size means within 30 meters LOA of original vessel. Most PEC's have more than one vessels. I.e. applications for more than one vessel are received
Poland	Yes	Sister ships (when master rotates between ships on same line). Additional pilotage practice required for different type / size of vessel. Around 25% of applications are for sister ships.
Sweden	Yes	In 2012 64 applications were approved with more than one vessel.

A.8. Pilotage dues and PEC dues

Table 68 – Are there additional fees?

Country	Information provided
Belgium	n/a
Denmark	No, pilotage due /fee is the only cost
Finland	Yes, There are fairway fees collected by Customs.
Netherlands	This all depends upon if the vessel will berth in the port. If so it will have to pay port dues. Further fees may be required depending upon the usage of towage and / or mooring services. With respect to pilotage no further fees are payable.
Norway	All vessels subject to compulsory pilotage must pay pilotage readiness fee, for use of waters. Vessels can choose between fee per voyage and annual fee (vessels sailing mainly in Norwegian internal waters must choose annual fee). Amount of fee based on tonnage. In addition vessels actually using a pilot must pay for such use, by the hour and based on tonnage. Pilotage readiness fees do not vary according to vessel category, but according to size (tonnage). Fees are adjusted annually and are given in Regulations applicable from 1. January each year. The fees apply generally for all vessels subject to compulsory pilotage in Norwegian internal waters, i.e. it applies equally to all Norwegian ports and also to coastal voyages in Norwegian internal waters. Pilotage readiness fees as of 1. January 2012: Fee per voyage: payable when entering and leaving Norwegian internal waters: NOK 0,78 pr. GT for first 3 000 GT and NOK 0,70 pr. GT thereafter. Annual fee: NOK 27,34 pr. GT for vessels up to 5 000 GT, NOK 53,16 pr. GT for vessels of 5 001 GT to 10.000 GT and NOK64,62 for vessels more than 10.000GT Shipping companies can opt to pay for an annual fee or for a single voyage fee, with the exception of vessels sailing mainly (more than 6 months) in Norwegian internal waters, who must pay the annual fee.
Poland	No response.
Sweden	No.

Table 69 – Pilotage fees for vessels with a PEC holder on board

Country	Information provided
Belgium	Every single call (incoming or outgoing) a fee of € 100 is charged. Harbours: no costs involved.
Denmark	There is no extra pilotage fee for a vessel using PEC holders.
Finland	For a vessel with a PEC holder on board, there are no official fees; shipping companies usually pay for master's compensation for PEC (not using pilot).
Netherlands	Nil.
Norway	A ship using PEC holders only pay the pilotage readiness fee. A vessel using a pilot (i.e. not holding any PEC) must pay the pilotage readiness fee + pilot fee. Total fees payable are thus considerably lower for vessels holding a PEC. How much lower depends on the length of sailing and size (tonnage) of vessel. PEC-vessels must in addition pay for obtaining the PEC, see 10.1.
Poland	There is no pilotage fee for vessel having PEC in place
Sweden	There are no dues except for the fairway due which all ships pay regardless of piloting or not.

Table 70 – Average cost of pilotage per pilotage mission

Country	Total pilotage due / fee revenue 2011	Total number of pilotage missions 2011	Cost per pilotage mission
Belgium	n/a	93 455	n/a
Denmark			Costs in average for a pilotage 6,872 DKK (DanPilot).
Finland		30 075	
Netherlands		88 413	
Norway	608 800 000 NOK (includes pilotage readiness fees + pilot fees for vessels using pilot	44 980	NOK 13 535
Poland		15 605	
Sweden	Circa 355 000 000 SEK (€42 617 000)	37 783	9 400 SEK (€1,128)

A.9. Cost of obtaining PEC

Table 71 – Competent authorities for setting criteria and final level of pilotage dues

Country	Cost of obtaining PEC	Cost of renewing PEC
Belgium	€1 460 (exam and test journeys)	
Denmark	Average cost per PEC 6 739 DKK. Costs for issuing a PEC and aptitude test 1,067 DKK/hour + travel expenses. Costs for an external examiner 1,645 DKK/hour + travel expenses. Costs in average for a PEC during the last three years were 6,739.19 DKK.	None, but in 2012 an annual renewal cost per PEC of 2600 DKK was introduced
Finland	€3200 for obtaining PEC	€2342 for renewing PEC
Netherlands	Cost of PEC for all ships (requiring an exam): Fees vary depending on number of participants in the required exams for obtaining a PEC. 1 applicant: €4 368 in Scheldt region, €4 238 in Ijmond region, €5 216 in Rotterdam – Rijnmond region and €5 216 in Northern region. Prices are reduced by 50% if 2 or more participants take exam at same time. Cost of PEC for ships up to a certain length (not requiring an exam): The costs for obtaining a PEC which is limited to ships up to a certain length, are null. After application there is no exam involved. The specified demands in relation to quality of ship, master and crew and knowledge of fairway involved, have to be met.	
Norway	Cost can vary – minimum 5 000 NOK to as much as 75.000 NOK for large number of harbours/port. 1 000 NOK (admin / application / issue fee) + 2 000 (practical test) + 2 000 NOK (theory test)	No exam required for renewal 1 000 NOK
Poland	€90 Fee for examination to obtain PEC document is 150 tariff units as per Act of maritime Safety i.e. around 30 Euros depending on exchange rate. Fee for issuance of PEC document is 250 tariff units as per Act of maritime Safety i.e. around 60 Euros depending on exchange rate.	€30 150 units per year for renewal as per Act of maritime Safety i.e. around 30 Euros depending on exchange rate. Additional fee for issuance?
Sweden	€3 421 Fee varies depending on area. 15m fairway with no re-exam costs 28 500 SEK € 2 701 5m fairway + 1 practical re-exam 22 500 SEK €600 If application not completed 5 000 SEK fee charged	6 650 SEK €798

A.9.1. Pilotage vs. PEC missions

Table 72 – Total pilotage missions

Country	2007	2008	2009	2010	2011
Belgium			54 990[65]	59 374[66]	93 455[67]
Denmark			23 734	22 823	23 542
Finland			25 706	29 385	30 075
Netherlands			84 377	87 600	88 413
Norway	49 047	47 894	42 168	44 708	44 980
Poland	20 920	20 654	18 523	16 086	15 605
Sweden	40 736	39 926	35 366	38 207	37 783

Table 73 – Total exempted missions

Country	2007	2008	2009	2010	2011
Belgium				11 512	9 998
Denmark			6 180	5 050	4 570
Finland			17 959	17 050	16 907
Netherlands					18 853
Norway[68]	9 921+	26 191+	41 214	47 984	51 127
Poland			4 420	4 474	4 459
Sweden				46 500	

[65] Underestimated of around 35 000
[66] Ibidem
[67] 59 735 + EMPA amendment (30 020 + over 3 700).
[68] PEC-figures for 2007 and 2008 are rough estimates only. The reason being that counting of individual PEC-sailings did not start until 2009.

Table 74 – Active PECs

Country	2007	2008	2009	2010	2011
Belgium	n/a	n/a	n/a (103)[69]	n/a (107)[70]	n/a (112)[71]
Denmark			182	167	158
Finland	1 900	1 659	1 405	1 185	857
Netherlands[72]	191	203	309	317	315
Norway	2 904	2 866	2 800	2 800	2 800
Poland	140	234	245	198	213
Sweden	1 100	1 200	1 200	999	1051

[69] Active PECs Pilot-age Decree + Active PECs Re-vised Scheldt Rules
[70] Ibidem
[71] Ibidem
[72] Total includes Scheldt, Rotterdam Rijnmond and Ijmond.

A.9.2. Number of PECs per type of vessel

Table 75 – PECs by vessel type

Country	Active PECs 2011	PECs passenger vessel	PECs RoRo freight vessels	Other merchant vessels
Belgium	n/a	n/a	n/a	n/a
Denmark	158	0	0	158
Finland	857	n/a	n/a	n/a
Netherlands				
Norway	213	No response		
Poland	213	No response		
Sweden	1 051	471 (on 87 vessels)	123 (on 46 vessels)	457

Table 76 – Are PEC holders counted twice if they hold a PEC for more than one pilotage are or vessel?

Country	Information provided
Belgium	N/A
Denmark	N/A
Finland	N/A
Netherlands	
Norway	A PEC holder can have multiple fairways and in/out harbour, all included in the one PEC.
Poland	
Sweden	Yes and No. Every PEC is valid for a specific pilot area and specific fairway. But a PEC holder can have more than one vessel on his or her same PEC.

A.9.3. Accidents

Table 77 – Accidents with ships involving pilots

Country	2007	2008	2009	2010	2011
Belgium			66	75	45
Denmark			21	31	29
Finland			5	5	1
Netherlands					
Norway	14	15	8	10	5
Poland	13	12	6	19	12
Sweden	n/a	n/a	9	15	8

Table 78 – Accidents with ships involving exempted ships

Country	2007	2008	2009	2010	2011
Belgium					
Denmark	0	0	0	0	0
Finland			3	4	10
Netherlands					
Norway	14	25	28	23	15
Poland	0	0	2	3	2
Sweden	n/a	n/a	7	6	11

Table 79 – Accidents with ships involving pilots 2011

Country	Total	Grounding	Collision quay	Collision other vessel	Fire	Man overboard	Other
Belgium	45	n/a	8?	8?	n/a	n/a	n/a
Denmark	29	14	5	4	0	0	0
Finland	1	0	1	0	0	0	0
Netherlands							
Norway							
Poland	12	2	5	1	0	0	1
Sweden	8	1	3	0	0	0	4

Table 80 – Accidents with ships involving PEC holder on board

Country	Total	Grounding	Collision quay	Collision other vessel	Fire	Man overboard	Other
Belgium	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Denmark	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Finland	10	0	1	9	0	0	0
Netherlands							
Norway							
Poland	2	0	1	1	0	0	0
Sweden	11	3	4	2	1	0	1

Annex II – Survey on PEC/ pilotage costs

A.1. Introduction

An online survey was designed to collect information on the different cost of entering/ leaving European ports in case pilots are required and in case pilotage exemption certificates are used. It was specifically addressed to shipping lines and shipmasters, nevertheless responses from other stakeholders have been considered.

The survey was designed through an online PDF form. The survey was composed by two main sections: the first one regarding the cost of pilotage operations to be sustained by shipping lines when entering/leaving ports, and the other, specular one, requesting the same information concerning costs to be sustained when PECs are on board.

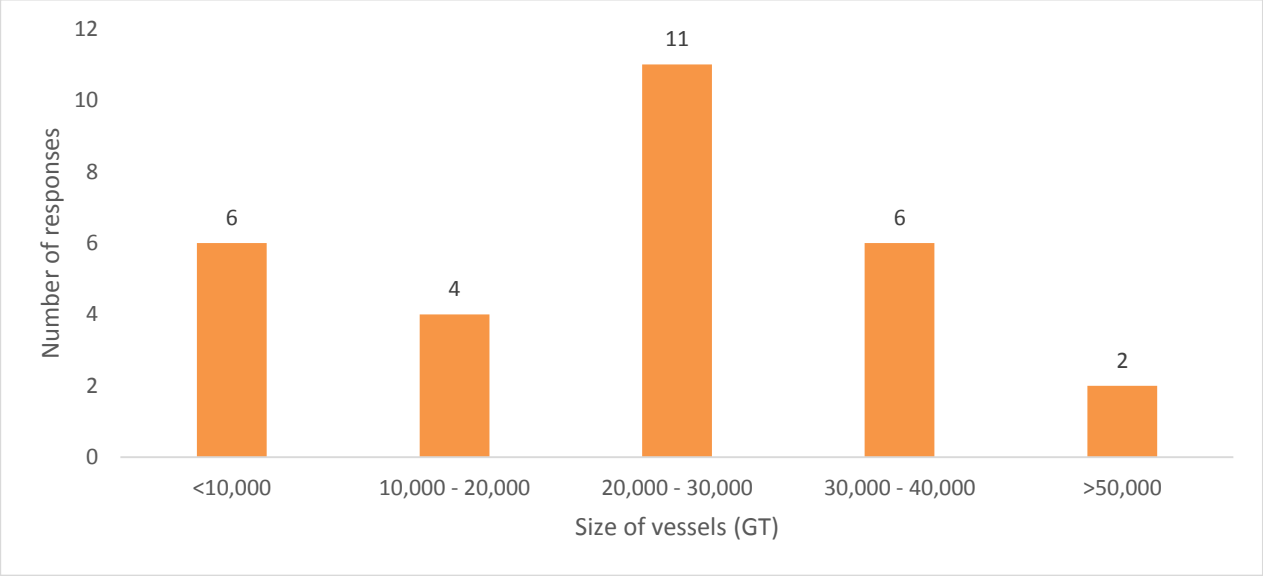
Responses have been collected between March and mid-April 2013, from around twenty different European ports. The number of considered cases is 29 and mainly regards Ro-Ro traffic (80% of the total).

Table 81 - Responses broken down per type of vessel and size (GT)

Vessel type	Number of responses
Containers	4
Cruise	2
Ro-Ro	23
Total	**29**

The size of vessels considered in this report varies between ~5,000 GT and over 50,000 GT. The average GT is 23,267, while the median is 24,196 GT. Most responses (38%) falls in the central distribution range (20,000 GT – 30,000 GT).

Table 82 - Distribution of responses per size of vessels (GT)



Responses were collected from various countries; nevertheless, the geographical distribution is not balanced, nor covers the entire EU. Almost half of the overall responses refer to ports located in United Kingdom; more than 10% regards ports that are in the Netherlands.

Table 83 - Geographical distribution of responses

Country	Number of responses
Belgium	2
France	2
Germany	1
Ireland	2
Poland	1
Portugal	2
Sweden	2
The Netherlands	3
United Kingdom	14
TOTAL	**29**

A.2. Cost of pilotage/ PEC

Statistics from PwC survey clearly show that PECs are economically less expensive than operations involving pilots. However, the amount of savings is not homogeneous among ports, countries, etc.

Depending on the different countries and ports, the use of PEC can produce little economic benefit (i.e. in Kiel, Cherbourg, etc.) as well as very relevant ones (i.e. in some ports, PEC holders pay no fee, as in Swedish considered ports). A particular case is represented by the UK, where costs related to PECs can vary much, from almost inconsistent to one-third that of pilotage.

The survey demonstrates that the use of PECs can result in a relevant saving for shipping companies, which, in extreme cases, can reduce costs for entering/leaving ports up to over 300 times (while, in worst cases, it still remains between 2-4 times lower than with pilots).

Table 84 presents the results of the consultation. Each single row includes the information on the port, number of calls and vessel type and size to which the pilotage and PEC costs are related. In addition, two different cost structures are presented: the first one defines the annual cost to be sustained in case the vessel calls at the port requesting the support of the pilot; opposite, the second one presents the costs that would be paid in case the vessel calling at the port holds a PEC (this time, the cost is distinguished between annual cost for PEC operations and annual cost for PEC issuing). Finally, a rate between the two costs is included, showing how much the use of PEC is more convenient compared to pilotage.

Table 84 - Results of the survey on PEC/ pilotage costs

Country	Port	Vessel type	Vessel size	Annual Pilotage cost	Annual PEC (operation) cost	PEC issuing annual cost	Number of calls	Pilotage/ PEC cost rate
BE	Zeebrugge	Containers	11,530	305,768	29,600	-	148	10.3
BE	Zeebrugge	Ro-Ro	21,010	117,200	200	1,460	50	70.6
DE	Kiel	Cruise	38,557	75,920	53,168	152	16	1.4
FR	Cherbourg	Ro-Ro	31,914	191,098	57,330	15,000	116	2.6
FR	Roscoff	Ro-Ro	31,914	52,544	7,882	200	49	6.5
IR	Dublin	Ro-Ro	5,989	500,548	35,000	450	578	14.1
IR	Dublin	Ro-Ro	50,938	2,594,420	182,000	1,170	730	14.2
NL	Rotterdam	Ro-Ro	13,073	570,000	30,000	17,700	300	11.9
NL	Rotterdam	Ro-Ro	24,196	1,710,000	62,700	17,700	450	21.3
NL	Rotterdam	Ro-Ro	25,609	600,000	62,700	17,700	150	7.5

Country	Port	Vessel type	Vessel size	Annual Pilotage cost	Annual PEC (operation) cost	PEC issuing annual cost	Number of calls	Pilotage/ PEC cost rate
PL	Gdynia	Cruise	38,557	12,000	100	100	10	60.0
PT	Leixões	Containers	7,064	26,697	-	1,996	25	13.4
PT	Lisboa	Containers	7,064	32,950	-	1,996	25	16.5
SE	Halmstad	Ro-Ro	8,946	292,013	-	818	104	357.0
SE	Malmö	Ro-Ro	23,500	294,349	-	818	90	359.8
UK	Felixstowe	Ro-Ro	13,073	504,755	36,628	851	300	13.5
UK	Felixstowe	Ro-Ro	24,196	943,225	54,351	851	450	17.1
UK	Grimsby	Ro-Ro	8,946	590,771	177,231	414	250	3.3
UK	Harwich	Ro-Ro	22,382	301,529	10,279	354	145	28.4
UK	Holyhead	Ro-Ro	5,989	751,224	12,997	780	578	54.5
UK	Holyhead	Ro-Ro	50,938	1,983,808	12,997	1,872	730	133.4
UK	Immingham	Ro-Ro	24,196	1,616,869	404,198	4,726	302	4.0
UK	Immingham	Ro-Ro	25,609	905,297	53,406	201	150	16.9
UK	Immingham	Ro-Ro	25,609	1,413,124	353,281	3,669	260	4.0
UK	Immingham	Ro-Ro	29,429	1,916,274	479,067	4,726	302	4.0
UK	Immingham	Ro-Ro	37,939	2,425,315	606,332	7,089	302	4.0
UK	Pembroke	Ro-Ro	34,031	2,481,237	12,353	10,676	700	107.7
UK	Rosyth	Containers	11,530	253,559	23,047	124	148	10.9
UK	Southampton	Ro-Ro	21,010	69,120	17,251	236	50	4.0

Annex III – Identification of impacts

The three tables overleaf identify and outline the main economic, social and environmental impacts of the policy initiative.

Table 85 Economic impacts

Economic impacts	Baseline scenario			Intervention scenario		
	Expected impact	Stakeholders affected	Description	Expected impact	Stakeholders affected	Description
Functioning of the internal market and competition						
What impact (positive or negative) does the option have on the free movement of goods, services, capital and workers?	No impact			Low positive	Market operators	Increase in number of PECs granted is expected to partially reduce cost of transport. Facilitating the granting of PECs would then contribute.
Will it lead to a reduction in consumer choice, higher prices due to less competition, the creation of barriers for new suppliers and service providers, the facilitation of anti-competitive behaviour or emergence of monopolies, market segmentation, etc?	No impact			Medium positive impact	Shipping companies Pilots	As pilots usually benefit from a monopolistic position, the opportunity to be granted with PECs creates a substitute to the service they offer.
Competitiveness, trade and investment flows						
What impact does the option have on the global competitive position of EU firms? Does it impact productivity?	No relevant impact			No relevant impact		
What impact does the option have on trade barriers?	No relevant impact			No relevant impact		
Does it provoke cross-border investment flows (including relocation of economic activity)?	No relevant impact			No relevant impact		
Operating costs and conduct of business/Small and Medium Enterprises						
Will it impose additional adjustment, compliance or transaction costs on businesses?	No relevant impact			Low positive	Shipping companies	The administrative simplification for the granting of PECs would decrease burden on shipping companies and shipmasters. All measures

Economic impacts	Baseline scenario			Intervention scenario		
	Expected impact	Stakeholders affected	Description	Expected impact	Stakeholders affected	Description
How does the option affect the cost or availability of essential inputs (raw materials, machinery, labour, energy, etc.)?	No relevant impact			No relevant impact		
Does it affect access to finance?	No relevant impact			No relevant impact		
Does it impact on the investment cycle?	No relevant impact			No relevant impact		
Will it entail the withdrawal of certain products from the market? Is the marketing of products limited or prohibited?	No relevant impact			No relevant impact		
Will it entail stricter regulation of the conduct of a particular business?	No relevant impact			Positive	Shipping companies	A homogeneous, clear and fair set of rules on granting PECs in whole EU All measures
Will it lead to new or the closing down of businesses?	No relevant impact			No relevant impact		
Are some products or businesses treated differently from others in a comparable situation?	No relevant impact			Positive	Shipping companies	It will be easier to obtain a pilotage exemption in all coastal MSs.
Administrative burdens on businesses						
Does it affect the nature of information obligations placed on businesses (for example, the type of data required, reporting frequency, the complexity of submission process)?	Small positive	Shipping companies	As it is growing slowly, the granting on PECs is becoming easier little by little in several MSs, thus requiring less bureaucracy	Positive	Shipping companies	Information to be provided by shipping companies are precise and homogeneous across MSs
What is the impact of these burdens on SMEs in particular?	No relevant impact			Positive	Small shipping companies	As burden is reduced, SMEs will incur in lower fixed costs.

Economic impacts	Baseline scenario			Intervention scenario		
	Expected impact	Stakeholders affected	Description	Expected impact	Stakeholders affected	Description
Public authorities						
Does the option have budgetary consequences for public authorities at different levels of government (national, regional, local), both immediately and in the long run? Does it bring additional governmental administrative burden? Does the option require the creation of new or restructuring of existing public authorities?	No relevant impact			Low negative	Public authorities	Granting PECs requires administrative costs to be sustained, as publishing recommendations, set up transparent procedures, etc. On the other hand, some procedures are simplified, lowering costs. The use of English together with local language might increase the number of required documentation.
Property rights						
Are property rights affected (land, movable property, tangible/intangible assets)? Is acquisition, sale or use of property rights limited?	No relevant impact			No relevant impact		
Or will there be a complete loss of property?	No relevant impact			No relevant impact		
Innovation and research						
Does the option stimulate or hinder research and development? Does it promote greater productivity/resource efficiency?	No relevant impact			No relevant impact		
Does it facilitate the introduction and dissemination of new production methods, technologies and products?	No relevant impact			No relevant impact		
Does it affect intellectual property rights (patents, trademarks, copyright, other know-how rights)?	No relevant impact			No relevant impact		

Economic impacts	Baseline scenario			Intervention scenario		
	Expected impact	Stakeholders affected	Description	Expected impact	Stakeholders affected	Description
Does it promote or limit academic or industrial research?	No relevant impact			No relevant impact		
Consumers and households						
Does the option affect the prices consumers pay? Does it impact on consumers' ability to benefit from the internal market? Does it have an impact on the quality and availability of the goods/services they buy, on consumer choice and confidence? (cf. in particular non-existing and incomplete markets – see Annex 8) Does it affect consumer information and protection? Does it have significant consequences for the financial situation of individuals / households, both immediately and in the long run? Does it affect the economic protection of the family and of children?	No relevant impact			No relevant impact		
Specific regions or sectors						
Does the option have significant effects on certain sectors?	No relevant impact			Positive	Shipping companies	All measures are related to the maritime sector
Will it have a specific impact on certain regions, for instance in terms of jobs created or lost?	No relevant impact			Low Negative Low Positive	Pilots Shipping companies	Pilot operators might experience reduction in their business. Maritime economies in coastal MSs will benefit of the new policies.
Is there a single Member State, region or sector which is disproportionately affected (so-called "outlier" impact)?	No relevant impact			No relevant impact		

Economic impacts	Baseline scenario			Intervention scenario		
	Expected impact	Stakeholders affected	Description	Expected impact	Stakeholders affected	Description
Third countries and international relations						
How does the option affect trade or investment flows between the EU and third countries? How does it affect EU trade policy and its international obligations, including in the WTO?	No relevant impact			No relevant impact		
Does the option affect specific groups (foreign and domestic businesses and consumers) and if so in what way?	No relevant impact			No relevant impact		
Does the option concern an area in which international standards, common regulatory approaches or international regulatory dialogues exist?	No relevant impact			No relevant impact		
Does it affect EU foreign policy and EU/EC development policy?	No relevant impact			No relevant impact		
What are the impacts on third countries with which the EU has preferential trade arrangements?	No relevant impact			No relevant impact		
Does it affect developing countries at different stages of development (least developed and other low-income and middle income countries) in a different manner?	No relevant impact			No relevant impact		
Does the option impose adjustment costs on developing countries?	No relevant impact			No relevant impact		
Does the option affect goods or services that are produced or consumed by developing countries?	No relevant impact			No relevant impact		

Economic impacts	Baseline scenario			Intervention scenario		
	Expected impact	Stakeholders affected	Description	Expected impact	Stakeholders affected	Description
Macroeconomic environment						
Does it have overall consequences of the option for economic growth and employment?	No relevant impact			Low positive	All	Easier granting of PECs would increase efficiency in shipping, thus increasing a sustainable transport means, in particular considering the increasing demand for ports capacity.
How does the option contribute to improving the conditions for investment and the proper functioning of markets?	No relevant impact			No relevant impact		
Does the option have direct impacts on macro-economic stabilisation?	No relevant impact			No relevant impact		

Table 86 - Social impact of policy options

Social impact	Baseline scenario			Intervention scenario		
	Expected impact	Stakeholders affected	Description	Expected impact	Stakeholders affected	Description
Employment and labour markets						
Does the option facilitate new job creation?	No relevant impact			Low Positive	Maritime workers	The reduction of cost of maritime transport will generate new jobs on the sector.
Does it lead directly or indirectly to a loss of jobs?	No relevant impact			No relevant impact		
Does it have specific negative consequences for particular professions, groups of workers, or self-employed persons?	No relevant impact			Low negative	Pilots	As PECs will get more common, pilots might see their service less required. Nonetheless as maritime traffic is increasing the impact will be small.
Does it affect particular age groups?	No relevant impact			No relevant impact		
Does it affect the demand for labour?	No relevant impact			No relevant impact		
Does it have an impact on the functioning of the labour market?	No relevant impact			No relevant impact		
Does it have an impact on the reconciliation between private, family and professional life?	No relevant impact			No relevant impact		
Standards and rights related to job quality						
Does the option impact on job quality?	No relevant impact			Low positive	Deck officers	Deck officers are given the opportunity to achieve additional qualifications
Does the option affect the access of workers or job-seekers to vocational or continuous training?	No relevant impact			No relevant impact		
Will it affect workers' health, safety and dignity?	No relevant impact			Positive	Pilots and seafarers	Occupational accidents resulting in pilot or seafarers overboard will be reduced

Social impact	Baseline scenario			Intervention scenario		
	Expected impact	Stakeholders affected	Description	Expected impact	Stakeholders affected	Description
Does the option directly or indirectly affect workers' existing rights and obligations, in particular as regards information and consultation within their undertaking and protection against dismissal?	No relevant impact			No relevant impact		
Does it affect the protection of young people at work?	No relevant impact			No relevant impact		
Does it directly or indirectly affect employers' existing rights and obligations?	No relevant impact			No relevant impact		
Does it bring about minimum employment standards across the EU?	No relevant impact			No relevant impact		
Does the option facilitate or restrict restructuring, adaptation to change and the use of technological innovations in the workplace?	No relevant impact			No relevant impact		
Social inclusion and protection of particular groups						
Does the option affect access to the labour market or transitions into/out of the labour market?	No relevant impact			No relevant impact		
Does it lead directly or indirectly to greater equality or inequality?	No relevant impact			No relevant impact		
Does it affect equal access to services and goods?	No relevant impact			No relevant impact		
Does it affect access to placement services or to services of general economic interest?	No relevant impact			No relevant impact		
Does the option make the public better informed about a particular issue?	No relevant impact			No relevant impact		

Social impact	Baseline scenario			Intervention scenario		
	Expected impact	Stakeholders affected	Description	Expected impact	Stakeholders affected	Description
Does the option affect specific groups of individuals (for example the most vulnerable or the most at risk of poverty, children, women, elderly, the disabled, unemployed or ethnic, linguistic and religious minorities, asylum seekers), firms or other organisations (for example churches) or localities more than others? , firms, localities more than others?	No relevant impact			No relevant impact		
Does the option significantly affect third country nationals?	No relevant impact			Positive	Deck officers	Deck officers not speaking the local language might be given the opportunity to use English
Gender equality, equality treatment and opportunities, non –discrimination.						
Does the option affect the principle of non-discrimination, equal treatment and equal opportunities for all?	No relevant impact			No relevant impact		
Does the option have a different impact on women and men?	No relevant impact			No relevant impact		
Does the option promote equality between women and men?	No relevant impact			No relevant impact		
Does the option entail any different treatment of groups or individuals directly on grounds of sex, racial or ethnic origin, religion or belief, disability, age, and sexual orientation? Or could it lead to indirect discrimination?	No relevant impact			No relevant impact		
Individuals, private and family life, personal data						
Does the option impose additional administrative requirements on individuals or increase administrative complexity?	No relevant impact			No relevant impact		

Social impact	Baseline scenario			Intervention scenario		
	Expected impact	Stakeholders affected	Description	Expected impact	Stakeholders affected	Description
Does the option affect the privacy, of individuals (including their home and communications)?	No relevant impact			No relevant impact		
Does it affect the right to liberty of individuals?	No relevant impact			No relevant impact		
Does it affect their right to move freely within the EU?	No relevant impact			No relevant impact		
Does it affect family life or the legal, economic or social protection of the family?	No relevant impact			No relevant impact		
Does it affect the rights of the child?	No relevant impact			No relevant impact		
Does the option involve the processing of personal data or the concerned individual's right of access to personal data?	No relevant impact			No relevant impact		
Governance, participation, good administration, access to justice, media and ethics						
Does the option affect the involvement of stakeholders in issues of governance as provided for in the Treaty and the new governance approach?	No relevant impact			No relevant impact		
Are all actors and stakeholders treated on an equal footing, with due respect for their diversity? Does the option impact on cultural and linguistic diversity?	No relevant impact			No relevant impact		
Does it affect the autonomy of the social partners in the areas for which they are competent? Does it, for example, affect the right of collective bargaining at any level or the right to take collective action?	No relevant impact			No relevant impact		

Social impact	Baseline scenario			Intervention scenario		
	Expected impact	Stakeholders affected	Description	Expected impact	Stakeholders affected	Description
Does the implementation of the proposed measures affect public institutions and administrations, for example in regard to their responsibilities?	No relevant impact			No relevant impact		
Will the option affect the individual's rights and relations with the public administration?	No relevant impact			No relevant impact		
Does it affect the individual's access to justice?	No relevant impact			No relevant impact		
Does it foresee the right to an effective remedy before a tribunal?	No relevant impact			No relevant impact		
Does the option make the public better informed about a particular issue? Does it affect the public's access to information?	No relevant impact			Positive impact	Shipping companies Deck officers	Authorities are required to publish information on PEC examinations.
Does the option affect political parties or civic organisations?	No relevant impact			No relevant impact		
Does the option affect the media, media pluralism and freedom of expression?	No relevant impact			No relevant impact		
Does the option raise (bio) ethical issues (cloning, use of human body or its parts for financial gain, genetic research/testing, use of genetic information)?	No relevant impact			No relevant impact		
Public health and safety						
Does the option affect the health and safety of individuals/populations, including life expectancy, mortality and morbidity, through impacts on the socio-economic environment (working environment, income, education, occupation, nutrition)?	No relevant impact			Ambiguous		No proven records that PECs granting can impact on safety

Social impact	Baseline scenario			Intervention scenario		
	Expected impact	Stakeholders affected	Description	Expected impact	Stakeholders affected	Description
Does the option increase or decrease the likelihood of health risks due to substances harmful to the natural environment?	No relevant impact			No relevant impact		
Does it affect health due to changes in the amount of noise, air, water or soil quality?	No relevant impact			No relevant impact		
Will it affect health due to changes energy use and/or waste disposal?	No relevant impact			No relevant impact		
Does the option affect lifestyle-related determinants of health such as diet, physical activity or use of tobacco, alcohol, or drugs?	No relevant impact			No relevant impact		
Are there specific effects on particular risk groups (determined by age, gender, disability, social group, mobility, region, etc.)?	No relevant impact			No relevant impact		
Crime, Terrorism and Security						
Does the option improve or hinder security, crime or terrorism?	No relevant impact			No relevant impact		
Does the option affect the criminal's chances of detection or his/her potential gain from the crime?	No relevant impact			No relevant impact		
Is the option likely to increase the number of criminal acts?	No relevant impact			No relevant impact		
Does it affect law enforcement capacity?	No relevant impact			No relevant impact		
Will it have an impact on security interests?	No relevant impact			No relevant impact		
Will it have an impact on the right to liberty and security, right to fair trial and the right of defence?	No relevant impact			No relevant impact		
Does it affect the rights of victims of crime and witnesses?	No relevant impact			No relevant impact		

Social impact	Baseline scenario			Intervention scenario		
	Expected impact	Stakeholders affected	Description	Expected impact	Stakeholders affected	Description
Access to and effects on social protection, health and educational systems						
Does the option have an impact on services in terms of quality/access for all?	No relevant impact			No relevant impact		
Does it have an effect on the education and mobility of workers (health, education, etc.)?	No relevant impact			Positive	Deck officers	Deck officers not speaking the local language might be given the opportunity to use English. This will increase the mobility of deck officers in Europe.
Does the option affect the access of individuals to public/private education or vocational and continuing training?	No relevant impact			No relevant impact		
Does it affect the cross-border provision of services, referrals across borders and co-operation in border regions?	No relevant impact			No relevant impact		
Does the option affect the financing / organisation / access to social, health and care services?	No relevant impact			No relevant impact		
Does it affect universities and academic freedom / self-governance?	No relevant impact			No relevant impact		
Culture						
Does the proposal have an impact on the preservation of cultural heritage?	No relevant impact			No relevant impact		
Does the proposal have an impact on cultural diversity?	No relevant impact			No relevant impact		
Does the proposal have an impact on citizens' participation in cultural manifestations, or their access to cultural resources?	No relevant impact			No relevant impact		

Social impact	Baseline scenario			Intervention scenario		
	Expected impact	Stakeholders affected	Description	Expected impact	Stakeholders affected	Description
Social impacts in third countries						
Does the option have a social impact on third countries that would be relevant for overarching EU policies, such as development policy?	No relevant impact			No relevant impact		
Does it affect international obligations and commitments of the EU arising from e.g. the ACP-EC Partnership Agreement or the Millennium Development Goals?	No relevant impact			No relevant impact		
Does it increase poverty in developing countries or have an impact on income of the poorest populations?	No relevant impact			No relevant impact		

Table 87 Environmental impacts

Environmental impacts	Baseline scenario			Intervention scenario		
	Expected impact	Stakeholders affected	Description	Expected impact	Stakeholders affected	Description
The climate						
Does the option affect the emission of greenhouse gases (e.g. carbon dioxide, methane etc) into the atmosphere?	No relevant impact			No relevant impact		
Does the option affect the emission of ozone-depleting substances (CFCs, HCFCs etc)?	No relevant impact			No relevant impact		
Does the option affect our ability to adapt to climate change?	No relevant impact			No relevant impact		
Transport and the use of energy						
Does the option affect the energy intensity of the economy?	No relevant impact			No relevant impact		
Does the option affect the fuel mix (between coal, gas, nuclear, renewables etc) used in energy production?	No relevant impact			No relevant impact		
Will it increase or decrease the demand for transport (passenger or freight), or influence its modal split?	No relevant impact			Low positive	All	The reduction of cost of maritime transport will result in modal shift from more polluting transport modalities
Does it increase or decrease vehicle emissions?	No relevant impact			No relevant impact		
Will the option increase/decrease energy and fuel needs/consumption?	No relevant impact			Low positive	All	Lower consumption of fuel for respecting pilot reservations or to get back in schedule after a delay caused by unavailability of pilots.
Air quality						
Does the option have an effect on emissions of acidifying, eutrophying, photochemical or harmful air pollutants that might affect human health, damage	No relevant impact			No relevant impact		

Environmental impacts	Baseline scenario			Intervention scenario		
	Expected impact	Stakeholders affected	Description	Expected impact	Stakeholders affected	Description
crops or buildings or lead to deterioration in the environment (soil or rivers etc)?						
Biodiversity, flora, fauna and landscapes						
Does the option reduce the number of species/varieties/races in any area (i.e. reduce biological diversity) or increase the range of species (e.g. by promoting conservation)?	No relevant impact			No relevant impact		
Does it affect protected or endangered species or their habitats or ecologically sensitive areas?	No relevant impact			No relevant impact		
Does it split the landscape into smaller areas or in other ways affect migration routes, ecological corridors or buffer zones?	No relevant impact			No relevant impact		
Does the option affect the scenic value of protected landscape?	No relevant impact			No relevant impact		
Water quality and resources						
Does the option decrease or increase the quality or quantity of freshwater and groundwater?	No relevant impact			No relevant impact		
Does it raise or lower the quality of waters in coastal and marine areas (e.g. through discharges of sewage, nutrients, oil, heavy metals, and other pollutants)?	No relevant impact			Ambiguous	All	Additional maritime accidents could result in pollution of coastal waters
Does it affect drinking water resources?	No relevant impact			No relevant impact		
Soil quality or resources						
Does the option affect the acidification, contamination or salinity of soil, and soil	No relevant impact			No relevant impact		

Environmental impacts	Baseline scenario			Intervention scenario		
	Expected impact	Stakeholders affected	Description	Expected impact	Stakeholders affected	Description
erosion rates?						
Does it lead to loss of available soil (e.g. through building or construction works) or increase the amount of usable soil (e.g. through land decontamination)?	No relevant impact			No relevant impact		
Land use						
Does the option have the effect of bringing new areas of land ('greenfields') into use for the first time?	No relevant impact			No relevant impact		
Does it affect land designated as sensitive for ecological reasons? Does it lead to a change in land use (for example, the divide between rural and urban, or change in type of agriculture)?	No relevant impact			No relevant impact		
Renewable or non-renewable resources						
Does the option affect the use of renewable resources (fish, etc.) and lead to their use being faster than they can regenerate?	No relevant impact			No relevant impact		
Does it reduce or increase use of non-renewable resources (groundwater, minerals, etc.)?	No relevant impact			No relevant impact		
The environmental consequences of firms and consumers						
Does the option lead to more sustainable production and consumption?	No relevant impact			No relevant impact		
Does the option change the relative prices of environmental friendly and unfriendly products?	No relevant impact			No relevant impact		

Environmental impacts	Baseline scenario			Intervention scenario		
	Expected impact	Stakeholders affected	Description	Expected impact	Stakeholders affected	Description
Does the option promote or restrict environmentally un/friendly goods and services through changes in the rules on capital investments, loans, insurance services etc?	No relevant impact			No relevant impact		
Will it lead to businesses becoming more or less polluting through changes in the way in which they operate?	No relevant impact			No relevant impact		
Waste production / generation / recycling						
Does the option affect waste production (solid, urban, agricultural, industrial, mining, radioactive or toxic waste) or how waste is treated, disposed of or recycled?	No relevant impact			No relevant impact		
The likelihood or scale of environmental risks						
Does the option affect the likelihood or prevention of fire, explosions, breakdowns, accidents and accidental emissions?	No relevant impact			Ambiguous	All	Additional maritime accidents could result in pollution of coastal waters
Does it affect the risk of unauthorised or unintentional dissemination of environmentally alien or genetically modified organisms?	No relevant impact			No relevant impact		
Does the option have an impact on health of animals?	No relevant impact			No relevant impact		
Does the option affect animal welfare (i.e. humane treatment of animals)?	No relevant impact			No relevant impact		
Does the option affect the safety of food and feed?	No relevant impact			No relevant impact		

Environmental impacts	Baseline scenario			Intervention scenario		
	Expected impact	Stakeholders affected	Description	Expected impact	Stakeholders affected	Description
International environmental impacts						
Does the option have an impact on the environment in third countries that would be relevant for overarching EU policies, such as development policy?	No relevant impact			No relevant impact		